

# OPERATIONAL GUIDELINES

## Introduction of Pentavalent Vaccine with *Haemophilus influenzae b* (Hib) in Timor-Leste



### Expanded Program on Immunization



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## TARGET AUDIENCE

These guidelines are meant to assist health managers and immunization program managers at national, district and sub-district levels to introduce Haemophilus influenzae type b (Hib) in pentavalent (DPT+HepB+ Hib) vaccine in the immunization program. The intention is to provide information that is practical as well as technically and operationally sound. This information should enable the programme managers to smoothly introduce the pentavalent vaccine in their immunization services.

**These operational guidelines have been developed by the EPI division in the Ministry of Health with technical support from UNICEF and inputs from the EPI Technical Working Group.**

**For further information, please contact:**

**Mr. Caetano Gusmao,**

**National EPI Manager,**

**Ministry of Health**

Email: [wairisi@yahoo.com.au](mailto:wairisi@yahoo.com.au)

Mobile : +670-77234849

**Ministry of Health,**

**Republica Democratica de Timor-Leste, 2012**



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## BACKGROUND

Immunization is one of the key interventions to help save lives of children. From 2003 to 2010, full immunization coverage in Timor-Leste has tripled from 18% to 53%. Timor-Leste has also successfully completed a validation exercise for elimination of Maternal and Neonatal tetanus. Although the surveillance and reporting systems need to improve, there has been no polio case detected since 1996. The Government of Timor-Leste, through the Ministry of Health, is committed to ensuring that all Timorese children are reached and provided with high quality immunization services and vitamin A supplements. The Ministry of Health, together with its partners, strives continuously to strengthen the national immunization program to ensure sustained routine immunization services for children and women.

### **Overall objective of the immunization programme:**

To reduce under-five morbidity and mortality caused by vaccine-preventable diseases among children in Timor-Leste.

In 2008, the Ministry of Health introduced an initiative called “SISCa” (Servisu Integradu Saude Comunitaria), an outreach approach aimed at delivering a package of basic health services in every village at least once a month. This community-based approach has led to an increase in accessibility of immunization services over the years through expanding the community-based outreach sites. In addition, with UNICEF support the cold chain system has also been revitalized since independence. In 2008 and 2009, the Ministry of Health and partners conducted a Multi-Antigen Campaign for improving routine immunization coverage in the country. In 2011, in response to an outbreak of measles, a nationwide measles immunization catch-up campaign was successfully completed.

The comprehensive Multi Year Plan (cMYP, 2011-2015) for immunization and the National Immunization Strategy 2011 call for the introduction of new vaccines to improve the protection of Timorese children against vaccine-preventable diseases. Accordingly, an application was prepared by the Ministry of Health, with technical support from UNICEF, for GAVI (Global Alliance for Vaccines and Immunization) support for introduction of pentavalent vaccine. The proposal was approved by GAVI in 2012.

The introduction is planned and led by a Core Committee, chaired by the National Director of Community Health and by sub committees for technical guidelines and training, IEC and communication and the launching ceremony. The activity is planned to ensure that pentavalent vaccine is available for all children in Timor-Leste.

*Note: The new pentavalent vaccine (DPT-HepB-Hib) will replace the existing tetravalent vaccine (DPT-HepB). The new vaccine will give protection to children against 5 diseases – diphtheria, pertussis, tetanus, hepatitis B, and haemophilus influenzae type b.*

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## THE IMMUNIZATION SCHEDULE

The Expanded Program on Immunization serves the following target groups:

All children under 1 year of age (0-11 months)

All women of childbearing age (including pregnant women)

The recommended vaccines are the following:

BCG	-	Bacillus Calmette-Guerin
OPV	-	Oral Polio Vaccine
DPT	-	Diphtheria, Pertussis, Tetanus
HepB	-	Hepatitis B
TT	-	Tetanus Toxoid
Measles	-	Measles
DT	-	Diphtheria and Tetanus
DTP-HepB	-	Diphtheria, Tetanus, Pertussis, and Hepatitis B
Hib	-	Haemophilus influenzae type b Vaccine

Immunization Schedule for Infants <1 (from birth up to 12 months of age)

In case of pentavalent (DTP+HepB+Hib) vaccine

Type of vaccine	When administered
BCG, OPV 0	At birth (or as soon as possible after birth)
OPV1, DTP-HepB1-Hib1	At 6 weeks
OPV2, DTP-HepB2-Hib2	At 10 weeks (or 4 weeks after OPV1, DPT1, HepB1-Hib1)
OPV3, DTP-HepB3-Hib3	At 14 weeks (or 4 weeks after OPV2, DPT2, HepB2-Hib2)
Measles	At 9 months

*Note: The schedule of the new pentavalent vaccine is same as existing tetravalent vaccine, i.e. at 6, 10 and 14 weeks.*

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## RATIONALE FOR Hib VACCINE

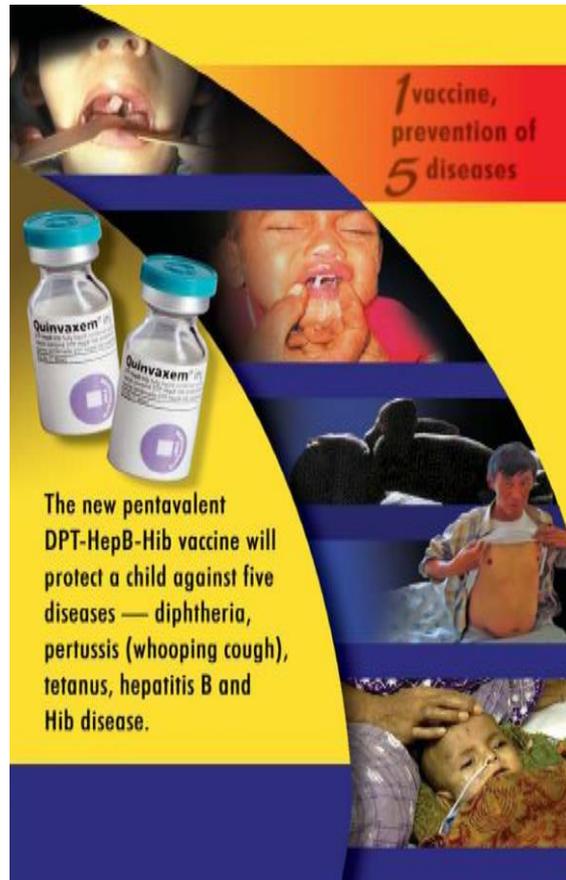
Haemophilus influenza type b (Hib) is a bacterium associated with a number of severe childhood diseases, namely infection of the brain membrane (pyogenic meningitis), pneumonia, sepsis and infection of other internal organs and bones. Hib accounts for roughly half of the pyogenic meningitis cases in the age group of 6 months to 2 years, and is also estimated to be responsible for 20% of pneumonia cases in this age group. Hib is most serious in young children (up to 2 years); after age 5 years there is little risk in getting disease. One out of 20 children who get Hib meningitis die and 10-30 % of survivors have permanent brain damage.

Haemophilus influenzae type b (Hib) was estimated to cause approximately 8.1 million cases of serious Hib diseases, and an estimated 371,000 deaths globally, in the year 2000 (Watt et al., 2009).

Vaccines are the only public health tool capable of preventing the majority of cases of serious Hib disease. In view of their demonstrated safety and efficacy, World Health Organization (WHO) recommended in 2006 that Hib vaccines be included in routine immunization programmes of all countries (WHO, 2006). Hib vaccine has been included in routine childhood vaccination programmes in more than 150 countries, in all regions of the world. As a consequence, invasive Hib disease has been practically eliminated in many industrialized countries, and its incidence has been dramatically reduced in some parts of the developing world.

Pneumonia is a leading cause of child deaths in Timor-Leste. According to the HMIS 2011 Report, 509 cases of severe pneumonia were identified in children (0-5 years) by the IMCI programme. The 6 hospitals of Timor-Leste reported that 1,830 cases of pneumonia and 51 cases of meningitis were admitted for treatment in the age group 0-5 years in 2011. In addition, the hospitals reported 36 deaths due to pneumonia in children and 11 deaths due to meningitis in children under 5 years of age. The government has planned to introduce Hib vaccine as part of the pentavalent vaccine (DPT, Hep B, Hib) in order to prevent children from dying due to pneumonia or meningitis caused by Hib.

*Note: The Hib component of the pentavalent vaccine will only protect against pneumonia and meningitis caused by Hemophilus influenzae type b. The child can still get pneumonia or meningitis from other causes.*



*Note: Earlier, tetravalent vaccine was used in Timor-Leste for protecting children against four diseases- diphtheria, pertussis and tetanus and hepatitis B.*

**NOW, new pentavalent vaccine** will protect children against **FIVE DISEASES** - diphtheria, pertussis and tetanus and hepatitis B and Haemophilus influenzae type b (Hib)

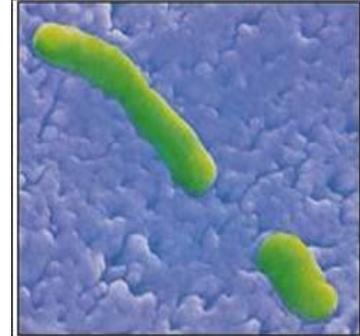
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## THE DISEASE

### What is Haemophilus influenzae?

Haemophilus influenzae is a Gram-negative coccobacillus that affects only humans. There are six types of Haemophilus influenzae (a, b, c, d, e, and f), but Haemophilus influenzae type b (Hib) bacteria account for over 90% of serious Haemophilus influenzae infections in children. Hib bacteria live in the nose and throat area.



*Note: In spite of its name, Haemophilus influenzae type b does not cause influenza (i.e., the “flu”) or the common cold. Hib is not the same as HIV or Human Immunodeficiency Virus, the virus that causes AIDS. Similarly, Hib is not the same as HepB or Hepatitis B, the virus that causes infection (hepatitis) and cancer of the liver.*

### Modes of transmission

Like measles, Hib is passed from an infected person to an uninfected via droplets of saliva when an infected individual coughs or sneezes. Hib can also be spread when children share toys and other objects that they have put in their mouth. The probability of transmission increases when children spend prolonged periods of time together. Children are often asymptomatic carriers of the Hib bacteria, showing no signs or symptoms but still able to infect others.

### Risk groups for Hib disease

Hib disease is most common in children under five years of age. Children between the ages of 4 to 18 months of age are most at risk (WHO, 2006). It is important to immunize children and prevent disease very early in life. At birth, antibodies from the mother sufficiently protect most infants. When the child reaches 2 or 3 months of age, the level of maternal antibodies decreases and the risk of Hib infection increases. By the age 5 years, most children will have already developed their own immunity against Hib so, Hib disease after the age of five years is rare.

## **Diseases caused by Hib infection**

### Bacterial meningitis:

Bacterial meningitis is the inflammation of the membranes that cover and protect the spinal cord and brain, known collectively as the meninges. In the absence of vaccination, bacterial meningitis in children is most often caused by Hib.

### Inflammation of the lungs:

In developing countries, Hib is a major cause of pneumonia (or acute lower respiratory infection, ALRI) in children. It has been found that up to 20% of the severe bacterial pneumonia cases are caused by Hib.

### Other Hib infections include:

Septicaemia: Presence of pathogenic bacteria in the blood.

Septic arthritis: Inflammation of the joints.

Osteomyelitis: Inflammation of the bones

Epiglottitis: Inflammation of the larynx and pharynx. In the absence of appropriate and immediate treatment, 50% of cases are fatal.

## **Diagnosis of Hib infection**

The diagnosis of Hib disease can be made by bacterial culture, Latex Agglutination Test or by Polymerase Chain Reaction (PCR). In reality, it is very difficult to identify Hib in resource poor settings. The culture needs to be done on sterile fluids like CSF or blood. For CSF, a delicate procedure called a lumbar puncture (LP) must be done. The samples collected need to be stored and transported in appropriate media while maintaining appropriate cold chain to have any chances of culturing Hib bacteria.

## **Treatment**

Treatment for Hib disease is not always effective because some strains of Hib may be resistant to antibiotics. Antibiotic resistance is a serious and growing problem in developing countries.

## **How it can be prevented?**

Immunization with Hib vaccine is the only practical way to prevent Hib disease. Children should receive three doses before the age of 1 year. Hib vaccines are safe and efficacious. Immunization against Hib is a cost effective strategy for disease prevention.

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## THE PENTAVALENT VACCINE

Hib vaccines, either alone or in combination, protect against Haemophilus influenzae type b. It is important to note that Hib containing vaccines do not prevent meningitis and pneumonia caused by other etiologic agents.



### Formulation

Hib vaccines are available in different formulations of liquid or lyophilised (dried powder), standalone (monovalent) and combination (DPT+Hib, DPT+HepB+Hib) forms. **The formulation that the EPI in Timor-Leste will provide is Liquid Pentavalent Vaccine (LPV). The vaccine has 5 antigens (DPT+ HepB+ Hib) in a single formulation.**

### Presentation

The Liquid Pentavalent Vaccine in the EPI will be available in 10-dose presentation.

### Storage volume

The storage volume of Hib vaccine in 10-dose vials is approximately the same as currently used DPT or HepB vaccine in similar presentation. Hence, there will not be any additional cold chain space requirement for pentavalent vaccine.

### **Storage temperature**

Pentavalent vaccine should be stored at temperature of 2-8 degree Celsius, in the basket of ILR and should never be frozen. Conditioned ice packs should be used during transportation to prevent freezing. The vaccinator should perform the shake test on vaccine that may have been frozen, and vaccine that fails the test should be returned to SAMES.

### **Vaccination schedule**

A three dose primary series will be considered routine. The first dose is given to children at six weeks of age or older. The vaccine may be given at the same time as DTP, OPV, and HepB vaccines, as shown, for example, in the schedule below. The interval between (Hib vaccine) doses should be at least one month.

Age	Vaccines	Dose	Route of administration
6 weeks	DTP-HepB-Hib 1	0.5 ml	Intramuscular, anterolateral aspect of thigh
10 weeks	DTP-HepB-Hib 2	0.5 ml	Intramuscular, anterolateral aspect of thigh
14 weeks	DTP-HepB-Hib 3	0.5 ml	Intramuscular, anterolateral aspect of thigh

### **Dosage and Route**

The dose of pentavalent vaccine is 0.5 ml. The mode of administration is the same as for DPT vaccine. Pentavalent vaccine is used directly from the vial and given by intramuscular injection in the antero-lateral aspect of the mid-thigh in infants. Pentavalent vaccine SHOULD NOT be given in buttock or administered intradermally because, firstly, there is risk of damaging the nerves in the area and, secondly, the vaccine will not produce an adequate antibody response.

### **Inter-changeability of the vaccines**

Liquid pentavalent vaccines from different manufacturers can be used for different doses for the same infant.

### **Adverse events following immunization (AEFI)**

When the Hib vaccine is given at the same time or as a combination vaccine with DPT, such as with pentavalent vaccine, the rate of AEFI is not any higher than when DPT is given alone. However, the introduction of pentavalent vaccine (or any other new vaccine) may coincide with the increased reporting of AEFIs in the districts. All AEFI cases, including those following pentavalent vaccine should be reported as per the guidelines for AEFI surveillance and response operational guidelines (Surveillance Unit, MoH, RDTL, 2010).

Hib vaccine has not been associated with any serious adverse effects. However, redness, swelling and pain at the site of injection may occur in as many as 25% of those who have been vaccinated. Such reactions usually start within 1 day after immunization and last for 1–3 days (WHO 2009). Less commonly, children may develop fever or can become irritable for a short period.

Adrenaline injection (1:1000) must be immediately available should an acute anaphylactic reaction occur due to any component of the vaccine. For infants and children the recommended dose of adrenaline is 0.01mg/kg (0.01ml/kg of 1:1000 injection). Single pediatric dose should not exceed 0.5mg (0.5 ml). The mainstay in the treatment of severe anaphylaxis is the prompt use of adrenaline, which can be lifesaving. For management of all AEFI, please follow the AEFI management guidelines of MoH, RDTL.

As with the use of all vaccines, the vaccinated children should remain under observation for not less than 30 minutes for possibility of occurrence of immediate or early allergic reactions.

### **Contraindications:**

There are no major contraindications for pentavalent vaccination except the following.

#### Severe allergic reactions

Although rare, an individual may have had a severe allergic reaction to a component of the vaccine following a previous dose of Hib/pentavalent vaccine. In such an event, subsequent doses are contraindicated and should not be given.

### Persons with severe acute illness

Children with severe acute illness should not be administered pentavalent vaccine until their condition improves. The minor illnesses, however, such as upper respiratory infections (URI) is not a contraindication to vaccination.

### **Immunogenicity, efficacy and effectiveness**

All Hib containing vaccines (i.e., pentavalent vaccine) are safe and efficacious. They provide 85 to 95% protection after completion of the schedule. The vaccination reduces nasopharyngeal colonization – or carriage – of the organism, leading to substantially greater reduction in disease transmission and incidence than can be directly attributed to the effects of the vaccine. This indirect effect on herd immunity has been demonstrated in several post introduction effectiveness studies.

### **Long-term protection and booster dose**

In general, the Hib vaccine provides protection for at least 15 years. Current scientific evidence suggests that protection is life-long. In the case where serum antibodies wane, an anamnestic response of antibody production triggered by memory B cells and memory T4 cells often occurs following re-exposure to the vaccine. A booster dose (for Hib) is not recommended.

### ***Completing the DPT Series***

*Note:* If a child has already received one or two doses of DPT-Hep B (tetraivalent), then you should finish that child's series of three doses with one or two doses (as appropriate) of pentavalent vaccine, maintaining the minimum interval of 4 weeks between doses. The ideal ages for the three doses are 6, 10, and 14 weeks; however, if this is not possible, then the second and third doses should be given as soon as possible once 4 weeks have passed since the previous dose.

*This guideline is to allow smooth transition from tetraivalent (DPT-HepB) to pentavalent (DPT-HepB-Hib) vaccine and avoid confusion by use of two kinds of vaccine at the same time.*

## **Open/Multi-Dose Vial Policy**

The open/multi-dose vial policy has the potential to reduce vaccine wastage rates by up to 30%, resulting in a significant annual savings in vaccine costs.

Multiple-dose vials of OPV, pentavalent vaccine (DPT-Hep B-Hib), TT, DT and hepatitis B vaccines from which one or more doses of vaccine have been removed during an immunization session at a **static immunization site (health facility)** may be used in subsequent immunization sessions for up to a maximum of 4 weeks, provided that all of the following conditions are met:

- The expiry date has not passed
- The vaccines are stored under appropriate cold chain conditions (2-8 degrees centigrade)
- The vaccine vial septum has not been submerged in water
- Aseptic technique has been used to withdraw all doses
- The vaccine vial monitor (VVM), if attached, has not reached the discard point
- The vials have been marked with the date opened in order to track the 4- week use period.

Multiple-dose vials of OPV, pentavalent vaccine (DPT-Hep B-Hib), TT, DT and hepatitis B vaccines from which one or more doses of vaccine have been removed during **an outreach immunization session** MUST BE DISCARDED at the end of the day.

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## STEPS TO INTRODUCE THE PENTAVALENT VACCINE

The inclusion of Hib as pentavalent vaccine into the EPI schedule requires careful planning at all levels. This initially involves top-down macro-planning at the national level followed by bottom-up micro-planning detailing precise logistics and financial needs for each district and sub-district levels starting from the more peripheral levels and moving towards the higher levels.

*Note: The introduction of pentavalent vaccine should be viewed as an opportunity to strengthen overall routine immunization service delivery.*

### **Conduct advocacy workshop at district and subdistrict level**

Seek commitment and support for introduction of pentavalent vaccine from various other departments & ministries like police, MSS, schools etc., and NGO partners, church, faith based groups and community leaders.

Specifically, the Director DHS and DPHO for EPI should form a committee for coordinating the activities for introduction of the pentavalent vaccine. This committee should include the following members:

- Director DHS, Chairperson
- DPHO, EPI, Secretary
- All CHC managers
- NGO partner representatives
- Church representatives
- Other stakeholders (other government departments, partners etc)

The Key tasks of the committee include ensuring that:

- all relevant health staff are trained and oriented about the new vaccine and communication skills and talking points regarding new vaccine
- required vaccine and other logistics needed are available to introduce the vaccine
- all health staff are aware of the possible AEFI and have the knowledge and necessary supplies (for e.g. adrenaline, hydrocortisone, paracetamol, etc.)
- all IEC materials and information materials have been distributed.

- all the Suco and aldeia chiefs are oriented on the new vaccine introduction
- activities to introduce Hib vaccine are used as an opportunity to strengthen RI services and develop plans for supervision, monitoring and evaluation
- analyse data report and proper documentation

### **Launching of vaccination program**

The launching of pentavalent vaccine provides an ideal opportunity to educate & inform the public about Hib disease, its prevention and the positive health benefits to individuals and the community. A well-publicized launching ceremony for pentavalent vaccine introduction to improve general awareness about EPI and specific knowledge related to pentavalent vaccine should be planned in your district. A successful launch of pentavalent vaccine will include mass media components as well as one-to-one interpersonal contact with beneficiaries to openly respond to queries that will surely arise. To be able to respond comprehensively, other related government departments, local media and NGOs should be briefed and brought on board so that they may also spread the message and motivate the community to utilize immunization.

#### ***Recording Pentavalent Doses***

*Note:* Health workers may use existing columns for DPT or HepB for entry of pentavalent vaccine by over-writing with hand. This should be done till the new formats are printed to include pentavalent vaccine (tally sheets, reporting forms, MCH registers, stock registers, Lisio)

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## GUIDE FOR HEALTH WORKERS

### Frequently Asked Questions

#### **Why are we Introducing Pentavalent vaccine in Timor-Leste?**

The change from tetravalent (DPT-Hep B) to pentavalent (DPT-Hep - Hib) means that the DPT-containing injections will now protect children against some forms of serious meningitis and pneumonia, as well as other, less common infections caused by Hib. Pneumonia, as you know, is one of the leading causes of infant and child morbidity and mortality in the country. Meningitis is a very serious disease whose prevalence in Timor-Leste is not accurately known.

The beauty of pentavalent vaccine is that it requires essentially no additional effort from either health workers or from parents, yet it provides protection against a number of additional diseases caused by Hib.

#### **What is the dosage schedule for the new pentavalent vaccine?**

The schedule of the new Pentavalent vaccine is same as existing tetravalent vaccine, i.e. at 6, 10 and 14 weeks.

#### **What is the presentation and storage temperature?**

The Liquid Pentavalent Vaccine (LPV) in the EPI will be available in 10 dose presentation. Pentavalent vaccine should be stored between 2-8 degree Celsius and should never be frozen. Conditioned ice packs should be used during transportation to prevent freezing

#### **How do you vaccinate children who have already received previous doses of tetravalent vaccine?**

If a child has already received one or two doses of DPT-Hep B (tetravalent), then you should finish that child's series of three doses with one or two doses (as appropriate) of pentavalent vaccine, maintaining the minimum interval of 4 weeks between doses. The ideal ages for the three doses are 6, 10, and 14

weeks; however, if this is not possible, then the second and third doses should be given as soon as possible once 4 weeks have passed since the previous dose.

This guideline is to allow smooth transition from tetravalent (DPT-HepB) to pentavalent (DPT-HepB-Hib) vaccine and avoid confusion by use of two kinds of vaccine at the same time.

### **What is the dosage and route of vaccination?**

The dose of pentavalent vaccine is 0.5 ml. The mode of administration of pentavalent vaccine is the same as DPT vaccine. Pentavalent vaccine is used directly from the vial and given by intramuscular injection in the antero-lateral aspect of the mid-thigh in infants. Pentavalent (DTP-Hep.B-Hib) vaccine SHOULD NOT be given in buttock or administered intradermally because, firstly, there is risk of damaging the nerves in the area and, secondly, the vaccine will not produce adequate antibody response.

### **How will you record and report the pentavalent vaccination?**

Health workers may use existing columns for DPT or HepB for entry of pentavalent vaccine by over-writing with hand. This should be done till the new formats are printed to include pentavalent vaccine (tally sheets, reporting forms, MCH registers, stock registers, Lisio)

### **Will there be a change in the Open/Multi-Dose Vial Policy?**

The existing open/multi-dose vial policy for DPT-HepB vaccine should be followed for pentavalent (DPT-HepB-Hib). This policy has the potential to reduce vaccine wastage rates by up to 30%, resulting in a significant annual savings in vaccine costs

### **Which are the Adverse Events following Immunization (AEFI) with pentavalent vaccine?**

Hib vaccine has not been associated with any serious adverse effects. However, redness, swelling and pain at the site of injection may occur in as many as 25% of those who have been vaccinated. Such reactions usually start

within 1 day after immunization and last for 1–3 days. Less commonly, children may develop fever or can become irritable for a short period.

All AEFI cases, including those following pentavalent vaccine should be reported as per the guidelines for AEFI surveillance and response operational guidelines

As with the use of all vaccines, all vaccinated children should remain under observation for not less than 30 minutes for possibility of occurrence of immediate or early allergic reactions.

### **Questions that Parents May Ask and Suggested Responses**

#### **What does this new vaccine mean for me and my child?**

The pentavalent vaccine means that your child will gain protection against some forms of serious diseases such as pneumonia and meningitis in addition to the protection that was given by the old vaccine against diphtheria, tetanus, pertussis, and hepatitis B. The good news is that to receive this extra protection, you and your children do not need to make any more effort. The new vaccine is given at the same times and places as the old one. The new vaccine is no more likely to cause side effects than the old one.

#### **Can you tell me more about the diseases the new vaccine will protect against?**

The new vaccine will add protection against various diseases, but the most important ones are pneumonia and meningitis. Pneumonia is a serious respiratory disease that is one of the main causes of child deaths in Timor-Leste. Meningitis is a very serious infection in the cover of the brain or other places that can kill or severely disable a child. It is important to realize that both of these diseases can be caused by different bacteria (germs). The new pentavalent vaccine will protect against one of the germs that cause pneumonia but not against all of the causes of pneumonia. The pentavalent vaccine will protect against the germ that causes most cases of meningitis. Countries that have introduced this vaccine have seen a tremendous decline in meningitis cases.

#### **Are there any other ways to make my family safe from these diseases?**

The new vaccine is the only practical way to prevent meningitis. There are various good practices, in addition to immunization, that can reduce a child's risk of suffering from pneumonia. These include:

- +giving breast milk only for a baby's first 6 months
- +not allowing babies to be exposed to smoke from fires or cigarette smoking
- +keeping children well-fed and well nourished
- +keeping children or others with respiratory infections away from young children.
- +ensuring that children receive Vitamin A supplementation

*Note: The introduction of pentavalent vaccine should be viewed as an opportunity to strengthen overall routine immunization service delivery.*

- PROTECT EVERY CHILD FROM PNEUMONIA AND MENINGITIS CAUSED BY Hib.
- THREE DOSES OF PENTAVALENT VACCINE CAN PROTECT THE CHILD AGAINST FIVE DISEASES – DIPHTHERIA, PERTUSSIS, TETANUS, HEPATITIS B and HAEMOPHILUS INFLUENZA TYPE b.

**Ministry of Health,**

**Republica Democratica de Timor-Leste, 2012**

