

MOVING TOWARDS MERCURY-FREE HEALTH CARE: SUBSTITUTING MERCURY-BASED MEDICAL DEVICES IN INDIA



Toxics Link
for a toxics-free world





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Moving Towards Mercury-Free Health Care: Substituting Mercury-Based Medical Devices in India

by
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Toxics Link
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Acknowledgement

We would like to thank the Delhi Health and Environment Departments, who took up our first report on Mercury - "Lurking Menace - Mercury in the healthcare sector" for action. The public notices and the office directions issued by the government warned the healthcare sector of the dangers of the heavy metal and gave deadlines to the hospitals for the phase out of its use.

Our hospitals are our biggest strength; they not only let us research in their premises but also welcome all our suggestions and environment friendly ideas with great zeal and appreciation. Our special thanks to all the environment friendly hospitals - Sir Ganga Ram Hospital, Max Hospital, Saket, St. Stephens Hospital, Holy Family Hospital, Himalayan Institute Hospital Trust, Uttarakhand and Batra Hospital.

A very special thanks to Dr. T.K. Joshi, Centre for Occupation and Environmental Health (COEH), Dr. Mahesh Verma and Dr. Sangeeta Talwar, Maulana Azad Institute of Dental Sciences and Dr. Vijay Agrawal, Pushpanjali Crosslay Hospital who have always rendered support for all the work we undertook.

About Toxics Link

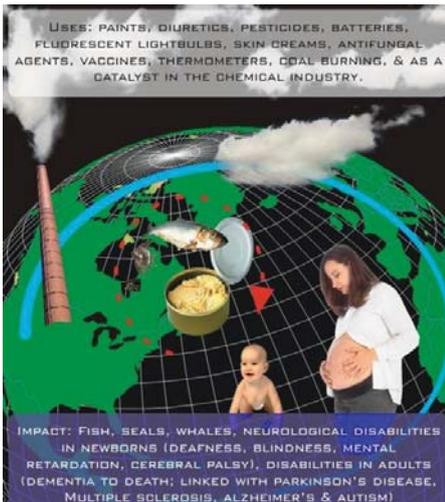
Toxics Link is an environmental NGO, dedicated to bringing toxics related information into the public domain, both relating to struggles and problems at the grassroots as well as global information to the local levels. We work with other groups around the country as well as internationally in an understanding that this will help bring the experience of the ground to the fore, and lead to a more meaningful articulation of issues. Toxics Link also engages in on-the-ground work especially in areas of municipal, hazardous and medical waste management and food safety among others. Working in networks, utilising community outreach and education, policy analysis, research, training and programme development, we work at the state and central levels to help create solutions, which are driven by the needs of people. We are also involved in a wider range of environmental issues in Delhi and outside as part of a coalition of non-governmental organizations.

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Introduction: Why Mercury?

Mercury, one of the most toxic natural elements, is found in sources such as rock formations and volcanoes. Over the past century, anthropogenic sources of mercury have increased dramatically. Many researches 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 is a global contaminant and transports over long distances and is even found in the Arctic ice though the closest sources are thousands of miles away.

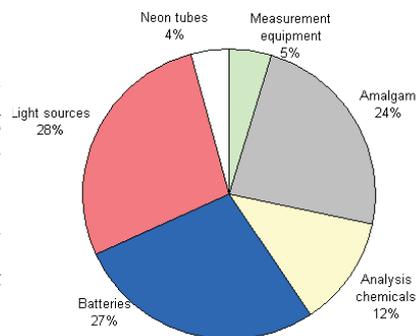


Mercury poisoning has an adverse effect on the human nervous system and other body systems. Mercury is a neurotoxin, meaning it affects the nervous system. The 'mad hatters' of the 19th century suffered from mercury poisoning, which caused personality changes, nervousness, trembling and even dementia. The hatters were exposed to mercury in the felting process of hats, where mercury was rubbed onto cloth as a preservative. It was theorized that the Hatter in Lewis Carroll's *Alice's Adventures in Wonderland* was 'mad' as a result of mercury poisoning. Between 1932 and 1968, a petrochemical and plastic manufacturing unit in a small fishing village in Japan dumped 750 kg of mercury compounds every year into the Minamata Bay, which by mid-1950s caused

a decline in the fish population, while symptoms of blurred vision, numbness in limbs and speech impairment emerged in people who consumed the fish. Most victims complained of severe convulsions, loss of consciousness, repeated lapses into crazed mental states and they finally slipped into coma. By 1992, the Minamata tragedy had affected 2,200 people of which over 1,000 died. Since then, mercury in the environment has been a focus of attention all across the globe especially for its health and environment risks.

Mercury is significantly associated with the healthcare industry. It is mostly found in healthcare products in its elemental or liquid form. It is used in thermometers, blood pressure cuffs, esophageal dilators and dental amalgams.

Nurses and other medical staff work with mercury-based products on a routine basis and are in danger of inhaling toxic vapour when breakages or leakages occur. Mercury free alternatives are available for almost all the products. Many countries across the world have shifted to mercury free alternatives and have proper mercury management policies.



Toxics Link first took up the issue of 'Mercury in Health Care' in 2004. Through research and advocacy the mercury hazard was revealed and various positive movements have taken place in the past five years of campaign. The city of Delhi woke up to the danger of mercury toxicity when a report released in 2004 showed that an



average sized hospital could release, conservatively, around 3 kgs of elemental mercury in the environment in a year. With very conservative estimates, a city like Delhi would be releasing around 51 kgs of mercury each year through dental practices alone. The city's total release would come from hospitals, dental clinics, crematoriums and laboratories. The problem is compounded as mercury generating sources are scattered and non-regulated. Since there are no laws and guidelines governing the release of mercury, no one seems accountable.

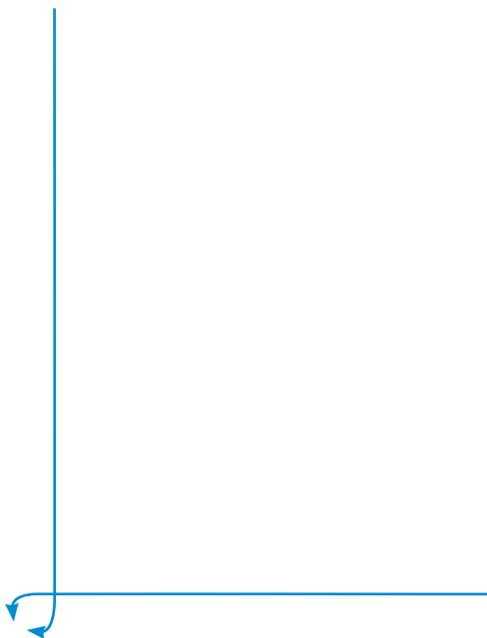
Viable alternatives exist for most mercury usage, yet, mercury use continues in the country without any regulation. The use of mercury-free products is a cost effective choice, when the direct and indirect costs of the products are considered although on the basis of purchase price alone, the cost of mercury-free equipment is generally higher than mercury-based products.

There was an urgent need to bring in policy for a gradual shift from mercury equipment to safer alternatives. More so, an awareness drive was needed amongst the healthcare institutes which could pledge to do away with mercury proactively without any compulsions from the government.

Both of the above happened, the Delhi government and the hospitals started dialogue on this heavy metal. Some big, private hospitals in Delhi decided to shift from mercury days after the report was released. The government started to put out public notices in the newspapers to sensitise the healthcare community and within the span of four years there were public notices, office orders, guidelines and directives and the journey continues. Delhi has taken up the move to use mercury free products in a big way and hopes that others would join hands to make the nation mercury free.

This document tries to present the efforts and initiatives taken so far by some people fighting against this lurking menace in Health Care Settings.

A lot has happened after a small report was released. This report was an attempt to amplify the phenomenon and encourage more states to take up the cause of 'mercury-free healthcare'. To be mercury-free might be a voluntary decision for a few more years, but as environmental laws and quality accreditations become stricter this might be a mandatory requirement soon. Thus it is time for all of us to do some introspection and start changing. The experiences of people who have changed have been documented in the report and a small chronicle of what has happened on the mercury front has been profiled to help people in their journey to go 'mercury free'.



Summary of the Experiences of the Hospitals

All the hospitals have different experiences to share, but largely everyone feels that once the industry decides to shift there will be no excuses. All medical technologies have seen a major transformation and healthcare practitioners have readily accepted the change and this transformation should be no different.

Strength of the Programme

Commitment

Hospitals that have taken up the cause are working out ways to handle all the hurdles. Phasing out the use of a conventional method is usually difficult and met with resistance. To be successful, commitment of the management is essential.

Communication

Most hospitals have drafted and circulated a written policy on mercury and included that in the hospital policy. Written correspondence has been sent to the staff to inform them about mercury reduction efforts.

Accountability

In a few cases the Infection Control Committee / Senior Medical Administration Officer has been made the overall in-charge of the programme.

Training

Regular training is conducted for staff on mercury spills prevention and management.

Issues with the Phase Out

- 1) **Attitudes:** Most hospitals felt that it was difficult to change the mindset of personnel who were used to mercury-based thermometers.

On the other hand two of the hospitals had a different story to tell. Max Healthcare, Saket started as a mercury free facility and thus did not face any resistance. Himalayan Institute Hospital Trust (HIHT) did extensive research before introducing the equipment and were able to handle any apprehensions on accuracy and personally convince the doctors.

- 2) **Finances:** Some hospitals felt that the cost of digital thermometers is higher than the mercury equipment.

Although true, if the only consideration is one time replacement cost of mercury versus non-mercury instruments a study in a few hospitals has shown that the recurring cost with mercury instruments far exceeds this cost difference in addition to the extra environmental and occupational hazard cost which the healthcare system does not even acknowledge at the moment.

- 3) **Accuracy:** Most hospitals and clinicians feel comfortable with mercury equipment. Physicians are apprehensive about the accuracy of digital equipment. Accurate



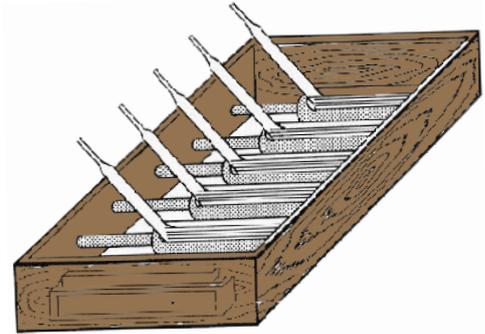


mercury free products are available, though relatively less readily. Hospitals have to proactively take up checking for accurate products and adopt them.

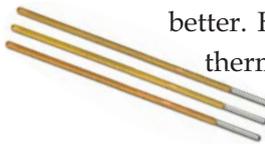
HIHT experience – “The mercury-free instruments we are now using are more sensitive than the Indian mercury BP instruments.”

Ganga Ram Hospital- “Many of our senior consultants have tested the aneroid BP apparatus and their apprehensions are now fading. We plan to document their findings. Also Consumer Education and Research Centres (CERCs) (Ahmedabad) document on accuracy of mercury thermometers has again shown that most of them are not accurate.”

- 4) **Storage:** Hospitals have been storing mercury in glass bottles in water; however they feel that it evaporates due to poor sealing at the top. In dentistry, where people have put traps for the amalgam waste feel disheartened as there is no collection system for this waste and finally when this waste piles up they have to discard it in normal bins.



- 5) **Calibration:** Some hospitals felt that if calibrated properly the non-mercury products work better. Half yearly calibration for BP instruments and yearly calibration for thermometers is good enough, though these time spans may vary with the type of product used.



Expectations from the Government

1. As accuracy is a key concern, the government needs to set up its own standardization committee of experts to approve BP and temperature instruments and additional instruments as deemed necessary.
2. Hospitals feel that the government should help financially in replacing mercury-based instruments phase by phase, rather than merely introducing policies to curb their usage.
3. Awareness sessions should be held with both OPD and IPD patients and relatives on all mercury equipment. Thermometers, which are commonly available in households, should have a hazard warning.
4. Some feel that customs duty should be reduced.
5. Hospitals feel that the government should have a collection and disposal programme for mercury to help hospitals dispose off stored mercury.
6. Students should be exposed to new technologies at the medical and nursing curriculum levels so that they are familiar with the new trends.

Government Initiatives

Department of Health and Family Welfare, Government of NCT of Delhi

After all the reports on mercury, including the one on usage, breakage and disposal patterns (2004) and the one on presence of mercury in ambient air(2007), revealed the mercury poisoning taking place through the healthcare industry, Toxics Link called upon the Department of Health and Family Welfare to take action. The Department was very proactive and forthcoming and arranged a meeting with all the stakeholders. This meeting led to the formation of a 'Mercury Phase-Out Committee', to look into the use and reduction possibilities of this heavy metal in healthcare. The committee plans to expand its scope with time. The health department has asked all the healthcare facilities to budget for mercury free alternatives in the next fiscal year. Any breakage needs to be managed properly by staff and requisite training should be provided to them. Broken or new instrument requirements (thermometer/sphygmomanometer) need to be replaced with digital/aneroid products.

The department drafted and circulated a written policy to all the government hospitals, which asks the hospitals to curb the use of mercury equipment. It also plans to take up a study on the occupational exposure of mercury on healthcare workers and the health assessment of workers with regular exposure.

Delhi government now has three task forces - one each for alternatives, training and monitoring.

Delhi Government Policy on Mercury waste

Objectives

To prevent elemental mercury waste from reaching the three waste streams in healthcare and the elimination of mercury containing instrument / equipment in a time bound manner.

Responsibility

Responsibility will rest with the Medical Superintendent / head of the hospital /health care institution.

Salient features

Until such time that the objective of replacing existing mercury based instruments has been achieved, waste would be collected as per the described protocol in this policy.

Steps for replacement





- ❖ Any broken thermometer should be replaced by a mercury free one.
- ❖ Any broken BP instrument should one.
- ❖ Precision issues should be discussed with the physicians.
- ❖ Nurses and nursing orderlies may be trained in dealing with mercury spillage and its proper collection.
- ❖ Dental departments to ensure a fool-proof collection and storage of mercury-containing waste.
- ❖ Hospitals should factor the additional cost in their budgetary proposal to implement the policy.

Department of Environment, Delhi Government

The Delhi Pollution Control Committee (DPCC) has been very proactive in addressing new issues emerging with medical waste management. Subsequent to the report released by Toxics Link (2004) and subsequent campaign and awareness drives, the Department of Environment issued its first public notice, warning the hospitals about the hazards of mercury and its safe management and recycling. This was the first public acknowledgement by any pollution control board on the hazards of mercury. The Department of Environment also played an important role in pursuing the issue of mercury in the health care sector. In May 2008, in a public notice, it clearly stated that usage of mercury is problematic and the hospitals should initiate steps to stop its use. All hospitals are required to provide a template on its commitment to minimise/eliminate mercury containing waste, and this declaration needs to be signed and placed at prominent locations in the institute. Moreover, this has to be treated as a condition for seeking authorization. The declaration also asks hospitals to adopt the safe mercury handling standard international procedures to collect and store spilt mercury in suitable containers without affecting occupational health or the environment.

At present DPCC has issued more than 500 letters to the authorised hospitals in the National Capital Region, giving details of the phasing-out of mercury from their facility.

It plans to conduct some studies in collaboration with the Centre for Occupation and Environmental Health to assess mercury pollution and health risk in the population.

Centre for Occupation and Environmental Health (COEH)

The centre is located at the Maulana Azad Medical College and is headed by Dr. T.K. Joshi. Dr. Joshi specialises in Occupational Medicine and thus handles most of the work done by the Delhi health department on this issue. The Centre and Dr. Joshi presented various data on the hazards of mercury and dangers to health care staff from the occupational health perspective. This has created an immediate necessity for taking action on the issue of mercury in health care. The centre has trained nearly 10,000 health personnel in Delhi and the effort continues. COEH has conducted health assessments for healthcare workers in the Delhi government hospitals to assess occupational exposure to mercury.

Government of India's Initiatives

Central Pollution Control Board

In 2005, the Central Board wrote to all the State Pollution Control Boards to stress on the segregation of mercury containing waste and make it a parameter for granting authorization to the healthcare centres. This was the first step by the central government.

Ministry of Health and Family Welfare

Under the National Rural Health Mission the Ministry released the 'Infection Management and Environment Plan' in 2007. This document has two volumes:

- 1) A policy framework document, which gives a broad overview and guidance to central and state level institutions on the type of systems and processes to be established for infection control and bio-medical waste management.
- 2) A set of operational guidelines which are designed as instruction manuals for healthcare workers at primary level healthcare facilities.

Both these volumes have integrated mercury spill management and also advised the healthcare establishments to eventually start a phase-out plan for mercury containing equipment.





International Negotiations

WHO

In September 2005, the World Health Organization (WHO) issued a Policy Paper on mercury in healthcare, calling for short, medium and long-term strategies to address the problem. WHO stressed on assessment of mercury usage and waste management programmes in all countries and proposed to work with them in a phased manner. As far as alternatives are concerned, WHO states that both mercury and aneroid BP apparatus have been in use for 100 years and both give accurate readings when working properly.



Health Care Without Harm

Health Care Without Harm (HCWH) and the WHO are together leading a global partnership to achieve virtual elimination of mercury-based thermometers and sphygmomanometers over the next decade and their substitution with accurate, economically viable alternatives. (www.mercuryfreehealthcare.org)

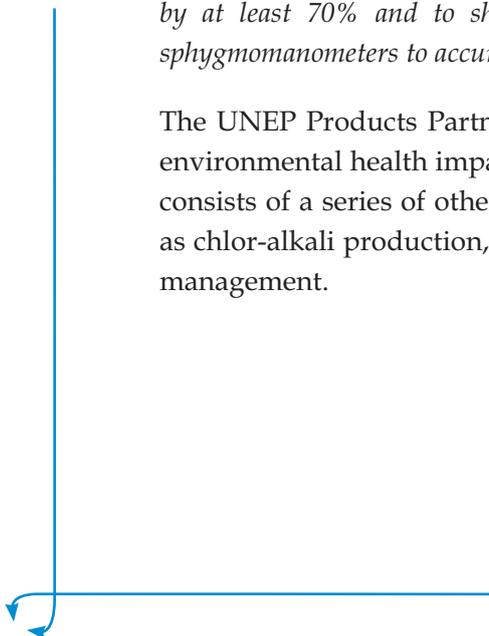
This initiative is based on the 2005 WHO Policy Paper, which calls for short, medium and long-term steps to achieve the gradual substitution of mercury-based medical devices. It is also grounded in Health Care Without Harm's experience of more than ten years, of working with the health care sector and national governments in North America, Europe, Asia, Africa and Latin America to successfully achieve mercury substitution.

The partnership is a component of the UN Environment Programme's (UNEP) Mercury Products Partnership, which is led by the US Environmental Protection Agency. This broader UNEP Products Partnership seeks action to eliminate mercury in products such as batteries, lighting and lamps, electrical and electronic devices, dental products and measuring and control devices.

With specific regard to the WHO/HCWH Health Care partnership, the Products Partnership has set the following objective:

By 2017, to phase out the demand for mercury-containing fever thermometers and sphygmomanometers by at least 70% and to shift the production of all mercury-containing fever thermometers and sphygmomanometers to accurate, affordable and safer non-mercury alternatives.

The UNEP Products Partnership is in turn part of a larger global effort to address the toxic environmental health impacts of mercury accumulation in the global environment. This effort consists of a series of other voluntary partnerships in areas of major mercury emissions such as chlor-alkali production, artisanal gold mining, coal fired power plants, and mercury waste management.



UNEP

In 2001, governments requested UNEP to produce a global study on mercury. The Global Mercury Assessment Report was published in December 2002, and was presented to UNEP's Governing Council in 2003.



The Governing Council considered the assessment at its 22nd session in February 2003, and:

- ❑ concluded that there was sufficient evidence of significant adverse global impacts from mercury and its compounds to warrant further international action to reduce the risks to human health and the environment.
- ❑ decided that national, regional and global actions, both immediate and long-term, should be initiated as soon as possible.
- ❑ urged all countries to adopt goals and take national actions, as appropriate, with the objective of identifying exposed populations and ecosystems, and reducing anthropogenic mercury releases that impact human health and the environment.
- ❑ requested UNEP to initiate technical assistance and capacity building activities to support the efforts of countries to take action regarding mercury pollution.

In 2005, the Governing Council, included the possibility of a legally binding instrument in its consideration of actions to deal with the significant adverse global impacts of mercury. The Governing Council also:

- ❑ requested UNEP to develop a report on the supply, trade and demand for mercury on the global market.
- ❑ called for partnerships between governments and other stakeholders as one approach to reduce risks to human health and the environment from the release of mercury and its compounds to the environment.
- ❑ encouraged governments, the private sector and international organizations to take immediate actions to reduce the risks to human health and the environment posed on a global scale by mercury in products and production processes.

In February 2007, the Governing Council recognised that efforts to reduce risks from mercury were not sufficient to address the global challenges posed by mercury and concluded that further long term international action is required. It called for a review and assessment of the options of enhanced voluntary measures and new or existing international legal instruments in order to make progress in addressing this issue. It also:

- ❑ called for strengthening of the UNEP mercury programme partnerships.
- ❑ established an ad hoc open-ended working group of governments, regional economic integration organizations and stakeholder representatives to review and assess options for enhanced voluntary measures and new or existing international legal instruments. The open ended working group will report to the GC at its twenty-fifth session in 2009.¹

* GC - Governing Council.



1. <http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=521&ArticleID=5702&l=en>



The Medical Community

National Accreditation Board for Hospitals and Healthcare Providers (NABH) and ISO Certification

Most of the big hospitals are now seeking NABH accreditation and ISO certification and under both of these the hospital would have to identify all hazardous material in its campus and implement processes for sorting, transporting and disposing of it. The overall goal, however, would be to eliminate or reduce such hazards. Phasing out use of mercury and mercury containing instruments, which fall in the list of hazardous materials, would thus have to be seriously considered by any hospital seeking an environmental or occupational safety benchmark.

Mercury Free Healthcare - A group of doctors who have come together with a common mission of phasing out the use of mercury products in the healthcare sector have started using mercury free alternatives in their set ups and are trying to spread awareness amongst their counterparts.²

Medical Professionals

Dr. Vijay Agrawal

“As the chairperson of Nursing Home Forum of Delhi, I had to handle the issue of the Supreme Court order directing all hospitals with more than 30 beds to install incinerators to handle biomedical waste. I came in contact with Srishti/Toxics Link who made me realize that this order if implemented will be worse than the original problem of biomedical waste. We appealed against this order and got the same modified and in the process we highlighted the dangers associated with incineration. This brought me closer to Srishti and the environmental issues. As a practicing paediatrician, I realised that a lot of childhood problems have roots in the environmental degradation.

When we were in the process of finalising the waste management policy at Max Healthcare, I decided to do it with the help of Toxics Link and I was told about the problems with mercury. By the time they released their first report on mercury use in healthcare we had already finalised on mercury free facilities.

I am happy that I could be instrumental in making Max one of the first Mercury Free hospitals in the Private Sector in Delhi. I am again committed to making Pushpanjali Crosslay Hospital at Vaishali, Ghaziabad as the first Mercury Free hospital in UP.

At the inception stage, it is relatively easy to adopt any system. But the most important task is to convince the clinicians to adopt the alternative to mercury BP apparatuses.

Globally people are moving away from mercury and I see my hospital conforming and in line with all major international developments. All the new staff joining the hospital is trained in using the digital instruments installed in the hospital and I haven't ever received any complaints from anyone about the use and or accuracy of these instruments.

2. <http://toxicslink.org/mercury-forum/>

All our patients, staff and often visitors witness the shift from mercury to non-mercury instruments. Even some hospital managers come with queries when they come to know about the system we have adopted, the word is spreading. Government and other groups can highlight the issue and we can serve as practical models.

It is time that the medical fraternity joins hands with social and environmental groups and contributes by treating, not just passively but also actively.

I think the government needs to make some policy statement to stop mercury use in the healthcare sector. Medical associations can also take up the issue at their own end and try to indulge in such environmental negotiations.”

Hospital Initiatives

Government Hospitals

All government hospitals in Delhi have stopped purchase of mercury equipment and are in the process of phasing it out. A non-mercury product replaces any broken mercury instrument.

Current scenario of mercury replacement in government hospitals of Delhi (Dr. TK Joshi, COEH)

I) Chacha Nehru Bal Chikitsalaya

- ❖ Thermometers have been totally replaced by digital ones.
- ❖ BP instrument replacement is in progress.
- Difficulties
- ❖ Non availability of small cuffs.

II) Lal Bahadur Shastri Hospital

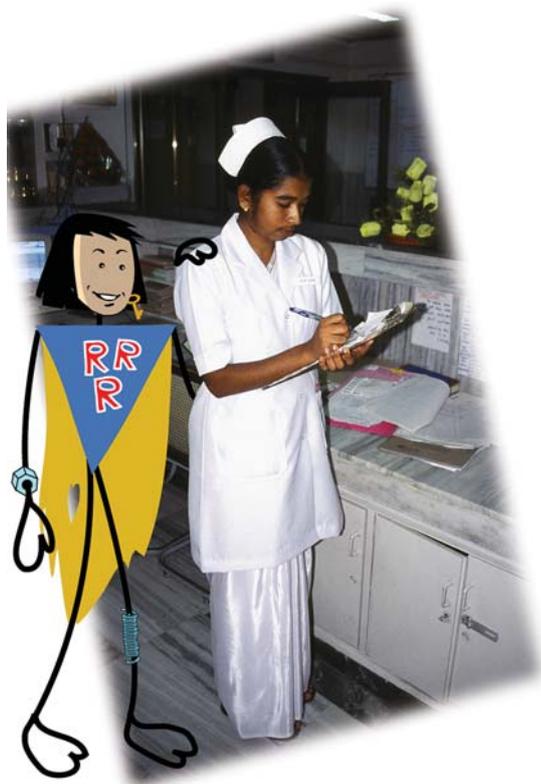
- ❖ Thermometers and BP instruments have been totally replaced.
- ❖ Currently no mercury containing equipment is being used in the hospital.

III) Aruna Aasaf Ali Hospital

- ❖ No mercury based thermometers and sphygmomanometers have been enlisted in the current year tender.
- ❖ Existing mercury based instruments are being phased out as they become non functional or irreparable.

IV) Lok Nayak Hospital

- ❖ No fresh purchase of any mercury containing equipment.





- ❖ Purchase order has been placed to replace the existing mercury based equipments.

V) Babu Jagjivan Ram Memorial Hospital

- ❖ Mercury based equipment is being replaced in a phased manner.
- ❖ No fresh purchase of any mercury based equipment is being made.
- ❖ Periodic training sessions to sensitize hospital staff against toxic hazards of mercury are held.
- ❖ No mercury based amalgam is being used in the dental department.

VI) Acharyashri Bhikshu Government Hospital

- ❖ Equipment containing mercury has been totally phased out.
- ❖ All mercury equipment has been received back from different departments and Awaiting for disposal.

VI) Dr. Hedgewar Arogya Sansthan

- ❖ Hospital is discouraging mercury usage in all reagents, equipments and instruments.
- ❖ Old equipment is being phased out and no new equipment containing mercury is being purchased.

VII) Institute of Human Behaviour and Allied Sciences

- ❖ Institute is in the process of procuring non mercury based equipment and as soon as it is received, mercury based equipment would be replaced.

VIII) Sardar Vallabh Bhai Patel Hospital

- ❖ Total replacement of mercury amalgam has been done in the dental department.
- ❖ The thermometers and BP instruments are being replaced in a phased manner.

IX) Maharishi Balmiki Hospital

- ❖ Mercury thermometers have already been replaced by digital ones in 2007.
- ❖ All BP instruments have been withdrawn and replaced by portable Non-Invasive Blood Pressure (NIBP) monitors.
- ❖ Dental amalgam was replaced in 2007.
- ❖ There is limited usage of mercury based BP instruments in OPD and concerned staff is adequately trained to manage any spillage.
- ❖ No fresh purchase of mercury equipment is being made.

X) Pt. Madan Mohan Malviya Hospital

- ❖ No mercury based equipment is being procured.
- ❖ Staff has been trained in mercury elimination from bio medical waste.

XI) Dr. B.R. Sur Hospital

- ❖ Mercury based equipment has been replaced by digital equipment.

Private Hospitals

Some of the private hospitals had started mercury phase out as early as 2003 when mercury was included in the training programmes conducted for medical waste management. The occupational exposure and the health impacts motivated these hospitals to take such steps. After the assessment of mercury releases by the hospitals in Delhi, a number of hospitals decided to become mercury free.

Max Healthcare

(Dr. Arti Verma, Dr. Garima Trivedi)

“When Max Saket was under construction, Toxics Link was invited to develop a waste management plan for the hospital, so that hospital waste management became an integral part of the system. It was then suggested that mercury is a toxic that the hospital would have to deal with. The Director (Administration) was very proactive and immediately decided that the hospital would be mercury free. Max (Saket) started as a mercury free hospital and thus did not face any resistance from the staff. There was no accuracy debate in the hospital and everyone was comfortable with the system that was in place. At a Pan Max (Inter Max) meeting it was decided that all the other Max hospitals would also phase out mercury equipment. It was very easy for the group of hospitals to do this because there is centralised purchasing.”

- ❖ All the mercury equipment was picked up from the hospital and replaced with non-mercury alternatives. The cost implications were not large (Rs. 10,000 for thermometers and Rs. 2,10,000 for sphygmomanometers for three hospitals)
- ❖ The hospitals have stopped using mercury amalgam. They are trying to make an inventory of mercury equipment in non-patient areas and trying to eliminate those.
- ❖ The hospital feels that the government should acknowledge the hospitals, which have been proactive in eliminating mercury and also help them make the change.

St. Stephens Hospital

(Dr. Ann Mathew's)

“The institute's endeavour towards phasing away mercury began in 2003, when in a training session conducted on occupational safety they learnt about the dangers and the hazards of this heavy metal. Simultaneously the hospital was also in the process of acquiring an ISO certification, which made it mandatory for the hospital to phase out mercury. In their efforts to reduce the usage, the hospital employed a phased approach, during which the thermometers were phased out in the first stage. In the implementation of the second phase, the hospital moved towards the usage of mercury free sphygmomanometers. Even though certain mercury containing equipments can still be found, the hospital remains committed in its effort to phase it away completely from the hospital. The purchase department is undertaking no new purchases of mercury containing equipment. For the success of the programme in the hospital it is very essential that the cooperation of all the staff members is sought and for this it becomes essential to have regular communication with them.”



Mercury Movement in India



- ❖ The number of mercury thermometers issued per year has significantly decreased from 687 in 2002 to nil in 2005. Around 54 digital thermometers have been issued in 2005.
- ❖ Approximately 2130 gms of mercury from spills was collected by the staff and sold to a thermometer manufacturer.
- ❖ Over 1000 nursing staff have been trained on mercury spill prevention and management.

Sir Ganga Ram Hospital

(Dr. Sudhakar Vira)

“The environmental and health impact concerns of mercury motivated the hospital to adopt a mercury phase out programme in the year 2004. The hospital drafted a mercury policy and decided to implement the programme in two phases. In the first phase mercury thermometers were phased out. Also in the dental wing 80% of the restorations were switched to mercury alternatives. The hospital is now implementing the second phase in which the sphygmomanometers are being replaced with aneroid units. The hospital also holds mercury awareness campaigns for the staff. Over 3000 nursing staff has been trained on mercury spill prevention and management.”

- ❖ The success largely depended on the communication between the administration and the staff and the commitment to phase out mercury.
- ❖ The hospital issues digital thermometers to the patients and is contributing to reduce mercury thermometer usage in the community.
- ❖ The hospital has received ISO 14,000 and NABH certification both of which require the hospital to curtail the use of these hazardous substances in the hospital.
- ❖ Thus the hospital foresees itself as a mercury free hospital in the near future.

Holy Family Hospital

(Father Biju)

“It was in the early months of 2004, that the issue was first talked about, and by the end of the year the hospital replaced the traditional thermometers with digital ones. The hospital still keeps some mercury-based thermometers for teaching purposes. The hospital has not finalised anything about replacing the BP apparatus since the chance of breakage is very negligible and the cost of replacing the equipment is very high.

The hospital is not entirely comfortable with the present system, since turnover of nursing staff is very high and each new staff needs to be trained in the use of digital thermometers. There are problems in the transition stage. They faced initial resistance from the staff and accuracy related questions were raised often. Some staff in nursery, paediatrics, etc are very positive.”

Himalayan Institute Hospital Trust (HIHT)

(Dr. Kathy McKeehan)

“HIHT has been working with Toxics Link since its inception, thus it has tried to incorporate environment

friendly waste management procedures in the hospital. Due to this relationship, awareness of the problems with mercury has existed since the hospital began in 1994.”

The hospital started with these steps:

1. They researched reliable, verifiable aneroid blood pressure instruments on the net and scanned lists of approved BP aneroids from the British Hypertension Society and Dabl Educational Trust.
2. They then charted out their plan for mercury phase out over a period of time. The first order to Welch Allyn company included close to 100 aneroid BP instruments and about 50 digital thermometers.
3. During this time, they initiated mercury-spill kits at all the units (since some mercury BPs and thermometers were still on units). A mercury-spill procedure was also included in the Nursing Procedure Manual to all units and included in all the orientation programmes for new staff nurses.
4. The next step was to convince the GOI of the necessity to reduce customs on the Welch Allyn instruments. They did not succeed in this endeavour and had to pay 37% customs on the items. Renewed efforts are being made for the next shipment.
5. A committee was created to develop a standardized procedure for taking blood pressures at the hospital comprising the Head of Departments of Physiology and Cardiology, Director of Medical OPD, Nursing Superintendent, and the Director. The new BP procedure was developed and disseminated at a Continuing Medical Education (CME) Programme for all physicians. At this CME, they also introduced the aneroid BPs and digital thermometers and described the published research on mercury vs aneroid BP instruments.

The Physiology Department of the Medical College plays a major role in introducing the medical and nursing faculty to the importance of replacing mercury BP instruments and thermometers. They have educated well over 400 health care practitioners in the facility to date.

6. Continuing Education Programmes were also held for all the nursing faculty in the College of Nursing and Nursing Managers in the hospital who in turn were responsible for educating all staff nurses and nursing students on the use of the new aneroid BPs and digital thermometers.
7. Use of mercury fillings in the dental department has been discontinued.
8. The hospital is now in Phase II of the mercury-free institute plan and will be replacing more of the mercury BP instruments.
9. The programme for verifying the accuracy of the aneroid BP instruments every 6 months has started.
 - a. Physicians needed to be educated and re-educated regarding the accuracy of “approved” aneroid BP instruments and “approved” digital thermometers. The approval agencies used are AAMI (Association for the Advancement of Medical Instrumentation) and BHS (British Hypertension Society). The BHS regularly publishes approved BP instruments





with research documentation. The hospital is now leaning towards using only the BHS approved listings.

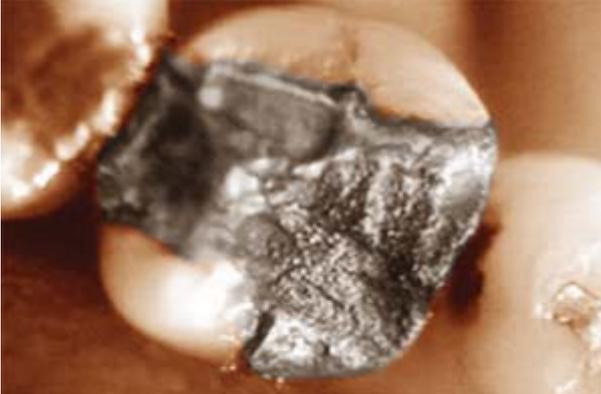
- b. Mercury BP instruments are often more valid than aneroid BP instruments, particularly in India where reliable aneroid BP machines are not made, and India does not have a standard's committee with experts to approve aneroid or digital BP machines. Therefore, any institution that is changing from mercury to aneroid BPs must develop a "verification" programme to regularly verify the accuracy of the aneroid BP machines and digital thermometers. Internationally, digital BP instruments are questionable except those approved for clinical use by the BHS (British Hypertension Society) or AAMI (Association for the Advancement of Medical Instrumentation). The hospital team verifies aneroid BP instruments every six months or more often if anyone questions the accuracy of the machine. To do this, valid verification meters need to be secured from the US. This takes time and money, but is worth the work to Prove to physicians that there are valid aneroid machines in existence (at least in HIHT).



Dentistry

Maulana Azad Institute of Dental Sciences

(Prof. Sangeeta Talwar)



“The institute has long been concerned about mercury usage and management. The steps taken have mainly been in two directions: decreased usage of mercury and proper management of mercury and its waste when used. With the availability of many alternative restorative materials now, amalgam use is being advocated in clinical cases where it is particularly indicated. The institute has a mercury filling versus non-mercury filling ratio of 38%: 62%.”

The institute has taken steps to improve the handling of mercury, like use of dental chairs with amalgam filters, use of mechanical trituration, in place of hand mixing, etc.

The main lacuna at present is the lack of recycling plants for mercury. After all the time and energy spent in collecting mercury at the dental chair level, the institute feels helpless without any proper recycling or disposal facility to take ownership of this collected mercury.

Being a teaching institute, going mercury-free is difficult, till the time mercury is banned.”

Max Healthcare

Max Healthcare’s Dental wing in Delhi is totally mercury free. The head of the dental wing feels that with the advancement of technology and increased availability of alternative restoration materials, mercury has become redundant and obsolete.

Himalayan Institute Hospital Trust (HIHT)

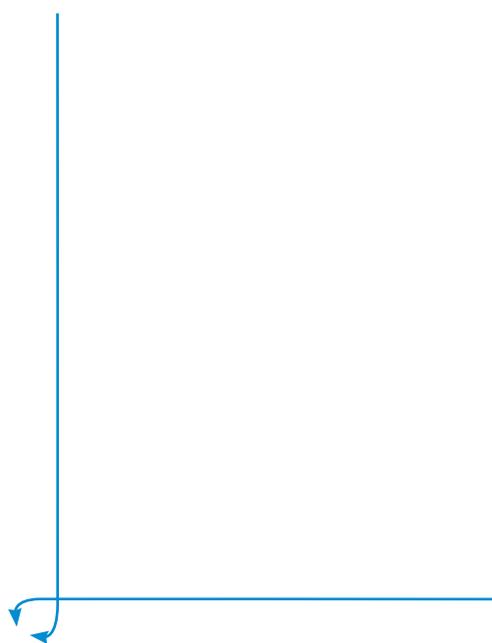
The hospital has stopped the use of mercury amalgam in the dental wing.





The Mercury Chronicle

S. No.	Event	Year	Agency
1.	Toxics Link I report on mercury usage	2002	Toxics Link
2.	Toxics Link I report on mercury usage in healthcare	2004	Toxics Link
3.	I Public notice by DPCC, warning about mercury toxicity	2004	DPCC
4.	5 Delhi Hospitals pledge to be mercury free and send a joint press release with Delhi Health Department	2004	Toxics Link
5.	Policy on mercury usage	2005	WHO
6.	Advocating mercury phase out as a criteria for granting authorization	2005	CPCB
7.	Toxics Link III report - Mercury in ambient air	2007	Toxics Link
8.	Formation of Mercury Phase out Committee	2007	Delhi Health Department
9.	National Rural Health Mission released the 'Infection Management And Environment Plan', which had reference to mercury toxicity	2007	Ministry of Health
10.	Formation of mercury free healthcare- A forum of doctors for the environment	2007	
11.	II Public notice by DPCC, issuing of letters on mercury phase out, to 500 hospitals	2008	DPCC
12.	Schools talk about mercury toxicity and stop its usage in labs	2008	



NGO Initiative

Toxics Link started its effort against mercury use and its safe handling and disposal as early as 1998. In 1998 when bio-medical waste management was being talked about, Toxics Link integrated occupational safety in all its training programmes - where issues like sharps management, chemical safety and mercury use were discussed.

The dismal state of handling and disposal of mercury in all the leading hospitals led to the compilation of the report 'Lurking menace: Mercury in the healthcare sector'. The aim was to highlight the harmful effects of mercury focusing on its usage in healthcare establishments and the lackadaisical attitude in handling it. The study shattered the myth nurtured by all concerned that the hospital could not release enough mercury in the environment to bring them under any scanner for this metal- when it established that an average-sized hospital annually releases 3 kg of mercury in to the environment. The report also covered the current government policy and international trade laws and practices. The report is part of a larger campaign to initiate policy changes ultimately resulting in phasing out mercury from healthcare usage.

Progress Made:

- The Toxics Link report was well covered by the press and triggered queries in the Parliament of India.
- Following Toxics Link's report, some big hospitals in Delhi decided to shift away from use of toxic mercury. Hospitals like St. Stephens, Holy Family, Max, Devki Devi and Sri Gangaram took initiatives and opted for alternatives to mercury thermometers. Many other hospitals across the country have shown keen interest in understanding the myths surrounding mercury and are exploring possibilities of making the shift.
- In September 2005, the World Health Organisation (WHO) issued a policy paper on mercury in healthcare calling for short, medium and long-term strategies to address the problem. Toxics Link made a major contribution in preparing this policy paper.
- This was soon followed by Delhi Pollution Control Committee's (DPCC's) public notice on mercury through which DPCC notified the public and healthcare professionals about the hazards of mercury.
- Toxics Link conducted workshops for awareness on mercury in partnership with Christian Medical Association of India (CMAI) covering East and South India.
- Training of senior nurses from around the country was done in association with the Trained Nursing Association of India.
- Toxics Link conducted a study 'Mercury in hospital indoor air: Staff and patients at risk' in two hospitals of Delhi to measure the quantity of mercury present in ambient air in the various departments of hospitals. The dental wing of both the hospitals had very high levels of mercury ($3.11 \mu\text{g}/\text{m}^3$) where as the recommended safe level is only $1.0 \mu\text{g}/\text{m}^3$.
- School Initiative - Around five Delhi schools joined in the mercury awareness programme. More than 200 teachers, lab assistants and 3000 students participated. The sessions included presentations on mercury in our environment with specific reference to the school

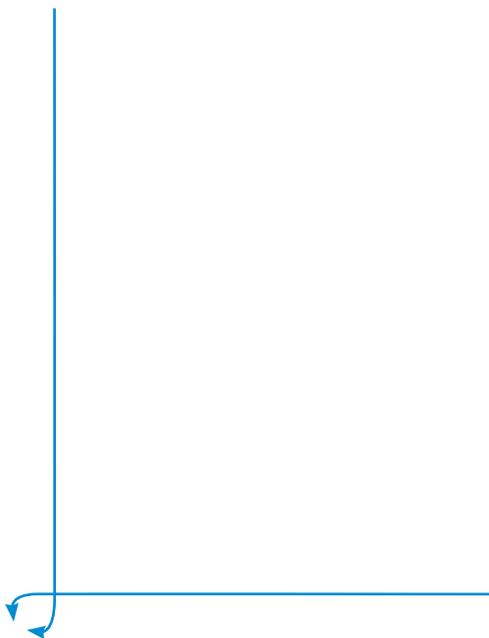


Mercury Movement in India



environment. To ensure ongoing awareness amongst all the sections of the school, mercury teams comprising of the principal, teachers, lab assistants and students have been formed in these schools.

Sri Ram School organized an awareness session for parents and teachers. Nearly 60 parents and 40 teachers were briefed about the problems of mercury and also suggested ways of reducing it. The school has also started a thermometer collection programme.



International Scenario

(Abstracted from a Report- “End of an Era- The Phase Out of Mercury Blood Pressure Devices”- Healthcare Without Harm’2008, www.mercuryfreehealthcare.org)

In 1997 a United States Environmental Protection Agency (EPA) study found that medical waste incinerators were the fourth largest source of anthropogenic mercury emissions to the US environment. In 1998, the US EPA and the American Hospital Association (AHA) signed a Memorandum of Understanding (MOU) to address health care’s contribution to mercury pollution and called on the nation’s hospitals to virtually eliminate mercury. Since 1998, Health Care Without Harm has been working with EPA, AHA, allied organizations and our health care partners to reduce and eliminate mercury use in healthcare in the **US**. As a result, over the last decade we have witnessed the progressive phase-out of the use of mercury-based medical devices from the US healthcare community both through voluntary initiatives and legislative mandates.

The major US health care institutions consulted for this report have had few, if any concerns about the accuracy or affordability of the alternatives. We are similarly witnessing movement in the developing world. For instance, the **Philippines** has just set into motion a two-year plan to completely phase out mercury-based medical devices. Health care systems in **Argentina, Brazil** and **Mexico** are replacing thermometers and sphygmomanometers with alternatives. The vast majority of blood pressure devices purchased by **Cuba** are aneroid (non-mercury). In **South Africa**, the province of Kwa Zulu Natal is also successfully replacing mercury-based blood pressure devices. These initiatives are all coming together under the umbrella of a global partnership, co-led by the World Health Organization and Health Care Without Harm to eliminate 70% of mercury based-medical devices globally by 2017. What’s more, the United Nations Environment Programme, at the behest of the European Union and others, is debating whether to negotiate a global treaty to phase out mercury across a diversity of economic sectors. We have also witnessed the substitution of mercury-based medical devices in European countries such as Sweden, as well as in individual hospitals in countries ranging from France to Austria, to the United Kingdom.

In both the US and the EU, mercury thermometers are nearly completely phased out. In the US, this has been achieved largely through voluntary and state-level legislation. In **Europe**, this has been achieved through an EU-mandated ban.

Hundreds of US hospitals have successfully phased-out mercury sphygmomanometers with alternatives. They report little or no problem with the transition. Twelve US states are phasing out mercury sphygmomanometers via legislative mandates.

In a 2005 survey of GPOs (Group Purchasing Organisations), three of the five largest USGPOs had implemented mercury-free purchasing policies that ban items from contracts except where a non-mercury alternative is not available.

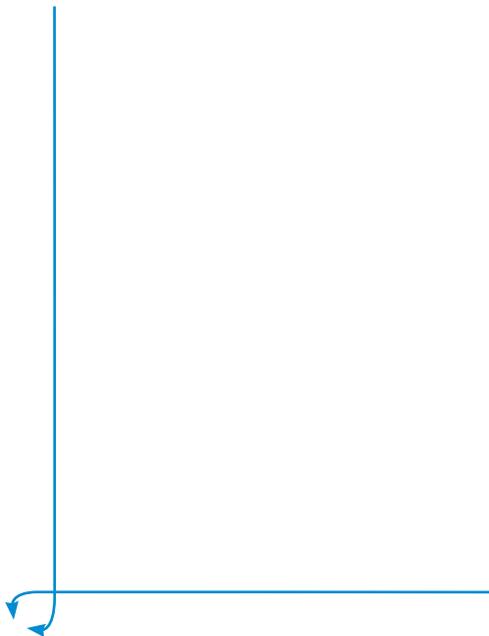
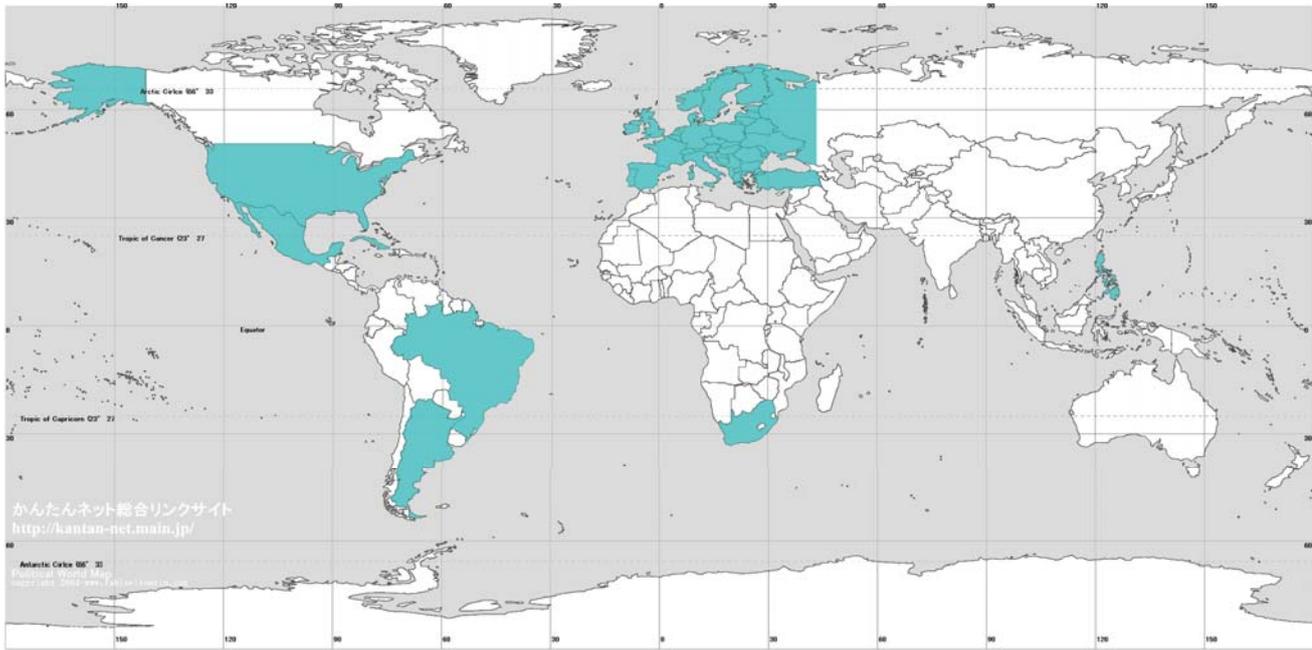
Two of the former leading US based mercury blood pressure device manufacturers, Welch Allyn and Trimline Medical, have ended their production of mercury blood pressure devices. After considering the scientific evidence, a report produced by the World Health Organization (WHO) department addressing cardiovascular diseases concluded in 2005 that even in low

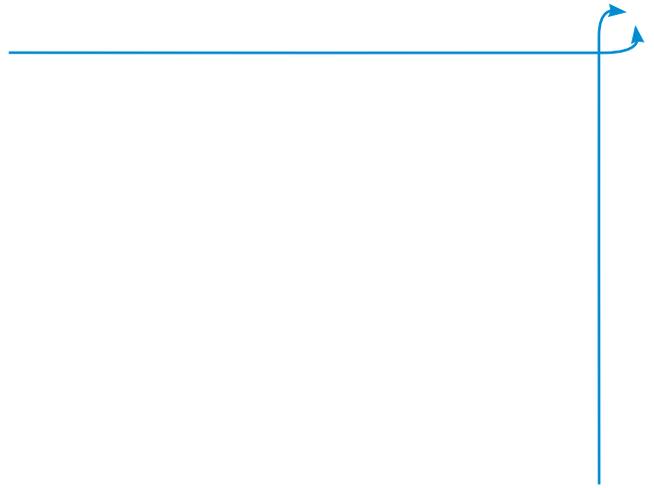


Mercury Movement in India



resource settings, “in light of the toxicity of mercury, it is recommended that mercury blood pressure measuring devices be gradually phased out in favour of affordable, validated, professional electronic devices.” WHO also points out that “international protocols for blood pressure measuring device validation have been released by the Association for the Advancement of Medical Instrumentation, the British Hypertension Society, and the European Society of Hypertension Working Group on Blood Pressure Measurement.”





ANNEXURES





Annexure- I

MAHARISHI BALMIKI HOSPITAL
POOTH-KHURD, DELHI-39
GOVT. OF N.C.T. OF DELHI

No F.1/119/Esll/MBH/07

Dated

OFFICE ORDER

In pursuance of meeting held on "Use of Mercury and Health Care" on 25.05.2007 in the office of Pr. Secretary (H & F W) Govt. of NCT of Delhi followed by the workshop on "Elimination of mercury waste in health care establishments" in Department of Health & Family Welfare GNCTD it has been decided to phase out use of mercury in this hospital by December 2007.

It has been further decided to replace the equipments, instruments and consumables containing mercury in its free and hazardous form in a phased manner. To start with, all the B.P. instruments and thermometer from different sections of the hospital shall be shifted to OPD and these instruments shall be replaced by portable NIBP monitors and digital thermometers which are mercury free.

Dr. N S Khurana M O I/C BMW Management has been entrusted to workout the requirement of the different section of this hospital and get them procured at the earliest and also train the staff in using the NIBP monitor and digital thermometers.

(DR. N.V. KAMAT)
MEDICAL SUPERINTENDENT

No F.1/119/Esll/MBH/07

Dated

Copy to

1. Pr. Secretary (H & F W), GNCTD. 9th Level Delhi Secretanat New Delhi-2
2. Chairman, DPCC, GNCTD, 4th Floor, ISBT Building, Kashmere Gate Delhi-6
3. Dr. T. K. Joshi, IVPSS (COEH), B. L Taneja Block, Ground Floor MAMC Lok Nayak Hospital, New Delhi-2
4. Dy. Medical Superintendent, Maharishi Balmiki Hospital Pooth Khurd Delhi- 39
5. M O I/C, BMW, Maharishi Balmiki Hospital Pooth Khurd Delhi-39
6. A N S Maharishi Balmiki Hospital, Pooth Khurd, Delhi-39
7. Nursing Sister-Ward-I,II,III,IV, HDU, Main O. T. Nursery ICU Casually I.R and OPD Maharishi Balmiki Hospital, Pooth khurd Delhi-39

(DR. N.V. KAMAT)
MEDICAL SUPERINTENDENT

Annexure- II



Mercury is Poisonous **Inhalation of mercury vapour is toxic**

Its safe disposal is your responsibility.

- Avoid brooms, brushes and vacuum cleaners to clean spilt mercury.
- Never put mercury in trash bins, burners or drains or in municipal dustbins.
- Switch off heating or air – conditioning systems during mercury spillage.
- Collect spilt mercury using paper board to accumulate small mercury droplets together.
- Keep the collected drops in airtight glass or plastic containers under water as mercury vaporizes under normal temperature.
- Tie up with manufactures or suppliers to return the collected mercury.

Elemental mercury is a volatile metal that can cause severe harm when inhaled by human beings. Hence, it is extremely important for medical & para –medical staff to take utmost care in disposing this hazardous substance. Follow the above guidelines to effectively dispose off mercury and ensure maximum safety.

Issued in public interest by
DELHI POLLUTION CONTROL COMMITTEE
Department of Environment
Government of NCT of Delhi



Annexure- III

Mercury Waste Management In Delhi

For curtailing the use of Mercury based thermometers/B.P. Apparatus, letters have been issued to (i) Pr. Secy. (Health), GNCT of Delhi (ii) Addl. Commissioner (Health), MCD (iii) Jt. Secy, Min. of Health, Government of India for issuance of suitable directions to the Directors/Medical Superintendents of Delhi Government Hospitals to reduce the mercury pollution.

Further a study is proposed to be conducted about the extent of mercury waste in Delhi and ways of disposal. The study shall also suggest suitable methodology to mitigate the problem of mercury. Proposal has been received from Dr. T.K.Joshi of Centre for Occupational & Environmental Health of Maulana Azad Medical College, Delhi, for submitting the proposal for conducting study on mercury.

Also, the Health Care Facilities have been directed to put up / display a template at the prominent locations for the commitment to minimize mercury waste. A public notice is also issued in this regard on 02.05.2008 as reproduced below.

PUBLIC NOTICE

Kind Attention : All Hospitals, Nursing Homes & HealthCare Facilities in NCT of Delhi

Considering the adverse effects of Mercury Waste on the Environment , it has been decided that all Hospitals, Nursing Homes & Health Care Facilities in NCT of Delhi shall provide Template (A set of Declarations , Format given below) for Commitment to minimize/eliminate mercury containing waste .The Declarations have to be signed by the Head / Medical Superintendent/ Director of the Health Care Establishments/Institutions and displayed widely at various prominent locations in the Health Care Establishment. This is to be treated as a condition of authorization under the Bio Medical Waste (Management and Handling) Rules, 1998, as amended to Date.

We formally declare our commitment to mercury reduction.

WHEREAS mercury is an elemental substance, that once released into the environment, easily and rapidly changes form to several organic and inorganic states that transfer from soil to air to water and back again;

WHEREAS the organic form of mercury, methylmercury, bioaccumulates in aquatic ecosystems to magnify concentrations in animal tissue in increasing degrees up to 250,000 times;

WHEREAS methylmercury, the most toxic form of mercury, can affect the reproductive efforts of top predators in aquatic environments;

WHEREAS the neurotoxic effects of high levels of methylmercury poisoning in humans has been established, and low-level doses of methylmercury consumption can potentially effect human health, especially that of a foetus;

WHEREAS elemental mercury is a highly toxic substance which can vaporize easily and cause both acute and chronic health effects including severe respiratory irritation and damage to the central nervous system;

WHEREAS mercury has been identified internationally as a toxic substance of concern, and mercury contamination has led to fish consumption advisories in many countries,

WHEREAS the majority of mercury entering water bodies comes from anthropogenic sources, and one-quarter of these emissions are the result of the purposeful use of mercury;

WHEREAS mercury is used widely in consumer and industrial products, where, in most cases, alternative, mercury-free products are available;

WHEREAS pollution prevention or product substitution is a progressive approach to protecting the environment that eliminates or minimizes the generation of mercury-bearing waste, making it one of the most favorable strategies for maintaining a clean environment;

WHEREAS pollution prevention for mercury can help environmental conditions, as well as protect the health and safety of workers;

WHEREAS we here by declare to adopt safe mercury handling Standard International Procedure so as to collect ,store the mercury spilled in a suitable container without affecting the occupational health , or environment;

WHEREAS recognizing mercury minimization as an active opportunity to improve the environment of Delhi, we, the undersigned, do hereby declare our intent to be a mercury minimization participant.

(Medical Superintendent / Director)

Issued in Public Interest by
DELHI POLLUTION CONTROL COMMITTEE
Department of Environment, Govt. of NCT , Delhi
4th Floor, ISBT Building, Kashmere Gate, Delhi -6.
Website:[http//dpcc.delhigovt.nic.in](http://dpcc.delhigovt.nic.in)

