TOWARD THE TIPPING POINT

WHO-HCWH Global Initiative to Substitute Mercury-Based Medical Devices in Health Care

A Two-Year Progress Report

World Health Organization

Health Care Without Harm

In association with the UNDP GEF Global Health Care Waste Project

UNDP

GEF

Acknowledgements

This report, and the tremendous advances it chronicles, would not be possible without the dedication and hard work of tens of thousands of nurses, doctors and other health professionals from around the world who are committed to making their institutions and facilities mercury-free.

Written by: Joshua Karliner

With contributions from: Anu Agarwal, Ravi Agarwal, Fernando Bejarano, Shu-Ti Chiou, Yves Chartier, Jorge Emmanuel, Rico Euripidou, Faye Ferrer, Silvia Ferrer, Jamie Harvie, Ashley Iwanga, Anja Leetz, Elena Lymberidi, Alejandra Livschitz, Nomcebo Mvelase, Veronica Odriozola, Peter Orris, Lisette van Vliet, Susan Wilburn

Co-published by: the World Health Organization and Health Care Without Harm in association with the UNDP GEF Global Health Care Waste Project (www.gefmedwaste.org).

Funding for activities discussed in this report comes from a broad and diverse set of institutions, including: The United States Environmental Protection Agency, the Swedish Chemicals Inspectorate, the United Nations Environment Programme, the UNDP GEF Project on Healthcare Waste, the Skoll Foundation, the Oak Foundation, the Marisla Foundation, the Deshpande Foundation, the Swedish Society for Nature Conservation, the Sigrid Rausing Trust, the Garfield Foundation, the Zero Mercury Working Group, and IPEN (the International POPs Elimination Network), as well as the thousands of hospitals, health systems and government agencies expending human and financial resources to implement mercury substitution.

Design and Layout by: Winking Fish

June 2, 2010

About the Global Initiative

The WHO-HCWH Global Initiative is a component of the UNEP Mercury Products Partnership, which is led by the United States Environmental Protection Agency.

The Objective of the WHO-HCWH Global Initiative to Substitute Mercury-Based Medical devices is to:

By 2017, 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.

About the Initiative Co-leads:

The **World Health Organization (WHO)**, the international agency within the United Nations system responsible for health, has a number of programmes that address the threats posed by environmental pollutants. These programmes provide information and guidelines for risk assessment and management, for preventing human exposure and for improving the diagnosis, treatment and surveillance of health effects.

The Department on Public Health and Environment (PHE) and Regional Offices are committed to helping member states to achieve safe, sustainable and health-enhancing human environments, protected from biological, chemical and physical hazards, and secure from the adverse effects of global and local environmental threats. They facilitate the incorporation of effective health dimensions into regional and global policies affecting health and environment, and into national development policies and action plans for environment and health, including legal and regulatory frameworks governing management of the human environment.

Health Care Without Harm (HCWH) is an international coalition of more than 400 organizations in 52 countries working to transform the health care sector so it is no longer a source of harm to people and the environment. HCWH has offices in the United States (Washington DC, Boston and San Francisco), the European Union (Brussels), South America (Buenos Aires), and South East Asia (Manila). HCWH also has close programmatic partnerships with organizations working on these issues in the African Region (in Durban, South Africa, Dar es Saalam, Tanzania) and in the South Asian Region (Delhi, India).

HCWH has been working since the mid-1990's to promote the reduction and phase-out of sources of mercury pollution from the healthcare sector in collaboration with hospitals, health care systems, health care workers, other NGOs, medical device suppliers, government ministries and international agencies.

www.mercuryfreehealthcare.org

Contents

Executive Summary

- The WHO-HCWH Global Initiative to Substitute Mercury-Based Medical devices with safer, affordable and accurate alternatives was initiated in July 2008 and launched in Delhi, India in December 2008.
- 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.[1]
- It is also grounded in Health Care Without Harm's more than ten years of experience working with the health care sector and national governments in North America, Europe, Asia, Africa and Latin America to successfully achieve mercury substitution.
- A component of the UNEP Mercury Products Partnership, led by the U.S. Environmental Protection Agency, the Initiative's goal is:

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.

Mercury-free health care is increasingly becoming the status quo in many countries.

Progress in Reaching 3-Year Objectives

Actions by hospitals, health care systems and governments around the world have put the Initiative on track or ahead of schedule to reach each of its Short-Term, 3-Year Objectives:

1 **Standards:** WHO is developing a guidance document which will provide technical advice to Ministries of Health recommending how to evaluate non-mercury thermometers and blood pressure measuring devices.

2 **National Policies in Asia, Africa and Latin America:** National policies have been issued and are being implemented in Argentina and the Philippines, while South Africa is conducting a Situational Assessment to examine the feasibility of such a policy. Several other countries are also considering or in the process of creating national policies.

3 **Mercury Blood Pressure Device Phase-out in the European Union:** The EU has prohibited sphygmomanometers for sale to the general public. The EU is now considering phasing-out sphygmomanometers for clinical use.

4 **Mega-City Health System Mercury Phase-outs:** To date, four mega-cities, Buenos Aires, New Delhi, Mexico City and São Paulo are implementing mercury phase-outs in their public health systems.

5 **1,000 Hospitals Committed to Going Mercury-Free:** The target has been surpassed. More than 5,600 hospitals in Asia, Africa and Latin America are in the process of switching, or have already substituted their mercury thermometers and blood pressure devices.

6 **Pilots in 10 New Countries:** The target has been surpassed. New pilot projects exist or are in the process of being created in 14 countries.

7 **Create a Global Training Kit for Hospitals:** HCWH has created and is in the process of testing a global training kit.

8 **Support Management of Mercury Waste from Hospitals:** A series of initiatives are underway in various countries to promote systematic management of mercury waste from healthcare and other sources.

9 **Promote Production of Alternatives:** A series of meetings, market analyses and other initiatives have been undertaken with a focus on the large producers—China and India. A plan to promote industrial transition will be developed.

10 **Assess Progress:** In addition to this report, an assessment of Medium-Term, 6 Year Objectives will be undertaken and these Objectives will be refined by mid-2011.

Momentum is growing and mercury-free health care is increasingly becoming the status quo in many countries. The Global Initiative is moving closer to a tipping point that will shift the dynamics of supply and demand in the global thermometer and blood pressure device markets away from mercury and toward the alternatives.

Introduction

Mercury in Health Care

Mercury is one of the world's most ubiquitous heavy metal neurotoxicants. The United Nations Environment Programme (UNEP) and World Health Organization have identified the adverse effects of mercury pollution as a serious global environmental and human health problem.[2] The UNEP Governing Council has targeted reducing methyl mercury accumulation in the global environment as a major global priority.[3] In February 2009 the world's governments agreed to establish an Intergovernmental Negotiating Committee to prepare a global legally binding instrument on mercury.

Mercury has been extensively used in health care since antiquity. It has been an integral part of many medical devices, most prominently thermometers and blood pressure devices (sphygmomanometers). In recent decades this has led to a paradox: around the world, institutions and professionals whose mission is to heal and promote health, have been contributing to a significant global environmental health problem—mercury contamination—through the use of their health care instruments.

Mercury has been extensively used in health care since antiquity.

In response to growing awareness of the health implications of mercury exposure, in the first decade of this century the health sector in the U.S. largely phased out mercury thermometers. Many U.S. hospitals no longer purchase mercury sphygmomanometers, and as of 2008, more than one-third of the U.S. population lived in states that have banned or severely restricted their sale and/or use.[4] Similarly, the European Union prohibited mercury thermometers in 2007 and is considering similar strictures for sphygmomanometers. Nations such as Sweden have almost completely phased-out mercury. Unfortunately, despite some outstanding efforts in a growing list of countries, the health sector in much of the rest of the world still uses mercury-based medical devices.

Mercury sphygmomanometer

However, in recent years, several developing countries have initiated a shift toward mercury-free health care. These countries have responded to policy guidelines issued by the World Health Organization. Many are conducting their activities under the umbrella of the WHO-HCWH Global Initiative to substitute mercury-based medical devices. They have also been convinced of the technical and economic viability of the alternatives. Most notably, the ministries of health in both Argentina and the Philippines have issued national policies phasing-out mercury-based medical devices. Health care systems in countries around the globe, including India, Nepal, South Africa, Tanzania, Mexico, Chile, Costa Rica and Brazil also have launched programs to demonstrate and expand mercury-free health care.

The Global Initiative is on track or ahead of schedule in achieving its objectives.

The Global Initiative for Mercury-Free Health Care

Health Care Without Harm and the World Health Organization are co-leading a global initiative to achieve virtual elimination of mercury-based thermometers and sphygmomanometers over the next decade and their substitution with accurate, economically viable alternatives.

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.[5] It is also grounded in Health Care Without Harm's more than ten years of experience working with the health care sector and national governments in North America, Europe, Asia, Africa and Latin America to successfully achieve mercury substitution.

This project is a component of the UN Environment Programme's (UNEP) Mercury Products Partnership, which is led by the U.S. 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.

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.

Nurses in Argentina receive their first digital thermometers.

UNEP has also been charged by the world's governments to facilitate the negotiation of an internationally legally binding instrument to address mercury pollution.

With specific regard to the WHO-HCWH Global Initiative, 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 Initiative is based on experiences with the healthcare sector over the past decade, and is premised on the understanding that a well-planned and appropriately funded initiative should be capable of achieving global virtual elimination of mercury fever thermometers and blood pressure devices in health care institutions within the next decade. In order to achieve this, five core strategies have been identified.

1. Establish an international mechanism to certify the accuracy and efficacy of mercury-free alternative medical devices.
2. Continue to expand awareness-raising and mobilization of the health care sector in all countries, including actors involved in health care emergency responses, in order to shift demand towards alternative devices and educate societies about the broader impacts of mercury.
3. Support the development of model policies and catalytic activities that leverage resources to shift demand at global, regional, national, state and municipal levels.
4. Define safe elimination strategies for existing mercury equipment. Develop and implement interim and long-term mercury waste management plans at the health care sector, national and regional levels.
5. Support the establishment and/or adequate expansion of production facilities for mercury-free fever thermometers and other medical devices in developing countries, with an emphasis on encouraging substantial production in China and/or India.

With this framework established, most ongoing work to substitute mercury-based medical devices around the world was incorporated into the Global Initiative as it began in July 2008. The Initiative was formally launched in Delhi, India in December 2008.

In order to promote this effort and chart achievements, WHO and HCWH have established a website that serves as a global information clearinghouse on mercury and healthcare (www.mercuryfreehealthcare.org).

A membership structure, which parallels the UNEP products partnership, was also established. More than 60 leading hospitals, professional associations, local governments and NGOs from around the world have joined this effort as Founding Members or Partners (see p. 25).

The Global Initiative also established a series of Short Term Objectives (3 years—July 2008 – July 2011) and Medium Term Objectives (6 years—to be achieved by July 2014) as benchmarks by which to measure progress. This report reviews the progress of hospitals, health care systems and governments whose actions—taken both formally as part of the Initiative and in conjunction with or parallel to it—are contributing to the achievement of its Short Term Goals.

Hospitals can actually save money by substituting mercury-based medical devices with safe alternatives.

Affordability of Alternatives

Many healthcare practitioners are concerned about the availability of alternatives. In fact, there are many mercury-free thermometers and sphygmomanometers available from major medical equipment suppliers who service the global market.[6]

With limited healthcare budgets, many health care systems and hospitals today still face the challenge of deciding between a mercury device and its alternative. Those facilities with limited budgets have been able to successfully avoid this road block through operational strategies.

For example, when planning future budgets, hospitals are including the expense of frequent mercury thermometer breakage when calculating annual costs. In many cases, the cost of purchasing more durable digital or mercury-free alternatives is comparable to or less than the replacement cost of mercury thermometers over a year period.

The Hospital Posadas in Buenos Aires, Argentina pursued just such a strategy and reported significant savings when it replaced all of its thermometers. Between April and June 2006, this 450 bed hospital purchased 3,152 mercury thermometers. A year later, during the same period in 2007, it purchased 355 mercury thermometers and 188 digital devices. The cost savings totaled nearly U.S. $3,000.

At the Federico Gomez Children's Hospital in Mexico, it is estimated that this 250 bed institution will save a minimum of U.S. $10,000 over six years when replacing mercury thermometers. This estimate includes the costs of digital device and battery replacement, as well as mercury and battery disposal.[7]

In the Hospital São Luiz in São Paulo, Brazil, a 116 bed hospital, health care officials found that the costs of maintenance and calibration of digital and aneroid thermometers and sphygmomanometers were significantly lower than the costs of maintaining existing mercury devices. In fact, they determined if they were to replace all sphygmomanometers, wall thermometers and clinical thermometers in the hospital with alternative devices, that the savings on maintenance and calibration would pay back the initial capital investment of more than U.S. $9,000 in five years, while saving another U.S. $2,000 a year after that.[8]

In India, the NGO Toxics Link, a Founding Member of the Global Initiative, reports that "a study in a few hospitals has shown that the recurring cost with mercury instruments far exceeds this cost difference [with non-mercury instruments] in addition to the extra environmental and occupational hazard cost."[9]

Progress in Meeting Short Term Objectives

The Global Initiative, developed in July 2008 and formally launched in New Delhi in December of that year, set out 10 Short Term Objectives to be completed by July 2011. The following is an update on progress in reaching these Objectives to date:

Objective 1: Standards

Identify and/or establish international standards for mercury-free alternative medical devices.

Status: In Process and On Track

Description of Activities: WHO is developing a guidance document that will provide practical technical advice to Ministries of Health to evaluate and compare thermometers and blood pressure measuring devices. The document will draw on a series of standards already used by several governments in different parts of the world.

Next Steps: The document will be developed in 2010, reviewed by relevant parties at WHO, and once approved, distributed to Ministries of Health and as a web-based document.

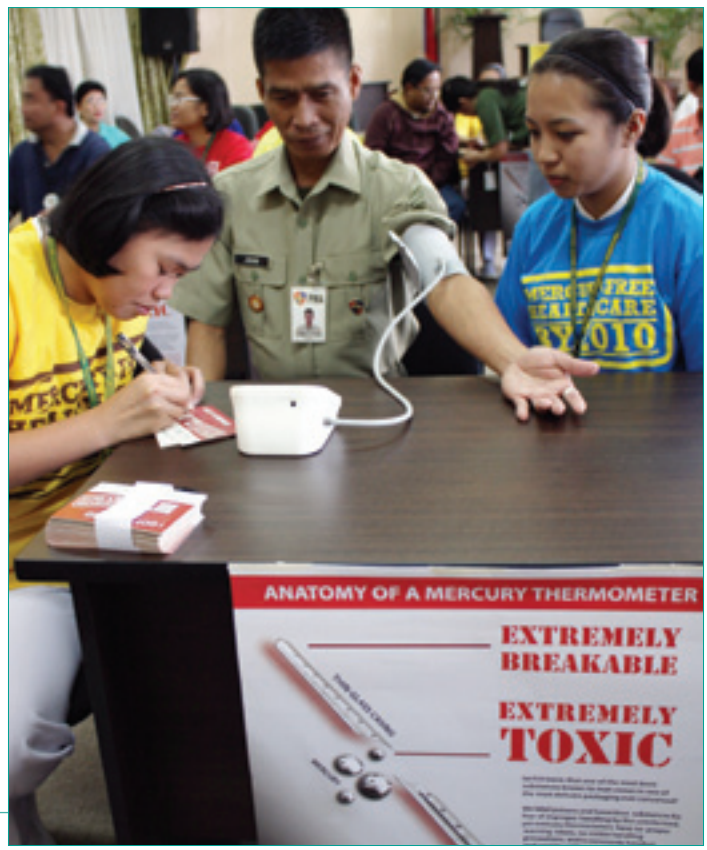
Objective 2: National Policies

Establish and implement national policies to phase-out mercury-based medical devices minimally in one country each in Asia, Africa, and Latin America.

Status: In Process and On Track

Description of Activities:

Philippines: National Policy Established—Implementation in Process – In late July 2008, the Department of Health (DOH) of the Philippines issued Administrative Order 21 to phase-out all mercury-based medical devices in the country over a two year period.[10] Since the announcement, HCWH SE Asia and WHO Philippines have been working with the DOH



The Philippines was the first developing country to establish a national policy to phase-out mercury-based medical devices.

Argentina and the Philippines are both implementing national policies to phase-out mercury medical devices. Several other countries are following suit.

and many individual hospitals and professional associations to assure successful implementation of the Administrative Order in the Philippines' more than 1,800 hospitals. More recently, the Secretary of Health has called for a stronger measure banning the import of mercury containing medical devices.[11]

Argentina: National Policy Established—Implementation in Process – In February 2009 Argentina's Minister of Health issued a resolution advising the health sector to refrain from purchasing new mercury-based medical devices. This resolution establishes the policy and purchasing guidelines required for the phase-out of mercury thermometers and blood pressure devices in the more than 1,700 hospitals in the country.[12] It is estimated that the reduction in global mercury emissions from thermometers alone from a fully implemented national policy will be 1 metric ton per year.[13]

In February 2010, the Minister of Health issued a second resolution, strengthening and deepening the 2009 resolution by prohibiting "the production, import, sale or free transfer of mercury column blood pressure sphygmomanometers to be used by the general population, medical doctors or veterinarians." Imports were to be halted immediately, and all sales will cease within six months.[14]

South Africa: National "Situational Assessment" to Begin – Global Initiative Founding member, groundWork, a South African NGO, reports that the country's Ministry of Health and Department of Environmental Affairs are undertaking a situational assessment to examine the feasibility of replacing mercury devices nationally.

Next Steps: Encourage and Support Other Countries Moving Toward National Policies:

Costa Rica: The Caja Costarricense del Seguro Social (CCSS—Costa Rican Social Security Institute), which runs all 29 public hospitals in the country, adopted a Directive on the purchase of mercury thermometers which stipulates that mercury devices should be avoided.[15] The CCSS is currently moving to substitute mercury-based medical devices throughout its system. This is the first step in developing a potentially more far-reaching national policy on mercury in health care.

Argentina ordered a phase-out of mercury in health care in 2009 and banned mercury sphygmomanometers in 2010.

The stage is set for a phase-out of mercury sphygmomanometers in the EU.

India: In March 2010, the Directorate General of Health Services of India's Ministry of Health and Family Welfare advised all Central Government Hospitals and Health Centers, "to gradually phase out mercury containing equipments (thermometer, BP Instruments etc.) and replace them with good quality non-mercury equipment, in order to prevent the toxic effects of mercury on patients and health care workers."[16] Global Initiative Founding Member, the NGO Toxics Link, reports that these guidelines, which apply to roughly 1,669 hospitals and 174,000 primary clinics and health centers, have been circulated to all the Ministries under the Government of India that run health establishments, including the Ministry of Health, Ministry Of Defence, Ministry of Home Affairs, Ministry of Labour, Ministry of Railways, Ministry of Women & Child Development and Ministry of Panchayati Raj. These guidelines have the potential to evolve into a broader national policy on mercury in health care.

Taiwan, China: In March 2008, the Environmental Protection Administration announced a national policy to phase-out mercury thermometers. The Official Announcement prohibited the issuance of new licenses to import mercury ther mometers and banned their sale to the public as of July 2008. A ban on the sale of mercury thermometers to medical establish ments is slated to go into effect in July 2011.[17] While mercury sphygmomanometers are still not prohibited, authorities report that the majority of health care organizations are now adopting electronic blood pressure measuring devices, as Taiwan, China is one of the largest global manufacturers of these devices, making them affordable.[18]

Uruguay: In January 2009, the Ministry of Health announced that it was phasing-out mercury thermometers for use in health care and private homes.[19]

Objective 3: Sphygmomanometer Phase-out in the EU

Achieve the phase-out of mercury sphygmomanometers in the European Union.

Status: In Process

Description of Activities: In September 2007, the EU banned the sale of mercury thermometers for use in health care. The ban went into effect in April 2009.[20] Under this Europe-wide legislation, mercury sphygmomanometers and other measuring devices are also banned for sale to the general public. The EU is now considering phasing-out sphygmomanometers for clinical/professional use.

A recent report by the EU Scientific Committee on Emerging and Newly Identified Health Risks, under the Directorate General for Health and Consumers of the European Commission, found that "there is no evidence of adverse effects on patients' health in clinical settings due to the replacement of mercury containing sphygmomanometers by validated mercury-free alternatives."[21] This has set the stage for a phase-out of mercury-sphygmomanometers in the European Union.

Digital sphygmomanometer

Four mega-cities—Buenos Aires, Delhi, Mexico City and São Paulo—are phasing out mercury in their health systems.

Next Steps: The European Chemicals Agency, at the request of the EC, intends to submit a proposal for restricting the use of mercury sphygmomanometers in health care under the European chemicals law REACH 'Restrictions' Process, Article 69(6). Expected date of submission is June 15, 2010.[22] This submission will lead to a series of comments and inputs from interested parties, and decisions from relevant Chemical Agency and European Commission bodies that may result in a final decision being taken in early 2012 to ban mercury sphygmomanometers in the EU. The European Environmental Bureau, HCWH Europe and the Health and Environment Alliance have provided significant technical and policy input for the European discussions, and will continue to closely follow this process.

Objective 4: Mega-City Mercury Phase-outs

Replicate the municipal policies of Buenos Aires and Delhi in 3 other developing country megacities.

Status: In Process and On Track

Description of Activities:

Buenos Aires, Argentina: In July 2006, the Ministry of Health of the City of Buenos Aires, which at the time was purchasing 40,000 mercury thermometers a year, issued a Letter of Intent to gradually and progressively eliminate mercury from the 33 hospitals and 41 clinics under its supervision. Since that time, this, the largest health care system in the country, has phased out mercury in most of its hospitals and has taken mercury thermometers and blood pressure devices off its purchasing lists.

Delhi, India: As a result of a policy issued by the Delhi Department of Health and Family Welfare in 2007, all 73 government-run hospitals have stopped purchasing new mercury-based medical devices, and a total of 2,229, mostly small healthcare establishments in the National Capital Territory of Delhi are in the process of replacing mercury devices. Several private systems and philanthropic hospitals in Delhi have also replaced mercury.[23]

All 73 government-run hospitals in Delhi have stopped purchasing new mercury medical devices.

Mexico City formally joined the Initiative, committing 29 hospitals and 230 primary care clinics serving 5 million people to mercury-free health care.

Mexico City, Mexico: In 2009, the Mexico Federal District (Mexico City) Health Secretariat formally joined the WHO-HCWH Joint Initiative and committed to mercury phase-out in its entire public health system, which is comprised of 29 major hospitals and 230 primary care clinics serving five million people.[24] Based on 2009 figures when the system purchased 57,000 mercury thermometers, the switch to alternatives will prevent the release of more than 57 kg mercury/year from thermometers alone.

São Paulo, Brazil: The City of São Paulo is the first in Brazil to eliminate the use of devices containing mercury in its public hospitals. To date, 162 hospitals/emergency rooms in the public and private sector in São Paulo have completely substituted mercury devices. Another 117 primary health care centers, hundreds of laboratories, blood banks and medical specialty centers have also made the switch, making the total 517 health entities that are now mercury-free.[25] While there is no formal policy, the Municipality of São Paulo and its related health institutions have relied on the tireless work of one individual in the Ministry of Labor there, Dr. Cecilia Zavariz, who has spearheaded this effort.[26]

Next Steps: Support implementation in Mexico City and replicate these models in other mega-cities globally.

Objective 5: 1000 Hospitals Commit To Go Mercury-free

Establish the commitment to, or activities designed to, phase out mercury-based medical devices in 1,000 hospitals in Asia, Africa, the Americas and Europe.

Status: Target Surpassed

Description of Activities:

NUMBER OF DEVELOPING COUNTRY HOSPITALS* COMMITTED OR ALREADY MERCURY-FREE**		
Argentina	1722	***
Brazil	162	
China	3	
Chile	16	
Costa Rica	5	
India	1742	****
Mexico	40	
Philippines	1847	***
South Africa	127	
Total	**5664**	

*Health centers and clinics not included

**Partial list based on available information, the true number of countries and hospitals is likely much greater

***Assumes that all hospitals in the country have been committed to phase-out via national policy

****Assumes all Central Government hospitals committed through national guidelines, plus Delhi city hospitals; does not include private sector

Next Steps: Continue to build and expand the number of hospitals around the world.

Hospitals in fourteen new countries have begun or are set to begin piloting mercury-free health care in the coming year.

Objective 6: Pilots in 10 New Countries

Establish demonstration pilots in 10 new countries.

Status: Target Surpassed

Description of Activities: Pilot projects, demonstrating the viability of mercury-free health care, are underway or set to begin in 14 countries. Some of these are funded, others still require funding.

1. Brazil: While São Paulo has excelled in substituting mercury-based medical devices, much of the rest of Brazil has yet to take action. A pilot project in Rio de Janeiro is currently being established by HCWH, in collaboration with health authorities and NGOs, with financial support from U.S. EPA.

2. Chile: The Ministry of Health and the National Environmental Commission collaborated with HCWH, with financial support from U.S. EPA, to establish three pilot hospitals in 2008-09. The success of these efforts have resulted in more than 16 hospitals in the country committing to go mercury-free.

3. China: In 2007, China's environmental agency, SEPA, partnered with U.S. EPA to conduct mercury inventories and develop plans for phase-out in two hospitals in Beijing.[27] Since that time, three hospitals—Beijing Tiantan Hospital, Beijing Jishuitai Hospital and Blood Disease Hospital of China Medical Science Institute—have taken steps to educate personnel and substitute mercury devices with alternatives.[28] In 2010, WHO is preparing to work with authorities in China, as part of a Green and Safe Hospitals Project, to pilot mercury substitution in 3 more hospitals—the First Hospital of Jilin University, Nanchang's Third Hospital, and the Second People's Hospital of Panzhihua.

With three hospitals in China moving to substitute mercury, WHO is working with the government to pilot three more.

Several hospitals in Costa Rica have switched to alternatives.

4. Costa Rica: In Costa Rica, the National Children's Hospital successfully piloted mercury-free health care in 2008-09. There are two more pilots coming online in 2010 as part of an effort to promote broader national replication. HCWH is supporting the Costa Rican government's effort as needed. U.S. EPA has provided funding.

5. Ecuador: The Quito-based Institute for the Development of Production and the Work Environment, and the Lowell Center for Sustainable Production at the University of Massachusetts, are working together to assist two pilot hospitals in reducing use of mercury-containing products and improving management of mercury-containing waste. U.S. EPA has provided funding.

6. Latvia: As a component of the UNDP GEF Project on Health Care Waste, in which WHO and HCWH are Principle Cooperating Agencies, two hospitals, Rezekne and Ventspils Hospitals, have been identified, and work is beginning to substitute mercury-based medical devices as part of a broader sustainable health care waste management effort.[29]

7. Lebanon: The Ministry of Environment will work with two hospitals, one medical laboratory and one clinic to substitute mercury-based medical devices as part of a broader sustainable health care waste management effort. This pilot demonstration is a component of the UNDP GEF Project on Health Care Waste, in which WHO and HCWH are Principle Cooperating Agencies. The project includes a review of existing policies and recommendations regarding mercury use.

8. Nepal: WHO is working with the Ministry of Health, Initiative Founding Member, the Health Care Foundation of Nepal and CEPHED to establish a project in a hospital in Katmandu to model mercury substitution. Funding is provided by U.S. EPA.

9. Nicaragua: The Nicaraguan Ministry of Health has agreed to develop at least one pilot hospital project in 2010. Full funding is not yet secured.

10. Senegal: The Directorate of Environment and Classified Establishments, along with the National Program for the Control of Nosocomial Infections of the Ministry of Health, are working with a major urban hospital (Grand Yoff General Hospital in Dakar), Rufisque district hospital and a small rural health post to phase-out mercury and demonstrate non-mercury devices. This activity is part of a broader effort on sustainable health care waste management under the UNDP GEF Project on Health Care Waste, in which WHO and HCWH are Principle Cooperating Agencies.

11. Syria: The Environmental Protection & Sustainable Development Society, a Syrian NGO, has initiated a pilot project to substitute mercury-based medical devices in one hospital in Damascus. The effort has seed funding from IPEN.

12. Tanzania: WHO and the Ministry of Health have signed an agreement to pilot mercury-free health care in a hospital in the Bagamoyo District. Funding comes from U.S. EPA. Global Initiative Founding Member AGENDA is also working with support from SSNC to develop at least one other pilot project in the country.

13. Thailand: The Bureau of Environmental Health of Thailand's Ministry of Public Health is implementing a GREEN and CLEAN Hospital Project in twelve regional Health

Pilot hospitals can set the stage for national replication.

The UNDP GEF Health Care Waste Project is piloting mercury substitution in Lebanon, Latvia, Vietnam and this major urban hospital in Senegal.

Promotion Hospitals. All of these hospitals will pilot mercury-free health care.[30]

14. Vietnam: As a component of the UNDP GEF Project on Health Care Waste, in which WHO and HCWH are Principle Cooperating Agencies, one urban hospital, a provincial hospital, and a cluster of rural health facilities have been identified, and work will begin soon to substitute mercury-based medical devices as part of a broader sustainable health care waste management effort.

Next Steps: Assure that pilots are well-established, viable, and able to catalyze broader replication. Continue to expand the number of pilots.

The switch to alternatives is reducing the health sector's annual production of mercury waste.

Objective 7: Global Training Module

Develop and globally distribute a training module focused on substituting mercury-based medical devices; conduct additional outreach and educational activities.

Status: In Process and On Track

Description of Activities: HCWH Latin America has created a Global Training Toolkit. It is currently being tested with HCWH partners in the region.

Next Steps: The Toolkit will be modified, based on early feedback, and then distributed more widely—first in Latin America and then globally—to allow for broad replication and scaling-up of mercury-free initiatives around the world. The UNDP GEF Health Care Waste Project will also adapt the training module as part of the national training programs being developed in seven countries.

Objective 8: Mercury Waste Management Projects in Health Care

Establish vis-à-vis the Basel Convention Secretariat, model national health care mercury waste management projects, and promote their replication.

Status: In Process

Description of Activities: The switch from mercury-based devices to alternatives is beginning to significantly reduce the health sector's annual production of mercury waste, generated by the daily breakage of thousands of thermometers and blood pressure devices.

Yet many hospitals making the switch find themselves with surplus mercury thermometers and sphygmomanometers. Given the lack of hazardous waste management infrastructure in many countries, hospitals often have no other option but to store obsolete mercury-based devices on-site. In this context, safe storage within health care facilities is being promoted, while methods for a more centralized interim safe storage are being developed.

The UNEP Secretariat of the Basel Convention is receiving funding from the U.S. EPA to develop approaches and national plans for managing mercury waste in Latin America, with an emphasis on mercury waste from the health care sector. The projects will consist of training, inventories, technical advice to set up low cost, temporary mercury storage, and development of national plans for the environmentally sound management of mercury waste. In addition to the activities of the Basel Center, various other initiatives are underway.

For instance, the City of Buenos Aires is storing its hospitals' mercury-based medical devices securely in the city's waste facility, as the city government's environmental authorities develop a longer-term solution for all of the city's mercury waste.[31] In the Philippines, hospitals storing mercury waste onsite are urging the Department of Environment and Natural Resources to develop and implement a national plan for mercury waste management.

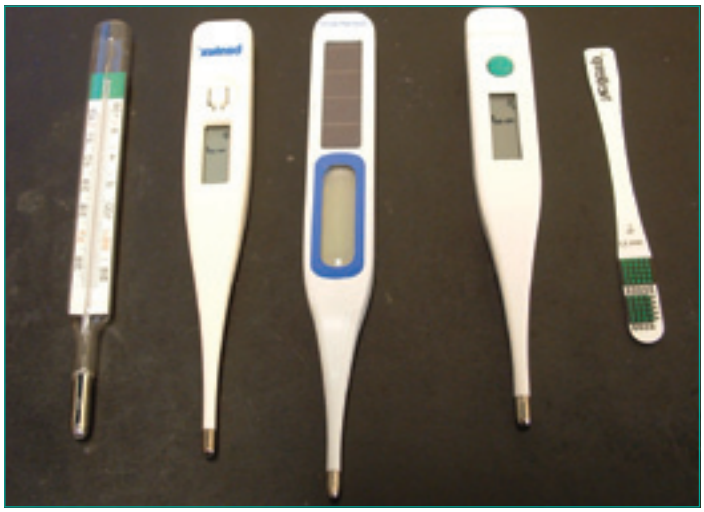
Additionally, as a component of the UNDP GEF Project on Health Care Waste, in which WHO and HCWH are Principle Cooperating Agencies, initial guidelines are being developed to assist hospitals in Argentina, India, and the Philippines on requirements for temporary on-site storage, transportation, and centralized intermediate storage of mercury waste from health facilities.

Next Steps: As mercury phase-out in the health sector and beyond begins to gain momentum, mercury storage and waste management plans, as well as infrastructure, will need to be developed in every country. This goes beyond the scope of this Initaitive and for that matter of the health sector, but is essential to achieving full elimination of mercury in health care and in the broader societal context.

Storage of mercury devices has traditionally failed to take into account their toxic nature.

Today, various initiatives are underway to pilot safe managment of remaining mercury waste in health care facilities.

China, the single largest producer of both mercury devices and alternatives, can lead the global manufacturing transition.



Objective 9: Promote Production of Alternatives

Develop a plan of action to establish and fund the development of production facilities for high quality, affordable mercury-free medical devices in developing countries.

Status: In Process

Description of Activities: While a plan of action has yet to emerge, dialogues have been initiated in both India and China. In India, WHO, HCWH and Toxics Link held a Business Roundtable in December 2008 to discuss India's potential to become a world leader in producing mercury-free medical devices. Subsequently a market study was produced.[32] Substantive follow-up by Indian industry is pending.

China is by far the single largest global producer and supplier of mercury thermometers and blood pressure devices, as well as the alternatives.[33] Yet to date only a handful of hospitals have gone mercury-free.[34] Discussion of how China's health sector and medical devices industry can together provide leadership in the global transition to mercury-free health care is moving forward.

Next Steps: The growing move toward mercury-free health care around the world is shifting market demand away from mercury-based medical devices and toward alternatives. As this effort builds momentum, it will, in turn, shift production in the main manufacturing centers away from mercury devices and toward the alternatives as well. As this shift continues to evolve, this Initiative will develop a plan of action to support a broad industrial transition toward alternatives production.

Accuracy of Alternatives

Some medical professionals still consider mercury to be the only accurate and consistent method of measuring temperature and blood pressure. Yet, as peer reviewed studies demonstrate, this is not the case, and in fact widespread faith in the accuracy of mercury thermometers and sphygmomanometers was probably overly positive in years past.

As with most products (mercury or mercury-free) the accuracy of digital thermometers, the most commonly used mercury-free temperature device, is dependent on manufacturing quality and techniques. Standards organizations like ASTM International have developed protocols that will help the healthcare community identify accurate alternatives.[35] It is imperative that the healthcare community and governments purchase thermometers from manufacturers who follow techniques and testing protocols independently certified by ASTM or other internationally established regimes, to ensure the accuracy of these devices.

Sphygmomanometers represent the largest reservoir of mercury in current medical use. As with thermometers, mercury and non-mercury blood pressure devices provide accurate measurement as long as both instruments are calibrated. Examples of both inaccurate mercury and mercury-free sphygmomanometers can be found in the medical literature, though this inaccuracy is typically related to poor maintenance and calibration.[36] A large number of scientific studies have concluded that mercury-free measuring devices produce the same degree of accuracy as mercury devices, provided they are properly maintained and calibrated.[37]

A recent report by the Committee on Emerging and Newly Identified Health Risks, under the Directorate General for Health and Consumers of the European Commission, found that "mercury-free blood pressure measuring devices (when clinically validated) are generally reliable substitutes for mercury-containing sphygmomanometers in routine clinical practice." It also concluded that "there is no evidence of adverse effects on patients' health in clinical settings due to the replacement of mercury containing sphygmomanometers by validated mercury-free alternatives." The report further finds that mercury-based sphygmomanometers are "not essential" for calibration.[38] Therefore, due to the acute toxic hazard to health care workers and chronic hazard to society, these devices have no place in clinical care.

Switching to mercury-free sphygmomanometers in clinical settings has not caused any reported problems in clinical diagnosis and monitoring in any of the Latin American countries that have phased-out mercury blood pressure devices and adequately maintained the alternatives. Meanwhile, the Swedish government has completely eliminated mercury column sphygmomanometers.[39]

One problem that several hospitals in developing countries have encountered as they substitute mercury-containing sphygmomanometers is that many aneroid and digital devices are of poor quality. Yet many devices currently produced satisfy the criteria of professional organizations such as the British Hypertension Society, the European Hypertension Society and the Association for the Advancement of Medical Instrumentation. The British Hypertension Society (BHS) has created a list of vendors of sphygmomanometers that have met the BHS criteria and are suitable for clinical practice; this list is posted on their web site.[40]

The World Health Organization is in the process of preparing a guidance document that will provide technical advice to Ministries of Health and health care systems as they select alternative, mercury-free technologies (See "Short Term Objective One: Standards" Page 8).

With adequate resources, the Initiative can build on success and scale-up activities to achieve a global phase-out.

Objective 10: Assess Progress and Refine Medium-term Objectives

Assess progress after two years, refine Medium Term Objectives, and develop activities for years 4-6.

Status: In Process

Description of Activities: Current medium term objectives are as follows:

By 2014:

1. Assure adherence to international standards for mercury-free alternative medical devices.
2. Establish and implement national policies to phase-out mercury-based medical devices in at least four countries each in Asia, Africa, and Latin America.
3. Assure the prohibition of exports of mercury sphygmomanometers from the European Union.
4. Replicate the municipal policies of Buenos Aires and Delhi in 10 other developing country megacities.
5. Establish the commitment to, or activities designed to, phase out mercury-based medical devices in 5,000 hospitals in Asia, Africa the Americas and Europe.
6. Establish demonstration pilots in 20 new countries.
7. Globally distribute a training module focused on substituting mercury-based medical devices; conduct additional outreach and educational activities.
8. Support the Basel Convention Secretariat as it replicates model national health care mercury waste management projects, and promote their replication.
9. Encourage new production facilities for high quality, affordable mercury-free medical devices in developing countries to come on line.
10. Assess progress after two years; set specific targets for years 7-10.

Next Steps: Based on this report and feedback from participants in the Global Initiative, WHO and HCWH will assess progress and refine the Medium Term Objectives.

CONCLUSION

The WHO-HCWH Global Initiative to Substitute Mercury-Based Medical devices with safer, affordable and accurate alternatives is on track or ahead of schedule in achieving its objectives.

National governments, provinces, states, and municipal health care systems in Asia, Africa and Latin America are moving forward to develop and implement policies to switch to mercury-free health care.

The European Union, which has prohibited mercury thermometers, has developed strong scientific evidence that supports an EU-wide phase-out on mercury sphygmomanometers—one which can then be replicated in many parts of the world. Thousands of developing country hospitals are making the switch, and hospitals in more than a dozen new countries are piloting alternatives—an important first step in building a broader, system-wide approach in each nation.

This progress, along with comprehensive efforts to phase out mercury-based medical devices in the U.S., have significantly reduced the global health sector's annual production of mercury waste, created by the daily breakage of thousands of thermometers and blood pressure devices. Safe storage of remaining mercury products within health care facilities is being promoted, while methods for more centralized longer-term storage are being developed.

The broad goal of this Initiative is to phase-out 70% percent of mercury-based medical devices by 2017. While ambitious, this goal is also eminently achievable. It will require hard work—and the commitment of governments, ministries of health, hospitals, doctors, nurses and other health professionals.

Health professionals are becoming important messengers, addressing the health effects of mercury used in health care and beyond.

We are moving toward a tipping point that will shift global dynamics toward the alternatives.

Given current momentum, the global move toward mercury-free healthcare should, in the next few years, reach a tipping point where non-mercury medical devices will become the status quo throughout the world. While this moment is still not on the immediate horizon in many countries, it is increasingly in the realm of possibility.

Market demand is already shifting away from mercury-based medical devices and toward alternatives. As this effort builds momentum it will, in turn, shift production in the main manufacturing centers away from mercury devices and toward the alternatives as well. As economies of scale grow, prices for high quality non-mercury devices should continue to drop, allowing demand for the alternatives to grow even more.

As recent progress shows, once the health sector becomes aware of the impact of its use of mercury on global environmental health, as well as on worker and patient health and safety, it moves to take action. The viability and affordability of alternatives not only makes this change possible, but is helping to accelerate it.

Just as importantly, once they are actively addressing the hazards of mercury in their own sector, ministries of health and health care professionals often become important messengers and advocates on the broader challenges of mercury pollution in their countries. As the world's governments negotiate a binding treaty to control the use of mercury, there is a need for both broader public awareness and more far-reaching public policy on mercury's health effects. In this regard, the health sector can play a central role.

References

1 Mercury in Health Care, Policy Paper, World Health Organization, 2005. WHO/SDE/WSH/05.08 http://www.who.int/water_sanitation_health/medicalwaste/mercurypolpap230506.pdf

2 "Exposure to Mercury: A Major Public Health Concern," World Health Organization, 2007, http://www.who.int/phe/news/Mercury-flyer.pdf; UNEP, *Global Mercury Assessment*, UNEP Chemicals, Geneva, December 2002, http://www.chem.unep.ch/mercury/report/final%20assessment%20report.htm

3 Decisions adopted by the Governing Council/Global Ministerial Environment Forum at its twenty-fourth session, UNEP, February 9, 2007: see Decision 24/3 http://www.unep.org/gc/gc24/docs/GC24_decisions.pdf

4 Jamie Harvie PE, Joshua Karliner, *End of An Era: The Phase-Out of Mercury-Based Blood Pressure Measurment Devices in the United States*, Health Care Without Harm, September 2008, pp. 23-25.

5 Mercury in Health Care, Policy Paper, World Health Organization, 2005. WHO/SDE/WSH/05.08 http://www.who.int/water_sanitation_health/medicalwaste/mercurypolpap230506.pdf

6 For instance see: *Guide to Alternatives for Health Care Personnel*, Health Care Without Harm, South East Asia Office, June 2007. http://www.noharm.org/details.cfm?ID=1690&type=document

7 Presentación de Rocío González Mesa "Costos de Sustitución Termómetros de Mercurio Hospital Infantil de México Federico Gómez." Centro de Análisis y Acción en Tóxicos y sus Alternativas (CAATA), Punto Focal de Salud sin Daño en México, Septiembre 2007.

8 Carlos Eduardo Lima, Engº Segurança do Trabalho, Elaine Alves Anastácio, Engenheira Clínica "Benefícios Advindos da Susbstituição dos Aparelhos com Mercúrio do Ponto de Vista Econômico" Hospital Sao Luiz, Sao Paulo Brazil, Presentation delivered at Jornada da eliminação do uso de aparelhos com mercúrio" Sao Paulo, Brasil, May 3, 2007.

9 Anu Agarwal, *Moving Toward Mercury-Free Health Care: Substituting Mercury-based Medical Devices in India*, Toxics Link, New Delhi, 2009. p. 3. http://www.toxicslink.org/pub-view.php?pubnum=244

10 Administrative Order 2008-0021, "Gradual Phase-out of Mercury in all Philippine Health Care Facilities and Institutions," Department of Health, Republic of the Philippines, July 30, 2008. See: http://www.mercuryfreehealthcare.org/Philippines_AO21.pdf

11 Jerry E. Esplanada, "DOH calls for ban on mercury." Philippine Daily Inquirer 02/22/2010. http://newsinfo.inquirer.net/breakingnews/nation/view/20100222-254730/DOH-calls-for-ban-on-mercury

12 Resolution 139/2009 Argentine Ministry of Health, Feb. 19, 2009, Public Health Plan for Minimization of Exposure to/Replacement of Mercury, published in the Official Bulletin, Feb. 23, 2009, Number: 31600, Page: 11. See: http://www.mercuryfreehealthcare.org/success.htm#nac

13 *The Global Movement for Mercury Free Health Care*, Health Care Without Harm, November 2007, p. 9. http://www.noharm.org/globalsoutheng/mercury-report-download

14 Resolution 274/2010, Ministry of Health, Republic of Argentina, February 9, 2010, "Prohibition of the importation, commercialization or free transfer of mercury column sphygmomanometers, apparati for measuring aterial pressure. Expansion of the limits of current restrictions."; Published in the Official Bulletin February 16, 2010. See: http://www.mercuryfreehealthcare.org/Argentina_Administrative_Decision%20_274.pdf

15 Caja Costarricense de Seguro Social, "CCSS avanza en la eliminación del mercurio," www.ccss.sa.cr/html/comunicacion/noticias/2009/12/n_1100.html

16 "Guidelines to Reduce Environmental Pollution due to Mercury and E-waste in Central Government Hospitals and Health Centers," issued by Dr. Anil Kumar, Chief Medical Officer, Directorate General of Health Services, Ministry of Health and Family Welfare, Government of India. http://www.mercuryfreehealthcare.org/guidelines.pdf

17 "Restriction of the Import and Sale of Mercury Thermometers," EPA Fei-Tzu No. 0970021484, March 26, 2008. http://law.epa.gov.tw/en/laws/229386189.html

18 Personal Correspondence, Shu-Ti Chiou, M.D., Ph.D., M.Sc. Director-General, Bureau of Health Promotion, Department of Health, Taiwan, China, May 5, 2010.

19 "Fin de termómetros en base a mercurio" *El Pais*, Montevideo, January 30, 2009. http://www.elpais.com.uy/09/01/30/pnacio_395849.asp

20 Directive 2007/51/EC of the European Parliament and of the Council of 25, September 2007, amending Council Directive 76/769/EEC relating to restrictions on the marketing of certain measuring devices containing mercury. Text with EEA relevance: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2007:257:0013:01:EN:HTML

21 Committee on Emerging and Newly Identified Health Risks, under the Directorate General for Health and Consumers of the European Commission on *Mercury Sphygmomanometers in Healthcare and the Feasibility of Alternatives* 23 September 2009. http://ec.europa.eu/health/ph_risk/committees/04_scenihr/docs/scenihr_o_025.pdf

22 See http://echa.europa.eu/chem_data/reg_int_tables/reg_int_curr_int_en.asp

23 Anu Agarwal, *Moving Toward Mercury-Free Health Care: Substituting Mercury-based Medical Devices in India*, Toxics Link, New Delhi, 2009, pp. 5, 11-14. http://www.toxicslink.org/pub-view.php?pubnum=244

24 Letter from Dr. Jose Armando Ahued Ortega, Secretary of Health, Mexico Federal District, to Yves Chartier, WHO, and Joshua Karliner, HCWH, August 31, 2009. http://www.mercuryfreehealthcare.org/SSDF.pdf

25 Cecilia Zavariz, Status Update of Mercury Devices Substitution in the Health Sector Sao Paulo, Brazil, January 2010, Ministry of Labor and Employment/ São Paulo Regional Superintendence of Labor, published as an annex to Summary Report of Studies and Assessments on Mercury Developed in Brazil, Ministerio do Meio Ambiente, submitted to UNEP Chemicals, March 23, 2010. http://www.unep.org/hazardoussubstances/LinkClick.aspx?fileticket=-uYmMOfUPJc%3d&tabid=4325&language=en-US

26 Personal Correspondence with Vera Lucia Anacleto Cardoso Allegro, Director of Environmental and Workers Health, Municiaplity of Sao Paulo, April 30, 2010.

27 "Executive Report: Reducing Mercury in Hospital Waste Project," Sino-US Cooperation Program, Chemical Registration Center of SEPA, Beijing, September 2007.

28 "Workshop for Promoting Mercury Free Health Care Held in Beijing," Global Village of Beijing, December 2009. http://www.mercuryfreehealthcare.org/wsbeijing.pdf

29 The UNDP GEF Global Healthcare Waste Project is being implemented in eight countries by the United Nations Development Program with funding from the Global Environment Facility. The goal of the project is to protect public health and the global environment from the impacts of dioxin and mercury releases. The project demonstrates environmentally sound healthcare waste management practices and best available technologies. http://www.gefmedwaste.org/

30 Personal Correspondence with Twisuk Punpeng, Senior Technical Advisor, Bureau of Technical Advisors, Department of Health, Ministry of Public Health, Thailand, May 12, 2010.

31 Personal Correspondence with Silvia Ferrer, Coordinator for Environmental Health, Ministry of Health, City of Buenos Aires, April 27, 2010.

32 *A Report on Market Study on Alternatives of Mercury Measuring Devices in Health Care in India*, Market Insight Consultants, Delhi, January 2009.

33 "Research Analysis Report on Mercury Use in China 2003 – 2005 - The Measuring Devices Industry of China," Chemical Registration Center of State Environmental Protection Administration of China (SEPA),Natural Resources Defense Council, May 2007; "Market Research Report on Chinese Mercury Free Thermometers and Sphygmomanometers," Global Village of Beijing, November 2007. http://www.chem.unep.ch/MERCURY/Sector-Specific-Information/Docs/China%20-%20GVB%20Non-Mercury%20Medical%20devices%20Report.pdf

34 "Workshop for Promoting Mercury-Free Healthcare Held in Beijing," Global Village of Beijing, December 2009. http://www.mercuryfreehealthcare.org/wsbeijing.pdf

35 Dean C. Ripple, Gregory F. Strausse, "Selection of Alternatives to Liquid-in-Glass Thermometers," *Journal of ASTM International*, Vol. 2, No. 9, 2005.

36 Mion D, Pierrin AMG. "How accurate are sphygmomanometers?" Journal of Hypertension, 12: 245-248 (1998); 9. Markandu NK, Whitcher F, Arnold A,Carney C. "The mercury sphygmomanometer should be abandoned before it is proscribed," Journal of Human Hypertension, 14(1): 31-6 (2000).

37 Susan Buchanan, MD, MPH, "The Accuracy of Alternatives to Mercury Sphygmomanometers," Health Care Research Collaborative, Chicago, October 2009. http://www.noharm.org/lib/downloads/mercury/Accuracy_Alts_Mercury_Sphyg_rev10-09.pdf

38 Committee on Emerging and Newly Identified Health Risks, under the Directorate General for Health and Consumers of the European Commission, *Mercury Sphygmomanometers in Healthcare and the Feasibility of Alternatives* (23 September 2009). http://ec.europa.eu/health/ph_risk/committees/04_scenihr/docs/scenihr_o_025.pdf

39 KEMI, "Mercury Free Blood Pressure Measurement Equipment: Experiences in the Swedish Health Care Sector," Swedish Chemicals Inspectorate, Stockholm, 2005.

40 British Hypertension Society, "Validated Blood Pressure Monitors List," http://www.bhsoc.org/blood_pressure_list.stm

Photo Credits:

Cover: Sphygmomanometer and Digital thermometer: shutterstock.com

Mercury: istockphoto.com

Blood pressure check: Courtesy HCWH SE Asia- photo: Faye V. Ferrer

Blood pressure device: Courtesy HCWH Latin America

Temperature check Courtesy HCWH SE Asia- photo: Pam Chua

p. 2: Courtesy HCWH Latin America – photo: Juan Manuel Gonzalez

p. 4: Thermometers, courtesy HCWH
Sphygmomanometer, courtesy HCWH, photo: Jamie Harvie

p. 5: Courtesy HCWH Latin America

p. 8: Courtesy HCWH SE Asia - photo: Faye V. Ferrer

p. 9: Courtesy, Verónica Umido, Hospital de Niños Ricardo Gutierrez

p. 10: Courtesy HCWH Latin America

p. 11: istockphoto.com

p. 12: Courtesy Maria Laura Moreno, Centro de Salud Nueva Esperanza

p. 13: Courtesy HCWH, photo: Jamie Harvie

p. 14: Courtesy HCWH Latin America, photo: Alejandra Fernandez

p. 15: Courtesy UNDP GEF MedWaste Project, photo: Ashley Iwanga

p. 16: Courtesy HCWH Latin America, photo: Alejandra Fernandez

p. 17: Sphgymomanometers courtesy Toxics Link
Mercury Storage, courtesy HCWH Latin America, photo: Alejandra Fernandez

p. 18: Courtesy HCWH, photos: Jamie Harvie

p. 20: istockphoto.com

p. 21: Courtesy HCWH SE Asia, photo: Faye V. Ferrer

p. 22: Courtesy HCWH SE Asai, photo: Pam Chua

About the Global Initiative

The WHO-HCWH Global Initiative to Substitute Mercury-Based Medical devices is a component of the UNEP Mercury Products Partnership led by the U.S. EPA.

Global Initiative Advisory Group:

Ravi Agarwal, Executive Director, Toxics Link, India

Yves Chartier, Department for Public Health and Environment, World Health Organization

Maria Doa, Director, National Program Chemicals Division, Office of Pollution Prevention and Toxics, U.S. Environmental Protection Agency

Josh Karliner, International Team Coordinator, Health Care Without Harm

Dr. Peter Orris, MD, MPH, Professor and Chief of Service, Environmental and Occupational Medicine, University of Illinois at Chicago Medical Center

Founding Members and Partners (partial list)

Global

The UNDP GEF Global Healthcare Waste Project

International Council of Nurses

Africa

AGENDA (Tanzania)

GroundWork (South Africa)

Health Department of KwaZulu-Natal (South Africa)

Asia

Baguio General Hospital Fort Del Pilar, Station Hospital at Philippine Military Academy (Philippines)

Center for Public Health and Environmental Development (Nepal)

General Santos Doctors Hospital (Philippines)

Institute of Public Health Management (Philippines)

Lung Center of the Philippines (Philippines)

Manila Adventist Medical Center and School of Medical Arts (Philippines)

Manipal Hospitals (India)

Northern Samar Provincial Government Environment and Natural Resources Office (Philippines)

Northern Samar Provincial Hospital (Philippines)

Notre Dame de Chartres Hospital (Philippines)

Occupational Health Nurses Association of the Philippines (Philippines)

Ospital ng Maynila (Philippines)

Philippine Children's Medical Center (Philippines)

Philippine College of Physicians Southern Luzon Chapter (Philippines)

Philippine Heart Center (Philippines)

Philippine Nurses Association (Philippines)

Philippine Public Health Association (Philippines)

Pines City Doctors Hospital (Philippines)

Saint Louis Hospital of the Sacred Heart (Philippines)

San Lazaro Hospital (Philippines)

School of Health Sciences at St. Paul University (Philippines)

School of Health Sciences, Indira Gandhi National Open University (India)

St. Paul Hospitals in Tuguegarao City and Cavite (Philippines)

Toxics Link (India)

University of the Philippines College of Dentistry (Philippines)

Women's Health (Philippines)

Latin America

Center for Analysis and Action on Toxics and their Alternatives (Mexico)

Environmental Health Coordination, Ministry of Health, Government of the City of Buenos Aires (Argentina)

Federico Gómez Children's Hospital of México (Mexico)

General Regional Hospital No. 1, IMSS Chihuahua (Mexico)

Institute of Health, Central State Hospital, State of Chihuahua (Mexico)

Mexico City Health Secretariat, Federal District (Mexico)

National Institute of Pediatrics (Mexico)

Pediatric Society of Argentina (Argentina)

Regional Hospital No.1, Chihuahua (Mexico)

Toxicology Association of Argentina (Argentina)

Toxicology Unit, General Fernández Hospital (Argentina)

Toxicology, School of Medicine, University of Buenos Aires (Argentina)

United States

Consorta (United States)

Kaiser Permanente (United States)

Practice Greenhealth (United States)

World Health Organization

www.who.int

Health Care Without Harm

www.noharm.org

www.mercuryfreehealthcare.org

Printed on New Leaf Reincarnation Matte, a processed chlorine-free, 100% recycled sheet containing 50% post-consumer waste.