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International SAICM Implementation Project (ISIP)

In 2010, in an effort to demonstrate SAICM implementation via IPEN Participating Organizations, IPEN launched an International SAICM Implementation Project, also known as ISIP. ISIP aims to mobilize resources for initial enabling activities pertaining to national priorities, in keeping with the work areas set out in the strategic objectives of section IV of the SAICM Overarching Policy Strategy.

In particular, the ISIP supports the Governance objective of SAICM's Overarching Policy Strategy paragraph 26, which calls for enhanced "cooperation on the sound management of chemicals between Governments, the private sector and civil society at the national, regional and global levels."

In addition, ISIP builds on the 2008-2009 Global SAICM Outreach Campaign to raise awareness about SAICM and strengthen collaboration among the public interest, health and labor sectors.

ISIP Objectives

ISIP's four objectives include:
• Promoting the need for sound chemicals management
• Advancing National SAICM Implementation
• Promoting global SAICM implementation by global civil society
• Building capacity among NGOs developing countries and countries with economies in transition

Title of activity: Medical Waste Management and Mercury Devices in Health Sector Assessment and its Alternatives in Bali, Indonesia
NGO: BaliFokus
Country: Indonesia
Date: June 2011

Elements of SAICM Covered:

Work toward establishing and implementing national action plans with respect to waste minimization and waste disposal, taking into consideration relevant international agreements and by using the cradle-to-cradle and cradle-to-grave approaches (69); Carry out measures that will inform, educate and protect waste handlers and small-scale recyclers from the hazards of handling and recycling chemical waste (72); Promote waste prevention and minimization by encouraging production of reusable/recyclable consumer goods and biodegradable products and developing the infrastructure required (73); Implement demonstration projects on waste minimization and efficient resource management including zero waste demonstration projects (262)

Description of current waste management practices in your country:

Solid waste management in Indonesia is still not handled properly. The lack of infrastructures, proper and structured collection system, and public awareness, as well as sound developed/formulated and enforced policies (especially at the local level) are the main problems that all the different provinces of Indonesia are facing.

Waste is only partially collected by government trucks and in many areas private collectors are the main active collection force. Open dumping is vastly practiced and landfills lack any planning in construction (very few are built with lining to avoid contamination of the surroundings) to minimize impact on the surrounding environment and communities. Waste segregation at source is not practiced. At the same time the so called informal sectors represented by pickers and recyclers is very active and responsible mostly for waste recovery for recycling purposes.

The island of Bali is no different and represents a good example of what is explained briefly above. The main city of Denpasar shares the 25 hectares of the Suwung landfill with the Badung Regency; together these regions represent the most populated in the island both in terms of residents as well as tourists. About 10 hectare of the landfill is currently being operated by a private company for carbon credit purposes. The rest of the 15 hectares is operated as an open dumping disposal site for all kind of mixed wastes. As found in other landfills in Indonesia cities, about 600 scavengers are registered and settled near the landfill site, together with 2000 pigs and some 600 cows. During the dry seasons, uncontrolled fires and white smoke sometimes occur and is released from the active cells.

Waste collection services are done by a local government agency, Dinas Kebersihan dan Pertamanan (DKP), and by private operators. Most of the partner operators are either pig farmers or scavengers' bosses with no legal status. Some of them buy the wastes generated from hotels, restaurants and cafes for the food scraps value and some others have mutual agreements with waste producers. There is no control on how and where the waste collectors should or will bring their garbage. Occasionally, during the period of December until April, some uncontrolled wastes are disposed of on empty land, and some of it is medical wastes from clinics, found stranded on the west coast beach of Southern Bali.

In general, in Indonesia there are no proper facilities developed yet at the regional level to dispose of and properly treat toxics and medical waste except for one private enterprise close to the capital, leaving all other areas and provinces with no real and safe solution.

There are about 1178 hospitals operating in Indonesia's medium and big cities (2007). About 49% predicted have medical incinerators, but out of 49%, only 77% are functioning. So far there is no record and no regular monitoring activities related to the medical waste management and its emissions, especially on the PCDD/F (Polychlorinated dibenzo-p-dioxin and polychlorinated dibenzofuran) parameter. Indonesia does not have any environmental standard yet, especially related to medical wastes and domestic wastes incinerators. Several hospitals have already made efforts to show their green alternatives, but they do not reflect the essential value of being operated in an environmentally friendly way with less harm to human health and the environment.

Additionally, some data taken from several studies shown that the average waste generation in health care facilities are approximately 0.14 kg/bed/day (Ditjen PP & PL and WHO, 2003) or approximately about 4000 ton/year. The composition of wastes consisted of:

- 80% non-infectious wastes
- 15% pathology and infectious wastes
- 1% sharp wastes
- 3% chemicals and pharmacy wastes
- less than 1% ampules and broken thermometers

The waste generation from Primary Health Care was about 7.5 gram/patient/day (PATH, 2005) and consisted of 25% contraception wastes, 65% immunization wastes and 10% medical treatment wastes.

The technology option for medical waste handling in general is an incinerator. From the 1178 hospitals all over Indonesia, about 49% have in-house incinerators, but only 77% are functional. No reports are available on the PCDD/F monitoring data. In Jakarta, of 11 incinerators operated internally by the hospitals staffs, only 7 are actively operated and 4 are inactive, with a capacity of about 0,15 m^3/day. Most of the incinerators were built between 1997 and 2001, mostly using kerosene to start the burning. Temperatures applied are between 800–1200^oC, but most of the time operated at 800^oC with the height of stack between 5–9 meters, and situated between 50-200 meters from residential areas (Indonesia NIPs on POPs Elimination, 2009).

Most of the wastewater treatment plants are septic tanks in various sizes, and only 36% have proper waste water treatment plants. About 52% comply with the environmental standard set by the Ministry of Environment for Hospitals (Rapid Assessment Ministry of Health, 2003).

The annual budget for environmental services (water, electricity, solid wastes and wastewater treatment) is generally allocated in limited amount and is inefficient.

Description of health and environmental effects of current waste handling practices:

In general:

- Soil, water and air contamination due to improper disposal practices such as burning and illegal dumping.
- These practices foster the spread of diseases such as dengue and typhoid fever. Contamination with toxic substances, including heavy metals, can be found in the water as well as in animals that are farmed (free range cow farming system, where cows often feed in dumping sites).

For what concerns medical waste:

- Improper disposal in landfill or in illegal dumps;
- Effects of incineration;
- Contamination with dioxin; and
- Contamination with mercury coming from broken medical equipments and wastes.

Description of existing legislation on waste management:

Some of the national regulations referred to as the umbrella policy on medical wastes are:

- Law No.32 year 2009 regarding Environmental Management and Protection;
- Law No.36 year 2009 about Health;
- Government Regulation No.18 year 1999 and No.85 year 1999 regarding Hazardous Waste Management;
- Government Regulation No.74 year 2001 regarding Hazardous Substances Management;
- Ministry of Health Decree No.1204 year 2004 regarding the Provisions for Hospital Environmental Health; and
- National Law No.18 year 2008 on Waste Management.

To comply with the national regulations, local governments are strongly recommended to develop supporting regulations which will be inline or set higher standards than regulated in the national regulations. In reality, not many local governments develop their own standard, mostly they will follow whatever is stated by the national or provincial regulations.

In general, the main points on policy and regulations are as follows:

- There is a gap between the national regulations and the local regulations. Some regulations need to be translated at the provincial level first to be able to translate further by local governments.
- National policies recognize the importance of reducing waste from the source, favoring recycling, composting and reduction at all levels.
- National policies are also strongly introducing the practice of Extended Producer Responsibility (EPR) as a viable way to provide solutions and implement waste reduction.
- Medical wastes were not accommodated in the National Law No.18 year 2008 on Waste Management. There is a mandate for the law to further develop a Government Regulation on Specific Wastes and medical wastes could be accommodated in that regulation.
- No clear national strategy on hospital waste management at the national level creates confusion at the local level.
- Lack of proper guidance and monitoring from central government, regional and provincial agencies.
- The procedure to get a Special Permit for medical waste collectors and services is too complicated and takes time.

Project Outcomes:

Description of the activity conducted to promote waste minimization:

A series of activities have been already carried out as follows:

1. Assessment of hospitals' waste management system and their safer alternatives (began in November 2010), consisting of:

    a. Baseline situation:
    The result of the questionnaires that were distributed to 19 hospitals in Denpasar City showed the representation of the hospital waste management systems that need to be improved, in particular for the final handling of medical wastes. The incineration method is currently seen as the only technology option and is being used to destroy various kinds of medical waste in hospitals in Denpasar City (Bali).
    The guidelines provided the Ministry of Health on hospital waste management in general lists incineration as a disposal method in which medical wastes are

subjected to combustion. Therefore, there is no consideration in the procurement of an alternative to incineration such as non-incinerator technology.

b. Socialization on the existence of the incinerator and the potential adverse effects to health and the environment presented as educational material to the hospitals.

c. Information about non-incineration technologies as an alternative was discussed and recommendations with viable alternatives to improve the waste management and services among the hospitals were provided.

d. Socialization and approaches were also delivered to the Environmental and Health Agency at the local level to provide information about the existence and the condition of incinerators in hospitals and the potential adverse effects on health and the environment. Furthermore, the Environmental and Health Agency needs to consider the necessity of temporary storage for toxic and hazardous wastes at the local level.

2. The assessment of mercury-containing devices in several hospitals and strategy development to phase-out or eliminate mercury-devices was conducted as follows:

   a. The baseline situation of mercury-containing devices in the hospitals.
      The result of the questionnaires that were distributed to 19 hospitals in Denpasar City:
      - Associated with the regulations or policies regarding the existence of mercury-containing devices indicates 79% of hospital's commitment and the accommodation of regulations is tending to be weak.
      - Associated with the identification to the availability of alternatives to mercury thermometers and sphygmomanometers indicates 82, 5% tend to be weak or do not have any strong interests.

   b. Socialization of the potential adverse effects of mercury to health and the environment presented as educational material to the hospitals stakeholders. Safer alternatives to mercury thermometers, sphygmomanometers, and dental amalgam are provided as recommendations to hospitals and dental professionals.

   c. Socialization of the importance of the temporary storage in the respective hospital for their mercury waste and avoidance of waste burning.

   d. Socialization and approaches are also delivered to the Environmental and Health Agency at the local level to provide the information of the existence and the condition of mercury-containing devices and the potential adverse effects on health and the environment.

Impact on target groups:

A number of meetings and discussions were conducted as a way to engage the target groups to achieve set objectives, such as to find law and regulation gaps, improve the overarching policy to reduce and eliminate medical waste incinerators as well as phase-out mercury-containing devices with safer alternatives available at the local level, and to establish agreements with the hospitals related to the project implementation plan.

The initial collaboration with the Environmental and Health Agency, after socialization and approaches activities carried out by BALIFOKUS, had the goal to build a common vision regarding the project strategy and policy framework, as well as define the first steps for stakeholders' involvement and implementation of program.

The outcomes of the discussion on policy framework are as follows:

1. Guidelines on the management of medical waste (in particular, hazardous and toxic waste) need to be developed and distributed to the sector.
2. Guidelines (in particular, on handling mercury spills and temporary storage in hospitals) need to be developed and distributed.
3. Seven hospitals in Denpasar City agreed to become pilot project participants in medical wastes management improvement and mercury-containing devices phase-out.
4. An Action Plan should be prepared by the hospitals associated with medical waste management as well as the reduction and elimination of mercury-containing devices with safer alternatives.
5. Short-term targets for the hospitals are strategies and measures not to burn the mercury waste in the incinerator and the provision of temporary storage for mercury waste in each hospital.
6. A long-term target for temporary storage at the local level will be developed by the Environmental Agency of Denpasar City.
7. A long-term target for non-incinerator technology will be developed together by the Environmental Agency of Denpasar City and BALIFOKUS.

As a result of the above strategy, an MOU of collaboration has been signed between the Environmental Agency of Denpasar, Balifokus, the Denpasar Mayor's Representative and 7 hospitals.

Hospitals are engaged in drafting and proposing individual action plans for proper medical and toxic waste disposal to be implemented starting June 2011.

The Environmental Agency of Denpasar is actively taking steps to address the allocation of space and funds for temporary storage of toxic waste at the existing landfill.

Impact on target policies:

The target policy is the one related to the elimination of the use of incinerators for the treatment of waste in general and in particular for toxic and non-toxic medical waste.

The result will be to provide a set of procedures already tested in the field during the program that will facilitate the implementation on a large scale all over the country. The activity will have addressed and highlighted all possible shortcomings and obstacles and will provide a full standard operating procedure (SOP) for implementation. Moreover, the government is involved directly in different regions where the activities will take place and will actively be involved in problem solving at both a practical and policy level.

Outreach to stakeholders:

A series of meetings and workshops has been carried out with the stakeholders listed below. Also, a MoU has been signed with the Government (Environmental Agency and Denpasar Mayor's representative) and 7 hospitals in Bali to formalize commitment for the immediate implementation and action plan of best practices. At the same time, several requests to

participate in the same initiative have been received from other regions of Indonesia such as North Sumatra, Jakarta and Yogyakarta.

Finally, a forum is envisioned to be formed with the goal to share information and experiences as well as to host follow-up workshops and conferences.

List of the stakeholders:

Governments

1. National Development Planning Agency
2. The Ministry of Environment
3. The Ministry of Health
4. The Ministry of Public Works
5. Regional Development Planning Agency Bali Province
6. The Environmental Education Center Bali-Nusra
7. The Environmental Agency Bali Province
8. The Health Agency Bali Province
9. The Environmental Agency Denpasar City
10. The Enviromental Agency (Yogyakarta City – Central Java)
11. The Health Agency Denpasar
12. The Department of Landscaping and Sanitation Denpasar
13. Sanglah Public Hospital Denpasar
14. Wangaya Public Hospital Denpasar
15. Udayana Military Hospital Denpasar
16. Bhayangkara Trijata Police Hospital Denpasar.

Private sectors

Hospitals in Denpasar

1. Puri Bunda Hospital
2. Bali Royal Hospital
3. Puri Raharja Hospital.

Laboratories in Denpasar

1. MMC Medical Centre and Laboratory
2. Quantum Lab

Professionals/ Private pratices in Denpasar

1. Dentists
2. Veterinaries
3. Doctors

Suppliers - Medical Equiptments & Dental Amalgam Alternatives in Denpasar

1. Rusdi Medika
2. Sanidata
3. PT. Oksigen Medika
4. BCR Medika
5. PT. Rejeki Global Nusa
6. UD.Sumber Bahagia
7. Tatia Mitra Medika

8. UD. Karunia Dental Medical

Associations

1. The Indonesian Hospital Association
2. The Indonesian Medical Association
3. The Indonesian Dentists Association
4. The Indonesian National Nurses Association

Non-profit organizations

1. Insitute Hijau Indonesia
2. Indonesia Center for Environmental Law
3. Indonesian Consumer Institution Foundation

Academics

1. Faculty of Public Health Udayana University Denpasar
2. Medical Faculty of Udayana University Denpasar
3. Bali State Polytechnic Denpasar
4. Faculty of Mathematics and Natural Science Udayana University Denpasar
5. Faculty of Environmental Law Udayana University Denpasar
6. Faculty of Environmental Engineering, Bandung Institute of Technology

Deliverables, outputs and/or products:

- Booklet on mercury spills, how to handle toxic medical wastes, and promoting alternatives to medical wastes incineration.
- Training for hospital staffs on medical wastes management and phase-out of mercury-containing devices in 3 cities (Denpasar, Medan, and Makassar), for a total of 10 hospitals.
- Booklet on proper waste disposal for public distribution.
- Development of a draft of norms, standard, guidance, and manual (*Norma, Standar, Panduan dan Manual*/NSPM), which can be used as reference to develop proper SOPs or Minimum Service Standards (*Standar Pelayanan Minimal*/SPM).

Communication efforts:

http://www.thejakartapost.com/news/2010/08/06/government-report-hazardous-medical-waste.html

Government to report on hazardous medical waste

Adianto P. Simamora, The Jakarta Post, Fri, 08/06/2010 10:37 AM

The Environment Ministry said it will report on healthcare waste practices and alleged that some hospitals have been dumping untreated - and potentially hazardous - medical waste into rivers. The ministry said it had assessed waste management practices at 30 hospitals across the country using a corporate environmental performance rating system and would announce its results in October. The performance rating system, also called the Proper ranking system, categorizes companies or hospitals as "green" or "polluting" firms.

"We are also examining areas along the Ciliwung River where health care centers were alleged to have to dumped medical waste products, such as needles," Environment Ministry official Imam Hendargo Abu Ismoyo told reporters at a roundtable discussion on medical waste management Wednesday.

This year will be the first time that the ministry will evaluate hospitals using the Proper system, said Imam, who is deputy minister for hazardous waste management. He declined to name the hospitals alleged of illegal waste disposal but said that most were privately managed.

The Health Ministry currently has the authority to regulate waste management at healthcare center, he added.
Imam said that some hospitals used incinerators to destroy medical waste. "Several hospitals, particularly the big ones, have installed a proper wastewater treatment facilities that also manage medical waste," he said.
Hospitals are required to have waste treatment plants to obtain an environmental impact analysis documents (Amdal) to obtain an operating license. Healthcare centers produce both solid and liquid hazardous waste. He said that there were also a number of private firms collecting hazardous waste from hospitals.

Environment Ministry deputy assistant for hazardous waste Emma Rachmawaty said that the supervision of medical waste was still poor despite the increase in the number of healthcare centers in the country.

"The problems include dumping hazardous medical waste into rivers and domestic garbage dumps. Itis wrong if medical waste is processed along with domestic garbage," she said.
The ministry also found evidence illegal trading of hazardous waste in Indonesia, such as in Malang, East Java, she added.

The discussion was aimed to formulate a plan of action to manage medical waste in Indonesia.
Health Ministry official Wiwik Wahjoeni said that healthcare centers were required to separate medical waste into different plastic bags.

World Health Organization (WHO) reports said that 80 percent of healthcare waste is comparable to domestic waste and that the remaining 20 percent was comprised of hazardous materials that may be infectious, toxic or radioactive.

Healthcare facilities produce waste from infected patients, waste contaminated by blood and anatomical waste such as body parts and animal carcasses, according to the reports. The WHO said that anatomic and infectious human waste comprised 15 percent of the total healthcare waste and used syringes and chemical waste were 5 percent.

The 2008 Law on Waste Management provides up to a three year prison sentence and a Rp 100 million fine for those who failed to manage hazardous waste.

How Hospitals Put Public Health at Risk With Lax Handling of Biomedical Waste idelis E Satriastanti | August 05, 2010

Medical waste, unless disposed of carefully, can have health and environmental implications. (EPA Photo)

Indonesia. Indonesian hospitals' questionable waste management methods could give rise to epidemics of infectious diseases and the widespread contamination of rivers, an official said.

"Only around 10 to 15 percent of [hospital] waste is infectious, while the 85 to 90 percent that isn't goes straight to the municipal dump," Sharad Adikari, a senior adviser for environmental health at the World Health Organization, said on Wednesday. But if hospitals fail to maintain standards for the disposal of the 10 percent of biohazardous waste, he said, it could contaminate the other 90 percent.

"It's that contamination that ultimately puts the public's health at risk," Sharad said. "So we need to focus on how to carefully manage that 10 percent."

Infectious waste includes cultures and stocks of infectious agents, waste from sick patients, waste contaminated with blood or seminal fluid, discarded diagnostic samples, infected animals from laboratories, contaminated material and equipment, and recognizable body parts and animal carcasses.

Up to 16 million hepatitis B, 4.7 million hepatitis C and 160,000 HIV infections occur every year around the world through the reuse of needles that have not been sterilized, the WHO says.

Imam Hendargo, the Environment Ministry's deputy for hazardous substances and waste, said there were regulations in place on how hospital waste should be disposed of, but not all facilities abided by these rules, usually due to negligence or a lack of resources.

"We're working with the Health Ministry on this issue because from the management [point of view], the responsibility lies with [the Health Ministry], given that hospitals and health facilities fall under its jurisdiction," he said.

"However, it's our responsibility too because hospital waste is categorized as hazardous."

Imam said 30 hospitals had signed up this year to take part in a voluntary environmental assessment rating program sponsored by the Environment Ministry.

"We'll be looking at their waste management as well as the water quality in rivers within their vicinity, because reports of hospitals just dumping their waste into rivers are common," he said.

“Part of the problem is that it’s too expensive for some of the smaller hospitals and community health centers to properly manage their waste. Some even incinerate it, which is unacceptable.”

Imam said his ministry did not have data on how much waste hospitals across the country produced each year, blaming this on the rapid growth in the number of new hospitals, often without the relevant permits or accreditation.

Yuyun Ismawati, director of the independent toxic chemical watchdog Bali Fokus Foundation, said incinerating waste released more toxins into the atmosphere.

A small-scale incinerator operating at below 800 degrees Celsius can release dioxins, furans and mercury, according to a WHO report from 2000.

“It’s crucial to emphasize the use of non-incendiary waste-management methods, because 67 percent of atmospheric emissions of dioxins is due to incineration,” Yuyun said. Dioxins are a class of chemicals banned under the Stockholm Convention on Persistent Organic Pollutants. “We need to promote the use of autoclaves [to sterilize infectious waste by steam] rather than incinerators,” Yuyun said.

He added that the main hurdle in this campaign was the fact that incinerators were cheaper than autoclaves.

Faye Ferrer, from the international watchdog Health Care Without Harm, agreed that hospitals needed to move away from incinerators.

“You can do it by autoclaving, or using steam rather than fire to sterilize infectious waste, such as cotton buds or gloves.”

Bali in need of better medical waste management: NGO
Indonesia: the Jakarta Post - 11 June 2010

With more hospitals, clinics and healthcare centers being built in Bali every year, the government should enforce proper medical waste management at the facilities, environmentalists say.

Concern was raised a few weeks ago about how medical centers were disposing of medical waste after the discovery of numerous syringes and ampoules mixed with regular trash on beaches in Seminyak and Petitenget.

http://www.thejakartapost.com/news/2010/06/11/bali-need-better-medical-waste-management-ngo.html

Communication with National or Local Authorities: Did you communicate, coordinate or share the results of your Activity with your National SAICM Focal Point, or any other national or local authority related to chemicals management? If so, please describe how this happened.

BALIFOKUS communicates with the SAICM focal point on several issues related to chemical safety. An example of BALIFOKUS' successful lobbying is the establishment of a Mercury Roundtable Discussion Forum, a multi-stakeholders forum for mercury. In August 2010, the Ministry of Environment conducted the first Mercury Roundtable Discussion Forum in Jakarta. The second forum was last March 2011 after the INC2.

BALIFOKUS also has several programs in coordination with the National SAICM Focal Point:

- Hospital waste management improvement and introduction of non-incineration technologies to integrate it with the Hospital Environmental Rating system.
- Discussion and lobbying for issuance of the Government Regulation on Specific Wastes covering e-wastes and hazardous wastes.
- Elimination of UPOPs from medical wastes and domestic wastes through proper wastes management and community-based waste management programs.

SAICM National Focal Point:

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NGO Recommendations for next steps:

1. Policy and regulation
    a. A national strategy on medical waste management should be developed with the objective to protect human and environmental health. A clear strategy must cover the issue of on-site management aspects, off-site management in line with land-use planning and development, transfer aspects, treatment type and disposal aspects.
    b. Synchronization of medical wastes management with other law and regulations needs to be done. In conjunction with Stockholm Convention NIPs and the National Law No.18 year 2008 article 29 which prohibit technically not-feasible waste burning (due to high organic content), there is a need to review the Ministry of Health Decree No.1204 year 2004 regarding the Provisions for Hospital Environmental Health. The Decree No.1204 year 2004 promotes incinerators as the main disposal method for medical waste treatment.
    c. Develop norm, standard, guidance, and manual (*Norma, Standar, Panduan dan Manual*/NSPM) which can be used as reference to develop proper SOPs or Minimum Service Standards *(Standar Pelayanan Minimal*/SPM).
    d. Establishment of a stakeholders forum or utilization of any active existing forum to address and discuss the improvement of hospital wastes management and phasing out of mercury-containing devices.

2. Medical waste management
    a. Guidelines on the management of medical waste (in particular, hazardous and toxic waste) need to be developed and distributed.
    b. Individual hospitals need to develop action plans on the environmental management within their properties, with a clear target and indicators to achieve.
    c. Human resources capacity-building needs to be strengthened to improve responsible staffs' capacity and knowledge on proper medical waste management and comply with the SOP provided by the hospital's management.

d. Periodic training should be attended by the responsible staffs, waste collectors and service providers.
e. At the city level, coordination with the city planner and responsible agency on waste management needs to be established, to discuss and plan further the temporary storage of mercury-devices from health care facilities.
f. An informed choice on non-incineration technology options should be developed and introduced to the target groups.
g. Awareness-raising and campaigning on proper waste management should be done through groups of professionals, Nurses' Associations, Medical Doctors' Association, private sectors, and the general public.
h. Sharing and / or exchange of experiences and best practices between local governments on medical waste management and non-mercury devices in the health care sector.

3. Mercury-containing devices and their alternatives
   a. A temporary storage for hazardous and mercury-containing devices and products needs to be built at the city level. Guidance should be provided by the Ministry of Environment and / or Ministry of Health.
   b. Safer alternatives to mercury-containing devices, especially those which are already available on the market, need to be promoted and introduced to the general public and health care professionals.
   c. Guidelines (in particular, on handling mercury spills) need to be developed and distributed.
   d. Wider awareness-raising and campaigning on mercury-devices and their safer alternatives to protect human and environmental health should be done through groups of professionals, Nurses' Associations, Medical Doctors' Association, private sectors, and the general public.