



Proper Handling and Disposal of
Auto-Disable Syringes
and Safety Boxes

A Training Module
for Clinic Managers and Immunization Providers



Training Resource Series, May 2002

Adapting This Training Module for Your Program

This module was developed as a prototype for training immunization providers about the proper handling of auto-disable syringes (and other infectious sharps) and safety boxes. Sections of this module should be adapted for the local context before use.

Recommended Steps for Adaptation

- Thoroughly review the training module and mark sections that require adaptation for your country or region. **ADAPTATION NOTES** are included throughout the module to help with this process. These notes should be deleted once you have finalized your version of the module.
- If your module will be in English or French, request a Microsoft Word version of the module from the Children's Vaccine Program at PATH (contact information below).
- Adapt the information to reflect local policies (for example, waste management policies may be different in rural and urban settings).
- Adjust the level of technical detail and language so that it is appropriate for the staff you are training.
- Add or change examples to reflect actual situations in your country. Add or change pictures to reflect the ethnic or cultural preferences of your audience.
- Translate the training module into the appropriate language and check that new page numbers coincide with the table of contents.
- Create handouts for participants. One way to do this is to delete all the Trainer's notes and other information not needed by participants. Then save the revised file as a participant handout.

Word processor versions of this module are available in English and French from the Children's Vaccine Program at PATH. Contact us by email, fax, or post.

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Acknowledgements

Much of the information in this module was adapted from documents produced by Program for Appropriate Technology in Health (PATH), the World Health Organization, and the Ministries of Health of Cambodia and Tanzania. See the References section on page 14 for information on these sources.

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Introduction

Purpose of this training module

This module is a training resource to increase the safety of immunization injection equipment handling and disposal at health posts and hospitals in the developing world. It is specially designed to be easy to adapt for specific country programs.

Who should receive this training?

The primary audiences for this module are health workers who regularly give childhood vaccinations, their supervisors, and clinic and hospital managers.

Objectives: By the end of this session, participants will be able to:

- describe the dangers associated with unsafe injections and unsafe handling of contaminated sharps
- use an auto-disable syringe and assemble and use a safety box correctly
- describe local procedures and processes for handling and disposal of contaminated sharps and safety boxes

Timeframe: The amount of time needed to present this module can vary from 2 to 4 hours, depending on choices you make. For example, you may choose to allow more discussion time for the participants or you may decide that they should have additional practice using auto-disable syringes, assembling safety boxes, or brainstorming best waste disposal solutions for their situation.

Preparation prior to training:

- Review all **Trainer's Notes** and contents before initiating the training.
- Photocopy participant handouts (one copy per trainee).

Trainer's Notes:

1. At the beginning of the training session, introduce yourself. Ask participants to introduce themselves and give information about their background and experience.
 2. Acknowledge varying levels of experience with vaccination and use of auto-disable syringes and safety boxes within the participant group.
 3. Present the timeframe and explain what participants will be able to do better after this training session.
 4. You may wish to ask participants to share their expectations for the training session. They may mention important training needs that you had not anticipated, but which can easily be incorporated into the session.
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Key Facts About Injection Safety

AIDS, Hepatitis, and Needlestick Injuries

Most people are aware of the risk of contracting HIV, the virus which causes AIDS, from dirty needles and syringes. However, many health workers and patients are NOT aware of the high risks of contracting hepatitis B or hepatitis C from those same dirty syringes and needles. Like HIV, hepatitis B and C are deadly infections—they can cause liver disease, cirrhosis and liver cancer.

CAUTION

Hepatitis B virus can remain infectious outside the body for at least one week!

WHO estimates that every year unsafe injections and needlestick injuries cause at least:

- 8-16 million hepatitis B infections
- 2.3-4.7 million hepatitis C infections
- 160,000 HIV/AIDS infections

If you are a health worker, avoid dangerous needlestick accidents by handling needles, syringes, and safety boxes very carefully—as if you know they are infected.

For more information about hepatitis B, visit the “Diseases and Vaccines” section of www.ChildrensVaccine.org.

Auto-Disable (AD) Syringes and other “sharps”

“Sharps” are any items that can cause cuts or puncture wounds, including syringes with needles, scalpels and other blades, knives, infusion sets, and some dental equipment, among others. For safety reasons, all used sharps should be handled as if they are contaminated with HIV or hepatitis B.

AD syringes are single-use, self-locking, disposable syringes used in many countries. They are popular among health workers and patients because they help increase injection safety.

AD syringes are designed to be easy to use. However, as with all new devices, practice helps health workers feel more confident before using the syringe with a patient, and may prevent vaccine from being wasted. Studies show that health workers should practice using at least two AD syringes during training, and before using the syringes at their workplace.

Safety Boxes

Safety boxes (also known as “sharps containers”) are puncture proof, impermeable containers for the safe and convenient disposal of used syringes and needles and other contaminated sharps. Safety boxes should be filled only once, then destroyed immediately. When they are used consistently and correctly, safety boxes can help prevent disease-spreading needlestick injuries.

Different safety boxes are assembled in different ways, but appropriate instructions are usually printed on each box.

As with AD syringes, health workers should practice assembling and using safety boxes.

Trainer’s Notes:

Conduct a discussion designed to motivate staff to use AD syringes and safety boxes properly. Talk about the dangers of unsafe injection practices and needlestick accidents and make it clear that staff should consider injection safety a high priority. Explain local policies related to handling contaminated medical waste and the reasons for those policies. Explain that AD syringes prevent dangerous re-use of contaminated sharps and help ensure that each syringe is sterile. Safety boxes help protect clients, health care workers, and the community from used, contaminated sharps.

Possible discussion questions:

- What is an unsafe injection?
 - Can you name five potentially unsafe injection practices?
 - How many of you have been pricked by a used needle?
 - Has anyone ever seen health consequences of an unsafe injection?
 - Is improper disposal of contaminated sharps a problem in our community?
 - What would you do to reduce unsafe injection practices in our community?
-

Proper Use of AD Syringes and Safety Boxes During Immunization Sessions

Trainer's Notes:

1. Ask participants, "What is the correct process for using AD syringes? What is the correct process for using safety boxes?"
 2. List answers on flipchart paper and discuss with the group.
 3. Rectify any incorrect answers by providing the information below.
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ADAPTATION NOTE: Revise all information below to be consistent with local policies and procedures. Some programs use new technologies for safely pulling, cutting or burning needles off of auto-disable syringes to reduce the risk associated with handling contaminated sharps. Other programs disinfect and shred used syringes, then recycle the plastic. If either of these systems is available to injection providers in your program, be sure to include clear instructions in your version of this module.

Prepare the safety box

Make certain that there is a correctly assembled safety box in the area where injections will be given. The safety boxes should be within reach of your work station so that you can dispose of the used syringe immediately after giving the injection.

Many needlestick injuries happen after the injection, but before the syringe is placed in a safety box.

The box should have enough room inside to hold all the needles and syringes that will be used during the immunization session.

If you are providing immunizations away from the clinic (during an outreach session, for example), be sure to take the safety box with you, even if the box already has some used syringes in it.

Keep an extra, empty safety box nearby at all times in case the box you are using fills up.

Trainer's Notes:

1. Practice assembling a safety box yourself, before the training session. It is not as simple as it might seem.
 2. Demonstrate safety box assembly in front of the entire group. Make certain that everyone can clearly see what you are doing. Explain each step clearly as you proceed.
 3. Divide participants into two-person groups. Give each group two unassembled safety boxes.
 4. Tell one person from each group to assemble his or her safety box. The other person should observe.
 5. Roam among the groups. Observe what they are doing and give assistance as necessary.
 6. When the first person has successfully assembled their box, the second person should assemble the box, while the first person watches.
 7. After everyone has had a chance to practice, discuss the process with the full group.
-

Use the AD Syringes

ADAPTATION NOTE: AD syringes from different manufacturers operate differently. Adapt your curriculum for the model of syringe used in your program. PATH's manual "Giving Safe Injections: Using Auto-Disable Syringes for Immunization" (see References on page 14) includes directions for several different AD syringe designs.

If the AD syringes used in your program have removable needles, (luer slips) and if you have special procedures for dealing with them, adapt the information below.

Use a new needle and syringe for every injection.

If you run out of AD syringes, but doses of vaccine are still available, the vaccine should be given only if sterile needles and syringes can be used. Otherwise do not give the injection.

Before using any AD syringe, check that the package seals are not damaged or opened.

- *For AD syringes packed in single packaging: check that the package is well sealed.*
- *For AD syringes packed in bulk: check that the cap of the needle and the piston cap are still "welded" to the syringe (i.e., they have not been previously removed or opened).*

Do not use the syringe if the packaging is open or damaged.

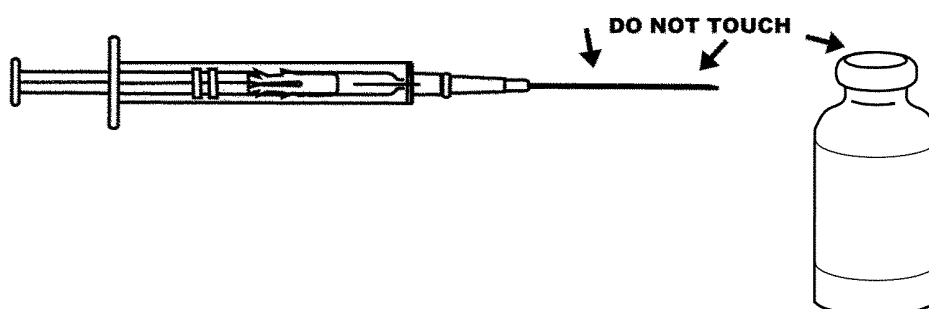
For AD syringes packed in single packaging: open the package and remove the needle cap.

For AD syringes packed in bulk, first remove the piston cap and then the needle cap.

If your AD syringe has a detached needle, attach the needle before removing the needle cap. Do not touch the syringe hub.

Do not touch the needle or the rubber cap (septum) of the vaccine vial. If you touch any of these areas, discard the contaminated syringe and open a new AD syringe.

Touching the needle, the syringe hub, or the rubber cap of the vial can cause microbial contamination of the injection.



Throw the needle cap and the piston cap in a waste or recycling container.

Do not pull the piston until you are ready to fill the syringe with vaccine.

Once you pull the piston out, you will not be able to pull it out again (it will disable the syringe).

Stick the needle into the vaccine vial rubber cap.

Gently pull the piston to fill the AD syringe slightly past the 0.5 ml mark (so that you can later remove any air trapped in the syringe).

Try not to draw air into the syringe.

Gently push the piston to remove excess air if necessary. Stop when you reach the 0.5 ml mark.

If air remains in the syringe, discard the syringe and try again.

If you expel too much air and no longer have 0.5 ml of vaccine in the syringe, discard the syringe. You should not vaccinate children with less than the full dose.

Remove the syringe from the vaccine vial. Do not recap the needle.

Recapping needles is a primary cause of needlestick injuries.



Image: SIGN

Inject the dose of vaccine. Do not use your finger to guide the needle into the injection site.

Touching the injection site can increase the transmission of blood-borne pathogens between clients or from the client to the health worker.

If the injection site is bleeding, do not place your finger on the injection site to stop the bleeding.

Immediately put each used AD syringe into the safety box

Do not recap syringes before disposal. Do not use your hands to remove the needle from the syringe. Do not use your hands to bend or cut the needle after the injection.

Most needlestick injuries happen when workers recap used needles. The more syringes and needles are handled, the greater the risk of needlestick injuries.

Fill the safety box until it is about $\frac{3}{4}$ full (or up to the “Full” line if there is one printed on the box). Do not force too many syringes into the box.

- A 1-liter box, for outreach sessions, can hold about 20 syringes
- A 5-liter safety box can hold approximately 100 used syringes.
- A 10-liter box can hold approximately 200 used syringes.

Once the safety box is filled, close the lid and seal the box to avoid syringes spilling.

This prevents needlestick injuries that occur when workers try to force needles and syringes into full safety boxes and prick themselves with the needles already inside the box.

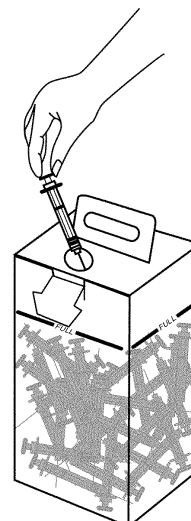
Safety boxes should be filled only once, then destroyed immediately or put into a safe storage area and destroyed as soon as possible (see “Storing and Collecting Filled Safety Boxes” and “Destroying Filled Safety Boxes”).

This prevents needlestick injuries and exposure to blood and body fluids, which could occur if dumping or reusing containers.

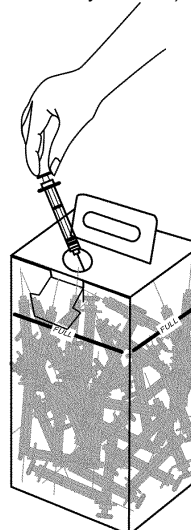
Replace the full safety box with an empty one.

If the used vaccine vial is now empty, throw it into a waste or recycling container.

Do not put the empty vial in the safety box—it will take up too much room and it is not contaminated with blood.



SAFE: The syringes have not yet reached the “Full” line (however, it is almost full and should be destroyed soon).



UNSAFE: Box is too full to use safely (the health worker could be pricked by one of the needles already in the box).

Trainer's Notes:

1. Practice using auto-disable syringes yourself, before the training session.
 2. Different brands of AD syringes operate differently. For detailed instructions on use of various types of AD syringes, consult PATH's manual *Giving Safe Injections: Using Auto-Disable Syringes for Immunization* (see "References" section on page 14).
 3. Ask if any participants are not experienced in giving injections. If there are any inexperienced participants, train them in all aspects of proper injection technique. The instructions above assume that all participants are familiar with standard safe injection procedures.
 4. Demonstrate using an AD syringe in front of the entire group. Make certain that everyone can clearly see what you are doing. Explain each step as you proceed.
 5. Divide participants into two-person groups. They can be the same groups as previously, or different groups.
 6. Give each group four AD syringes.
 7. Tell one person from each group to practice using two of the AD syringes. They can practice injecting expired vaccine or water into an orange or other fruit, or injection practice dummies. They should throw the used syringe into one of the assembled safety boxes as soon as they have given the injection.
 8. Roam among the groups, observing what they are doing and giving assistance as necessary.
 9. When the first person has practiced with his or her AD syringes, the second person should practice with his or her, while the first person watches.
 10. After everyone has had a chance to practice, discuss the process with the full group.
 11. Next, conduct a discussion about possible problems and how to solve them.
For example, what should participants do if:
 - * The AD syringe locks before a full dose is drawn up?
 - * There are not enough ADs to vaccinate all the children at the session?
 - * After expelling air from the syringe, there is no longer 0.5 ml of vaccine?
-

How to Make Your Own Safety Box

ADAPTATION NOTE: Revise the text below to include use of appropriate, locally available materials.

If you do not have a proper safety box:

- Find a strong cardboard box. (Your local shop may be able to help.) If possible, the walls of the box should be strong enough that needles will not pierce the box from the inside and prick someone handling the box.
- Close the box securely (top AND bottom) with sticky tape and/or staples.
- Cut a small hole in the top just big enough for a syringe and needle to enter.
- When the box is $\frac{3}{4}$ full, seal the opening with sticky tape.
- Destroy the filled safety box carefully and completely (see “Destroying AD Syringes and Safety Boxes”)

CAUTION!

If the cardboard is too thin, there is a risk that the needles could stick through the sides of the box. Therefore:

- Strengthen the walls of the box by making one safety box out of two cardboard boxes (one inside the other).
- Avoid unnecessary handling.
- Take extra care when you are carrying the box to the burning site. Hold the box by the top, above the level of the needles and syringes.
- Do not ask untrained staff to handle the box.

You might also consider using a metal can or plastic jug instead of a cardboard box. But do not reuse the same can or jug—destroy it when it is full and find a new one.

Emptying and reusing safety boxes, and touching contaminated waste, increases the risk of needlestick injuries and infection with HIV or hepatitis B or C.

Trainer’s Notes:

Conduct a group discussion about what participants might do if they run out of official safety boxes. What locally available materials would they use to make their own safety box?

Show participants examples of locally made safety boxes.

Storing and Collecting Filled Safety Boxes

ADAPTATION NOTE: Revise the text below, taking into account local policies and procedures. Tell trainees exactly what they should do to store and collect filled boxes. If it would help to have trainees practice any procedures related to this task, incorporate practice sessions into the training.

Place filled safety boxes in a secure and dry place until they are collected for destruction. Create a sign that says “CAUTION: CONTAMINATED SHARPS” to warn others.

In many places, new AD syringes and safety boxes are given in exchange for filled safety boxes: this is called “the exchange strategy.”

The exchange strategy allows a comparison of the number of used syringes and safety boxes distributed with the number returned.

It is important to keep records of how many AD syringes and safety boxes have been used so that the supplies will not run out.

Destroying Filled Safety Boxes

ADAPTATION NOTE: Revise the text below, taking into account local policies and procedures. If vaccinators are not responsible for destroying the boxes, make certain that the instructions are included in training for staff who have that responsibility.

Tell trainees exactly what they should do to destroy filled boxes. Incorporate practice sessions into the training.

Unfortunately, there are no easy, nonpolluting methods for destroying AD syringes or needles. However, there are ways to reduce overall risks associated with contaminated sharps and other waste. WHO recommends that:

. . . the risks of health impacts from environmental exposures should be weighed against the risks of accidental infection from poorly managed sharps or reuse of unsterilized syringes.¹

Four methods are commonly used to destroy filled safety boxes or to keep them away from people: **incineration** (usually this is the best option), **burning in a metal drum** (next best option), **open burning** (if incineration or burning in a drum or hearth is not possible), and **burying without burning** (least safe option unless the burial pit is extremely secure).

IMPORTANT: Used syringes and needles should NEVER be disposed of along with non-infectious waste or dumped in open areas where people might step on them or children might find them.

¹ WHO, “Decision-making guide for managing health care waste from primary health care centres” (draft, August 2001). This document is available at www.who.int/water_sanitation_health/Environmental_sanit/Healthcarewaste/decision.htm.

Incineration

Incineration can completely destroy needles and syringes by burning at temperatures above 800°C. The high temperatures kill microorganisms and reduce the volume of waste to a minimum. **Properly functioning incinerators ensure the most complete destruction of syringes and needles, and produce less air pollution than burning at lower temperatures.** Some hospitals have on-site incineration, while others use incinerators at other facilities, such as cement factories.

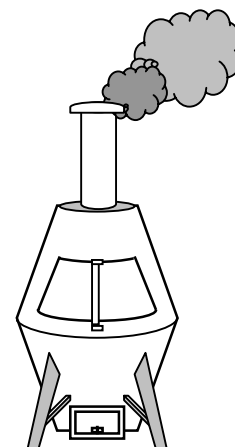


Image: MOH, Cambodia

Burning in a metal drum (container burning)

If no incinerator is available, burning in a metal drum or protected hearth is another way to dispose of used injection equipment and contaminated needles.

Different incinerators work in different ways. Carefully follow the instructions for your incinerator.

1. Choose an unused part of the compound for the container burning site, as far from buildings as possible.
2. Fence off and clear the area.
3. Make the drum incinerator:
 - Place four bricks on the ground in a square pattern (see illustration).
 - Place a metal screen or grate on top of the bricks.
 - Remove both ends of a 210-liter (55-US gallon) steel drum. This will allow more air to flow through the drum and better burn the contents. The cylinder could also be constructed from sheet metal, bricks, or clay. If you like, you can add a chimney to the (removable) top end of the drum.
 - Place the drum on top of the metal screen.
4. Take the filled safety boxes to the burning site just before burning. Do not open or empty the boxes.
5. Place the filled safety boxes in the metal drum. Mix paper, leaves, or other flammable material among the safety boxes to help them burn.
6. Sprinkle a small amount of kerosene on the boxes and other material in the drum, if available.
7. Place a fine metal screen over the top of the drum to reduce flying ashes.
8. Place wood, paper, or other flammable material under the drum, and ignite it.
9. Warn people to stay away and to avoid smoke and fumes from the fire.
10. Allow the fire to burn until all of the boxes have been destroyed.
11. Once the fire is out and the residue at the bottom of the drum has cooled, dig a small pit and bury the residue. Handle the residue carefully since it may contain needles and other sharps. Cover the residue with at least 13 cm of soil. Be sure to select a site where people will not dig to plant crops or establish latrines. Some people recommend covering the site with concrete when the pit is full to prevent digging at the site in the future.
12. Container burning should always be carried out under the supervision of a qualified staff member. Do not leave this vital task to unqualified people!

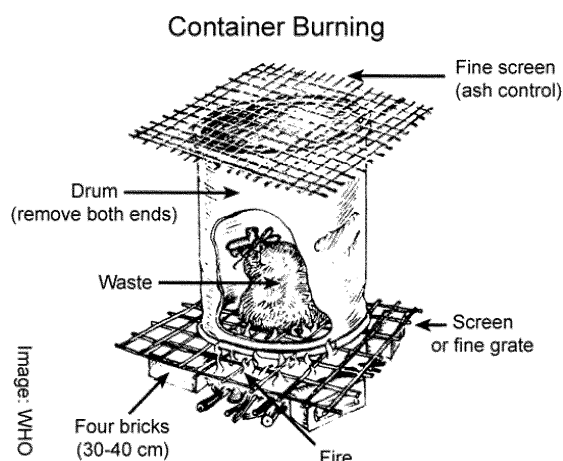


Image: WHO

Open burning

Open burning is not recommended because it can scatter waste. If safety boxes are placed in an open pit, the pit should not be so deep that people have to crawl down into the pit to start the fire. They could be pricked by the remaining stubs of previously burned needles.

However, if open burning must be done, health workers should:

1. Choose an unused part of the compound for the burning site, as far from buildings as possible. Be sure to select a site where people will not dig to plant crops or establish latrines.
2. Fence off and clear the area.
3. Dig a pit at least 1 meter deep.
4. Take the filled safety boxes to the burning site just before burning.
Do not open or empty the boxes.
5. Place the filled safety boxes into the pit. Mix paper, leaves, or other flammable material among the safety boxes to help them burn.
6. Sprinkle a small amount of kerosene on the boxes in the pit, then ignite the fire.
7. Warn people to stay away and to avoid smoke and fumes from the fire.
8. Allow the fire to burn until all of the boxes have been destroyed.
9. Once the fire is out and the residue at the bottom of the pit has cooled, cover the residue with at least 13 cm of soil. Some people recommend covering the site with concrete when the pit is full to prevent digging at the site in the future.
10. Open burning should always be carried out under the supervision of a qualified staff member. Do not leave this vital task to unqualified people!

Burying without burning

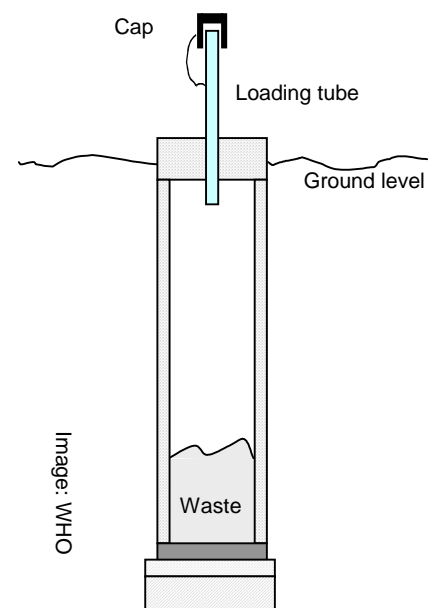
Burying filled safety boxes is probably the least effective way to protect people from contaminated sharps. It is often difficult to find a place to bury the boxes and it may be difficult to dig a pit large and deep enough for the bulky boxes. If contaminated AD syringes somehow escape from the box and are carried into streams or fields, people may step on them or children may play with them.

But if you cannot burn your safety boxes prior to burying:

1. Choose a site where people will not dig or establish latrines in the future.
2. Fence off and clear the area.
3. Dig a pit at least 2 meters deep. Make sure that the material will not escape from the pit (during the rainy season, for example).
4. Take the filled safety boxes to the pit site just before burying. Do not open or empty the boxes.
5. Place the filled safety boxes into the pit.
6. Cover the boxes with at least 30 cm of soil. Some people recommend covering the site with concrete when the pit is full to prevent digging at the site in the future.
7. Burying without burning should always be carried out under the supervision of a qualified staff member. Do not leave this vital task to unqualified people!

Trainer's Notes:

1. Conduct a group discussion about exactly how AD syringes and safety boxes will be distributed, how to handle filled safety boxes, how to reorder safety boxes, and how to keep relevant records. Each clinic or hospital will need to determine where the safety boxes will be located, who will assemble empty safety boxes, who will pick up filled safety boxes, who will destroy them, and how they will be destroyed.
 2. Organize meetings with participants a few weeks after the training session. Ask them about their experiences using AD syringes and safety boxes in the workplace. Discuss problems or challenges and solve them together, then communicate those solutions to all the staff.
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Some clinics build secure waste pits, like this one.

Closing the Session

ADAPTATION NOTE: Organize whatever closing activities are traditional in your country. This might include awarding certificates for completion of the training or simply saying “thank you for participating and sharing your insights and experience.”

References

This module was produced by the Children's Vaccine Program at PATH using information from the following sources:

Safe Injection section of Children's Vaccine Program at PATH website

www.childredivaccine.org/html/safe_injection.htm

Safe Injection Global Network (SIGN) website

www.injectionsafety.org

Giving Safe Injections: Using Auto-Disable Syringes for Immunization

PATH, September 2001

English, French, and Russian versions of this reference manual are available for download from the PATH website at *www.path.org/resources/safe-inj-pdf.htm* or by contacting the Children's Vaccine Program at PATH.

Safe Management of Wastes from Health-Care Activities

A. Prüss, E. Giroult and P. Rushbrook, eds. WHO, 1999. Downloadable from *www.who.int/water_sanitation_health/Environmental_sanit/MHCWHanbook.htm*

Decision-Making Guide for Managing Health Care Waste from Primary Health Care Centres

WHO draft, August 2001. Downloadable from

www.who.int/water_sanitation_health/Environmental_sanit/Healthcarewaste/decision.htm

Injection Safety—Guidelines for Immunization Campaigns

Ministry of Health, Kingdom of Cambodia, 2001

Your Guide to Safe Injections

Ministry of Health, United Republic of Tanzania, 2001

APPENDIX A

Poster: “What Goes in the Safety Box?”

Print the poster on the following page and put it near the safety box.

ADAPTATION NOTE: You may want to add pictures to the poster.

What Goes in the Safety Box?

- **Disposable syringes**
- **Needles**
- **Needles from IV bags**
- **Lancets**
- **Other contaminated sharps**

DO NOT put these materials in the box:

- Empty vials
- Cotton pads
- Compresses
- Dressing material
- IV bags or extension tubes
- Latex gloves
- Other plastic materials or waste products

More Training Resources from the Children's Vaccine Program at PATH

Visit the “**Training Materials and Clinical Information**” section of our website to download any of these materials:

www.ChildrensVaccine.org

- Immunizing Children Against Hepatitis B—A Training Module
- Giving Safe Injections: Using Auto-Disable Syringes for Immunization
- GAVI Training for Stronger Immunization Programs
- Hepatitis B Vaccine Introduction—
Lessons Learned In Advocacy, Communications, And Training
- Training Vaccinators in a Time of Change
- Immunization and Child Health Materials Development Guide
- The Case for Childhood Immunization
- Advocacy for Immunization
- Helping Young People Become Youth Advocates for Immunization



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