Tsunami and Hazardous Wastes

The *tsunami* and earthquake in December 2004 affected 82 health facilities in **Sri Lanka** and 180 in **Indonesia**. The management of medical wastes became an urgent issue. Isolated incidents of leakages of industrial and agricultural chemicals were reported, as well as a spill of radioactive material from a destroyed cement factory in Banda Aceh. **Sri Lanka** reported that of the hundreds of environmental samples analysed, no toxic substance exceeded WHO recommendations. More investigations are on going.

4.1 Pharmaceutical waste

The participants at the workshop highlighted the huge challenge posed by accumulated pharmaceutical wastes from post tsunami donations. This problem affected not only **Indonesia** in Banda Aceh Province and more recently in the post earthquake Jogyakarta area, but also other tsunami struck countries like in **Sri Lanka**. Several hundred if not thousands of tons of outdated drugs, are stored in poor conditions. The introduction of these substandard drugs stocks into the market represents two major public health risks:

1. Sale to and consumption of substandard drugs by the unwary public, and
2. Environmental pollution from either leakage to soil and groundwater or release of potentially toxic gases into the atmosphere from ill-monitored waste incineration.

The participants felt that immediate local action needed to be taken, including the following:

- As far as possible, pharmaceuticals should be kept in their original packaging. They should not be opened, crushed, repackaged in other containers or otherwise manipulated. This is to ensure that their transportation for final disposal becomes easier and cheaper.
- All obsolete pharmaceuticals found should be kept in secure stores to prevent their infiltration to local markets.
- All waste management options whether based on chemical processes, incineration, or landfill, are merely processes for converting the waste into other products. The converted products may be more or less harmful that the original waste. When dealing with hazardous waste all appropriate measures must be taken to ensure that no harmful by-products penetrate the environment.
- Sub-standard hazardous waste disposal methods such as open burning and uncontrolled landfill will result in environmental pollution and therefore, should not be permitted for the disposal of obsolete pharmaceuticals.
- The final disposal of the obsolete pharmaceuticals should be carried

Box 6 Post tsunami donations of outdated pharmaceuticals

After the *tsunami* of 26 December 2004, international aid was rapidly mobilized from around the world. It included shipments of large quantities of pharmaceuticals for immediate and medium term health care needs of the local population.

As is common in emergency situations, there was little opportunity to coordinate needs with supplies. Local infrastructure was virtually non-existent and some pharmaceuticals were supplied directly to hospitals and clinics; others were centralized, while some others were mixed with a variety of goods and had to be separated and redirected over a period of time.

By early 2006, large volumes of outdated/obsolete pharmaceuticals had accumulated in quantities estimated to be anywhere between several hundred and 6 thousand tons. The volumes have since increased, as tens of aid containers had not yet passed customs review.

A WHO supported survey was carried out in May 2006 by *Pharmaciens Sans Frontieres* (PSF) with DEPKES/DINKES/FDA, Indonesia. PSF found that out of more than 4000 metric tons of drugs, received for a population of 2 million, 60% were not on the national list of essential drugs, 70% were labeled in foreign languages and 25% had an inadequate expiry date. Some drugs arrived in excess amounts, in some cases covering the annual needs of the entire Indonesian population.

Over 30 tons of drugs are stored in unsecured places, courtyards or open sheds. Of the facilities surveyed, 84% was inappropriate to store perishable goods such as medical drugs.

Another survey was conducted in **Nias Island**, struck by *tsunami* in 2005 and by an earthquake in March 2004. Out of the estimated total 500 tons of donated drugs, 200 tons were found to be useless. Again, out of this 150 tons were segregated, re-collected and stored in temporary shelters before being sent off for incineration at a cement factory. The disposal cost is 1000 US$ per ton (Annex 10, P6).

In **Sri Lanka**, 160 MT post tsunami donated pharmaceuticals were found to be inadequate and 100 MT have already been destroyed in a local cement factory. WHO has funded a follow-up project. (Annex 10, P12).

"Segregated" obsolete pharmaceuticals, Nias Warehouse. Photo A.Kartika, UNDP

Ad-hoc dumpsite for tsunami damaged pharmaceuticals Photo: M Davis, FAO

Source: WHO, 2006; Pharmaciens Sans Frontieres, 2006; Country presentations (Annex 10)

out in dedicated hazardous waste management facilities, preferably in an industrialized country. The "Back to Sender" principle should be applied, and support from the Basel Convention should be sought.

- Donors should be approached immediately, for assistance in financing the immediate export and destruction of obsolete pharmaceuticals, in close coordination with the Basel Convention. FAO's lessons learnt from dealing with obsolete pesticide stocks should be made use of.
- The existing WHO Guidelines for Drug Donations (samples of the document were distributed at the meeting) are valid per se, but in the light of this situation, they need urgent revision. The guidelines need to be disseminated widely and made operational so as to be translated into action, through specific local training.
- More capacity building and awareness are needed to start addressing these unwanted stockpiles in a big way. Both, the agricultural sector and the health sector need to act urgently in a coordinated manner.

Box 7 Asbestos:

The term "asbestos" is used for a group of naturally occurring minerals that take the form of long thin fibres and fibre bundles. These minerals have great tensile strength, conduct heat poorly and are relatively resistant to chemical attack. Asbestos is non-biodegradable.

The principal varieties of asbestos are chrysotile (white asbestos) a serpentine mineral, and crocidolite (blue asbestos), amosite (brown asbestos), anthophyllite, tremolite and actinolite, all of which are amphiboles. The chrysotile form is the one most commonly used now.

Asbestos is widely used throughout the world, particularly in building and insulation materials. Typical uses include: Boilers and heating vessels; cement pipes; clutch, brakes, transmission components; conduits for electrical wire; pipe coverings; roofing products; duct and home insulations; fire protection panels; furnace insulating pads; pipe or boiler insulations; sheet vinyl or floor tiles; underlay for sheet floorings.

Asbestos-containing materials can be disposed of, in landfill sites, provided these have appropriate measures to prevent the release of asbestos fibre, e.g. a liner and a system for leachate collection. But asbestos should not be disposed of, by burning.

Damage to asbestos-containing material can result in the release of small asbestos fibres that become air-borne and are readily inhaled. These fibres can remain in the lungs for long periods thereby causing serious lung disease.

Asbestosis: slowly developing and progressive scarring of the lungs caused by the inhalation of high concentrations of asbestos dust and/or long exposure. Lung cancer: smokers have a higher risk of developing lung cancer than non-smokers when exposed to asbestos.

Diffuse pleural thickening: non-malignant disease in which the lining of the lung (pleura) becomes scarred. The disease is a chronic condition with no cure.

Mesothelioma: malignant tumour of the pleura or peritoneum. It is linked with exposure to all types of asbestos. Besides being an occupational hazard, it may develop in non-occupationally exposed people living in the same household as asbestos workers or in the vicinity of strong asbestos emission sources.

4.2 Post tsunami clean-up of asbestos-containing materials

During the clean-up of damaged and destroyed buildings—including health care facilities—after the tsunami, there was a need to handle, break up and dispose of asbestos-containing building and insulation materials. Much of this work was undertaken by volunteers and local residents who are unaware of the hazards of asbestos and who may be unable to identify asbestos-containing material.

The asbestos issue concerned most tsunami affected countries, but it was not discussed at length. **Sri Lanka** reported estimates of its annual asbestos waste generation to be of 108 MT (Annex 10, P12).

In early 2005, WHO SEARO issued the following guidance for debris removing teams:

1. Restrict access to sites where there are piles of building debris, and to demolition sites and waste sites. In particular, keep children away.
2. Try to keep any manipulation of asbestos-containing materials to a minimum asbestos structures should be dismantled as gently as possible. If it is necessary to move, saw or break up such materials, keep them thoroughly wet to reduce the amount of airborne fibres and dust. Take particular care with friable materials.
3. Clean surfaces contaminated with asbestos-containing materials using wet methods. Do not dust or sweep or use a domestic vacuum cleaner because this will puff fibres and dust up into the air.
4. Keep piles of asbestos-containing materials covered e.g. with tarpaulins or sheets of plastic until they can be safely stored or disposed of. Wet thoroughly before moving the materials.
5. Store asbestos-containing waste material in sealable containers until it can be disposed of safely. Containers can be drums of metal, plastic or fibre, or strong polyethylene bags (ideally put one bag inside another, sealing each with tape). Label the containers in the local languages and a hazard warning, e.g. "DANGER CONTAINS ASBESTOS FIBRES, HARMFUL IF INHALED, MAY CAUSE CANCER, KEEP SEALED, AVOID CREATING DUST ".