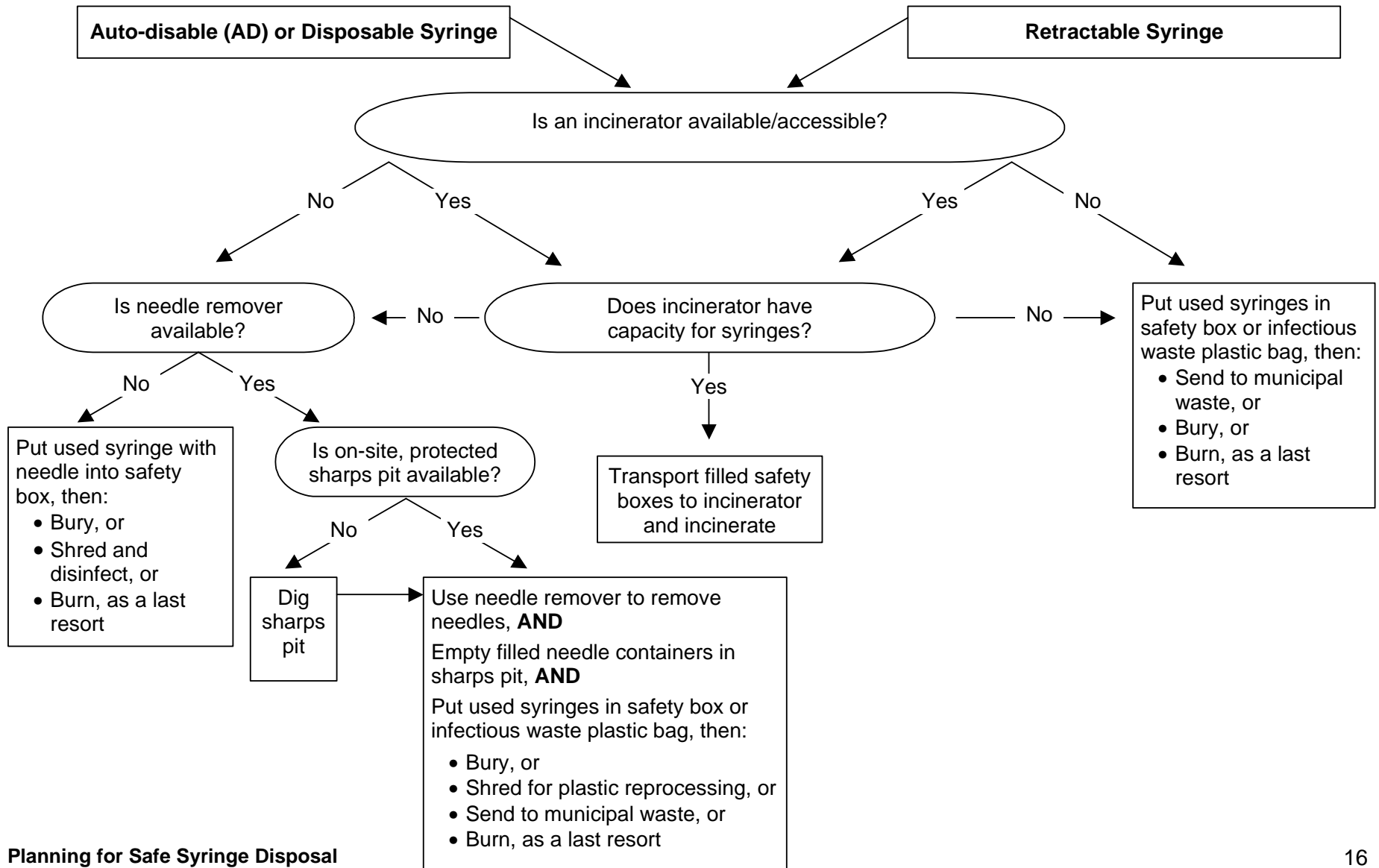


ANNEX 1: Overview of disposal options for needles and syringes



ANNEX 2: Designing a waste collection and transportation system for incineration.

The most appropriate sharps waste collection and transport system will depend on the local situation. Important factors to consider are:

- Storage of filled boxes prior to transport and destruction
- Distances and road conditions
- Staff (collection of safety boxes from injection rooms, secure storage, tracking waste volumes, driver for vehicle, incinerator operator, supervisors...)
- Volume and resupply of safety boxes
- Vehicles
 - Use of an existing vehicle on its return trip vs. dedicated waste collection trips
 - Motorcycle vs. car (see Annex 3)
 - Covered, protected bin or area for filled safety boxes
- Frequency of collection
- Storage of boxes at incinerator prior to burning
- Agreements among health facilities and incinerator for pick up and delivery of safety boxes
- Monitoring and recording systems
- Supervision

ANNEX 3: Transporting filled safety boxes

Safety boxes are designed for safely storing, carrying, and transporting syringes. Once filled to the maximum fill line these boxes may be transported by:

1. Hand carrying.
2. Bicycle or motorcycle.
3. Dedicated vehicle (eg. a truck used only for waste collection).
4. Dedicated trailer towed by a vehicle (i.e. a trailer used only for waste collection).
5. A supply vehicle (eg. a truck used both for supply and waste collection).
6. A personnel-carrying vehicle.



IMPORTANT!!

If safety boxes are transported by a supply vehicle or a personnel-carrying vehicle, the following precautions should be observed:

- The safety boxes should be **kept dry** (otherwise they become weak and burst open, spilling contaminated syringes).
- The safety boxes should be **stacked upright**, standing on their bases, not on their sides (they are not strong enough to resist weight and they collapse when stacked on their sides).
- The safety boxes should be **loaded by their handles**, not held by their sides (there is a risk of needle-stick if the box has been punctured).
- The safety boxes should be stored in **vehicles without direct contact with drugs, vaccines or other medical supplies** (they may contaminate the packaging of clean supplies).
- After each journey carrying safety boxes, the vehicle interior should be **cleaned with surface disinfectant**, such as 1:20 diluted household bleach.



ANNEX 4: Syringe safety boxes

Safety boxes (also known as “sharps containers”) are puncture- and water-resistant containers for the safe and convenient disposal of used syringes and needles and other contaminated sharps.

- Health workers must be trained to correctly assemble and use safety boxes.
- Different safety boxes are assembled in different ways—instructions are usually printed on each box.
- Safety boxes should be filled only once (to the fill line, if needles are attached).
- Filled safety boxes should be transported and stored upright. When they are used correctly, safety boxes can help prevent disease-spreading needle-stick injuries.

Safety boxes are usually made in 5-liter or 10-liter sizes with the following syringe capacity and weight (figures are approximate as they depend on syringe type).



Approximate Capacity of Safety Boxes

	<u>5 liter</u>	<u>10 liter</u>
Number of syringes with needles	100	200
Number of syringes without needles	235	470
Weight, syringes with needles	0.5 kg	1.0 kg
Weight, syringes without needles	1 kg	2 kg

ANNEX 5: Incinerating filled safety boxes

Whenever possible, syringes in safety boxes should be completely destroyed in a special incinerator. Incinerators should be double chambered and able to reach temperatures of at least 700°-800°C, so the plastic is destroyed completely and the smoke emission is less. Large hospital incinerators should be used if they are available.

Minimum requirements for proper use of an incinerator are the following:

1. Operation procedures manual
2. Maintenance schedule
3. Ash pit
4. Trained operator



De Montfort small-scale incinerator, 600°-800°C



Hospital incinerator, 1,000°-1,300°C



SICIM district, incinerator 700°-900°C



Waste types not to be incinerated:

- ❑ **Pressurized gas containers.**
- ❑ **Large amounts of reactive chemical waste.**
- ❑ **Silver salts and photographic or radiographic wastes.**
- ❑ **Halogenated plastics such as polyvinyl chloride (PVC).**
- ❑ **Waste with high mercury or cadmium content, such as broken thermometers, used batteries, and lead-lined wooden panels.**
- ❑ **Sealed ampoules or ampoules containing heavy metals.**

Source: Safe management of waste for health care activities, WHO, 1999.

Advantages:

- Provides complete and efficient destruction of syringes because temperatures are high (600°-1300°C).
- Consistent with standard hospital policy and practice.
- Can be used to destroy other infectious waste.
- Lower environmental emission hazard than open burning.
- Less smoke during operation than open burning.

Disadvantages:

- Cost is between US\$1,000-\$12,000 installed.
- If the incinerator is not close to the place where injections are given, the filled safety boxes must be transported to the incinerator.
- Training and supervision is required for proper use and maintenance.
- Small-scale incinerators require fuel or wood. Large incinerators need electricity.
- Small-scale incinerators are only feasible if they are placed far from buildings. Smoke and noxious emissions may not be tolerated in urban areas.
- Potential exists for needle-stick injury if needles are not removed.
- To avoid toxic emissions, the health worker needs to carefully control the kinds of waste incinerated.

ANNEX 6: Needle removers

Needle removers separate used needles from their hubs (or from syringes if they are directly fixed). There are different kinds of needle removers, but usually the needle drops into a small container after separation, then the syringe is discarded in a safety box. When the needle container is full, it is released from the needle remover and emptied into a sharps pit (see Annex 7).

Needle removers must be used immediately after each injection to minimize risk of needle-stick injuries. The needle remover must therefore be in direct reach of the person giving the injection, whether the injection is given in a clinic or at an outreach site. Thus, each “injection station” must have its own needle remover.

Once the needle has been removed from the syringe, the syringe must immediately be placed in a safety box or safety bag.



There are many kinds of needle removers on the market. This is the “Balcan Mini.”



WARNING!

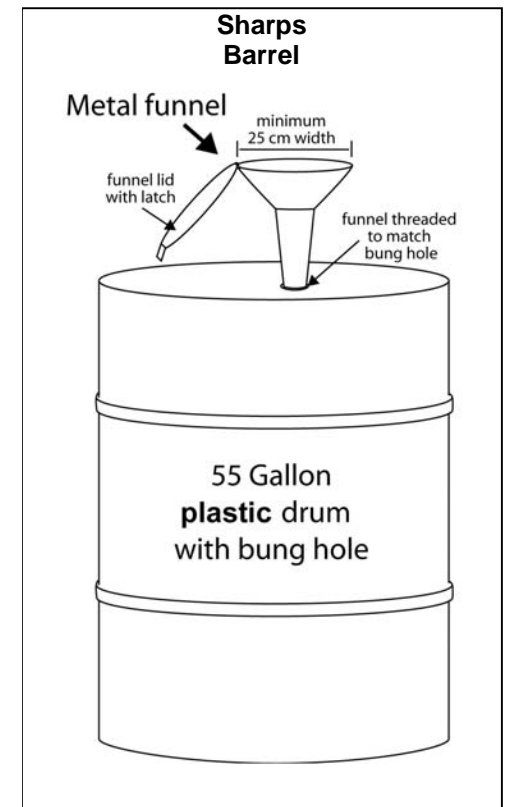
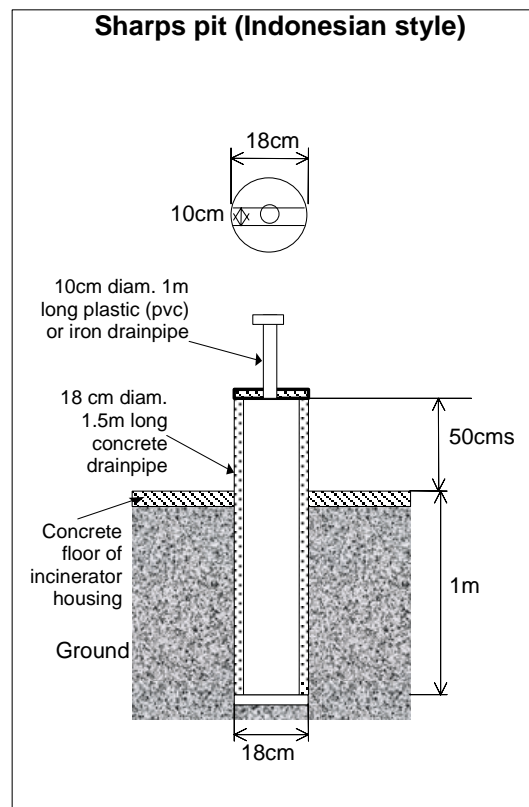
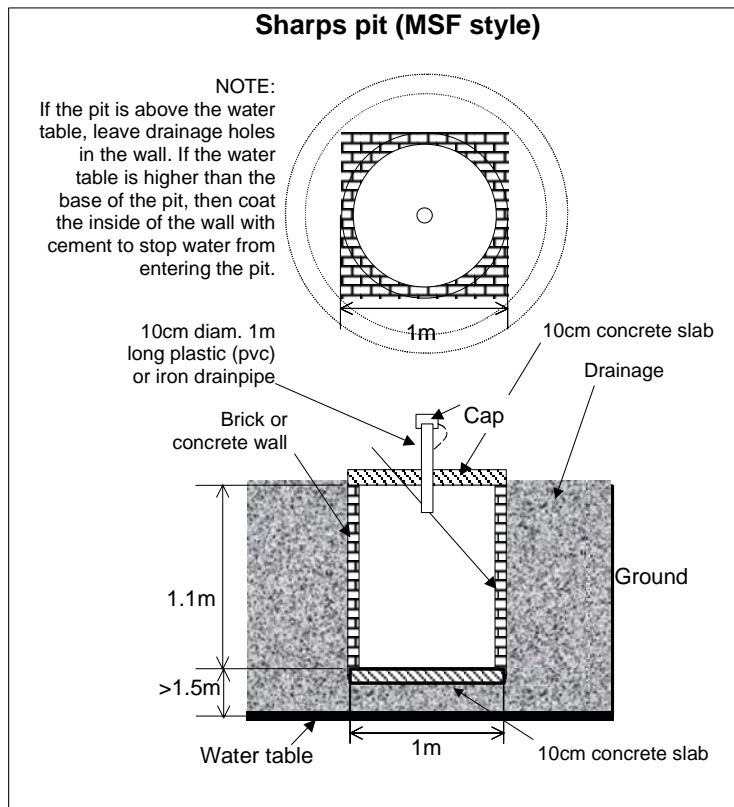
If the used syringes are collected at point of use and later carried to the needle remover as a batch, there is a high risk of needle-stick injury!

For safety reasons, needle removal must take place at the time and place of injection, every person giving injections should have their own needle remover close at hand.

ANNEX 7: How to build a sharps pit and sharps barrel

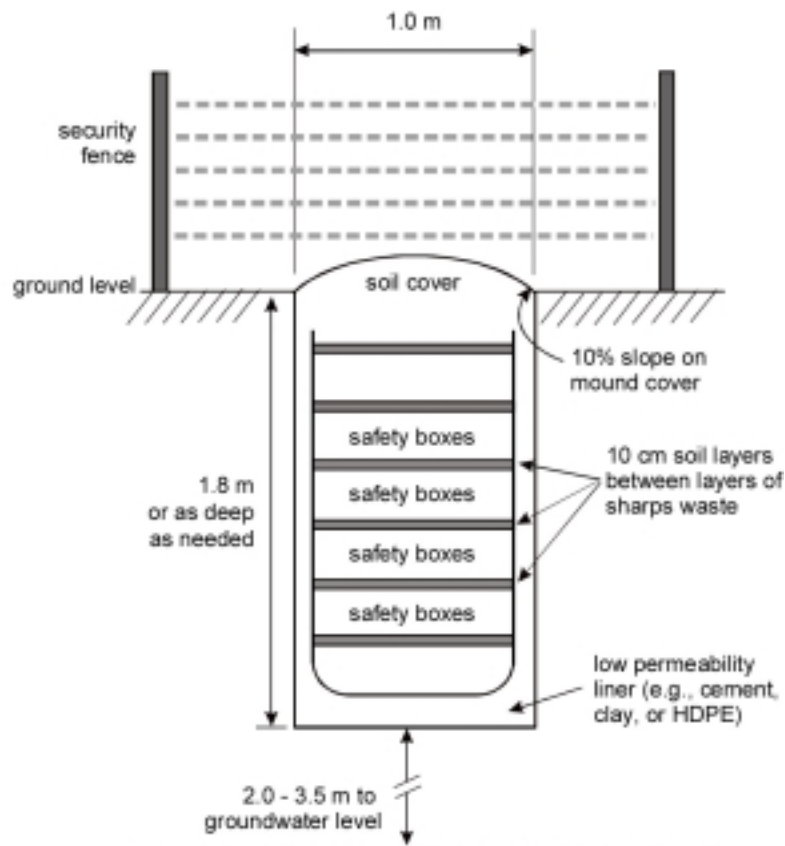
A sharps pit is a covered and lined pit used only for needles and other small sharps—not for bulky sharps such as syringes.

- One hundred needles occupy 106 cm^3 , so a pit of about 1 m^3 internal volume can hold about 1 million needles. The drawing below shows how to construct such a pit.
- A health center providing 200 immunization injections per month would provide at least 24,000 injections for all purposes in one year (assuming immunizations are 1/10 of all injections given).
- In that facility, a pit of 1 m^3 used exclusively for needles, would be sufficient for at least 42 years.



ANNEX 8: How to build an infectious waste burial pit

An infectious waste burial pit is easy to use and maintain, but there are some disadvantages. A pit of this size can be difficult to dig if the ground is hard, and waste pits are not appropriate where heavy rains or floods are common or where the water table is near the surface. And unlike incineration or burning, burying safety boxes in a pit does not reduce the volume of waste. However, if a burial pit is the best solution for your situation, this is the best way to construct the pit:



Materials needed for construction

- Tools (shovels, pickaxe).
- Concrete or corrugated iron rings.
- Fencing material.

Building the pit

- Select a proper site for the pit:
 - Do not dig the pit close to water sources such as wells or spring water.
 - The ground should be of low permeability.
- Dig a hole approx. 1 m diameter x 2 m deep.
 - Insert rings if necessary to reinforce the hole.
 - A fence should be put round the burial pit to avoid accidents and unauthorized access by humans or scavengers.
- Line the bottom of the pit with a material of low permeability, such as clay.

Using the pit

- Dump only non-anatomical waste in the pit.
- Seal the pit with soil and concrete **before** it is full of waste. Leave approximately 50 cm to properly seal off the pit.
- The abandoned pit must be marked with a warning so that it is not used in the future.

Source: Waste management and disposal during the Philippine follow-up measles campaign 2004: a joint report by Health Care Without Harm and the Philippine Department of Health. June 17, 2004.

NOTES