

# Management of waste from injection activities at district level

## Guidelines for District Health Managers



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# INTRODUCTION

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## WHY SUCH A GUIDE?

Inadequate management and disposal of waste generated by injection activities such as sharps and infectious waste can have a negative impact, either directly or indirectly, on the health of medical staff and waste handlers, as well as on the community and environment. Much attention has been paid to tertiary health-care facilities located in urban areas where financial and human resources are more readily available.

However, due to financial and institutional constraints, limited efforts have been made to provide District Management Teams with simple and adequate guidelines to set-up health-care waste management plans for primary and secondary health-care facilities. In particular, management of waste from mass and routine injection activities remains problematic as significant quantities of disposable or auto-disable syringes and needles are generated, for which there must be safe disposal options.

This guide is designed as a simple and practical tool to help District Health Managers elaborate a realistic District level plan to reduce improper disposal of waste from injection activities.

*This guide puts a special emphasis on the management of sharps.*

## WASTE CATEGORIES GENERATED IN INJECTION ACTIVITIES ARE AS FOLLOWS:

### **Used sharps (most hazardous)**

- Needles
- Lancets
- Broken glass (vials, flasks)



### **Waste materials possibly contaminated by body fluids**

- Syringes without needles
- Gloves, gowns, masks
- Gauze, dressings, swabs
- Containers for medical purposes



### **General Waste**

- Packages, boxes, papers
- Disposable cups, plates
- Food and drink packaging
- Tissues, paper towels



## WHY FOCUS ON SHARPS?

If they are not properly handled and disposed of, sharps and more specifically needles are considered the most hazardous category of health-care waste for health-care workers and the community at large. This is because needle-stick injuries can easily occur and carry a high potential for infection.

### THE RISK OF ACCIDENTS WITH SHARPS:



Children playing with syringes and needles may be infected by needle-stick injuries



Stick injury of medical staff is a major source of infection



Needle stick injuries may cause Hepatitis B & C, HIV, sepsis etc.

## HOW IS THIS GUIDE STRUCTURED?

This guide is divided into seven sections and includes a poster which can be widely reproduced and distributed to health-care facilities. The sections correspond to the seven major steps District Health Officers should implement to improve sharps management, protect public health, limit the risk of needle-stick injuries and reduce negative effects of waste on the environment. A chronological checklist of actions, illustrations, as well as practical tools, are included.

## STEP 1. ASSESS THE SITUATION IN YOUR DISTRICT

### CHECKLIST OF ACTIONS

- Create an inventory (list and map) of all health-care facilities in the district including mobile sites, health-posts, primary health-care centres, district hospitals;
- For each health-care facility, record access and logistical constraints throughout the year (taking into account seasonal variations);
- Categorize and estimate the quantities of sharps generated (disposable syringes, lancets and other waste materials);
- Review waste handling, treatment and disposal practices and identify facilities with dangerous practices requiring urgent action.

This assessment should result in the identification of existing good practices and the prioritization of areas requiring improvements. For example:

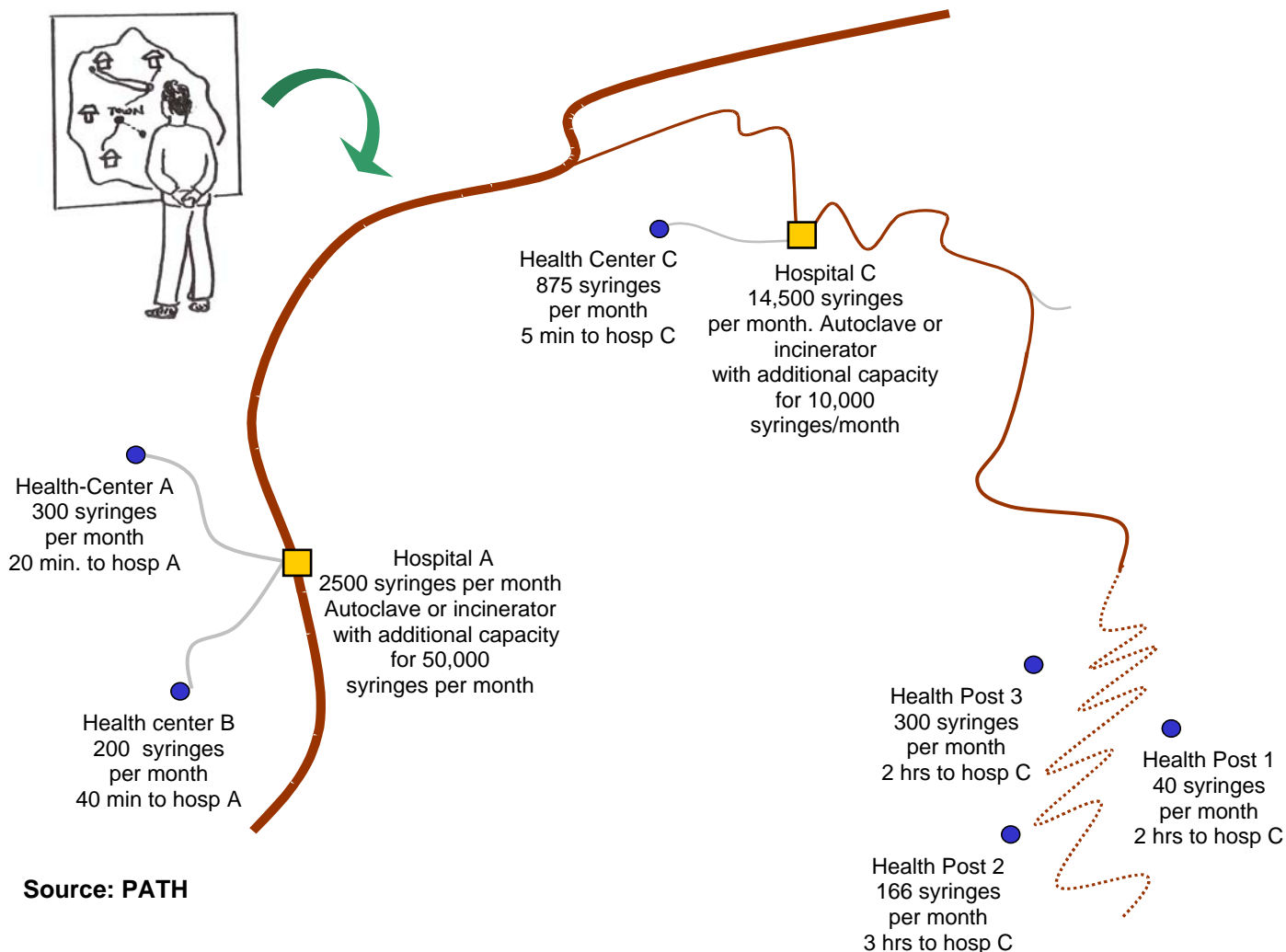
Good practices	Poor practices
<ul style="list-style-type: none"> <li>▪ Waste segregated into infectious and non infectious waste.</li> <li>▪ Entire syringe or needles collected in a puncture and leak proof container (with colour coding or bearing a biohazard sign/symbol). Alternatively, needles are removed immediately after injection via needle remover and disposed of on site.</li> <li>▪ Non-sharp infectious wastes are collected in bags (with colour coding or bearing a biohazards sign/ symbol).</li> <li>▪ Infectious waste bags and sharp containers are safely handled and transported (on-site).</li> <li>▪ Infectious waste bags and sharp containers are stored in secured places prior to transportation for treatment/disposal.</li> <li>▪ Availability and use of Personal Protective Equipment (PPE) and facility for washing hands for all persons handling waste.</li> <li>▪ Immunization of staff against Hepatitis B virus (HBV).</li> <li>▪ Regular supervision and correction of problems.</li> </ul>	<ul style="list-style-type: none"> <li>▪ No segregation of waste into infectious and non infectious matter, garbage contains syringes.</li> <li>▪ Waste disposed of in unprotected open dumps.</li> <li>▪ Reported cases of needle stick injuries in the community.</li> <li>▪ Lack of staff awareness about the risks from potentially infectious materials or blood-borne diseases.</li> <li>▪ Lack of know-how among staff in waste handling.</li> <li>▪ Insufficient staff and time dedicated to proper waste management (staff overload...).</li> <li>▪ Lack of supplies (PPE, Bags, sharp containers...) and/or improper use of those supplies.</li> <li>▪ Lack of money and know-how to build infrastructure.</li> <li>▪ Weak management and supervision of the waste management stream.</li> </ul>

## TOOLS YOU CAN USE

The following check list could be used for assessing existing practices:

Name of the facility : Location : Total number of workers :		Answer	Details
1	Is there a designated person in charge of waste management in the facility?		
2	Is there a written standard operating procedure (SOP) for waste management in the facility?		
3	Is there a system for segregation of waste in place?		
4	Are the staff aware of risks associated with improper waste handling?		
5	Are auto-disable syringes used for injection?	.....	For mass immunization campaigns? ..... For routine injection activities?
6	Are syringes discarded with their needles attached?		
7	Are needles separated from syringes after injection?		
8	If yes, how are they separated?		By hand, needle cutter, needle removal can/boxes, locally made devices...
9	What type of containers are used for sharps waste?		WHO safety boxes, rigid plastic safety containers, open bins.... What colour?
10	What type of containers are used for non-sharp infectious waste?		Bags, boxes, bins.... What colour?
11	Are syringes and needles disinfected before final disposal?	.....	needle ..... syringe
12	If yes, how are they disinfected?		Autoclave, boiled water, chlorine...
13	Are they processed in another way?	.....	Shredding, encapsulation on-site ..... Shredding, encapsulation off-site
14	What is the method of final disposal of all infectious sharps?		Open dumps, Protected pit, on-site incineration, controlled landfill, municipal facility...
15	Is there a secured waste storage area on site?		
16	How are safety boxes, bins, waste bags transported within the facility?		By hand, wheeled waste vehicles, wheelie bins or trolleys
17	How are safety boxes, bins, waste bags transported outside the site of the facility?		By hand, using public transport, shared-use vehicles, dedicated waste vehicles, motorcycle or bicycle....
18	For how long, on average, is waste stored on-site?		
19	Is there a specific budget for waste management?		% of total budget or amount

It may be **helpful to construct/design and use a map** of the district when quantifying waste generated in each facility which needs to be processed at a chosen site. Such a map would show the facilities generating infectious waste, the approximate quantities generated per month, and the sites that have the capacity to dispose of such waste because they have adequate infrastructure, staff, transport, etc.. An example is given below:



**Source: PATH**

**Note.** *this specific mapping considers only syringe/needles. The volume of non-sharps infectious waste should be included to show a complete picture of waste generated*

The following table may help you quantify the infectious waste generated by health facilities in your district and identify facilities that have the capacity to treat and dispose of waste from neighbouring facilities. Accessibility is defined as the possibility for a vehicle to travel on a regular basis to the waste treatment and disposal site depending on weather conditions.

**District of:** \_\_\_\_\_ **Date of survey:** \_\_\_\_\_ **Filled by:** \_\_\_\_\_

Health care setting			Logistics				Sharps	
Name	Type	Location	Final treatment & disposal site	Distance (Km)	Road condition	Accessibility	Type of syringe	Quantity Nb/month
								Total district/month

## STEP 2. WASTE HANDLING, TREATMENT AND DISPOSAL OPTIONS

### HANDLING AND DISPOSAL OPTIONS WHEN SYRINGES AND NEEDLES ARE NOT SEPARATED

#### A/ Collection of syringes with needles attached:

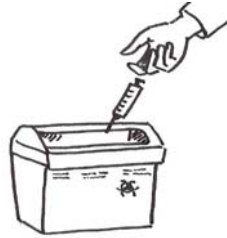
##### WHO – UNICEF cardboard Safety boxes

These puncture and leak proof boxes are specifically designed to receive syringes with their needles attached. Minimal capacity: 100 syringes. Should not be reused. Cost approximately 1 US \$.



##### Puncture resistant plastic Safety boxes

These plastic boxes are puncture resistant and slightly more expensive than cardboard Safety boxes. Supplies might be more difficult to find for small and medium-sized health care facilities. Capacity: 100 syringes. Should not be reused. Cost approximately 2 to 3 US \$.



##### Locally available puncture resistant cardboard boxes or plastic bottles

In small health-care facilities, in case of supply shortages of cardboard or puncture resistant plastic safety boxes, alternative solutions can be implemented to store used syringes. For example, puncture and leak proof boxes or thick plastic containers that can be closed can serve as adequate replacements. Open boxes, bleach bottles and thin plastic containers are not appropriate. Any receptacles used for this purpose should be labelled as containing hazardous sharps waste.



#### B/ Treatment and disposal options for filled safety boxes

- **On site burial / burial on premises** (option for small facilities with open land that cannot transport to a centralized facility):

##### Controlled burial in protected or concrete pit on premises

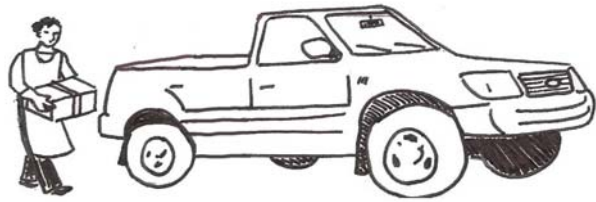
Both cardboard and plastic safety boxes may be buried on premises in a controlled manner. A fence should restrict the access to the pit. In unstable soils, the sides of the pit should be lined with brick or concrete to prevent collapse. A 10-15 cm layer of earth should be placed on each layer of waste and the pit should be filled with soil or concrete until the contents reach 50 cm of the hole surface. Once closed, the site should be marked to prevent future digging. Open dumping of boxes/bagged waste should be avoided.



■ **Off-site treatment at a centralized facility:**

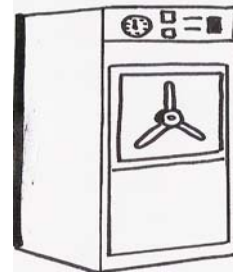
**Collection of safety boxes for off-site treatment**

Safety boxes should be collected on a regular basis (by vehicle or even by bicycle) and sent to a centralised treatment facility for autoclaving (saturated steam at high temperature) or for proper incineration. Tops of safety boxes should be closed and sealed.



**Autoclaving**

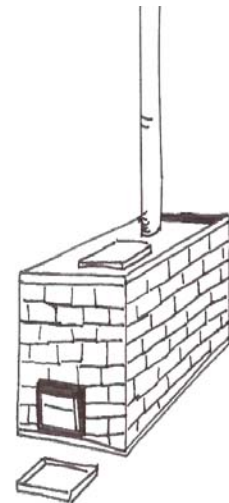
After receipt at the centralized facility, syringes may be sterilized in an autoclave (saturated steam at high temperature) restricted to waste treatment only.



**High temperature incineration (850°C)**  
(Ideally plastic should not be incinerated).

The temperature must be at least of 850 degrees to ensure minimal emission of toxic gases. Low-cost, high temperature incinerators are now affordable for medium-sized health-care facilities. Operating procedures based upon design and distance from populated areas should be carefully respected. For this purpose, only well trained staff should operate the incinerator. Proper operation procedures must be followed to ensure high temperatures are adequately reached.

Note: open burning should not be considered as an option because of the risk it represents for staff and communities and to the environment.



**HANDLING AND DISPOSAL OPTIONS WHEN SYRINGES AND NEEDLES ARE SEPARATED**

**A/ Separation of needle and plastic syringe:**

■ **Needles may be separated with a remover:**

**Needle remover**

Immediately after injection, the tip of the used syringe is placed in the needle remover and a lever pressed. A blade then cuts the hub of the syringe so that the needle drop into a protective container. A needle cutter costs from 20 to 80 US \$, does not require electricity and is easy to use. It is therefore equally suitable for small and large-sized health-care facilities. Cost of a needle container: 0.15 to 1.0 \$ (the contents of the container can be discarded so that the protective container can be re-used). There should always be one unit kept at the site of every injection session.



### Disposable needle remover (or hub cutter)

The disposable version of the needle remover is a rigid plastic box specifically designed with a blade to cut the syringe at hub level. It can store 400 to 600 needles safely. The box is then disposed along with the needles inside. Because it is compact and lightweight, it is well-adapted for outreach use. This device does not cut all syringe types. Cost about 2 US\$.



**Note: WHO is currently not promoting needle removers; nevertheless, it is recognized that the removal of needles immediately after injection offers advantages for the management of waste disposal; therefore one should consider the risk-benefit of introducing such devices.**

- If luer slip syringes are used, hub and needle are simply removed by applying slight pressure:

### Needle Remover Can (detachable needle syringes)

This is a puncture proof metal box with a hole in the lid. The needle is removed when the used syringe is inserted and light pressure is applied to release the needle. The average capacity is 100 needles and the cost ranges between 0.5 to 4 US\$.



### Thick plastic or steel container with an oval hole in the lid

In small and remote health-care facilities this can be a useful alternative to safety boxes. However one must be very careful to avoid spillage during separation of the needle and syringe. When full, the container can be autoclaved before disposal or must be sealed tightly before burial in a pit. Other sharps may also be discarded in such containers.



### B/ Disposal of needles:

- Needles must be disposed of in a sharps pit or buried:

### Sharps pit

This is a 1 m<sup>3</sup> concrete lined protected pit with a cement lid. Disposal is through a plastic or metal pipe. It is a good option for sharps disposal in medium and small health-care facilities. However it should not be used in areas subject to floods or where the water table is near the surface. Needle containers can be discarded in entirety or contents are emptied directly in the pit.



## Encapsulation

Encapsulation means surrounding dangerous materials with a substance that will harden. Encapsulation ensures that needles are stuck in a material, so that used needles cannot be harmful or reused. Filled needle containers are placed in a metal drum or a high-density plastic container up to  $\frac{3}{4}$  of the final capacity. An immobilizing material such as fresh cement, bituminous sand or clay is added in the container. Once dry, the container is sealed and disposed of in a land fill or buried on site.



## C/ Disposal of used plastic syringes:

### Segregation

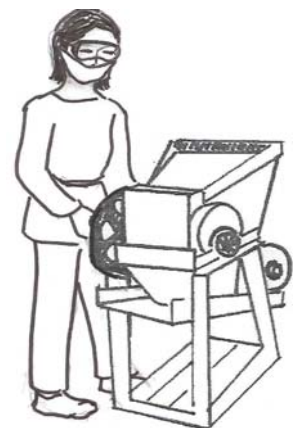
Immediately after needle removal, plastic syringes should be discarded in an appropriately colored container with a plastic liner bag. If syringes are to be disinfected and sent for recycling, they should not be mixed with other potentially infectious waste.



### *C1. On-site treatment:*

#### Shredding

Plastic syringes may be shredded in a hand mill or an electric shredder so as to reduce their volume. After shredding they may be buried on-site (see On site burial / burial on premises)



### *C2. Preparation for transport to centralized facility:*

#### Chemical disinfection

Syringes may be sterilized through exposure to bleach (0.5% chlorine solution) for at least 30 minutes. They should not be disassembled.



### Boiling water

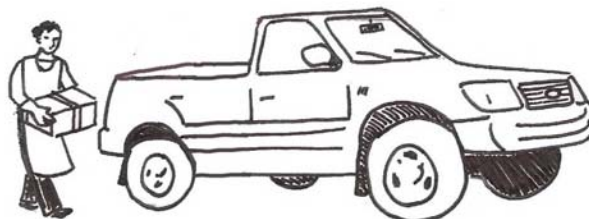
Syringes may be disinfected in a batch of boiling water for 20 minutes. They should not be disassembled.



### *C3. Collection and transport to a centralized facility:*

#### Collection of plastic syringes for off-site disposal or recycling

Plastic syringes are collected on a regular basis and sent to a centralised treatment facility for disposal or recycling.



### *C4. Treatment at a centralized facility:*

#### ■ Shredding

Plastic syringes may be shredded in a hand mill or an electric shredder so as to reduce their volume. After shredding they might be disposed of in a land fill.



#### ■ Recycling of syringes

Recycling is an economically and environmentally sound option for plastic syringes (valuable polypropylene and polyethylene). However, if no plastic recycling plant exists or if distances to the plant from the facilities makes transport costs too expensive, syringes may be disposed of after disinfection with municipal waste.

## **STEP3. CRITERIA FOR SELECTING APPROPRIATE WASTE TREATMENT AND DISPOSAL STRATEGY**

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### **ALTERNATIVE 1: REGULAR SHARPS WASTE COLLECTION FOR CENTRAL TREATMENT**

Regular waste collection for central treatment is a valuable option provided that:

- A central facility with adequate capacity exists;
- Health care facilities have all-year accessibility to and are at reasonable distance from the central treatment facility;
- A means of transport is available (truck, car, bicycle etc);
- Financial resources for fuel and a driver are available (considering distances of the route);
- Waste should be collected at least once a month and ideally once a week.

### **ALTERNATIVE 2: CONTROLLED BURIAL ON PREMISES FOR REMOTE AREAS OR SMALL FACILITIES**

A sharp pit may be a valuable option for the disposal of needles in remote health-care facilities with no access to central treatment provided that :

- Needle removers are available and practical at all injection stations;
- The region is not subject to heavy rainfalls and floods (otherwise consider sharps barrel);
- The water table is deep enough to avoid contamination of water;
- Skills, material and financial resources are available for the building of a sharp pit.

If no sharps pit in use, pits for the burial of infectious waste, including sharps may be a valuable option for the disposal of needles provided that:

- Encapsulation of needles before disposal is ensured;
- Space is available on premises;
- The water table is deep enough to avoid contamination of water;
- Financial resources are available for minimal training and for the construction of a fence;
- Human resources are available for supervision.

Note: The most feasible disposal options should be considered taking into account local conditions, available resources and constraints of health-care facilities. Then the best disposal strategy should be discussed with representatives of health-care facilities.

Based on the assessment of the existing situation (Step1) and the review of possible treatment and disposal options (Step2), a strategy for treatment and disposal of health care waste can be selected. The following criteria should be considered in the selection process to ensure that the chosen strategy is appropriate to the local context and that adequate resources are available.

	Selection Criteria
<b>Off-site final disposal of infectious waste</b>	<ul style="list-style-type: none"> <li>▪ The distance to legally approved treatment facilities for final disposal must be reasonable</li> <li>▪ Means of transport and a reliable road infrastructure should be available</li> <li>▪ Vehicle should be disinfected after transporting infectious waste material</li> <li>▪ Quantity of daily waste generated should be sufficient to justify transport costs</li> </ul>
<b>On-site final disposal of infectious waste</b>	<ul style="list-style-type: none"> <li>▪ Only if above conditions are not met</li> </ul>
<b>Separation of needle from syringe</b>	<ul style="list-style-type: none"> <li>▪ Relevant for most health-care facilities assuming a safe needle remover device is selected for the separation process</li> <li>▪ A sharps pit or needle barrel must be available on site</li> <li>▪ Inappropriate if there is no proper disposal of sharps afterwards</li> </ul>
<b>Sharps-pit to bury sharps/needles</b>	<ul style="list-style-type: none"> <li>▪ Relevant for most health-care facilities that are out-of-reach of transport to facilities with better options for final disposal</li> <li>▪ Inappropriate in regions with heavy rains and floods or shallow water table. A sharps barrel can be used in these situations.</li> </ul>
<b>Autoclave</b>	<ul style="list-style-type: none"> <li>▪ Proper training of staff for operating procedures is necessary</li> <li>▪ Availability of device and spare parts locally</li> <li>▪ Monitoring equipment needed</li> </ul>
<b>Construction of an incinerator</b>	<ul style="list-style-type: none"> <li>▪ Proper materials, qualified construction and training for operating procedures are necessary</li> <li>▪ Space is needed on premises to allow a minimal distance of 250 m from populated areas and maximal dispersion of gas emissions.</li> <li>▪ High chimney is also required (higher than nearby roofs)</li> </ul>
<b>Controlled burial</b>	<ul style="list-style-type: none"> <li>▪ Not suitable in case of a shallow water table (bottom of the pit should be 1.5m higher than the groundwater level) or in seasonally flooded area</li> <li>▪ Burial site should be fenced</li> <li>▪ Sufficient land available</li> </ul>
<b>Encapsulation</b>	<ul style="list-style-type: none"> <li>▪ Sufficient land available if burying on site</li> <li>▪ Encapsulation material necessary</li> </ul>
<b>Municipal landfill</b>	<ul style="list-style-type: none"> <li>▪ If no other option is possible, municipal landfill is better than open dumps</li> <li>▪ Encapsulation of sharps, mutilation beyond usability and disinfection of plastic syringes is necessary</li> </ul>

## **STEP 4. ESTIMATE EQUIPMENT NEEDS FOR INJECTION WASTE**

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On the basis of the selected strategy, an action plan and an assessment of equipment needs can be implemented as follows:

### **CHECKLIST OF ACTIONS**

- Estimate the total quantities of waste to be treated in each health-care facility per month
- Calculate the total number of safety boxes required for sharps per month
- Assess equipment and infrastructure for waste handling, treatment and disposal
- Design and secure storage area for waste (locked and safe)
- Assess existing personnel
- Assess existing budget

## A TOOL YOU CAN USE

In order to calculate the number of safety boxes (for instance)

### 2. Calculating the daily *production* of filled safety boxes

The disposal of the safety boxes on a daily basis must be ensured in each health-care facility. The calculation of the *daily production* of safety boxes helps in organizing the everyday logistics. It could be on weekly basis according to the number of injections performed.

Number of staff providing injections	S =	
Average number of injections performed per staff per day	Id =	
Total number of syringes used daily	Sd =	$Sd = S * Id$
Capacity of a safety box	C =	100 or 400
Daily number of safety boxes to be disposed of at the focal centre	Bd =	$Bd = Sd / C$ (boxes/day)

### 3. Estimating the costs for waste treatment and disposal

#### 3.1. Sharp collection costs

Item	Cost / box	x	Nb boxes	=	Total
safety boxes					
					Total

#### 3.2. Waste handling costs

Item	Cost / unit	x	Nb units	=	Sub-Total
protective clothes					
plastic bags					
adhesive tape					
etc...					
					Total

#### 3.3. Minimum investment costs for waste treatment and disposal equipment

Incinerator	(ratio plan 15 \$ / 1000 syringes disposed of)	$(Sd / 1000) * 15$	Total	
Autoclave etc.				

#### 3.4. Minimum recurrent costs

Human resources						
nb of workers	x	daily rate (\$ / day)	x	nb of days	=	Sub-Total
Combustible (wood, fuel...)						
quantity used / day	x	unit price (\$)	x	nb of days	=	Sub-Total
						Total
Total costs (3.1 to 3.4)						

## STEP 5. ENSURE THE SUSTAINABILITY OF YOUR STRATEGY/PLAN OF ACTION

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### CHECK NATIONAL HEALTH-CARE WASTE MANAGEMENT POLICY

- Find out existing national policy/standards and guidelines for health-care waste management
- Check for specific regulations towards emission control and pollution from incinerated waste
- Check for specific regulations concerning transport of waste
- Make recommendations in accordance with national guidelines and relevant legislation

### ENSURE BASIC WASTE MANAGEMENT REQUIREMENTS ARE UNDERSTOOD

- Organize visits to facilities with good ongoing waste management practices
- Set up a short training program with the following components :
  - Legal framework and duty of care towards health-care waste handlers
  - Policy for needle stick injuries among health personnel (assessment, treatment, reporting)
  - Use of auto-disable syringes
  - Basics of waste segregation and colour coding
  - Consequences of unsafe treatment and disposal methods on the environment and public health
  - Handling, treatment and disposal of safety boxes and sharp boxes
  - Pre-treatment of syringes (disinfection, shredding, encapsulation)
  - Internal and external transport safety
  - Consignment note and documentation for external transport

For facilities where waste is treated on-site add the following items to your training curriculum

- Drawbacks of open waste dump and uncontrolled incineration
- Construction of a sharps pit/needle barrel
- Controlled burial on premises

### ENSURE LONG-TERM COMPLIANCE WITH HEALTH-CARE WASTE MANAGEMENT PRACTICES

- Designate responsibility to district and local representatives for the waste management supervision
- Make sure roles and responsibilities of local healthcare workers are well explained and understood
- Help health-care facilities in the elaboration of their “code of practice” for waste handling
- Distribute documents explaining waste handling basics for staff but also for the information of local community
- Pedagogic posters for example may be posted in the entrance to health care facilities
- Set up a set of indicators to monitor quality of waste management, provide guidance or examples of quality of waste management indicators

### ENSURE TECHNICAL ASSISTANCE TO IMPROVE WASTE MANAGEMENT PRACTICES

- Determine which facilities need assistance for building of infrastructures or use of specific material
- Organize technical assistance for building and maintenance of new infrastructure
- Provide waste segregation bins and liners (and training)
- Provide assistance to organize transport system
- Provide assistance to repair and maintain the means of treatment used (and training)
- Where national guidance does not exist, conduct model programs to determine best practices and find best practical options

## STEP 6. CALCULATE AND COMMUNICATE NEEDS TO HEALTH AUTHORITIES

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### ESTIMATE INVESTMENTS NEEDED

- Assess material needed for each facility to implement the adequate waste management
    - Needle removers
    - Bins for segregation
    - Trolleys to transport waste
    - Centralized incineration or autoclave
    - Cement and tube for sharp pits
    - Cement and fences for landfill
    - Protective clothing : gloves, boots, apron, goggles, etc...
    - Training
- ⇒ See table next page.

### ESTIMATE FINANCIAL RESOURCES NEEDED TO COVER RECURRENT COSTS

- Transport costs
  - Human resources
  - Supplies and operational costs
    - Syringes
    - Plastic bags
    - Cement, clay, or plastic foam for encapsulation
    - Chlorine, bleach, buckets, gloves, masks
    - Safety boxes
    - Needle remover (hub cutter)
    - Needle remover can
    - Operation and maintenance costs of incinerator or autoclave (fuel etc.)
- ⇒ See table next page.

### WHERE RELEVANT, ORGANIZE A CENTRALIZED HEALTH-CARE WASTE TREATMENT SYSTEM

- Set up waste transportation plan
- Prepare a clear investment plan including setting, material, vehicles and operational costs also land and processing facility and operation and maintenance
- Contact local suppliers for information on material price and shipping procedures if needed.

### WRITE A REPORT OUTLINING RESULTS , RECOMMENDATIONS AND A PLAN OF ACTION

- Results and conclusions from initial district assessment of each health-care facility's needs
- Recommended actions
- Identification of potential local partners
- Financial estimation of investments and daily supplies
- Needs for local capacity building
- Operational plan of action and timeframe.
- This document should be the basis for discussion and validation of options with local/national health representatives, managers of health-care facilities and campaign partners (e.g., non-governmental organizations).

## ORGANIZE PURCHASING OF MATERIAL AND TRANSPORT

- Keep records of purchasing and organize stock monitoring.

In order to evaluate **investments costs** you can use the following table:

	Category	Quantity	Price per unit	Sub-Total
Investments	Needle remover	Q = Number of sites in which injections are given in facility	P	Q x P
	Bins	<i>Depends on daily kgs of waste</i>	P	Q x P
	Trolleys	<i>Depends on daily kgs of waste</i>	P	Q x P
	Cement and tube for sharp pits	<i>Depends on local conditions</i>	P	Q x P
	Cement and fences for landfill	<i>Depends on local conditions</i>	P	Q x P
	Protective clothing : gloves, boots, apron etc...	Q = Number of workers operating waste at the same time during the day	P	Q x P
	<b>Total</b>			<b>SUM</b>

In order to evaluate **monthly Operational and Maintenance costs** you can use the following table:

	Category	Quantity	Price per unit	Sub-Total
Operational Costs	Transport costs	<i>Depends on monthly kgs of waste and segregation practices</i>	P	Q x P
	Electricity	<i>Depends on electric material use on-site</i>	P	Q x P
	Salary (per worker) *	Q = Number of working days per month	P = Daily Salary	Q x P
	Fuel	<i>Depends on monthly kgs of waste incinerated</i>	P	Q x P
	Maintenance costs	<i>Depends on monthly kgs of waste incinerated</i>	P	Q x P
	Other...	Q	P	Q x P
Waste handling costs	Auto-disable syringes	Q = Daily number of persons who will benefit from injection + 10%	P	Q x P x 30
	Safety boxes	Q = Number of syringes used every day /100	P	Q x P x 30
	Puncture resistant plastic boxes	Q = Number of syringes used every day / maximal capacity of the box when ¾ full	P	Q x P x 30
	Needle removers (hub cutter)	Q = Number of syringes used every day / 500	P	Q x P x 30
	Needle remover cans	Q = Number of syringes used every day /100	P	Q x P x 30
	Colored plastic liner bags (black, red)	<i>Number of bags per point of collection</i>	P	Q x P
	Cement, clay, or plastic foam for encapsulation	<i>Depends on needle containers used</i>	P	Q x P
	Bleach	<i>Depends on kgs of waste to be disinfected (plastic syringes)</i>	P	Q x P
	Other...	Q	P	Q x P
<b>TOTAL</b>			<b>SUM</b>	

\* Additional lines will be necessary to reflect each category of workers involved

## **STEP 7. SET UP A MONITORING AND EVALUATION SYSTEM**

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### **ORGANIZE THE SUPERVISION OF HEALTH-CARE WASTE MANAGEMENT**


- Identify who will monitor and frequency of monitoring
- Set up registering and reporting procedures
- Provide monitoring forms for the follow up of daily activities and explain how to use them
- Collect monitoring forms and consignment notes regularly
- Keep a clear record of purchases and stock positions.
- Report discrepancies between estimated waste load, subsequent need of supplies and factual ordering of supplies from health-care facilities.
- Carry out regular missions to the field and discuss possible areas of improvement with the designated health-care waste management officer.
- Collect feedback from injection providers, waste handlers, patients and community

### **EVALUATE THE WASTE MANAGEMENT STRATEGY**

- Evaluate during field missions compliance and sustainability of recommended practices
- Write a final report and make recommendations for the next planning stage
- Send this report to relevant health authority representatives and associated bodies.

## SUMMARY – STEPS TO IMPLEMENT A SAFE WASTE MANAGEMENT PLAN

	MONTHS																			
	1	2	3	4	5	6		1	2	3	4	5	6	7	8	9	10	11	12	
<b>ACTIVITIES</b>																				
DISTRICT ASSESSMENT & ESTIMATION OF VOLUME OF WASTE & SEE NATIONAL POLICY	→																			
MAKE INITIAL RECOMMENDATIONS WITH HANDLING, TREATMENT AND DISPOSAL OPTIONS			→																	
ESTIMATE INVESTMENT & RECURRENT COSTS				→																
CALCULATE EXTERNAL SUPPORT REQUIREMENT				→																
ISSUE PLAN OF ACTION AND TIMEFRAME								→												
FINAL SELECTION OF STRATEGY AND PURCHASE OF EQUIPMENT										→										
SENSITISATION TRAINING												→								
IMPLEMENTATION																→				
MONITORING (AS SOON AS IMPLEMENTATION BEGINS)																				
EVALUATION (AFTER 6 MONTHS AND AGAIN AT ONE YEAR)																				

 The grey line represents the period of time during which funds will be allocated.

**Note:** This table is just an example and should be adapted according to context

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[http://www.who.int/water\\_sanitation\\_health](http://www.who.int/water_sanitation_health)

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