



Provisional Recommendations for **Health Care Waste Management**

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A lot of research work still has to be done on Health Care Waste Management (HCWM) in developing countries, but it is already possible to give some recommendations. These might change in the future, but waste management is never a static issue. The methods proposed hereafter are general solutions and will have to be adapted to the local constraints.

Basically, there are several steps that have to be taken into account for HCW: segregation, collection with possible temporary storage, possible treatment and final disposal. The HCW should stay as much as possible on the compound of the medical facility to avoid accidents (e.g. needle stick injuries). If any waste leaves the compound anyway, it should be made harmless (preferable sterilisation by autoclaving).

Segregation

It is crucial that the medical staff do the segregation at the time and on the spot where the waste is generated. The segregation management has to be as simple as possible and we propose to separate the waste in three main categories: sharps, “soft waste” and organic waste. Laboratory waste, expired and/or unwanted drugs and waste coming from radiology are rather specific, thus advice should always be asked to the Water, Hygiene and Sanitation Unit at Head Quarters level. Excreta and waste water within health structures are beyond the scope of this document.

Collection

The maintenance staff, which needs to receive a minimum of training can do the collection of the waste, But this personnel is not responsible for the treatment and final disposal of the waste. They only have to transport it from the treatment rooms toward the treatment / disposal site on the compound. It is important that this maintenance personnel has the right equipment to do his job correctly (overall, boots, good gloves, wheelbarrow, etc.). The frequency of collecting depends on the different types of HCW, as we will see later. In some cases, it might be a better option to have one person (maximum two for rotation purposes) responsible for the collection, treatment and final disposal of the HCW.

Treatment / disposal site (waste zone)

Each medical facility has to have such a site. Its' size depends on the size of the health structure itself and on the number of patients that are passing by every day. But it is important to foresee enough space, as new pits will have to be dug once the old ones are nearly full. The different destruction / disposal methods must also be kept rather closely together, to avoid spreading of the contamination over a large area. The site must be chosen in a zone which is not floodable and where the water table is rather low, even during the rainy season. It is also necessary to stay away from water points to avoid direct contamination. The site must be completely fenced and only the direct responsible must have access to the waste compound. A good access road for the wastes but also for combustibles for the incinerator has to be included (or to evacuate the sterilised waste if it is impossible to dispose it on the site itself). It can be interesting to leave an opening in the fence where the maintenance personnel can shift the waste inside the compound without entering. Only the responsible(s) of the disposal site should have access to this zone.

The waste zone is composed of a big concrete slab to put the HCW containers and the "incinerator". This whole area needs to have a roof so that the waste does not become more humid during rain showers, which will make it even more difficult to incinerate. Next to this area, a refuse pit with lid must be foreseen where the ashes can be dumped. The bottom of such a pit has to be at least two meters above the groundwater table. If other non-combustible waste (except organic waste) is to be landfilled, a lining of clay at the bottom is necessary. If there would be no lid on the refuse pit, the waste has to be covered with an earth layer every day to avoid residues being blown away or vectors being attracted.

The two other disposal methods are the sharps and the placenta pits. A sharps pit is a hole in the ground, preferable completely lined with a concrete foundation and concrete rings (or at least with clay), on which a concrete slab is put with in the middle a hole. In the hole, a tube of 1 m length is erected vertically. This tube has to have a diameter, which is a little larger than the diameter of the sharps containers (i.e. 150 mm). This provides the possibility for the container to be thrown in the pit without being opened to remove the sharps. The length of the pipe is to avoid people grabbing inside the pit to retrieve the sharps (containers). Once the pit is nearly full (500 mm from the edge), the tube is taken out and concrete or a mixture of cement, lime and water is poured inside the hole. The sharps are still contaminated, but the risk of somebody getting injured and infected is extremely small.

A "placenta pit" is a hole in the ground, which is lined at the edge to avoid collapse, with a concrete slab on top. The opening in the slab (500 x 500 mm) should be covered with a lid that can be closed and locked. This placenta pit has to be made on the site itself, where it has to be used and controlled by trained personnel. To reduce bad odours, lime can be added to the organic waste. Lime might initially reduce the volume of the organic waste a bit as it absorbs the liquids. It also eliminates a lot of pathogens, as the pH of lime is high (around 11). But be aware that the bacteria, which decompose the waste, will be eliminated as well, thus the volume reduction will be slowed down.

The technical drawings of both the pits can be seen in the annexes.

Management of the different types of Health Care Waste

Sharps

This type of waste includes needles, scalpels, ampoules, vials, (broken) glass, etc. All this waste can be put in sharps containers (which should be available in each room where injections are given) to avoid that people will be injured later. These containers must be puncture resistant and waterproof. They also should have a lid with a small hole, so that the sharps can't be spilled. We recommend the use of old plastic drugs boxes with a well closing lid, which should preferably be glued to the body of the container. A small triangle should be cut in the lid. Money can be saved as no special equipment has to be bought and the boxes have a double use. The plastic boxes should be disposed of in their whole (without opening them), which does not only solve the problem of the sharps but it reduces also a little the general waste volume.

Once such a container is nearly full, some tape has to be put over the triangular hole by the medical staff. The container has to be put on a spot that the maintenance staff knows that they can take them along toward the treatment / disposal site. The responsible of the waste compound will dump the whole container inside the sharps pit without opening it.

The Re-usable Sharps Container under development within MSF can be an interesting alternative if not enough plastic drugs boxes are available. Once the container is full, the operator can remove the sharps in the sharps pit, without the risk of spilling them, neither of coming in contact with them. The drawings of this Re-usable Sharps Container can be asked at the Water, Hygiene and Sanitation Unit of MSF-Belgium.

Soft waste

Under this kind of waste, we understand dressings (wet or dry), packages, paper, cardboard, plastic, syringes without needle etc. A separation in between contaminated and non-contaminated waste, as it is done in high-income countries, is not really necessary. This will ask for an enormous effort of the medical staff and there will be a lot of confusion under which category certain items have to be put. Disposable plastic bags are preferable as a container, but this might be too expensive in low-income countries, certainly as a long-term solution when the aid agency is leaving. Plastic buckets of at least 20 litres, of good quality and with a lid that fits correctly can be an acceptable alternative. But their number has to be sufficient so that a rotation can be organised. The lid should always be replaced to avoid vectors to be attracted.

Once a bucket is nearly full, it should be well closed and the lid should preferably be taped to the bucket. This avoids spillage during the transport and is a good sign for the waste collector that the bucket has to be removed. The maintenance personnel have to pass at least once a day to collect these buckets. Each bucket that is taken away to go to the waste compound has to be replaced by another one by the maintenance personnel. It is best to have at least one reserve bucket in every treatment room.

The content of the bucket with “soft waste” has to be incinerated. The “incinerator” has to be preheated with combustibles (e.g. wood, fuel) before the actual incineration of the waste can begin. Each time the majority of the previous load has been burned a new load can be introduced.

The empty bucket needs to be cleaned and disinfected with chlorine by the responsible of the waste compound before it can be re-used. It is up to the maintenance personnel to take the clean buckets at the waste compound before they start their collection tour.

Organic waste

Placentas, aborted embryos, organs, amputated limbs and food residues can be considered as organic waste. This waste can be highly infected or not, but they have in common that they contain a lot of liquids which makes it difficult to incinerate. Food residues can be found nearly everywhere inside a medical facility. They should be put in separated buckets, but it might be possible that their quantity is reduced, because the patients’ family often takes a lot of food back home. It is best to put the medical organic waste (placentas, amputations) in plastic bags (preferable biodegradable).

The medical organic waste has to be collected as soon as possible after the medical intervention, so a regular passing by of the maintenance personnel is required.

All the organic waste has to be disposed of in the placenta pit. In certain cultures, it is the habit that the family takes the placenta home. For small medical structures, the placentas are often thrown in the latrines. This is not such a big problem for placentas, but it has to be avoided for unborn embryos and amputated limbs.

Laboratory waste

All laboratory waste has to be considered as highly contaminated. Therefore, all this waste should preferably be treated before it leaves the laboratory. The most secure way is autoclaving, although this might be considered as being heavy to manage. Certain waste can be disinfected by chlorine solutions, but contact the WHS unit at HQ level first to check the efficiency of chemical treatment for all other laboratory waste. Disinfection with chlorine makes incineration normally impossible because a lot of dioxins will be formed.

Once the sterilisation has been done, the waste can be treated as the other types, although some liquid waste can go to the sewer and excreta to the latrines.

Expired drugs

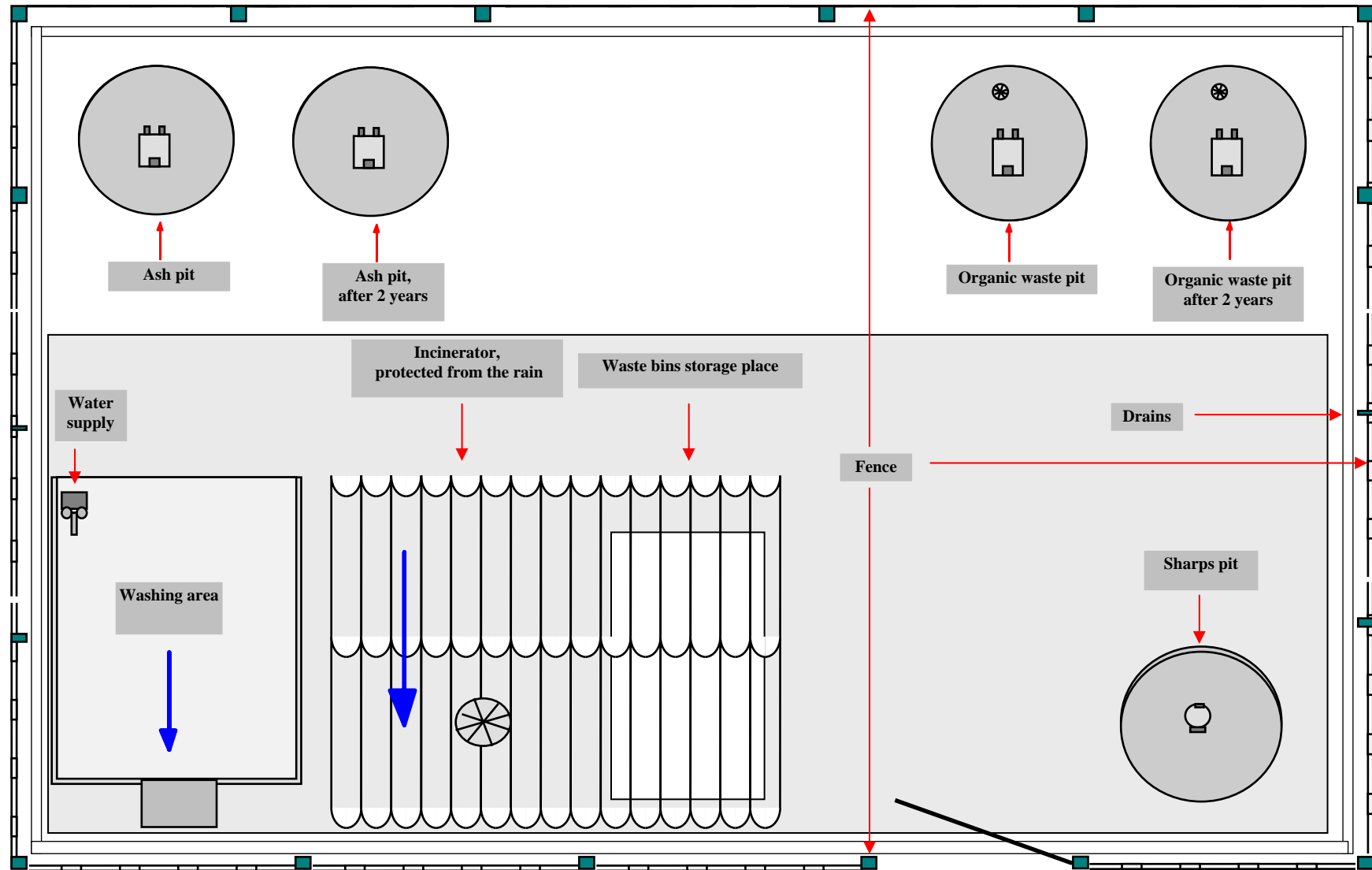
The elimination of expired drugs is not a question of just burying or incinerating them; it has to be managed very well. The World Health Organisation has published, in collaboration with several Aid Agencies a summary guideline on the elimination of expired drugs, but it is always best to contact your headquarters first to ask for more advice. To be able to give a correct answer, the WHS unit will ask you the following information:

- Which drugs have to be eliminated?
- What is the quantity of each drug to be eliminated?
- Under what form are the drugs conditioned (tablets, vials, ointment, etc.)?

More specific but rather simple questions will be asked once the Water, Hygiene and Sanitation Unit has received the basic information from the field. Know as well that we do have a list of the best disposal methods for all the essential drugs that MSF is using. This list is not distributed to the field because some specific knowledge is needed to be able to choose the best option for a certain drug.

Radio active waste

Although the medical sector doesn't produce waste with a high radioactivity, this kind of refuse stays rather specific and it is best to ask advice to specialists (contact your HQ).



Sharps pit

Typical dimensions :

Pipe : diameter min = diameter of needle containers
 length : minimum 1 m


Pit : for 20 years use
 500 needles = +/- 1 dm³

So if for example you make
 about 500 injections a week, you need
 a pit of :

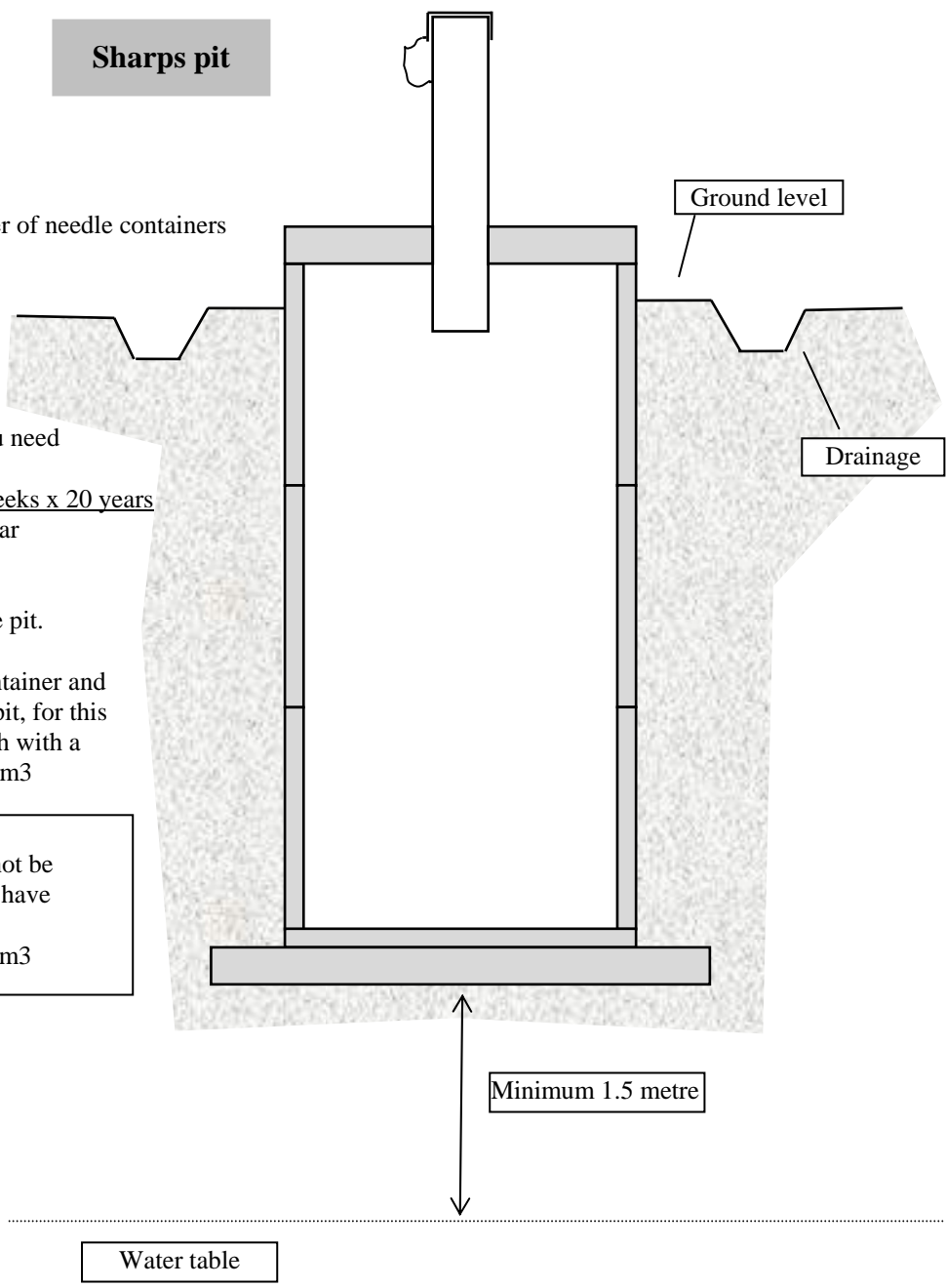
$$\frac{500 \text{ needles} \times 1 \text{ dm}^3}{500 \text{ needles}} \times 52 \text{ weeks} \times 20 \text{ years} \text{ year}$$

= 1040 dm³ = 1 m³,
 if you put only the needles in the pit.

If the needles and the needle container and
 some scalpel blades go into the pit, for this
 example you should have enough with a
 pit of 1 m x 1 m x 2 m depth = 2 m³



The upper 50 cm may not be counted, so you should have instead a pit of
 1 m x 1 m x 2.5 m = 2,5 m³



Organics' waste pit

