



Immunizing Children Against *Haemophilus influenzae* type B (Hib)

A Training Module For Vaccinators



Training Resource Series, Revised March 2006

Adapting This Training Module for Your Program

This module was developed as a prototype for training immunization providers on Hib disease and the safe and appropriate use of Hib vaccine. Sections of this module will need to be adapted for the local context before use.

Recommended Steps for Adaptation

- Thoroughly review the training module and mark sections that may require adaptation for your country or region. **ADAPTATION NOTES** are included throughout the module. These notes should be deleted once you have finalized your version of this document.
- Adjust the level of technical detail and language so that it is appropriate for the staff you are training.
- Delete sections that discuss vaccine formulations not used in your country.
- 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.
- Adapt the section on waste management and disposal of sharps to reflect local policies (for example, waste management policies may be different in rural and urban settings).
- Translate the training module into the appropriate language. Be sure to check that new page numbers coincide with the table of contents.
- Create handouts for participants. Delete the Trainer's notes and Adaptation notes from the word processor version of this document, then print the simplified file as a participant handout.

If your manual will be in English or French, request a free Microsoft Word version of the module from PATH:

Post:	PATH 1455 NW Leary Way Seattle, Washington 98107 USA	Email:	<i>info@path.org</i>
		Fax:	206-285-6619 (USA)
		Website:	<i>www.path.org</i>

Acknowledgements

Much of the information in this module was adapted from documents produced by the World Health Organization or by PATH. See the References section on page 18 for information on these sources.

Authors: Siri Wood, Rebecca Steinfeld, and Scott Wittet, PATH
Reviewers: Dr. Mark Kane, PATH; Dr. Pem Namgyal, World Health Organization (WHO/EPI);
Rebecca Fields, Academy for Education Development (AED);
Judy Graeff, UNICEF; and Alan Brooks, PATH.
Cover Art: Barbara Stout, PATH

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Introduction

Purpose of this training module

1. To educate vaccinators about *Haemophilus influenzae* type B (Hib) disease.
2. To train vaccinators in safe and proper Hib vaccination.
3. To decrease drop-out rates and increase coverage by improving vaccinators' ability to communicate with parents, other caretakers, and local leaders about Hib vaccination and immunization in general.

Who should receive this training?

Health workers who give childhood vaccinations, and their supervisors, will benefit from this training.

- Objectives:** By the end of this session, participants will be able to:
- cite key facts about Hib infection and disease, including how it is transmitted and its symptoms
 - demonstrate correct Hib vaccine administration techniques
 - describe appropriate Hib vaccine storage and safe disposal of used needles and syringes
 - communicate more effectively with parents of children being vaccinated

Timeframe: The amount of time needed to present this module can vary from approximately 2 hours to one full day, 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 giving injections, reconstituting vaccine (if appropriate), role-playing interaction with parents, or familiarizing themselves with new procedures and forms.

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. Point out that there are varying levels of experience within the group, and that everyone can benefit from the experiences and ideas of other group members.
 3. Present the timeframe and objectives, and explain what participants will be able to do better after this training session.
 4. You may wish to ask participants to explain 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 *Haemophilus influenzae* type B (Hib)

Trainer's Notes:

1. Lead a discussion using some of these questions:
 - Have you ever seen a child with pneumonia? What were the symptoms? Did the child survive?
 - Have you ever seen a child with meningitis? What were the symptoms? Did the child survive?
 - Have you ever heard of Hib disease? What can you tell me about it?
2. List answers on a flipchart paper and discuss with the group.
3. Rectify any incorrect answers by providing the information below.
4. See Attachment G (page 43) for a sample handout on Hib.

What is Hib?

Haemophilus influenzae type B (Hib) is a bacterium that causes serious disease in young children throughout the world.

- Hib causes one-third to one-half of all cases of bacterial meningitis¹ in infants and children less than five years old. It also accounts for up to one-quarter of all cases of severe pneumonia² in young children. Hib can also cause infections of the blood, joints, bones, throat, soft tissues and the covering of the heart.
- The World Health Organization estimates that 450,000 unvaccinated children die each year of Hib disease. But Hib disease usually does not affect adults.
- Hib bacteria live in the nose and throat area. Like measles, Hib bacteria are passed from child to child in droplets of saliva when an infected child coughs or sneezes. Hib is also spread when children share toys and other objects that they have put in their mouths.
- Children often carry the Hib bacteria without showing any signs or symptoms, but they still can infect others.

¹ **Bacterial meningitis** is an inflammation (swelling) of the membranes that cover and protect the spinal cord and brain. Bacterial meningitis is deadly unless treated immediately with the correct antibiotics. Even with proper treatment, 3-25% of affected children may die. Fifteen to 35% of children who survive Hib meningitis are left with permanent disabilities such as difficulty in movement, learning disabilities and hearing loss.

² **Pneumonia** is an inflammation of the lungs which can also be deadly, especially for young children.

- In spite of its name, *Haemophilus influenzae* type B does not cause influenza (the “flu”) or the common cold.
- Hib is not the same as HIV, the virus that causes AIDS.
- There are six types of *Haemophilus influenzae* (A, B, C, D, E, and F), but *Haemophilus influenzae* type B bacteria account for over 90% of serious *Haemophilus influenzae* infections in children.

Who is most at risk for getting Hib disease?

- Hib disease is most common in children under five years old. Children between the ages of four months and 12 months of age are most at risk. It is important to immunize children and prevent disease very early in life.
- At birth, antibodies from the mother sufficiently protect most infants. But when the child reaches two or three months of age, the level of maternal antibodies falls, and the risk of Hib infection increases.
- By age five, children usually develop their own immunity against Hib. Hib disease is rare after age five.

Can diseases caused by Hib be treated?

- Treatment for Hib disease is not always effective because some strains of Hib may be resistant to antibiotics. Antibiotic resistance is a serious problem and is increasing every day.
- Hib immunization is more effective and less costly than treatment.

How effective is Hib vaccine?

- Hib vaccine is highly effective. Full Hib immunization (three doses of vaccine) reduces the risk of Hib disease in young children by more than 90%.

NOTE: Hib vaccine does not protect against diseases caused by other germs. Even after full Hib immunization, a child may still get other types of pneumonia, meningitis or viral infections, such as the flu.

Are there any contraindications to Hib vaccination?

No. Children over six weeks of age can be given Hib vaccine safely.

Monovalent Hib vaccine (vaccine against Hib only) can safely be given to children, teenagers, or adults. But sometimes Hib is combined with other vaccines, such as DTP, hepatitis B, or both. **Combination vaccines that include DTP vaccine should only be given to children over six weeks of age and under five years of age.** DTP vaccine is not effective for children under six weeks of age and the “P” component of DTP (pertussis vaccine) can cause adverse reactions in children over the age of five, teenagers, and adults.

NOTE: Be sure to tell parents that the child should be immunized on schedule, even if they have a slight cold or flu. Low-grade fever, mild respiratory infection and other minor illness are not contraindications to giving Hib vaccine.

Trainer’s Notes:

1. To review what participants have learned up to this point, distribute **Attachment A: Matching Activity (page 19)**.
 2. Give participants several minutes to read and complete the exercise, and then call upon volunteers to read through the list with their answers.
 3. Correct any misinformation or wrong answers using the answers provided in the box on page 20.
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ADAPTATION NOTE:

The text below provides information on different Hib vaccine schedules and formulations. You may want to delete it from your version of the module. Train health workers ONLY on the vaccine formulation(s) available in your country.

What are the different Hib vaccine formulations?

Hib vaccine is available in five different formulations:

Monovalent Hib vaccine protects only against Hib disease.

The vaccine may be a **liquid** or a **lyophilized** (freeze-dried) powder which must be reconstituted.

Quadrivalent Hib vaccine (Hib + DTP) protects against four diseases: Hib disease, diphtheria, tetanus, and pertussis.

Hib + DTP vaccine may be a **liquid** or a **lyophilized** (freeze-dried) powder which must be reconstituted using liquid DTP vaccine as a diluent.

Pentavalent Hib vaccine (Hib + DTP + hepatitis B) protects against five diseases: Hib disease, diphtheria, tetanus, pertussis, and hepatitis B.

The Hib component is **lyophilized**; it is reconstituted using liquid DTP + hepatitis B vaccine as a diluent.

This module includes detailed instructions for using each formulation. Find out which formulation will be used in your country and include only that information in your version of the module.

Vaccine formulation used in your program	Information is available on:
Monovalent vaccine liquid or lyophilized	Page 5
Quadrivalent vaccine liquid or lyophilized	Attachment D-Page 27
Pentavalent vaccine lyophilized	Attachment D-Page 32

ADAPTATION NOTE: This information is for countries using monovalent Hib vaccine. See Attachment D for information on quadrivalent and pentavalent Hib vaccines.

Administering Monovalent Hib vaccine (Hib only vaccine)

Who should get Hib vaccine?

Trainer's Notes:

When Hib vaccine is first introduced into an area, health officials will determine which children should receive the vaccine.

When Hib vaccine is first introduced into your area: Explain the introduction strategy for your area.

After the vaccine has been fully introduced in your area: Use the information below.

- All children over six weeks of age should receive three doses of Hib vaccine with an interval of at least four weeks between doses.
- It is not effective or necessary to vaccinate adults or children over age 5 because the risk of Hib disease is very low.

What is the vaccination schedule?

Age	Vaccines Given		
Birth	OPV0	BCG	
6 weeks	OPV1	DTP1	Hib1
10 weeks	OPV2	DTP2	Hib2
14 weeks	OPV3	DTP3	Hib3
9 months	Measles		

ADAPTATION NOTE: Your immunization schedule may be different—replace this schedule with your own. Also, your immunization program may include other vaccines such as hepatitis B, yellow fever or Japanese encephalitis vaccine. In that case, add the vaccine(s) to the schedule.

What if a dose is missed?

To guarantee long-term protection, all three doses should be given. If a child misses the date for vaccination, the child can be given the dose as soon as possible. There is no need to re-start the vaccination schedule.

NOTE: Sometimes parents are not able to bring their child for immunization on schedule. In those cases, do not scold the parent—that might make them hesitant to return in the future. Instead praise the parent for bringing the child in and urge them to come on time for the next immunization.

Can an extra dose of vaccine hurt the child?

An extra dose of Hib vaccine given after the last scheduled dose does not hurt children, but also does not increase the effectiveness of the immunization.

Administering liquid, monovalent Hib vaccine

ADAPTATION NOTE: Monovalent Hib vaccine is available in liquid and lyophilized formulations. Include the instructions in this section if your program uses liquid Hib vaccine.

- Liquid Hib vaccine should be clear and colorless. If it appears cloudy, it may have been frozen.

Use the shake test to determine if the vaccine has been frozen. (See Attachment E on page 36). **Do not use liquid Hib vaccine that has been frozen, or that you suspect has been frozen.**

- Check the expiry date and vaccine vial monitor (VVM), if any, of the vaccine. Discard vaccine that is too old or has been exposed to too much heat.
- **Hib vaccine is given as a 0.5 ml, intramuscular injection in the infant's outer mid-thigh.**

NOTE: Infants should NEVER be given injections in the buttock as there is risk of damaging nerves in that area. The vaccine will also be less effective if injected deep into fatty tissues.

- Hib vaccine is administered with a 0.5 ml syringe and needle (disposable or auto-disable), the same type of syringe and needle as are routinely used for DTP injections.
- A sterile syringe and needle must be used for each injection.
- Hib vaccine can safely be given along with other vaccines such as DTP, hepatitis B, polio, BCG, measles, and yellow fever during the same immunization visit.

When giving two different immunization injections, give one in each thigh. For example, give DTP in the right thigh and Hib in the left thigh.

When it is necessary to give more than one immunization injection in the same thigh (for

example, when giving DTP, Hib, and hepatitis B), give one injection in one thigh and give two injections in the other thigh. For example, give DTP in the right thigh and give Hib and hepatitis B in the left thigh, at least 2.5 cm apart. (By giving the injections at least 2.5 cm apart, if there is a local reaction to one of the injections, you can tell which caused the reaction.)

Administering lyophilized, monovalent Hib vaccine

ADAPTATION NOTE: Include the instructions in this section if your program uses lyophilized Hib vaccine.

Like measles vaccine, lyophilized Hib vaccine must be mixed (reconstituted) before use.

Lyophilized Hib vaccine comes with two separate vials. One vial contains a diluent and the second vial contains the lyophilized (freeze-dried) Hib vaccine.

NOTE: Use only the diluent supplied with the Hib vaccine. Do not use another manufacturer's diluent.

- **First, reconstitute the lyophilized, monovalent Hib vaccine:**

1. Make sure that you have both the vial containing the lyophilized Hib vaccine and the vial containing the diluent that came with the vaccine.

Note: If the diluent is warmer than the vaccine, put it into the refrigerator ahead of time so that it cools to the same temperature as the vaccine. If the diluent is warmer, it can cause "thermal shock" and damage the colder vaccine.

You will also need a sterile, 2 ml mixing (reconstitution) syringe.

2. Check the expiry date and VVM (if any) of the vaccine. Discard vaccine that is too old or has been exposed to too much heat.
3. Using the mixing syringe, draw up all of the diluent from the vial. Inject all the diluent into the vial containing the lyophilized Hib vaccine.
4. Remove the mixing syringe and shake the vial, or roll it between your palms, until the powder is fully dissolved and there are no visible particles in the vial.

- **After mixing, draw 0.5 ml of vaccine into the injection syringe. Hib vaccine is given as an intramuscular injection in the infant's outer mid-thigh.**

NOTE: Infants should NEVER be given injections in the buttock as there is risk of damaging nerves in that area. The vaccine will also be less effective if injected deep into fatty tissues.

- Hib vaccine is administered with a 0.5 ml syringe and needle (disposable or auto-disable), the same type of syringe and needle as are routinely used for DTP injections.
- A sterile syringe and needle must be used for each injection. The syringe and needle used for reconstitution should not be used for giving the injection.

- Hib vaccine can safely be given along with other vaccines such as DTP, hepatitis B, polio, BCG, measles, and yellow fever during the same immunization visit.

When giving two different immunization injections, give one in each thigh. For example, give DTP in the right thigh and Hib in the left thigh.

When it is necessary to give more than one immunization injection in the same thigh (for example, when giving DTP, Hib, and hepatitis B), give one injection in one thigh and give two injections in the other thigh. For example, give DTP in the right thigh and give Hib and hepatitis B in the left thigh, at least 2.5 cm apart. (By giving the injections at least 2.5 cm apart, if there is a local reaction to one of the injections, you can tell which caused the reaction.)

IMPORTANT: Discard any reconstituted Hib vaccine after six hours or at the end of each immunization session, whichever comes first.

ADAPTATION NOTE: You may want to include the appropriate “Job Aid” (Attachment F) here for a step-by-step description of how to administer Hib vaccine. There are five different Job Aids in that section (two for monovalent vaccine (liquid and lyophilized), two for quadrivalent vaccine (liquid and lyophilized), and one for pentavalent vaccine). Be sure to insert the correct Job Aid for the vaccine formulation used in your program.

Trainer’s Notes:

1. Ask participants, **What are all the steps we should follow when immunizing an infant against Hib disease?**
 2. Allow participants to brainstorm a list of steps to follow when vaccinating. Write answers on a flipchart paper.
 3. Discuss the importance of:
 - greeting the parent
 - evaluating the child’s immunization card
 - explaining to the parent about the vaccine
 - checking to make sure the correct vaccine is available
 - looking at the expiry date and checking the vaccine vial monitor (VVM) if the vial has a VVM)
 - using safe injection equipment
 - using the “shake test” to determine whether the vaccine has been frozen or not
 4. Demonstrate correct vaccine administration, including good communication with the parent.
 5. Ask participants, **What are some important things to remember when reconstituting vaccines?**
 6. Allow participants to brainstorm a list of answers. Write answers on a flipchart paper.
 7. Discuss the importance of:
 - using the correct diluent for the vaccine
 - using a sterile syringe and sterile needle to mix the vaccine
 - using a different sterile syringe and sterile needle to give the injection
 - discarding vaccine after it is reconstituted
-

Side Effects

Trainer's Note:

Drop-outs due to parent concern about side effects are avoidable. Make sure that participants have a chance to role-play talking with parents about common side effects and what to do about them.

What are the side effects of Hib vaccine?

ADAPTATION NOTE: Revise the text below so that it refers only to the vaccine formulation(s) used in your program.

- Millions of doses of Hib vaccine have been given to children around the world.
But there have never been any reports of serious reactions to Hib vaccine.

However, if a child seems to have had a severe reaction to the vaccine, he or she should be given immediate medical attention and the mother should be told not to allow the child to be given another dose. The reaction should be reported to the authorities so that they can investigate, as needed.

NOTE: Hib vaccine cannot cause Hib disease.

- Only 25% of children receiving Hib vaccine develop mild redness, swelling and soreness at the injection site. This will go away within 1-3 days, and is not serious.

Parents may want to give the child acetaminophen (paracetamol) to treat these symptoms.

- It is rare for a child to have a fever after being vaccinated against Hib. However, infants vaccinated with DTP at the same time as Hib may have fever, probably because of the DTP.

NOTE: Children older than five years, teenagers, and adults should not be given DTP vaccine, or any combination vaccine containing DTP, because there is a higher risk of adverse reactions for those age groups.

- Help parents understand that their child may experience common side-effects resulting from Hib or DTP immunization so that they are not unduly concerned about them.

Be sure to discuss with parents what they should do if common side effects occur (and how to recognize uncommon, serious side effects).

Storing & Transporting Hib Vaccine

ADAPTATION NOTE: Revise the text below so that it refers only to the vaccine formulation(s) used in your program.

How do you store Hib vaccine?

Trainer's Notes:

1. To stimulate discussion, ask participants how vaccines are stored in their clinic.
 2. Ask for examples of how vaccines are stored in remote communities. What conditions are necessary? How is the cold chain guaranteed?
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- Hib vaccine should be stored between 2 to 8 degrees Celsius.
- Liquid Hib vaccine, DTP vaccine, TT vaccine, and hepatitis B vaccine must not be frozen. If frozen, they lose their potency and provide no protection against disease. Previously frozen vaccines may also cause “aseptic abscesses.”
- If you suspect that any of these vaccines have been frozen, perform the “shake test” (page 36).

How to avoid freezing vaccines

- Store vaccines in the warmest part of the refrigerator (usually the top if it is a top opening refrigerator). If vaccines are placed in the bottom or middle of a top opening refrigerator, they are more likely to freeze.

In front loading refrigerators: do not store vaccines on the top shelf since it is directly under the freezer and can be very cold.

- If possible, carry liquid Hib, hepatitis B, DTP, and TT vaccines in a separate cold box or vaccine carrier. Make sure that ice packs are put into the cold box or vaccine carrier only after they are “conditioned.” Also, to ensure that vaccines do not freeze due to direct contact with ice packs, wrap the vaccines in brown paper or newspaper before putting them into the box or carrier. This will help avoid freezing.
- If you cannot use separate carriers, be sure to keep the liquid Hib, hepatitis B, DTP, and TT vaccine vials far away from icepacks.

Wrap the vials in a paper bag (paper insulates better than plastic), then put them all in a plastic bag to keep the vials dry and the labels intact. Place the bag in the top level of the cold box.

None of these vaccines should touch an ice pack.

What should you do with leftover vaccine in an open vial?

ADAPTATION NOTES: Policies for dealing with open, rubber-stoppered vials of liquid vaccine (such as liquid monovalent or quadrivalent Hib vaccine) vary from country to country.

Learn what the policy is in your country and adapt the information in this section.

The information below is based on World Health Organization recommendations for using opened vials of vaccine. See References (page 18).

Open vials of **liquid monovalent Hib** vaccine and **liquid quadrivalent Hib + DTP** vaccine may be reused in subsequent sessions as long as:

- they have been kept at the correct temperature,
- the VVM (if any) is intact and has not reached the discard point,
- the vial has a rubber stopper (septum) and the septum has not been soaking in water, and
- aseptic technique has been used to draw previous doses.

Reconstituted monovalent Hib vaccine, **reconstituted quadrivalent DTP + Hib** vaccine and **reconstituted pentavalent Hib + DTP + hepatitis B** vaccine must be thrown away after six hours or at the end of the vaccination session (whichever comes first), because they can become contaminated and toxic.

During the session, you can use the vaccine in the vial as long as:

- the vaccine was reconstituted less than six hours earlier
- the vaccine has been stored between uses at 2 to 8 degrees centigrade and has not been frozen
- the vial septum has not been soaking in water and
- aseptic technique has been used to draw previous doses.

Safe Disposal of Used Needles and Syringes

How can you safely dispose of used syringes and needles?

ADAPTATION NOTES: Policies for dealing with contaminated needles and syringes, and other medical waste, vary from country to country. Learn what the policy is in your country and adapt the information in this section.

For more information about safe disposal, see References (page 18)

You may wish to add an illustration showing the safety box being used in your country.

Trainer's Note:

Introduce and discuss local or national medical waste procedures here.

- locally available safety box or incinerator box types
 - techniques for incinerating or burning filled safety boxes
-

- Every disposable syringe and needle must be put in a safety box immediately after use.

Keep a safety box within reach whenever you give injections.

If no official safety box is available, used syringes and needles should be placed in a hard plastic medical waste container or safety box.

- Safety boxes and waste containers should be fully incinerated, if possible.

If there is no incinerator, burn the contaminated waste in a metal drum. After burning, bury any remaining ashes and metal debris (such as needles).

Monitoring Use of Hib Vaccine

ADAPTATION NOTES: Policies for monitoring and reporting vaccine use vary from country to country. Learn what the policy is in your country and adapt the information in this section.

How can you monitor use of Hib vaccine?

Trainer's Notes:

1. Introduce and discuss local or national record keeping and reporting procedures here.
 - show participants the new immunization card with Hib included
 - show participants new registration forms and other recording forms that must be filled out by the health worker.
 2. Ask each health worker to complete all forms that have been revised for Hib, e.g. tally sheets, monthly summaries, and child health or vaccination cards. Observe their work.
 3. Correct any mistakes and answer any remaining questions about record keeping and reporting.
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Hib vaccine is valuable, so it is important to monitor the use of vaccine and to think about ways to reduce wastage.

Evaluation Exercise

Trainer's Note:

To further evaluate what participants have learned, use the ***Hib Statement Cards: Fact or Fiction?*** (Attachment C, page 24). Follow the instructions in the attachment.

Reducing Drop-Outs and Increasing Immunization Coverage through Better Communication with Parents

How can you help ensure that parents bring their children for all needed immunizations?

Why do parents bring their children for some immunizations, but then fail to return for the full vaccination series? Sometimes parents try to come for immunization but the health center is closed or they do not know when immunizations are offered. Sometimes they may be afraid of side effects. Or they may have had a bad experience during an earlier immunization visit and be hesitant to return.

To effectively discuss these concerns with parents, every vaccinator needs to develop good communication skills. When a mother feels that she and her baby have been treated well, and when she knows when to return for the next immunization, she will be more likely to bring her children for the full course of immunization. And she may encourage other mothers to bring their children for vaccinations too!

Trainer's Notes:

Ask participants, **What can a vaccinator do to reduce drop-outs and increase immunization coverage?** Possible answers include:

- Find out when it is convenient for parents to bring their children for immunization and offer immunizations at those times.
- Maintain a regular immunization schedule so that parents know when to come. Clearly post the schedule where parents will see it.
- Explain to parents when and why the child should return for future vaccinations. Remind them to bring the child's vaccination card. Assure them that the child should be vaccinated even if he or she has a slight fever or cold.
- Share his or her knowledge about vaccination with the parents.
- Be friendly and courteous in all interactions with parents.
- Listen respectfully to parents' questions and concerns.
- Answer questions and explain things simply and clearly. Be patient with people who cannot read or who have not attended school.
- Speak the local language and use words the parents can understand.
- Ensure a smooth patient flow so that children are seen in the order they arrived, and without unnecessary delay.
- Allow only one family at a time in the immunization area.
- Help parents understand possible common side effects and how they can treat the symptoms. Also, what they should do in case of uncommon allergic reactions.
- Explain to parents that measles can kill children and that it is important to vaccinate their children against this disease. Failure to get the measles vaccine can be a big problem.
- Guide the parent to the exit after giving the immunization and thank her or him for coming.
- Ask community leaders and community organizations to help educate parents about full immunization and motivate or assist them to bring their children on time. Interested groups might include youth organizations, mother's clubs or service organizations such as Rotary.

Role play: Administering Hib Vaccine Safely and Correctly

Trainer's Notes:

Role-playing is an excellent educational tool and participants often rate role-plays very highly when they evaluate training programs. Yet trainers sometimes make the mistake of not scheduling role-plays, or not allocating enough time for them.

Below are ideas for a role-play exercise on Hib administration. If you feel that participants need more practice preparing for immunization sessions, loading vaccines into cold boxes, reconstituting lyophilized vaccine, giving injections, safely disposing of contaminated needles or syringes, or communicating with parents, create special role-plays to address those issues.

1. Ask participants to form teams of three persons. One participant will role-play as the Immunization Provider. One will be a Mother (or Father) with her baby. The third participant will act as an Observer.
2. Give each participant a copy of the observation checklist (Attachments B1, B2 or B3, depending on the vaccine formulation used in your program – pages 21-23).
3. Each Provider will demonstrate the correct procedures for administering Hib vaccine, including interaction with the Mother. Oranges or grapefruits can be used as injection models.
4. You may want to give special challenges to the Providers. For example, ask them to role-play as if:
 - * the Hib vaccine (or DTP vaccine used as a diluent) appears to have been frozen
 - * there is some Hib vaccine remaining in an open vial at the end of the day
 - * the vaccinator does not have updated record cards and has to use the old cards
 - * the mother did not bring her child's immunization card
 - * the mother brings her child for immunization a week or two later than scheduled
 - * the mother demands that she also be vaccinated
 - * the mother is concerned about Hib vaccine side effects
 - * the baby will soon be moving to another place—how to complete vaccination?
 - * the baby is squirming violently—how should the mother hold the child?
 - * *you can add other "challenges" as appropriate.*
5. Each Observer will fill out the observation checklist during the role-play between the Provider and the Mother. The Observers should check "yes" when they observe that a Provider has completed that action, and "no" when the Provider neglected to perform that action.
6. Ask each team to stop role-playing after seven minutes (give them more time if you prefer). Tell all the Mothers that they will now role-play as Providers, all Providers are now Observers, and all Observers are now Mothers.
7. Repeat the role-play for another seven minutes.
8. Switch roles and repeat the role-play again until every participant has had a chance to be Observer, Provider, and Mother.
9. Conduct a group discussion about the role-play. Focus on the question "What can we do to improve our immunization service, increase safety, reduce drop-outs, and increase coverage?" Be sure that participants think about how their behavior and communication with parents affects immunization coverage.

Evaluation of the Training Session and Closing the Session

Trainer's Notes:

Ask participants to verbally share what they liked best about the training session and what they would change for the future.

AND/OR

Distribute the training evaluation form in Attachment H (page 45).

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

Hib Disease and Vaccine

Children's Vaccine Program/PATH. Diseases and Vaccines section of the CVP web site:
www.childrensvaccine.org/html/diseases_vaccine.htm

World Health Organization, Department of Vaccines and Biologicals. "Introduction of *Haemophilus influenzae* type B vaccine into immunization programmes—Management guidelines, including information for health workers and parents." 2000 (WHO/V&B/00.05)

World Health Organization, Department of Vaccines and Biologicals.
"Haemophilus influenzae type b immunization (fact sheet)" 2001 (WHO/V&B/01.29)

World Health Organization, Department of Vaccines and Biologicals.
"WHO policy statement: The use of opened multi-dose vials of vaccine in subsequent immunization sessions" 2000 (WHO/V&B/00.09)

These three WHO documents can be downloaded from
www.who.int/vaccines-documents/DoxGen/H3DoxList.htm

World Health Organization, Department of Vaccines and Biologicals.
"Proper Handling and Reconstitution of Vaccines" Vaccines and Biologicals Update, Volume 34, December, 2000.

This document can be downloaded from
www.who.int/vaccines-documents/DoxNews/pdf-updt/update34.pdf

Injection Safety and Safe Disposal of Medical Waste

Children's Vaccine Program/PATH. Safe Injection section of the CVP web site:
www.childrensvaccine.org/html/safe_injection.htm

PATH. "Giving Safe Injections: Introducing Auto-Disable Syringes." 2000

Children's Vaccine Program/PATH. "Proper Handling and Disposal of Auto-Disable Syringes and Safety Boxes—A Training Module." 2002

These two documents can be downloaded from
www.childrensvaccine.org/html/safe_injection.htm

World Health Organization. "Safe Injection." Bulletin of the World Health Organization. Volume 77, Number 10, 1999, 787-866

This document can be downloaded from
www.who.int/bulletin/tableofcontents/vol.77no.10.html

ATTACHMENT A

Trainer's Note:

If you are training vaccinators who do not read well, this exercise can be done verbally, relying on the participants' memories. Simply read the questions to the group and ask them fill in the blanks verbally.

Key Facts About Hib: Matching Activity

Directions: Fill in the blanks using words in the box.

other vaccines	coughs	bacterial meningitis
450,000	three doses	90 percent
sneezes	bacterium	effective

1. Hib disease is not caused by a virus, it's caused by a _____.
2. Hib is transmitted in droplets of moisture from a child's mouth or nose when he or she _____ or _____. Hib is also spread through shared toys and objects children put in their mouths.
3. Hib vaccine is very _____, and can be given safely to infants and children over six months of age or under five years of age.
4. For full protection, infants must receive _____ of Hib vaccine.
5. Worldwide, Hib infection is the largest cause of _____.
6. The World Health Organization estimates that *without vaccination* _____ children die each year of Hib disease.
7. Hib vaccination reduces the risk of Hib disease in young children by more than _____.
8. Hib vaccine can safely be given along with _____, such as DTP, polio, measles, BCG, and hepatitis B.

ANSWERS to matching activity (Attachment A)

1. Hib disease is not caused by a virus, it's caused by a **bacterium**.
2. Hib is transmitted in droplets of moisture from a child's mouth or nose when he or she **coughs** or **sneezes**. Hib is also spread through shared toys and objects children put in their mouths.
3. Hib vaccine is very **effective**, and can be given safely to infants and children over six months of age or under five years of age.
4. For full protection, infants must receive **three doses** of Hib vaccine.
5. Worldwide, Hib infection is the largest cause of **bacterial meningitis**.
6. The World Health Organization estimates that *without vaccination* **450,000** children die each year of Hib disease.
7. Hib vaccination reduces the risk of invasive Hib disease in young children by more than **90 percent**.
8. Hib vaccine can safely be given along with **other vaccines**, such as DTP, polio, measles, BCG, and hepatitis B.

ATTACHMENT B-1

Vaccine Administration Role-Play Observation checklist

Liquid, monovalent Hib vaccine or liquid, quadrivalent Hib + DTP vaccine

	Action	Observed? YES	Observed? NO
1.	Greet the parent.		
2.	Examine child's immunization card or question the parent about the child's immunization history.		
3.	Explain to parent which vaccines will be given during this session.		
4.	Check to make sure the vaccines you select are those required for the child.		
5.	Check the expiry date and VVM (if any) of each vaccine.		
6.	Perform a shake test to see if the Hib or Hib+DTP vaccine has been frozen.		
7.	Shake the vial again before use.		
8.	Take a sterile 0.5 ml syringe with a sterile intramuscular needle.		
9.	Draw exactly 0.5 ml of vaccine. Hold the syringe needle up and tap it to expel any remaining air.		
10.	Position the mother with baby on her lap and ask the mother to hold the baby's arms.		
11.	Insert the needle straight and deep into the baby's upper outer thigh muscle.		
12.	Inject the vaccine and withdraw the needle.		
13.	Immediately dispose of the contaminated needle and syringe in safety box.		
14.	Tell the mother when to return for the next immunization, counsel her about common side effects, and answer any questions she may have. Thank her for bringing her child to the clinic.		

Comments and feedback for vaccinator: _____

ATTACHMENT B-2

Vaccine Administration Role-Play Observation checklist

Lyophilized monovalent, Hib vaccine or lyophilized quadrivalent Hib + DTP vaccine

	Action	Observed? YES	Observed? NO
1.	Greet the parent.		
2.	Examine child's immunization card or question the parent about the child's immunization history.		
3.	Explain to parent which vaccines will be given during this session.		
4.	Check to make sure the vaccines you select are those required for the child.		
5.	Check the expiry date and VVM (if any) of each vaccine.		
6.	<i>[for quadrivalent vaccine only]</i> Perform the shake test to see if the DTP diluent vaccine has been frozen.		
7.	Take a sterile 2 ml mixing (reconstitution) syringe.		
8.	Draw up the diluent into the mixing syringe.		
9.	Inject the diluent into the lyophilized Hib vaccine vial.		
10.	Mix the vaccine by either shaking the vial or rolling it between your palms until the powder is entirely dissolved and no particles are visible in the vial.		
11.	Take a sterile 0.5 ml syringe with a sterile intramuscular needle.		
12.	Draw exactly 0.5 ml of vaccine. Hold the syringe needle up and tap it to expel any remaining air.		
13.	Position the mother with baby on her lap and ask the mother to hold the baby's arms.		
14.	Insert the needle straight and deep into the baby's upper outer thigh muscle.		
15.	Inject the vaccine and withdraw the needle.		
16.	Immediately dispose of the contaminated needle and syringe in safety box.		
17.	Tell the mother when to return for the next immunization, counsel her about common side effects, and answer any questions she may have. Thank her for bringing her child to the clinic.		

Comments and feedback for vaccinator: _____

ATTACHMENT B-3

Vaccine Administration Role-Play Observation checklist

Lyophilized, pentavalent Hib + DTP + hepB vaccine

	Action	Observed? YES	Observed? NO
1.	Greet the parent.		
2.	Examine child's immunization card or question the parent about the child's immunization history.		
3.	Explain to parent which vaccines will be given during this session.		
4.	Check to make sure the vaccines you select are those required for the child.		
5.	Check the expiry date and VVM (if any) of each vaccine.		
6.	Perform the shake test to see if the hepatitis B + DTP diluent vaccine has been frozen.		
7.	Take a sterile 2 ml mixing (reconstitution) syringe.		
8.	Draw up the diluent vaccine into the mixing syringe.		
9.	Inject the diluent vaccine into the lyophilized Hib vaccine vial.		
10.	Mix the vaccine by either shaking the vial or rolling it between your palms until the powder is entirely dissolved and no particles are visible in the vial.		
11.	Take a sterile 0.5 ml syringe with a sterile intramuscular needle.		
12.	Draw exactly 0.5 ml of vaccine. Hold the syringe needle up and tap it to expel any remaining air.		
13.	Position the mother with baby on her lap and ask the mother to hold the baby's arms.		
14.	Insert the needle straight and deep into the baby's upper outer thigh muscle.		
15.	Inject the vaccine and withdraw the needle.		
16.	Immediately dispose of the contaminated needle and syringe in safety box.		
17.	Tell the mother when to return for the next immunization, counsel her about common side effects, and answer any questions she may have. Thank her for bringing her child to the clinic.		

Comments and feedback for vaccinator: _____

ATTACHMENT C

Hib Statement Cards: True or False?

- Cut the sheet below to make 14 slips of paper, each with one statement. Or create your own true and false statements if you like.
- Give one statement to each participant. Ask participants to read their statements out loud.
- The group should discuss whether each statement is true or false.
- Ask for the group's agreement before correcting the answer (see page 25) or continuing on to the next statement.

1. Hib is the leading cause of bacterial meningitis.

8. Most children experience many side effects after being given Hib vaccine.

2. The risk of Hib disease falls sharply after the age of 5.

9. Hib vaccine is a 0.5 ml, intramuscular injection given in the outer mid-thigh.

3. Hib is transmitted primarily through blood and semen.

10. Used syringes and needles should be placed in a safety box, then incinerated.

4. There is a vaccine against Hib, but not against all germs that cause meningitis.

11. It is not necessary to use a sterile needle and syringe when administering Hib vaccine.

5. Hib can be transmitted by sharing toys that children have put in their mouths.

12. The vaccinator should always encourage the mother to come for all needed vaccinations, and clearly explain when to return for the next one.

6. Hib vaccine should be given to all children at birth.

13. Liquid Hib vaccine, DTP vaccine, TT vaccine, and hepatitis B vaccine should be kept frozen.

7. It is important for a vaccinator to be friendly and courteous, even if the mother has brought the child a week or two later than scheduled, or has forgotten the child's vaccination card.

14. Meningitis causes permanent brain damage in 20-35 percent of survivors.

ANSWERS to Hib Statement Cards: Fact or Fiction? (Attachment C)

1. True
2. True
3. False – Hib is transmitted through moisture in coughs or sneezes.
4. True
5. True
6. False – Only infants older than 6 weeks of age and younger than 5 years of age should be given Hib vaccine.
7. True
8. False – Most children experience no side effects after being given Hib vaccine. Up to 25% of children may have mild soreness or redness at the place of injection.
9. True
10. True
11. False – Needles and syringes used for ANY injection should always be sterile.
12. True
13. False - These vaccines must not be frozen.
14. True

ATTACHMENT D

Adapting the Training Module for Quadrivalent and Pentavalent Hib Vaccine Formulations

ADAPTATION NOTE: This attachment includes separate sections for dealing with quadrivalent and pentavalent Hib vaccines.

If your immunization program offers monovalent Hib, use the information included in the main body of this module (beginning on page 5).

If your program offers a combination vaccine (quadrivalent or pentavalent), substitute the information in the main body of the module (pages 5-9) with the appropriate information from this attachment.

Train health workers only to use the vaccine formulation(s) available in your program.

Vaccine formulation used in your program	Information is available on:
<i>Monovalent vaccine</i> <i>liquid or lyophilized</i>	Page 5
<i>Quadrivalent vaccine</i> <i>liquid or lyophilized</i>	Attachment D-Page 27
<i>Pentavalent vaccine</i> <i>lyophilized</i>	Attachment D-Page 32

ADAPTATION NOTE: This information is for countries providing Hib + DTP (quadrivalent) vaccine.

Be sure to note if you are using liquid Hib + DTP or lyophilized Hib + DTP, and include only the appropriate instructions.

Administering the Hib + DTP vaccine

Hib + DTP is a “quadrivalent,” or four-in-one, vaccine. It combines 4 different vaccines in one injection to protect against four diseases:

- *Haemophilus influenzae* type B (Hib) disease,
- diphtheria,
- tetanus, and
- pertussis.

Who should get Hib + DTP vaccine?

Trainer’s Note:

When Hib vaccine is first introduced into an area, health officials will determine which children should receive the vaccine.

When Hib vaccine is first introduced into your area: Explain the introduction strategy for your area.

After the vaccine has been fully integrated in your area: Use the information below.

- All children over six weeks of age should receive three doses of Hib + DTP vaccine with an interval of at least four weeks between doses.
- It is not effective or necessary to vaccinate adults or children over age 5 because the risk of Hib disease is very low.
- **Children under six weeks of age, older children, teenagers and adults should never be given Hib + DTP vaccine** (because of the DTP component).

What is the vaccine schedule?

Age	Vaccines Given	
Birth	OPV0	BCG
6 weeks	OPV1	Hib + DTP (quadrivalent 1)
10 weeks	OPV2	Hib + DTP (quadrivalent 2)
14 weeks	OPV3	Hib + DTP (quadrivalent 3)
9 months	Measles	

ADAPTATION NOTE: Your immunization schedule may be different—replace this schedule with your own. Also, your immunization program may include other vaccines such as hepatitis B, yellow fever or Japanese encephalitis vaccine. In that case, add the vaccine(s) to the schedule.

What if a dose is missed?

To guarantee long-term protection, all three doses should be given. If a child misses the date for vaccination, the child can be given the dose as soon as possible. There is no need to re-start the vaccination schedule.

NOTE: Sometimes parents are not able to bring their child for immunization on schedule. In those cases, do not scold the parent—that might make them hesitant to return in the future. Instead praise the parent for bringing the child in and urge them to come on time for the next immunization.

Can an extra dose of vaccine hurt the child?

An extra dose of Hib vaccine given after the last scheduled dose does not hurt children, but also does not increase the effectiveness of the immunization.

Administering liquid Hib + DTP vaccine

ADAPTATION NOTE: Hib + DTP vaccine is available in liquid and lyophilized formulations. Include the instructions in this section if your program uses liquid Hib vaccine.

- Liquid Hib + DTP vaccine should be clear and colorless. If it appears cloudy, it may have been frozen.

Use the shake test to determine if the vaccine has been frozen. (See Attachment E on page 36) **Do not use liquid Hib + DTP vaccine that has been frozen, or that you suspect has been frozen.**

- Check the expiry date and VVM (if any) of the DTP diluent vaccine. Discard vaccine that is too old or has been exposed to too much heat.
- **Hib + DTP vaccine is given as a 0.5 ml, intramuscular injection in the infant's upper outer thigh.**

NOTE: Infants should NEVER be given injections in the buttock as there is risk of damaging nerves in that area. The vaccine will also be less effective if injected deep into fatty tissues.

- Hib + DTP vaccine is administered with a 0.5 ml syringe and needle (disposable or auto-disable), the same type of syringe and needle as are routinely used for DTP injections.
- A sterile syringe and needle must be used for each injection.
- Hib + DTP vaccine can safely be given along with other vaccines such as hepatitis B, polio, BCG, measles, and yellow fever during the same immunization visit.

When giving two different immunization injections, give one in each thigh. For example, give Hib + DTP in the right thigh and hepatitis B in the left thigh.

When it is necessary to give more than one immunization injection in the same thigh (for example, when giving Hib + DTP, hepatitis B, and another vaccine), give one injection in one thigh and give two injections in the other thigh. For example, give Hib + DTP in the right thigh and give hepatitis B and the other vaccine in the left thigh, at least 2.5 cm apart. (By giving the injections at least 2.5 cm apart, if there is a local reaction to one of the injections, you can tell which caused the reaction.)

Administering lyophilized Hib + DTP vaccine

ADAPTATION NOTE: Include the instructions in this section if your program uses lyophilized Hib + DTP vaccine.

Like measles vaccine, lyophilized Hib + DTP vaccine must be mixed (reconstituted) before use.

Lyophilized Hib + DTP vaccine comes in two separate vials. One vial contains liquid DTP vaccine (used as a diluent). The second vial contains a lyophilized (freeze-dried) Hib vaccine.

NOTE: Use only the DTP diluent vaccine supplied with the Hib vaccine. Do not use another manufacturer's DTP vaccine.

- **First, reconstitute the lyophilized Hib vaccine, using the DTP vaccine as diluent:**

1. Make sure that you have both the vial containing the lyophilized Hib vaccine and the vial containing the DTP diluent vaccine that came with the vaccine.

You will also need a sterile, 2 ml mixing (reconstitution) syringe.

2. Check the expiry date and VVM (if any) of the DTP diluent vaccine. Discard vaccine that is too old or has been exposed to too much heat.
3. Use the shake test to determine if the DTP diluent vaccine has been frozen. (See Attachment E on page 36)

Do not use DTP diluent vaccine that has been frozen, or that you suspect has been frozen.

4. Using the mixing syringe, draw up all of the DTP diluent vaccine. Inject it into the vial containing the lyophilized Hib vaccine.
5. Remove the mixing syringe from the vaccine vial and shake the vial, or roll it between your palms, until the powder is fully dissolved and there are no visible particles in the vial.

- **After mixing, draw 0.5 ml of vaccine into the injection syringe. Hib + DTP vaccine is given as an intramuscular injection in the infant's upper outer thigh.**

NOTE: Infants should NEVER be given injections in the buttock as there is risk of damaging nerves in that area. The vaccine will also be less effective if injected deep into fatty tissues.

- Hib + DTP vaccine is administered with a 0.5 ml syringe and needle (disposable or auto-disable), the same type of syringe and needle as are routinely used for DTP injections.
- A sterile syringe and needle must be used for each injection. The syringe and needle used for reconstitution should not be used for giving the injection.

- Hib + DTP vaccine can safely be given along with other vaccines such as hepatitis B, polio, BCG, measles, and yellow fever during the same immunization visit.

When giving two different immunization injections, give one in each thigh. For example, give Hib + DTP in the right thigh and hepatitis B in the left thigh.

When it is necessary to give more than one immunization injection in the same thigh (for example, when giving Hib + DTP, hepatitis B, and another vaccine), give one injection in one thigh and give two injections in the other thigh. For example, give Hib + DTP in the right thigh and give hepatitis B and the other vaccine in the left thigh, at least 2.5 cm apart. (By giving the injections at least 2.5 cm apart, if there is a local reaction to one of the injections, you can tell which caused the reaction.)

IMPORTANT: Discard any reconstituted Hib + DTP vaccine after six hours or at the end of each immunization session, whichever comes first.

ADAPTATION NOTE: This information is for countries providing Hib + DTP + hepatitis B (pentavalent) vaccine.

Administering the Hib + DTP + hepatitis B vaccine

Hib + DTP + hepatitis B vaccine is a “pentavalent,” or five-in-one, vaccine. It combines 5 different vaccines in one injection to protect against five diseases:

- *Haemophilus influenzae* type B (Hib) disease,
- diphtheria,
- tetanus,
- pertussis, and
- hepatitis B.

Who should get Hib + DTP + hepB vaccine?

Trainer’s Notes:

When Hib vaccine is first introduced into an area, health officials will determine which children should receive the vaccine.

When Hib vaccine is first introduced into your area: Explain the introduction strategy for your area.

After the vaccine has been fully integrated in your area: Use the information below.

- All children over six weeks of age and under five years of age should receive three doses of Hib + DTP + hepatitis B vaccine with an interval of at least four weeks between doses.
- It is not effective or necessary to vaccinate adults or children over age 5 because the risk of Hib disease is very low.
- **Children under six weeks of age, older children, teenagers and adults should never be given Hib + DTP + hepatitis B vaccine** (because of the DTP component).

What is the vaccine schedule?

Age	Vaccines Given	
Birth	OPV0	BCG
6 weeks	OPV1	Hib + HepB + DTP (pentavalent 1)
10 weeks	OPV2	Hib + HepB + DTP (pentavalent 2)
14 weeks	OPV3	Hib + HepB + DTP (pentavalent 3)
9 months	Measles	

ADAPTATION NOTE: Your immunization schedule may be different—replace this schedule with your own. Also, your immunization program may include other vaccines such as yellow fever or Japanese encephalitis vaccine. In that case, add the vaccine(s) to the schedule.

What if a dose is missed?

To guarantee long-term protection, all three doses should be given. If a child misses the date for vaccination, the child can be given the dose as soon as possible. There is no need to re-start the vaccination schedule.

NOTE: Sometimes parents are not able to bring their child for immunization on schedule. In those cases, do not scold the parent—that might make them hesitant to return in the future. Instead praise the parent for bringing the child in and urge them to come on time for the next immunization.

Can an extra dose of vaccine hurt the child?

An extra dose of vaccine given after the last scheduled dose does not hurt children, but also does not increase the effectiveness of the immunization.

Administering lyophilized Hib + DTP + hepatitis B vaccine

Like measles vaccine, lyophilized Hib + DTP + hepatitis B vaccine must be mixed (reconstituted) before use.

Lyophilized Hib + DTP + hepatitis B vaccine comes in two separate vials. One vial contains liquid DTP + hepatitis B vaccine (used as a diluent). The second vial contains a lyophilized (freeze-dried) Hib vaccine.

NOTE: Use only the DTP + hepatitis B diluent vaccine supplied with the Hib vaccine. Do not use another manufacturer's DTP + hepatitis B vaccine.

Lyophilized Hib + DTP + hepatitis B vaccine is provided in two dose vials.

- **First, reconstitute the lyophilized Hib vaccine, using the DTP + hepatitis B vaccine as diluent:**

1. Make sure that you have both the vial containing the lyophilized Hib vaccine and the vial containing the DTP + hepatitis B diluent vaccine that came with the vaccine.

You will also need a sterile, 2 ml mixing (reconstitution) syringe.

2. Check the expiry date and VVM (if any) of the DTP + hepatitis B diluent vaccine. Discard vaccine that is too old or has been exposed to too much heat.
3. Use the shake test to determine if the DTP + hepatitis B diluent vaccine has been frozen. (See Attachment E on page 36)

Do not use DTP + hepatitis B diluent vaccine that has been frozen, or that you suspect has been frozen.

4. Using the mixing syringe, draw up all of the DTP + hepatitis B diluent vaccine. Inject it into the vial containing the lyophilized Hib vaccine.
5. Remove the mixing syringe from the vaccine vial and shake the vial, or roll it between your palms, until the powder is fully dissolved and there are no visible particles in the vial.

- **After mixing, draw 0.5 ml of vaccine into the injection syringe. Hib + DTP + hepatitis B vaccine is given as an intramuscular injection in the infant's outer mid-thigh.**

NOTE: Infants should NEVER be given injections in the buttock as there is risk of damaging nerves in that area. The vaccine will also be less effective if injected deep into fatty tissues.

- Hib + DTP + hepatitis B vaccine is administered with a 0.5 ml syringe and needle (disposable or auto-disable), the same type of syringe and needle as are routinely used for DTP injections.

- A sterile syringe and needle must be used for each injection. The syringe and needle used for reconstitution should not be used for giving the injection.
- Hib + DTP + hepatitis B vaccine can safely be given along with other vaccines such as polio, BCG, measles, and yellow fever during the same immunization visit.

When giving two different immunization injections, give one in each thigh. For example, give Hib + DTP + hepatitis B vaccine in the right thigh and another vaccine in the left thigh.

When it is necessary to give more than one immunization injection in the same thigh (for example, when giving Hib + DTP, hepatitis B, and another vaccine), give one injection in one thigh and give two injections in the other thigh. For example, give Hib + DTP in the right thigh and give hepatitis B and the other vaccine in the left thigh, at least 2.5 cm apart. (By giving the injections at least 2.5 cm apart, if there is a local reaction to one of the injections, you can tell which caused the reaction.)

IMPORTANT: Discard any reconstituted Hib + DTP + hepatitis B vaccine after six hours or at the end of each immunization session, whichever comes first.

ATTACHMENT E

Has This Vaccine Been Frozen? Doing the “Shake Test”

Liquid Hib vaccine, DTP vaccine, TT vaccine, and hepatitis B vaccine should never be frozen. Freezing damages the vaccine and it will not work correctly. And sometimes the grains in a vaccine that was frozen can create an “aseptic abscess”—a painful lump at the injection site filled with a clear liquid (not pus).

If you suspect that a vial of liquid Hib vaccine, DTP vaccine, TT vaccine, or hepatitis B vaccine has been frozen, use the “shake test” described below.

How to do the shake test

1. Prepare a frozen “control vial”

Select any vaccine vial from the same batch and manufacturer as the “suspect vials” you wish to test. This will be your “control vial” (the one you know has been frozen).

Freeze the vaccine in the control vial completely.

Clearly label the control vial “frozen” and never use it!

Allow the control vial to thaw to the same temperature as the suspect vials.

2. Compare a “suspect vial” with the frozen control vial

Gather any suspect vials you wish to test (they must be from the same batch and manufacturer as the control vial).

Shake the suspect and control vials for 10-15 seconds. If the solution in the suspect vials is not evenly-colored after shaking, do not use the vaccine. Discard it. The suspect vials probably were frozen.

Now place all the vials on a flat surface and watch as the vaccine sediment settles.

If the sediment in the suspect vials settles more slowly than the sediment in the frozen control vial, you may use the vaccine in the suspect vials.

If the sediment in the suspect vials settles at the same rate or more quickly than those in the frozen control vial, do not use the suspect vials. Discard them. The suspect vials probably have been frozen.

3. Repeat the test for each different batch of vaccine

Repeat steps one and two above for each batch of vaccine you test, even if they are from the same manufacturer. It is not necessary to test each shipping box, just each batch of vaccine.

ATTACHMENT F

Job Aids – How to Administer Hib Vaccine

You can photocopy the Job Aid and use it as a handout. Be sure to select the correct Job Aid for your program:

Liquid, <u>monovalent</u> (Hib) vaccine Job Aid	Page 38
Lyophilized, <u>monovalent</u> (Hib) vaccine Job Aid	Page 39
Liquid, <u>quadrivalent</u> (Hib + DTP) vaccine Job Aid	Page 40
Lyophilized, <u>quadrivalent</u> (Hib + DTP) vaccine Job Aid	Page 41
Lyophilized <u>pentavalent</u> (Hib + DTP + hepatitis B) vaccine Job Aid	Page 42

How to Administer Liquid Monovalent Hib Vaccine

1. **Before the session begins:** Prepare your vaccines, needles, syringes, and safety box ahead of time. Make sure that you have sufficient equipment to provide every child with a safe injection and to safely dispose of all injection materials.
2. **When the parent and child arrives:** Greet the parent in a friendly manner. Ask if the parent has any questions or concerns about immunization. Respond truthfully and respectfully.
3. Look at the child's immunization card. Determine whether the child is due for a Hib vaccination. Don't scold if the parent has brought the child in late.
4. Make sure that you have the correct vaccines you plan to use for this child.
5. Explain to the parent about Hib vaccine (and any other vaccines needed this visit).
6. Check the expiry date of the Hib vaccine. If the vaccine has expired, dispose of it.
7. If the vial has a vaccine vial monitor (VVM), check the VVM. If the VVM indicates that the vaccine has been exposed to too much heat, dispose of it.
8. Use the "shake test" to determine if the vaccine has been frozen or not. **Do not use Hib vaccine that has been frozen, or that you suspect has been frozen.**
If it appears to have been frozen, dispose of it.
9. Shake the vial again immediately before use.
10. Using a sterile 0.5 ml syringe, draw exactly 0.5 ml into the syringe. Hold the needle upwards and tap the syringe to expel any air trapped inside.
11. Position the mother with the baby on her lap. Ask the mother to hold the baby's arms and legs still.
12. Insert the needle straight and deep into the infant's upper outer thigh muscle.
13. Inject the vaccine, then withdraw the needle.
14. Dispose of the needle and syringe in a safety box. Do not recap the needle.
15. Record the date of vaccination on the child's vaccination card.
16. Thank the parent for bringing the child for immunization and tell the parent when to bring the child for the next immunization.

ADAPTATION NOTE: You may wish to add illustrations showing how to position the baby on the mother's lap and/or how to give an intramuscular injection.

How to Administer Lyophilized Monovalent Hib Vaccine

1. **Before the session begins:** Prepare your vaccines, needles, syringes, and safety box ahead of time. Make sure that you have sufficient equipment to provide every child with a safe injection and to safely dispose of all injection materials.
2. **When the parent and child arrives:** Greet the parent in a friendly manner. Ask if the parent has any questions or concerns about immunization. Respond truthfully and respectfully.
3. Look at the child's immunization card. Determine whether the child is due for a Hib vaccination. Don't scold if the parent has brought the child in late.
4. Make sure that you have the correct vaccines you plan to use for this child. Make sure that you have both the vial containing the lyophilized Hib vaccine and the vial containing the diluent. You will also need a sterile, 2 ml mixing (reconstitution) syringe.
5. Explain to the parent about the Hib vaccine (and any other vaccines needed this visit).
6. Check the expiry date of the Hib vaccine. If the vaccine has expired, dispose of it.
7. If the vial has a vaccine vial monitor (VVM), check the VVM. If the VVM indicates that the vaccine has been exposed to too much heat, dispose of it.
8. Using the mixing syringe, draw up all of the diluent and inject it into the vial containing the lyophilized Hib vaccine.
9. Remove the mixing syringe and shake the vial, or roll it between your palms, until all the powder has dissolved and there are no visible particles in the vial.
10. Using a sterile 0.5 ml syringe, draw exactly 0.5 ml of the reconstituted vaccine into the syringe. Hold the needle upwards and tap the syringe to expel any air trapped inside.
11. Position the mother with the baby on her lap. Ask the mother to hold the baby's arms and legs still.
12. Insert the needle straight and deep into the infant's upper outer thigh muscle.
13. Inject the vaccine, then withdraw the needle.
14. Dispose of the needle and syringe in a safety box. Do not recap the needle.
15. Record the date of vaccination on the child's vaccination card.
16. Thank the parent for bringing the child for immunization and tell the parent when to bring the child for the next immunization.

IMPORTANT: Discard any reconstituted Hib vaccine after six hours, or at the end of each session, whichever comes first.

How to Administer Liquid Hib + DTP Vaccine

1. **Before the session begins:** Prepare your vaccines, needles, syringes, and safety box ahead of time. Make sure that you have sufficient equipment to provide every child with a safe injection and to safely dispose of all injection materials.
2. **When the parent and child arrives:** Greet the parent in a friendly manner. Ask if the parent has any questions or concerns about immunization. Respond truthfully and respectfully.
3. Look at the child's immunization card. Determine whether the child is due for Hib vaccination. Don't scold if the parent has brought the child in late.
4. Make sure that you have the correct vaccines you plan to use for this child.
5. Explain to the parent about the Hib + DTP vaccine (and any other vaccines needed this visit).
6. Check the expiry date of the Hib + DTP vaccine. If the vaccine has expired, dispose of it.
7. If the vial has a vaccine vial monitor (VVM), check the VVM. If the VVM indicates that the vaccine has been exposed to too much heat, dispose of it.
8. Use the "shake test" to determine if the vaccine has been frozen or not. **Do not use Hib + DTP vaccine that has been frozen, or that you suspect has been frozen.** If it appears to have been frozen, dispose of it.
9. Shake the vial again immediately before use.
10. Using a sterile 0.5 ml syringe, draw exactly 0.5 ml into the syringe. Hold the needle upwards and tap the syringe to expel any air trapped inside.
11. Position the mother with the baby on her lap. Ask the mother to hold the baby's arms and legs still.
12. Insert the needle straight and deep into the infant's upper outer thigh muscle.
13. Inject the vaccine, then withdraw the needle.
14. Dispose of the needle and syringe in a safety box. Do not recap the needle.
15. Record the date of vaccination on the child's vaccination card.
16. Thank the parent for bringing the child for immunization and tell the parent when to bring the child for the next immunization.

How to Administer Lyophilized Hib + DTP Vaccine

1. **Before the session begins:** Prepare your vaccines, needles, syringes, and safety box ahead of time. Make sure that you have sufficient equipment to provide every child with a safe injection and to safely dispose of all injection materials.
2. **When the parent and child arrives:** Greet the parent in a friendly manner. Ask if the parent has any questions or concerns about immunization. Respond truthfully and respectfully.
3. Look at the child's immunization card. Determine whether the child is due for a Hib vaccination.
4. Make sure that you have the correct vaccines you plan to use for this child. Make sure that you have both the vial containing the lyophilized Hib vaccine and the vial containing the liquid DTP diluent vaccine. You will also need a sterile, 2 ml mixing (reconstitution) syringe.
5. Explain to the parent about the DTP + Hib vaccine (and any other vaccines needed this visit).
6. Check the expiry date of the DTP + Hib vaccine. If the vaccine has expired, dispose of it.
7. If the vial has a vaccine vial monitor (VVM), check the VVM. If the VVM indicates that the vaccine has been exposed to too much heat, dispose of it.
8. Use the "shake test" to determine if the liquid DTP vaccine (the diluent) has been frozen or not. **Do not use DTP diluent vaccine that has been frozen, or that you suspect has been frozen.** If it appears to have been frozen, dispose of it and dispose of the lyophilized Hib vaccine.
9. Using the mixing syringe, draw up all of the liquid DTP diluent vaccine and inject it into the vial containing the lyophilized Hib vaccine.
10. Remove the mixing syringe and shake the vial, or roll it between your palms, until all the powder has dissolved and there are no visible particles in the vial.
11. Using a sterile 0.5 ml syringe, draw exactly 0.5 ml of the reconstituted vaccine into the syringe. Hold the needle upwards and tap the syringe to expel any air trapped inside.
12. Position the mother with the baby on her lap. Ask the mother to hold the baby's arms and legs still.
13. Insert the needle straight and deep into the child's upper outer thigh muscle.
14. Inject the vaccine, then withdraw the needle.
15. Dispose of the needle and syringe in a safety box. Do not recap the needle.
16. Record the date of vaccination on the child's vaccination card.
17. Thank the parent for bringing the child for immunization and tell the parent when to bring the child for the next immunization.

IMPORTANT: Discard any reconstituted Hib + DTP vaccine after six hours, or at the end of each session, whichever comes first.

How to Administer Lyophilized Hib + DTP + Hepatitis B Vaccine

1. **Before the session begins:** Prepare your vaccines, needles, syringes, and safety box ahead of time. Make sure that you have sufficient equipment to provide every child with a safe injection and to safely dispose of all injection materials.
2. **When the parent and child arrives:** Greet the parent in a friendly manner. Ask if the parent has any questions or concerns about immunization. Respond truthfully and respectfully.
3. Look at the child's immunization card. Determine whether the child is due for a Hib vaccination.
4. Make sure that you have the correct vaccines you plan to use for this child. Make sure that you have both the vial containing the lyophilized Hib vaccine and the vial containing the liquid hepatitis B + DTP diluent vaccine. You will also need a sterile, 2 ml mixing (reconstitution) syringe.
5. Explain to the parent about the Hib + DTP + hepatitis B vaccine (and any other vaccines needed this visit).
6. Check the expiry date of the Hib + DTP + hepatitis B vaccine. If the vaccine has expired, dispose of it.
7. If the vial has a vaccine vial monitor (VVM), check the VVM. If the VVM indicates that the vaccine has been exposed to too much heat, dispose of it.
8. Use the "shake test" to determine if the liquid hepatitis B + DTP vaccine (the diluent) has been frozen or not. **Do not use liquid hepatitis B + DTP vaccine that has been frozen, or that you suspect has been frozen.** If it appears to have been frozen, dispose of it and dispose of the lyophilized Hib vaccine.
9. Using the mixing syringe, draw up all of the liquid hepatitis B + DTP diluent vaccine and inject it into the vial containing the lyophilized Hib vaccine.
10. Remove the mixing syringe and shake the vial, or roll it between your palms, until all the powder has dissolved and there are no visible particles in the vial.
11. Using a sterile 0.5 ml syringe, draw exactly 0.5 ml of the reconstituted vaccine into the syringe. Hold the needle upwards and tap the syringe to expel any air trapped inside.
12. Position the mother with the baby on her lap. Ask the mother to hold the baby's arms and legs still.
13. Insert the needle straight and deep into the infant's upper outer thigh muscle.
14. Inject the vaccine, then withdraw the needle.
15. Dispose of the needle and syringe in a safety box. Do not recap the needle
16. Record the date of vaccination on the child's vaccination card.
17. Thank the parent for bringing the child for immunization and tell the parent when to bring the child for the next immunization.

IMPORTANT: Discard any reconstituted Hib vaccine after six hours, or at the end of each session, whichever comes first.

ATTACHMENT G

Sample Handout on Hib

ADAPTATION NOTE: The handout on the following pages was designed for health workers or for parents, local leaders, and other community members who have a basic understanding of biology (i.e. they know what a germ is).

For less-educated community members, you will need to simplify the information. For these groups, it is often a good idea to design messages that focus on what they need to do to fully immunize their children (example: “Your child must come to the health center five times for immunizations”), not on biological concepts or explanations about how vaccines work.

Trainer’s Notes:

See the following resources for more ideas about communicating immunization messages to parents. All can be found by searching for the document name on the CVP/PATH website (www.ChildrensVaccine.org).

- **Introduction to the DTP-Hepatitis B Vaccine**
Two booklets from the Ministry of Health, Mozambique. One is for health workers, the other for community leaders.
- **Parents and Teens** section of the CVP/PATH website:
www.childrensvaccine.org/html/parents_teens.htm
- **Hepatitis B Vaccine Introduction: Lessons Learned in Advocacy, Communication, and Training**
A short paper with practical suggestions from Children's Vaccine Program/PATH.
- **Training Vaccinators in a Time of Change**
An article from the October 2001 issue of GAVI’s Immunization Focus newsletter. The article is a follow-up to the CVP paper listed above, with additional suggestions.
- **Immunization and Child Health Materials Development Guide**
A comprehensive manual from CVP which includes practical information on designing health education materials for less-educated (and low-literate) audiences

For more information about Hib, and other vaccine-preventable diseases, visit the “Diseases and Vaccines” and the “Training Materials and Clinical Information” sections of the CVP website at www.ChildrensVaccine.org

***Haemophilus influenzae* type b (Hib): the germ and the vaccine**

What is Hib? What diseases does it cause?

Hib is the abbreviation for *Haemophilus influenzae* type b, a bacterium that causes severe infections, including:

- Bacterial meningitis - an infection of the protective coverings of the brain and spinal cord
- Pneumonia - an infection of the lungs
- Epiglottitis - an infection of the throat
- Septicaemia - an infection of the blood; also called blood poisoning
- Septic arthritis - an infection of the joints

Hib also can cause problems with the bones, the heart, and the soft tissue under the skin, but these diseases are less common.

Hib is NOT the same as hepatitis B. The vaccine against hepatitis B is a different vaccine.

Hib is not the same as HIV, the virus that causes AIDS.

In spite of its name, Hib does not cause influenza.

Why is Hib disease a problem?

Hib disease is a problem because:

- It often results in serious illness and/or death for children. Children who survive the disease can have permanent brain damage.
- It is easily spread.

Who can get Hib disease? Who is most at risk?

Hib disease is most common in children under five years of age. Children between four and 12 months are most at risk.

The disease is rare in older children and adults.

How is it spread?

Hib germs are passed from child to child in droplets of moisture that come out of an infected child's mouth when he or she coughs or sneezes. Hib is also spread through shared toys and other things that children put in their mouths.

How can Hib disease be prevented?

Hib vaccine prevents all diseases caused by Hib bacteria.

Hib vaccine does not protect against diseases caused by other germs. After Hib immunization, a child may still get other types of pneumonia and meningitis or virus infections, such as flu.

Who should be immunized with Hib vaccine?

All infants older than six weeks and under five years of age should receive Hib vaccine.

Do older children need Hib vaccine?

Children over five years of age have usually developed a natural protection against the disease, so they do not need Hib vaccine.

How many doses of vaccine are needed and when are they given?

Hib immunization schedules differ from country to country, but usually three doses are given.

The first dose is given when a child is 6 weeks old, with a second dose a month later and a third dose a month after the second.

Ask your health care provider for the schedule in your area.

How is Hib vaccine given?

Hib vaccine is a 0.5 ml, intramuscular injection in the thigh (infants) or arm (older children). It can safely be given at the same time as DPT, polio, and hepatitis B vaccines.

What are the side effects?

Redness, swelling, and pain may occur where the Hib vaccine was injected. These usually start within one day after the immunization and last from one to three days. Less commonly, children may develop fever for a short time after immunization.

Hib vaccine does not cause serious side effects.

Is there any reason why a child should not be given Hib vaccine?

Although serious side effects have not been reported, a child who has had a severe reaction to Hib vaccine should not be given another dose.

ATTACHMENT H

Sample Training Evaluation Form

ADAPTATION NOTE: Adapt this form to gather the information you feel is most important for your trainers. You may want to delete some items. For example, if you did not serve food during the training session, delete the line in question 2 about food.

Immunizing Children Against Hib

If you need more space to write your responses, please use the back of the paper.

1. Please evaluate each of the following training sessions by putting a check in the appropriate column.

SESSION NAME	EXTREMELY USEFUL 6	VERY USEFUL 5	USEFUL 4	SOMEWHAT USEFUL 3	NOT TOO USEFUL 2	NOT USEFUL AT ALL 1
Key Facts About Hib						
Administering Hib Vaccine						
Side Effects						
Storing & Transporting Hib Vaccine						
Safe Disposal of Used Needles and Syringes						
Increasing Coverage Through Better Communication with Parents						
Hib Administration Role-Play						

1a. If you rated any session 3 or less, please tell us why:

2. Please evaluate each of the following aspects of the training by putting a check in the appropriate column.

ASPECT	EXCELLENT 6	VERY GOOD 5	GOOD 4	FAIR 3	SATISFACTORY 2	NOT SATISFACTORY 1
Achievement of my personal expectations						
Relevance of content						
Effectiveness of training methodology						
Organization of training session						
Usefulness of materials						
Effectiveness of facilitators and resource persons						
Accommodation						
Food						
Training Facilities						
Administrative Support						

2a. If you rated any session 3 or less, please tell us why:

3. Please evaluate how well the training was able to meet its three key objectives.

OBJECTIVE	EXTREMELY WELL 6	VERY WELL 5	WELL 4	SOMEWHAT WELL 3	NOT TOO WELL 2	NOT AT ALL WELL 1
To help you understand key facts about Hib infection and disease						
To help you understand how to use Hib vaccine						
To help you communicate more effectively with parents of children being vaccinated						

3a. If you rated any session 3 or less, please tell us why:

4. What did you like best about the training?

5. What did you like least about the training?

6. If there are any aspects of Hib vaccination that you are not sure about, please describe them.

7. Any other comments?

NOTES

More Training Resources from PATH

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

www.path.org/vaccinelibrary

- Hepatitis B Vaccine Introduction—
Lessons Learned In Advocacy, Communications, And Training
- Immunizing Children Against *Haemophilus influenzae* type B (Hib)
- Immunizing Children Against Japanese Encephalitis
- Proper Handling and Disposal of Auto-Disable Syringes and Safety Boxes—
A Training Module
- Giving Safe Injections: Using Auto-Disable Syringes for Immunization
- GAVI Training for Stronger Immunization Programs
- 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



PATH
1455 NW Leary Way
Seattle, Washington 98107
USA

Email: *info@path.org*
Website: *www.path.org*