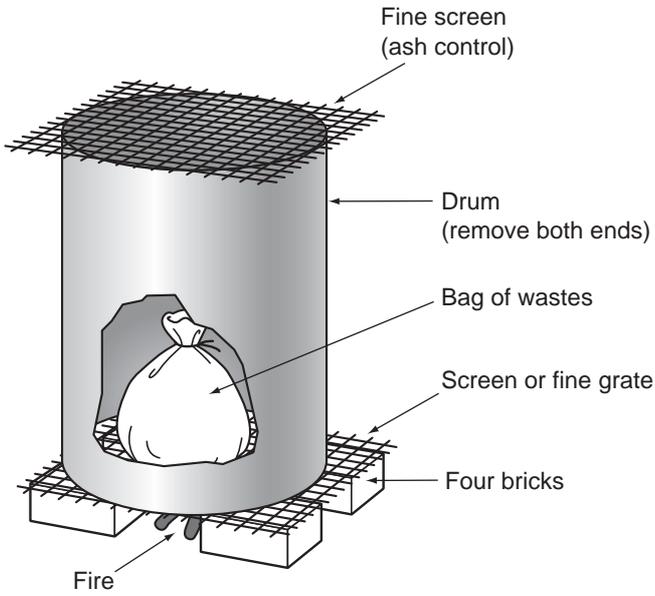


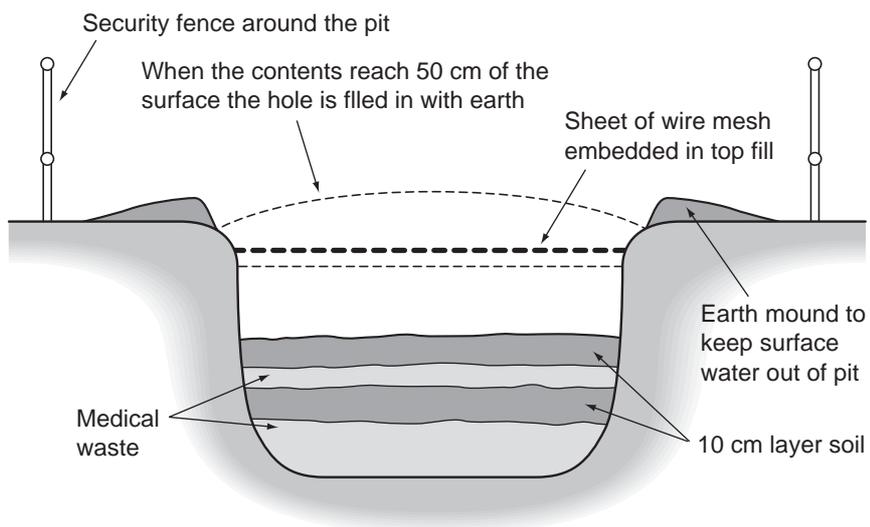
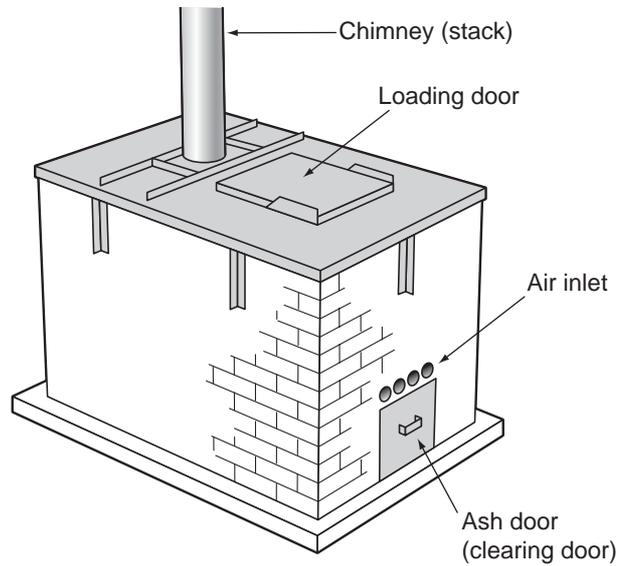
Table 2.14 Different methods of waste disposal

Method	Comments	Advantages	Disadvantages
Incineration	<p>Incineration is often the simplest and most appropriate waste disposal method, although not necessarily in urban settings or small facilities. Incineration should be carried out at least twice a week. Suitable on-site options include a simple, low-cost, low-maintenance, 2-chamber incinerator that uses locally available fuel, can reach a temperature greater than 800°C, is easy to operate and maintain, and can incinerate approximately 10kg of waste per hour, e.g. the DMU incinerator or the Medcin 400:</p> <ul style="list-style-type: none"> - DMU incinerator, designed to be built on site using bricks, firebricks and steel, uses local fuel (wood or charcoal or kerosene or diesel). - Medcin 400, pre-assembled, gas incinerator. <p>See Appendix 1 for more information.</p>	<ul style="list-style-type: none"> • Reduces volume and weight of waste. • Makes waste unusable. • Prevents scavenging • Decontaminates and produces less hazardous waste and non-infectious debris. • Does not require highly trained operators, but staff must be trained in safe and correct use of incinerator. 	<ul style="list-style-type: none"> • Running costs, e.g. fuel, may be too high for some health facilities. • Not environmentally friendly.
Burning	<p>Burning is one of the most common methods of waste disposal and is an acceptable alternative if incineration is not possible. Burning waste in a shallow pit or drum, e.g. the Dunsmore drum burner, is safer for operators and less of a hazard than uncontrolled open burning. After waste burning is completed, ash and other debris should be removed from the drum or pit and buried safely.</p> <ul style="list-style-type: none"> - Dunsmore drum burner, 210 litre steel drum, with both ends removed, placed over a fire. (Other fire-resistant material, e.g. a large section of clay pipe, can be used instead of a steel drum). Burns one bag of waste at a time. A strong metal grate holds the burning waste above the fire, and a fine screen on top of the drum prevents ash blowing out. 	<ul style="list-style-type: none"> • Reduces volume and weight of waste. • Makes waste unusable. • Prevents scavenging. • Produces less hazardous waste and non-infectious debris. • Low cost. 	<ul style="list-style-type: none"> • Can be difficult to burn waste completely without generating smoke and to maintain a high temperature. • Partially destroyed or decontaminated waste material can be hazardous. • Requires mixing with material that burns easily, e.g. wood shavings. • Not environmentally friendly.
Burying in a deep pit	<p>The pit should be 4-5m deep and 1-2m wide and its boundary lined with material, e.g. clay that prevents pollution of drinking water sources. Only use in areas where there is no risk of flooding, the water table is low and will remain at least 1.5-2m below the base of the pit even during the rainy season.</p> <p>Cover each load of waste with a layer of soil, leaves or ash to prevent bad smells, avoid attracting insects and rodents, and to speed up decomposition.</p> <p>Protect the pit and prevent accidents with a tight-fitting cover over the opening.</p> <p>You may need more than one pit if your facility produces a lot of waste.</p>	<ul style="list-style-type: none"> • Low cost. • Relatively safe, if waste is buried properly. 	<ul style="list-style-type: none"> • Can pollute water if the soil is permeable or the pit is too close to the water table. • Only practical for a short time. Once available space is filled a new pit is needed. • Must be protected with a fence or guarded to prevent scavenging.
Encapsulation	<p>Encapsulation involves filling a plastic or metal container with waste, adding 'immobilising' material, e.g. cement mortar, clay or bitumous sand, when the container is about ¾ full, waiting for the material to dry, then sealing and burying the container.</p>	<ul style="list-style-type: none"> • Simple and safe. • Suitable for drugs, chemicals, sharps. • Prevents scavenging. • Reduces water source pollution risk. 	<ul style="list-style-type: none"> • Can be costly. • Not recommended for infectious or non-sharps waste, because of the large volumes involved.

Dunsmore drum burner
for health care waste



DMU incinerator for mixed
health care waste



Burial pit for health care waste

Table 2.15 Different types of waste

Waste type	Disposal method	Comments
Infectious waste Waste contaminated by blood, body fluids, laboratory cultures, dressings and other materials that have been in contact with infected patients	Incineration Burning	Collect in good quality plastic or metal buckets with close-fitting lids or leakproof plastic bags. If possible, use double packaging, e.g. plastic bag inside bucket. Keep buckets covered, empty them when they are almost full, clean and disinfect between use. Collect infectious waste and general medical waste together rather than separately (see below). Certain infectious waste, e.g. sputum from TB patients should be disinfected before disposal in accordance with national guidelines.
General medical waste Syringes (without needles), bandages, swabs, paper, gloves	Incineration Burning	Collect in a good quality plastic or metal bucket with a close-fitting lid, along with infectious waste. Incinerate or burn used syringes that have been separated from needles. Do not bury waste that will not decompose, e.g. plastic or metal items. Incineration or burning reduces the volume of waste.
Drugs and vaccines Expired, damaged or spoilt, unused, unidentifiable	Return to supplier Incineration Burning Encapsulation Discharge to sewer Pit latrine	Follow national procedures for dealing with expired, damaged and unidentifiable drugs and vaccines. Keep a register of action taken or disposal method. Inform your supervisor. It is important to dispose of drugs and vaccines carefully to prevent pilfering, re-sale and re-use of expired or ineffective drugs and vaccines. For this reason, do not throw them away in their original packaging. Collect in lockable containers and keep separate from other supplies in a secure, locked place. Dilute mild cough mixtures, IV solution, eye drops with large amounts of water and pour down the sink or into a pit latrine. Pour in more water after disposal. Incorrect disposal can potentially contaminate water supplies. In practice, expired or damaged items that were supplied by the government health system, should be returned to the district store for disposal. Mark items as 'expired' or 'damaged' when returning to sender. Incineration and burning is only suitable for disposing of small quantities of drugs, but could be used for expired or damaged drugs provided from sources other than MOH, when it would be too expensive to return to sender. If drugs are still usable, try to find another health centre that can make use of them.
Chemical waste Unused, expired reagents, disinfectants	Incineration Burial in deep pit	Collect in a good quality plastic or metal bucket with a close-fitting lid. Follow the same disposal methods as for infectious waste if you have the authority to dispose of chemical waste or, preferably, return reagents and undiluted and expired disinfectants to the district store.
Waste containing heavy metals Batteries, BP gauges, broken thermometers	Recycling Encapsulation Burial in deep pit	Collect in a good quality plastic or metal bucket with a close-fitting lid. Do not burn or incinerate because waste containing heavy metals is toxic and pressurised containers may explode. Encapsulation is the safest method for dealing with this type of waste.
Delivery waste Placenta, aborted foetus	Pit latrine Placenta pits	Collect in plastic bags or, if not available, plastic buckets with close-fitting lids. Health workers should only deal with placenta or aborted material if this is culturally acceptable. In some cultures, the family will want to take the material home.

Waste type	Disposal method	Comments
Sharps Needles, needles and syringes, blades, scalpels, broken glass, ampoules, infusion sets	Incineration Burning Encapsulation Burial in deep pit	Sharps are hazardous and need careful handling, as there is a risk of needlestick injury, cuts and puncture wounds, and of infection of these wounds if sharps are contaminated or through subsequent handling of waste. Dispose of single use needles and syringes after one use and of reusable needles and syringes when these are damaged or worn out. Never recap or remove used needles from the syringe by hand. Collect used sharps in safety boxes or puncture resistant sealable containers, not flimsy cardboard boxes. Keep containers close to where sharps waste is generated. Tape over the hole and dispose of the container when it is nearly full. Throw it into a deep pit, incinerate or burn. Destruction by incineration at a temperature above 800°C (lower temperatures will just make the sharps soft and pliable) is the best method, although care is needed to avoid potential needlestick injuries when emptying the incinerator. Sharps, including needles in containers, should be mixed with other waste before incinerating or burning.
Organic waste Food and vegetable matter	Compost pit Organic waste pit	Collect in a bucket with close-fitting lid. Biodegradable waste, including animal dung, can be composted and used as fertiliser after 4-6 months.
Cholera waste Cholera stools and vomit	Chemical disinfection Pit latrines Burial in deep pit Incineration Burning	This is highly infectious waste. Put liquid waste (stools and vomit) in a pit latrine or bury it. Disinfect it first by mixing it with disinfectant, such as cresol, lysol or bleach. Incinerate semi-solid waste. If this is not possible, burn then bury it. Collect cholera waste separately and keep it separate from other waste, if possible in single use plastic bags. Disinfect buckets and containers used for collecting all types of cholera waste, preferably with 150ml of 2% chlorine, each time after emptying.