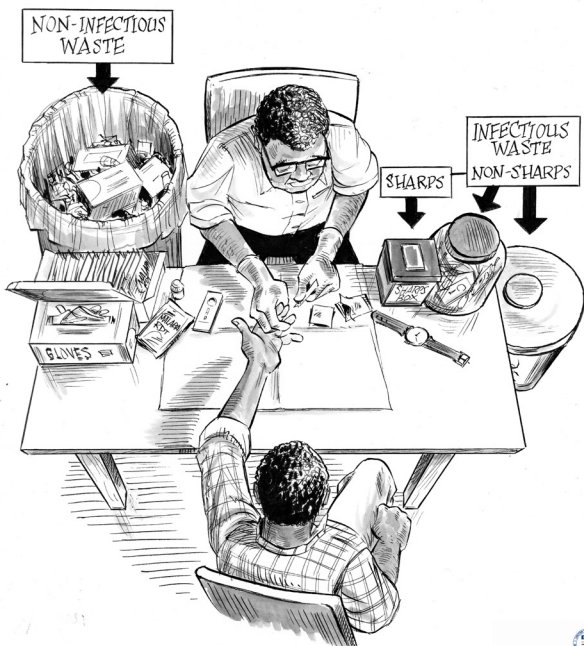




# Health Care Waste Management of Malaria Rapid Diagnostic Tests in Health Clinics



This publication was produced for review by the U.S. Agency for International Development. It was prepared by the USAID | DELIVER PROJECT, Task Order 3.

## **USAID | DELIVER PROJECT, Task Order 3**

The USAID | DELIVER PROJECT, Task Order 3, is funded by the U.S. Agency for International Development (USAID) under contract no. GPO-I-03-06-00007-00, beginning April 6, 2007. Task Order 3 is implemented by John Snow, Inc., in collaboration with PATH; Crown Agents Consultancy, Inc.; Abt Associates; Fuel Logistics Group (Pty) Ltd.; UPS Supply Chain Solutions; Family Health International; The Manoff Group; 3i Infotech; Center for International Health and Development (Boston University School of Public Health); and U.S. Pharmacopeia (USP). Task Order 3 supports USAID's implementation of malaria prevention and treatment programs by procuring, managing, and delivering high-quality, safe, and effective malaria commodities; providing on-the-ground logistics capacity, technical assistance, and pharmaceutical management expertise; and offering technical leadership to strengthen the global supply, demand, and financing of malaria commodities.

### **Recommended Citation**

USAID | DELIVER PROJECT, Task Order 3. 2011. *Health Care Waste Management of Malaria Rapid Diagnostic Tests in Health Clinics*. Arlington, Va.: USAID | DELIVER PROJECT, Task Order 3.

### **Abstract**

This publication is intended for all the staff at health centers that use malaria rapid diagnostic tests (RDTs) and must dispose of the waste from the tests after they are used. Included are descriptions of the basic principles of waste management and specific solutions for managing the waste.

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# Acknowledgments

Special thanks to the people who contributed to the writing, reviewing, and editing of material for this publication, including Thidiane Ndoye, Jim Eberle, Lisa Hare, Paula Lancaster, Pat Shawkey, and Heather Davis.



# Acronyms

|       |   |
|-------|---|
| HCW   | health care waste                         |
| HCWM  | health care waste management              |
| HIV   | human immunodeficiency virus              |
| PMI   | President's Malaria Initiative            |
| PPE   | personal protective equipment             |
| RDT   | rapid diagnostic tests                    |
| USAID | U.S. Agency for International Development |
| WHO   | World Health Organization                 |





# Introduction

Many countries in Africa have developed and are implementing a national strategic plan for malaria control; numerous partners are supporting them, including the President's Malaria Initiative (PMI). These countries have a high incidence of malaria and a relatively weak laboratory infrastructure, which makes it difficult to confirm the suspected cases of malaria. Most of the countries have been unable to regularly use the appropriate malaria laboratory tests.

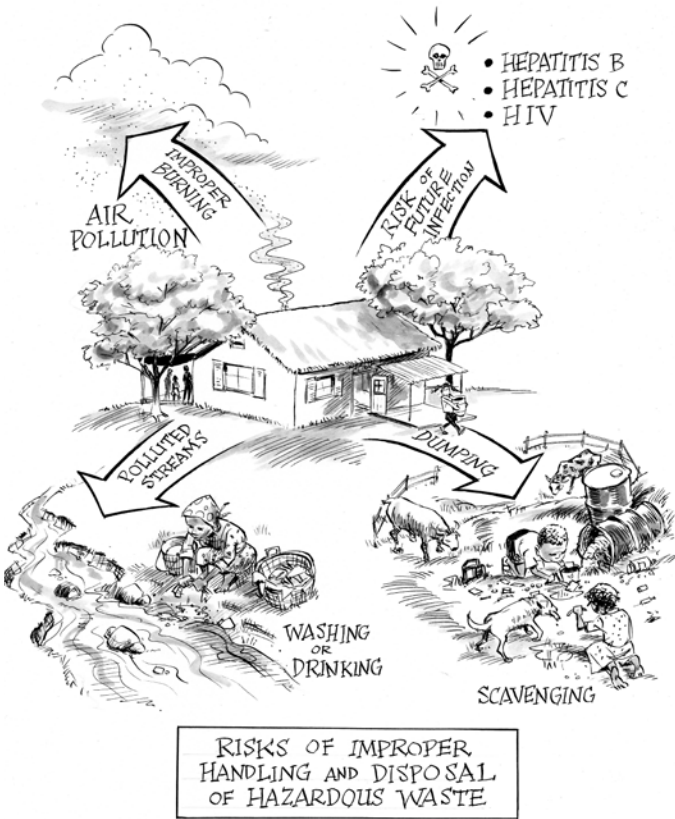
In 2010, the World Health Organization (WHO) revised the policy on the diagnosis and treatment of uncomplicated malaria. WHO now recommends that all health center patients with a fever, including children less than five years of age, be tested for malaria. If microscopy is not available, the facility should use a rapid diagnostic test (RDT).

If countries increase the use of RDTs in response to the WHO revised policy, the number of RDTs being sent to health facilities and community health workers is expected to increase significantly. The volume of RDTs used by the health facilities at the peripheral level and by the community health workers also has implications for the management of health care waste (HCW).

RDTs for malaria are providing much-needed access to diagnosis in remote areas where laboratories are not available. The problems associated with storing and transporting RDTs from higher-level facilities down to

the health centers is well documented. This guide focuses on how to manage the waste from the RDTs after the test has been used.

Some waste generated from RDTs can be infectious—used sharps (lancets and needles) can cause serious injury or illness. If they are contaminated with blood or other body fluids, they can cause infection with hepatitis B, hepatitis C, HIV, and other infectious diseases. To protect



health personnel, waste handlers, and the community against potential injury, all providers must establish safe, environmentally sound ways to handle and dispose of waste. Inappropriate handling and disposal will have serious implications for everyone's health.

In resource limited settings, it is often difficult to correctly dispose of HCW. This document offers solutions that are based on actual experience in developing countries.

# What Is Health Care Waste Management?

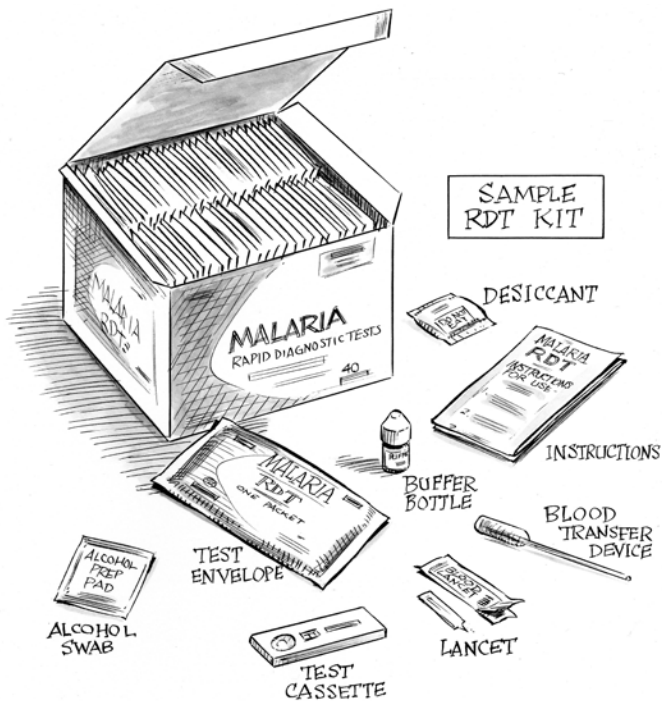
Medical or HCW are unusable by-products that health facilities produce when they administer medical tests or perform medical procedures. HCW is divided into two categories: general (non-hazardous) and hazardous (poses a risk). According to WHO, approximately 25 percent of HCW is hazardous. Although hazardous waste can be classified in many different categories, for this document, it is divided into two categories:

- infectious (pathological, anatomical, and sharps)
- chemical and pharmaceutical.

Sharps are the most common hazardous waste generated by a small health facility. Facilities also generate hazardous waste when they use some pharmaceuticals and chemicals, such as expired drugs and cleaning solvents.

RDTs for malaria are usually packaged in boxes that are approximately 40 centimeters (cm) × 40 cm × 30 cm. Each box contains approximately 40 packets. Each packet contains the components needed to administer about 25 tests. The contents of a typical box of RDTs—which may vary, depending on the RDT product or brand—are shown in the sample RDT kit diagram. Those components of an RDT kit that come into contact with blood upon use are considered hazardous waste.

Health care waste management (HCWM) is the science of processing and disposing of HCW, which is a major health and environmental concern. Waste from sharps



is highly infectious and poses a serious threat to both service providers and the general public if it is not handled and disposed of properly. Other hazardous waste also poses serious risks to human health and the environment.

# What Are the Steps for Health Care Waste Management?

## Seven Steps for Health Care Waste Management (WHO)

1. *waste generation*. The activities in a health care setting that generate waste.
2. *waste minimization*. The practices employed to reduce waste.
3. *waste segregation*. The practice of separating the waste by category—based on infectious, non-infectious but hazardous, and general waste—and collecting it in separate containers.
4. *internal handling and transport*. Usually consists of moving waste to a central storage area, generally from the point of generation to an on-site storage or treatment facility.
5. *on-site storage*. Where waste is stored prior to pick-up for external transport to the final treatment, or disposal area, or some other site.
6. *external transport*. The transport of waste from the health facility pick-up area to a treatment or disposal area.
7. *treatment and disposal*. Disposal methods include incineration, safe burial in a protected pit, or offsite disposal in a municipal landfill.

# How Can We Minimize Waste?

All health care facilities have one or more areas where waste is generated. For RDTs, these areas are usually in patient care rooms or laboratories. The easiest way to manage waste from RDTs is to minimize the amount of waste that is generated. Some options to minimize waste are—

- Most important, all facilities need to have and follow good procurement and stock management practices. Never allow RDTs and associated commodities to expire or become unusable.



- When possible, recycle the contents of the RDT kits; you can recycle the box and the instruction booklet.
- Save unused items, such as alcohol swabs, for other purposes; do not discard them after using the other kit components.



# What Is Waste Segregation?

When you segregate HCW, you separate waste into infectious and non-infectious components. Infectious waste includes anything that may have been in contact with blood or other bodily fluids. Non-infectious waste is general waste and includes items that have not been in contact with blood or other bodily fluids. To avoid injury, it is also important to separate infectious sharps from other infectious waste.

The contents of RDTs can be divided into—

Infectious waste:

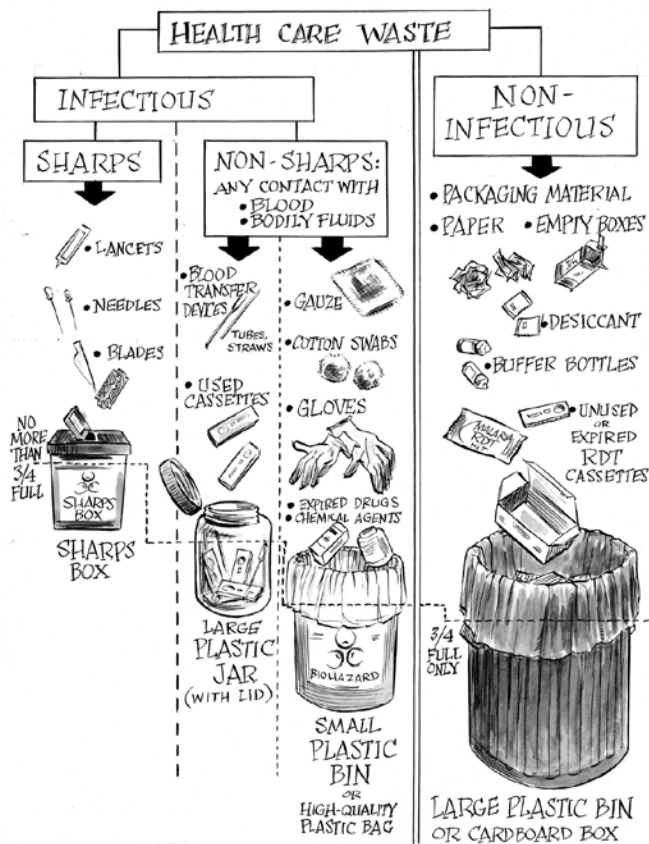
- sharps (lancets, needles, scalpel blades)
- blood collection devices (tubes, straws, and loops); gloves; swabs; and cotton
- used cassettes.

Non-infectious waste:

- packaging materials, desiccant, buffer, and unused or unusable RDTs.

You must collect each type of waste in separate containers:

*Sharps:* Usually dispose of these in safety boxes (either cardboard or plastic). If standard safety boxes are unavailable, use alternative containers, such as plastic bottles. Never overfill safety boxes. In general, stop using the containers when they are 3/4 full; make sure they are securely closed. *Other infectious waste:* You will usually collect this inside a bin (or plastic bag, if available).



Typically, these bins or bags are colored either yellow or red. If yellow or red bins/bags are not available, use a different color from the bins/bags used to collect non-infectious waste. If you use a bin, ensure that the bin of infectious waste is emptied every day and cleaned with bleach. If you use a plastic bag, change the bag at the end of each day. Use only high-quality plastic bags that

do not rip. In all cases, do not overfill the plastic bags or bins; remove or empty them when they are 3/4 full.

*Non-infectious waste:* This does not require any special processing; you can collect the waste in a bin, plastic bag, or other collection device (e.g., cardboard box). You are strongly advised to use one color bag for the bin or plastic bag and a different color bag for the bin or plastic bag used to collect infectious waste. These bins and bags are usually black. Dispose of non-infectious waste in a burial pit on-site or send it out for waste processing.

# What Guidelines Apply to Internal Handling and Transport?

Moving health care waste can be dangerous, even if you are only moving it a few feet. Waste handlers must always wear protective clothing (called personal protective equipment [PPE]). PPE protects health care workers, including waste handlers, from injuring themselves or contracting a disease. At a minimum, you must wear rubber boots (or sturdy working shoes) and strong rubber gloves. Ideally, all waste handlers should wear goggles or a mask, strong rubber gloves, rubber boots, and a rubber apron.

Never allow waste to accumulate. Collect it daily, or as often as possible.

Use dedicated wheelbarrow trolleys or carts to transport waste internally. Follow specific routes within the facility to prevent waste from being transported through clean areas. Use trolleys or carts that are easy to operate and clean. Regularly, clean trolleys or carts with bleach or another strong cleaning agent.

To avoid cross-contamination, transport non-infectious waste separately from infectious waste.

## PERSONAL PROTECTIVE EQUIPMENT



MASK



GOGGLES



HEAVY  
RUBBER  
GLOVES



RUBBER  
APRON



RUBBER  
BOOTS



# Why Is On-Site Storage Important?



TEMPORARY STORAGE ON SITE:  
WASTE SEGREGATED IN CUBICLES —  
GATED AND LOCKED

Establish a central storage area to temporarily store waste prior to external transport and disposal. The size of the central storage area depends on the volume of waste generated and how often it is collected.

At a minimum, the storage area should have—

- easy access for waste handlers and waste-collection vehicles
- a hard floor with good drainage
- good lighting and ventilation
- a location away from food preparation areas and patient care areas
- an easy-to-clean area (near a water supply, if possible)
- a design that prevents rodents or other animals from entering the area.

Store infectious waste and non-infectious waste in different areas or cubicles; never mixed them together. Clearly mark the areas and allow only authorized personnel to enter.

Prior to disposal, do not store infectious waste at the central storage area for more than 48 hours. Ensure that the storage area is secure; if it is outside, fence it in and cover it.

# How Do We Manage External Transport?

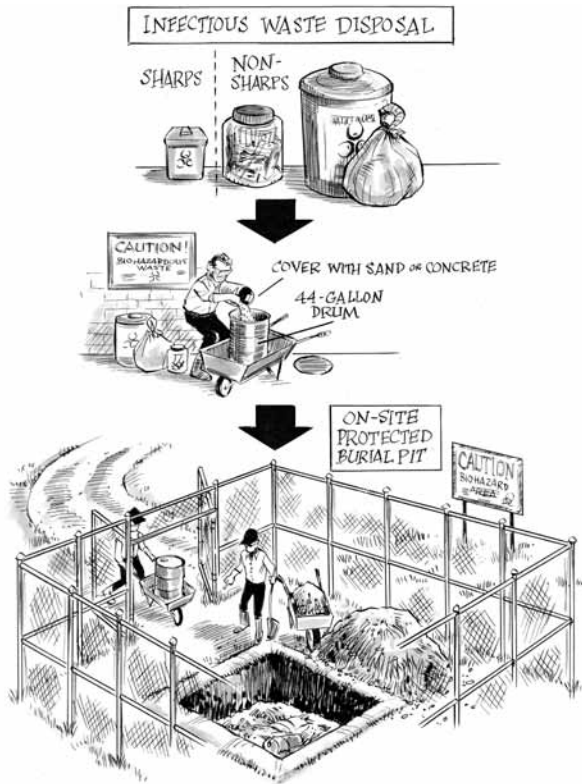
If you must transport health care waste to an offsite destination for disposal, document the transportation and ensure that all vehicles are carrying a consignment note (or other proof-of-delivery document) from the point of collection to the disposal site.

Do not use vehicles that carry infectious waste for any other purpose. The vehicles should be easy to load and unload and to clean and disinfect. Ensure that they are large enough to carry the waste and are fully enclosed to prevent any spillage.

Package the waste, as specified above, in sealed bags or containers. Ensure that the bags or containers are puncture-proof and able to withstand any damage that may result from vibration, high temperature, or other changes in the environment.



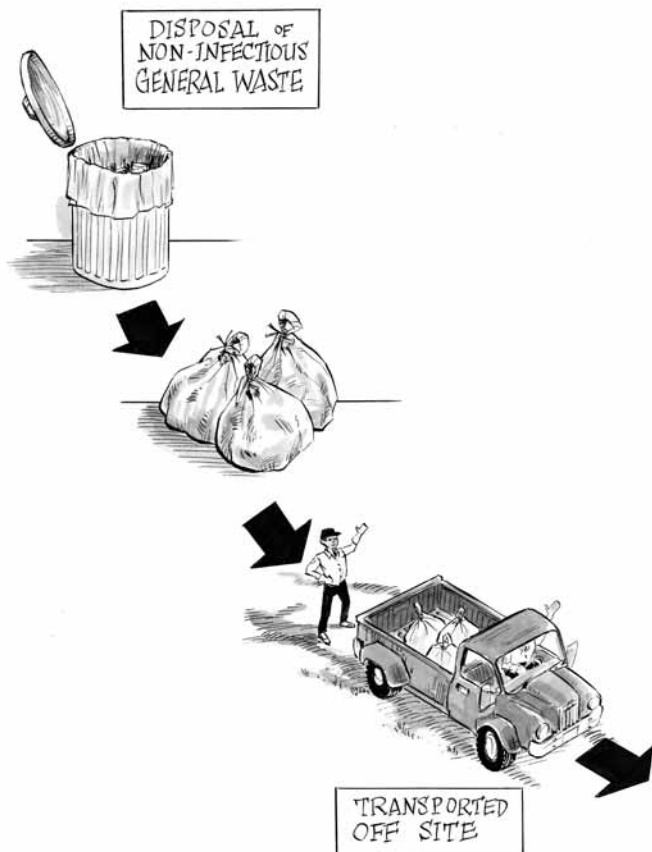
# What Guidelines Apply to Disposal?

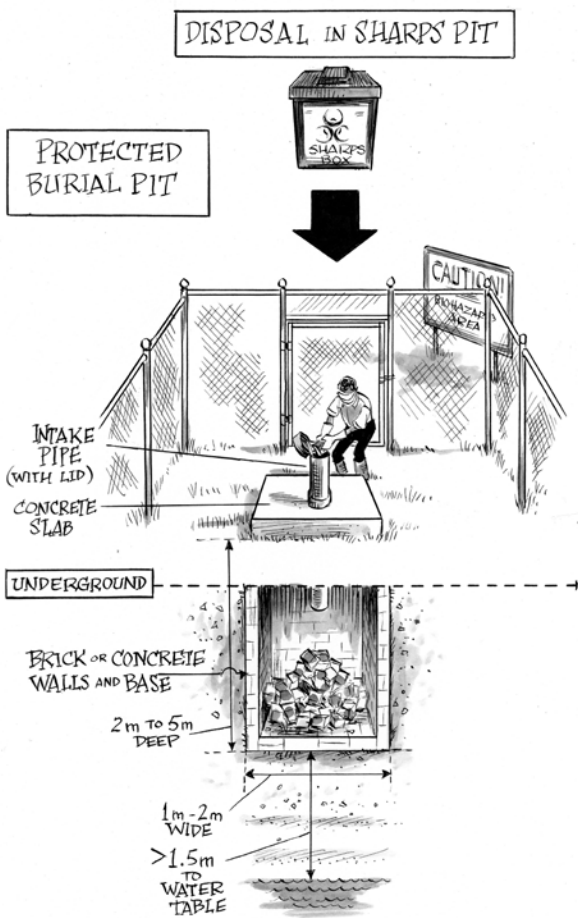


The final disposal of HCW is of the utmost importance. Health care facilities often inappropriately handle the disposal of health care waste, unless otherwise instructed. Facilities often burn infectious waste at low temperatures and use a disinfectant to treat hazardous waste that cannot

be burned. Safe disposal of sharps waste is difficult in these circumstances because, for complete destruction, they must be incinerated; low temperature burning will not completely destroy the sharps waste.

Because health care facilities, such as health posts or health centers, often cannot afford to meet international standards, they will use less-than-optimal solutions.





Therefore, if you cannot transport infectious waste or sharps waste to an offsite facility for disposal, your disposal options on-site are either burial pits or small-scale incinerators, such as the De Montfort.

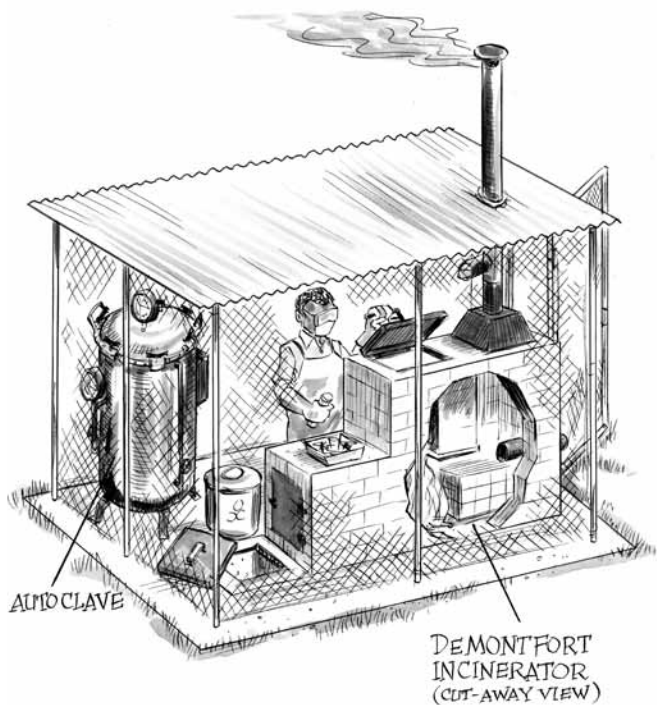
If infectious waste must be buried on-site, bury it in a pit that is at least 1.5 meters above the water table and 2 to 5 meters deep, and lined with clay. It is also important to add a layer of soil or sawdust after each layer of waste in the pit. Because used RDT cassettes are bulky they may fill the pit quickly, requiring a new pit. This makes transporting them to an offsite disposal facility or incinerating them the preferred method.

Sharps waste should be disposed of in either a sharps barrel or a sharps pit (which is preferred, if available). A sharps barrel is normally a drum or barrel (about 44 gallons). Place the barrel in a secure place and ensure that the barrel has a hole at the top. When it is 3/4 full, fill it with concrete and bury or dispose of it in an appropriate way (e.g., incineration).

A sharps pit is a deep hole in the ground with the floor and sides filled with clay, bricks, or cement. Ensure that the pit has a narrow hole through which sharps can be dropped. When the pit is 3/4 full, encapsulate it with concrete, and then bury it with other infectious waste.

You can treat general waste the same way you treat non-infectious waste, including the RDT packaging, desiccant, and buffer. If a burial pit is available, dispose of the waste on-site, or use offsite services, if they are available.

Although incineration at lower-level facilities is often challenging, small-scale incinerators are a good option at health centers and health posts, if they are well designed. Double-chambered combustion burners can reach the necessary high temperatures (800–900°C) if they are



correctly designed. The De Montfort incinerator is one example of a double-chambered small-scale incinerator; it has been constructed in many rural areas around the world. RDT sharps and used cassettes can be incinerated. You must wear PPE when you operate this type of incinerator.

# Why Does Monitoring and Supervision Matter?

Monitoring and supervising the activities related to HCWM is essential to ensure the safety of health care providers, waste handlers, and the general population. The public health system should appoint individuals to supervise waste management activities, adopt strict schedules to monitor the regulations, and take corrective action when it is needed. All aspects of waste management should be monitored, including the points of waste generation and segregation, the transfer of waste within a facility, the on-site storage, the external transport, and the final disposal.



MONITORING DISPOSAL  
IN BURIAL PIT



INSPECTION OF  
TEMPORARY ON-SITE STORAGE





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