
DOH

NATIONAL IMMUNIZATION PROGRAM
MANUAL OF OPERATIONS

BOOKLET 2

CHAPTER 2
# Vaccine-Preventable Diseases (VPDs)

CHAPTER 3
# Vaccine-Preventable Disease Surveillance

Cover Photo from DOH Central Office

Chapter 2

# VACCINE-PREVENTABLE DISEASES

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# Vaccine-Preventable Diseases (VPDs)

## A. Rationale

Chapter 2 will familiarize you with the characteristics of each vaccine preventable disease (VPD) in terms of transmission, occurrence and incidence in order to appreciate the preventive role of immunization. VPD-related information will serve as your handle when advising clients regarding VPDs and in educating your local officials and other stakeholders on the importance of vaccination against said diseases.Fifteen (15) VPDs will be explained below for your reference.

## B. Objectives

Chapter 2 lists and describes the common VPDs in the country. After reading this Chapter, it is hoped that we will be able to:

1. Define and describe each VPD in terms of transmission, occurrence, population at risk and incidence; and
2. Describe the appropriate immunization and key strategic prevention, control as well as elimination or eradiction approaches against each of the VPDs.

## C. Scope and Coverage

Chapter 2 lists the following VPDs and the vaccines in use to prevent them. Each VPD is described according to its manifestation, transmission, population at risk, and how each can be treated, controlled, prevented or eliminated.

- Tuberculosis (TB)
- Hepatitis B
- Poliomyelitis
- Diphtheria
- Pertussis (whooping cough)
- Tetanus
- Haemophilus Influenza B Disease
- Pneumococcal Diseases
- Measles
- Mumps
- Rubella and Congenital Rubella Syndrome
- Human Papilloma Virus (HPV)
- Influenza
- Rotavirus
- Japanese Encephalitis

# D. Common Vaccine – Preventable Diseases in the Philippines

*TABLE 1.*
***Common VPDs in the Philippines***

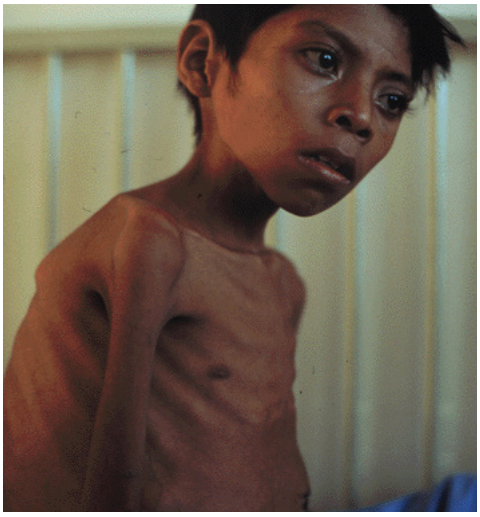
| Disease | Agent | Reservoir | Spread | Duration of Immunity Induced by Infection | Risk factors for Infection |
|---|---|---|---|---|---|
| **Tuberculosis** | Bacterium (*Mycobacterium tuberculosis*) | Humans | Airborne droplets | Not known. Reactivation of old infection commonly causes disease | Crowding Immunodeficiency Malnutrition In adults, alcoholism, diabetes, and HIV |
| **Hepatitis B** | Virus | Humans | Mother to newborn, child to child, blood, sexual. In developing countries, transmission at birth or early childhood is dominant. | If infection resolves, life- long immunity; | Infected mother Unsafe injections Unsafe blood transfusions; multiple sexual partners |
| **Polio** | Poliomyelitis virus - serotypes 1, 2, 3 | Humans | Fecal-oral | Lifelong type-specific immunity | Poor environmental hygiene |
| **Diphtheria** | Toxin-producing bacterium (*Corynebacterium diphtheriae*) | Humans | Close respiratory contact or contact with infectious material | Usually lifelong | Crowding |
| **Pertussis** | Bacterium (Bordetella pertussis) | Humans | Close respiratory contact | No concrete evidence | Crowding |
| **Tetanus** | Toxin-producing bacterium (*Clostridium tetani*) | Soil Animal intestines | Spores enter the body through wounds | None | Exposure to animal feces; infections with rusty metals Untreated wounds |
| **Maternal-Neonatal Tetanus** | Toxin-producing bacterium (*Clostridium tetani*) | Infected mother | Infection through the umbilical cord of newborns | None | Inadequately trained birth attendants; Lack of supplies for clean and safe deliveries |
| **Meningitis and pneumonia caused by Haemophilus influenza type b** | *Haemophilus influenzae* type b, bacterium | Humans | Close respiratory contact | Usually lifelong | Over crowding leading to exposure to the infections |
| **Rotavirus** | Virus | Humans | Fecal-oral | Unknown | Globally circulating virus strain. Poor environmental hygiene |
| **Measles** | Virus | Humans | Close respiratory contact and aerosolized droplets | Lifelong | Crowding |

| Disease | Agent | Reservoir | Spread | Duration of Immunity Induced by Infection | Risk factors for Infection |
|---|---|---|---|---|---|
| **Mumps** | Virus | Humans | Close respiratory contact and airborne droplets | Lifelong | Crowding |
| **Rubella** | Virus | Humans | Close respiratory contact and airborne droplets | Lifelong | Crowding |
| **Japanese Encephalitis** | Virus | Mosquitoes | Bite by infected Mosquito | Lifelong | Presence of high burden of disease causing vector |
| **Human Papilloma Virus** | Virus | Humans | Sexual intercourse | Not known | Unsafe sexual pratices |
| **Influenza** | Virus | Humans | Close respiratory contact and airborne droplets | Unknown or weak immunity | Crowding |
| **Pneumococcal Disease** | Bacteria | Humans | Close respiratory contact and airborne droplets | Some type-specific immunity | Crowding |

## D.1 Tuberculosis

### What is Tuberculosis?

TB is caused by the bacterium *Mycobacterium tuberculosis*. It usually attacks the lungs, but other parts of the body can also be affected, including the bones, joints, and brain.



*A young TB patient*

### What are the symptoms and signs of TB?

The symptoms of TB include general weakness, weight loss, fever and night sweats. In pulmonary TB, the symptoms include persistent cough, coughing of blood and chest pain. In young children, however, the only sign of pulmonary TB may be stunted growth or failure to thrive.

### How is TB transmitted?

TB is spread through the air when a person with the disease coughs, spits, or sneezes. Because it is highly contagious, it spreads rapidly where people are living in crowded situations, are poorly nourished, and cannot obtain treatment. Children can contract tuberculosis any time after birth.

### Who are the population at risk?

The disease is most commonly seen in adults but affects infants, children, and adolescents as well and is often more serious for younger people. Infants are more likely than adults to contract miliary and meningeal TB, which attack vital organs and are usually fatal. Countries with high TB burden include less developed countries. The Philippines is a high TB burden country.

### How is TB treated?

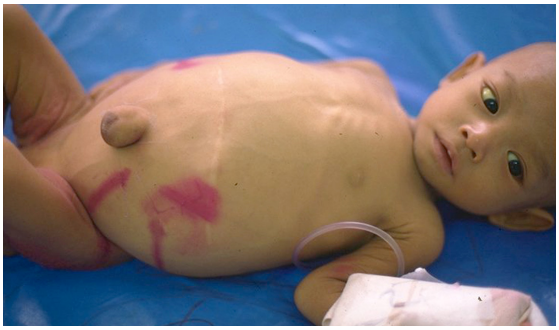
Patients with TB requires extensive and long-term care, many people who do not adhere to their treatment course long enough to be cured becomes resistant to anti-tuberculosis drugs. In response, the “DOTS” strategy was developed for both treatment and control. DOTS (Directly Observed Treatment Short-Course) is a standardized short course of chemotherapy.

### How is TB prevented?

National routine immunization programs use the Bacillus Calmette-Guérin (BCG) vaccine to prevent miliary and meningeal TB in the first years of life. BCG vaccine protects infants infected with TB from progressing to more dangerous forms of the disease and gives them some protection against recurrence at a later age. BCG does not prevent TB itself and provides little protection against the pulmonary forms. It is not recommended for adults.

## D.2 Hepatitis B

### What is hepatitis B?



*A boy with hepatitis*

Hepatitis B is a viral infection of the liver. Acute infection either resolves or progresses to chronic infection, which may lead to cirrhosis or liver cancer several decades later. In developing countries like the Philippines, hepatitis B infection usually occurs in childhood, at the time of birth, during infancy, or in early childhood. Symptoms are not usually apparent in infected young people, but the likelihood that an infected child will develop lifelong chronic infection is higher than if the infection occurs in older children or adults.

### What are the symptoms and signs of hepatitis B?

Acute hepatitis B does not often cause symptoms and signs but when it does, patients experience fatigue, nausea, vomiting, abdominal pain and jaundice. Chronic hepatitis B patients have signs related to liver failure (such as swelling of the abdomen, abnormal bleeding and changing mental status) as the disease progress.

### How is hepatitis B transmitted?

The hepatitis B virus is spread by contact with infected blood and other bodily fluids in various situations. In the Philippines, the hepatitis B virus is most commonly transmitted to children by:

- Child-to-child transmission through open wounds or shared instruments/equipment that contain blood or body fluids. This accounts for the majority of hepatitis B infections worldwide.
- Exposure of babies to maternal blood or other fluids during delivery, if the mother is a chronic carrier.
- Use of contaminated needles and syringes for injections.
- In countries where infection occurs later in life, the disease is transmitted through sexual activity, contaminated needles and syringes, and contaminated blood products.

### Who are the population at risk?

Hepatitis B virus infection occurs worldwide and can occur at any age. In many Asian countries, infection often occurs in infancy and childhood, when infected individuals are more likely to become chronically infected.

### How is hepatitis B treated?

There is no specific treatment for acute hepatitis B. Therefore, care is aimed at maintaining comfort and adequate nutrition, including replacement of fluids lost from vomiting and diarrhea.

*Chronic* hepatitis B infection can be treated with medicines, including oral antiviral agents. Treatment can slow the progression of cirrhosis, reduce incidence of liver cancer and improve long term survival.

The WHO recommends the use of oral treatments - tenofovir or entecavir, because these are the most potent drugs to suppress the hepatitis B virus. They rarely lead to drug resistance as compared with other drugs, are simple to take (1 pill a day), and have few side effects and require only limited monitoring.

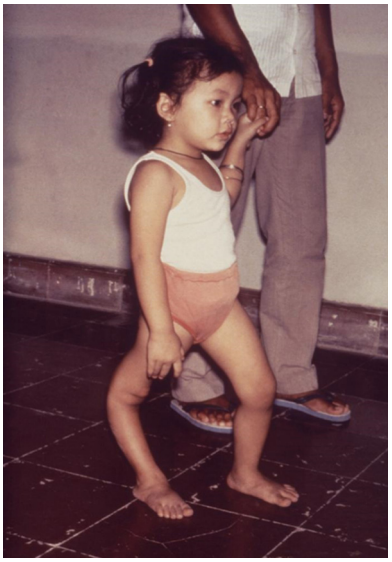
### How is hepatitis B prevented?

The hepatitis B vaccine is the mainstay of hepatitis prevention. WHO recommends that all infants receive the hepatitis B vaccine as soon as possible after birth.

## D.3 Poliomyelitis (Polio)

### What is polio?

Polio is a highly infectious disease of the central nervous system caused by three closely related polioviruses: types 1, 2, and 3.



*Paralytic polio in a Filipino girl*

### What are the symptoms and signs of polio?

Most children infected by poliovirus may never feel ill. Approximately 5% of people exposed to any of these viruses have influenza-like symptoms such as fever, loose stools, sore throat, headache, or upset stomach. Some may have pain or stiffness in the neck, back, and legs, and 1% become paralyzed. In paralytic polio, severe muscle pains follow the milder symptoms, and then paralysis develops, usually in the first week of illness. The functions of one or both legs or arms may be lost, and may result in difficulty of breathing.

### How is polio transmitted?

Poliovirus is highly communicable. It is spread from person to person by contact with infected feces. People who do not have symptoms may still be carriers and can spread the disease. The incubation period is commonly 7 – 10 days
(range : 4 – 35 days).

### Who are the population at risk?

Every person who is not vaccinated against polio will acquire the infection if the virus is in the environment, with the following outcomes:

- 95% will show no effect.
- 4% will have a mild flu-like illness.
- 1% will become paralyzed.
- 0.5% will be paralyzed for life.
- 0.1% will die during the acute phase.

### Where does polio occur?

Polio can occur anywhere in the world. Currently Polio is endemic in only two regions: African region (Nigeria) and Eastern Mediterranean region (Pakistan and Afghanistan).

In regions where it has been eliminated (the Americas, Europe, Western Pacific, South East Asia), control measures and certification-quality polio surveillance must be sustained until the disease is eradicated worldwide.

### How is polio treated?

There is no specific treatment for polio. Treatment consists of supportive, symptomatic care.

### How is polio prevented?

Polio can be prevented through Immunization with Oral Polio Vaccine (OPV) and/or Inactivated Polio Vaccine (IPV).

### What are the eradication strategies for polio?

In 1988, the 41st World Health Assembly launched a global initiative to eradicate polio. There are four core strategies to stop transmission of the wild poliovirus:

- High infant immunization coverage with three doses of OPV in the 1st year of life;
- Supplementary doses of OPV to all children under five years of age during immunization campaigns;
- Surveillance for polio virus through reporting and laboratory testing of all cases of acute flaccid paralysis (AFP) among children under 15 years of age;
- Targeted "mop-up" campaign once Polio transmission is limited to specific focal area.

In addition, the DOH recently introduced Inactivated Polio Vaccine (IPV) through the NIP in 2014, and switched the Oral Polio Vaccine from trivalent to bivalent type. The reasons for this change are that Type 2 Polio has been declared eradicated and to decrease the risk of emergence of VDPV Type 2.

The inclusion of IPV into the national immunization schedule is part of DOH's efforts to protect every Filipino child against the disease and to sustain the country's Polio-free status.

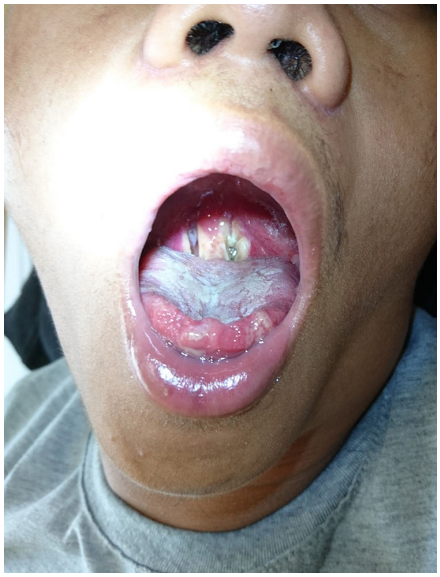
***Vaccine-Derived Polio Virus (VDPV):***

Under very rare circumstances when the coverage of Polio vaccine is inadequate, the virus strains in OPV can mutate and regain characteristics of wild polio virus: the abilities to cause paralytic disease in humans and to spread from person to person. This phenomenon, known as vaccine-derived polio virus, has been documented in many countries, most recently in Lao PDR, Myanmar and in Philippines (2014). In each case, vaccination coverage was very low in the affected areas. As with wild polio virus, the critical factor in controlling VDPV is achieving and maintaining high vaccination coverage rates through a combination of strengthening the routine immunization system and supplemental vaccination.

## D.4 Diphtheria

### What is diphtheria?

Diphtheria is a bacterial infection caused by *Corynebacterium diphtheriae*. The infection can involve almost any mucous membrane, but the most common sites of infection are the tonsils and pharynx. This type of diphtheria can lead to obstructed breathing and death. In tropical countries, the disease usually affects the skin (cutaneous diphtheria) and may result in high levels of natural immunity against respiratory diphtheria.



***A grayish membrane on the pharynx is a well-known sign of diphtheria***

### What are symptoms and signs of diptheria?

In its tonsillar and pharyngeal form, the early symptoms are sore throat, loss of appetite and slight fever. Within two to three days the infection results in the formation of a bluish-white or grey membrane that can cover the back of the throat, as seen in the photograph above. The membrane may bleed and also cause gagging and difficulty in swallowing and breathing. The incubation period is usually from 1 – 5 days.

### How is diphtheria transmitted?

Diphtheria is transmitted from person to person through close physical and respiratory contact.

### Who are the population at risk?

The epidemiology of diphtheria has changed considerably over recent decades due to improvements in sanitary conditions and immunization coverage. However, in Philippines, recent evidence shows the increasing trend of the disease in young children, and more cases with fatality have been seen among pre-school children since 2011.

### Where does it occur?

Diphtheria occurs worldwide among unimmunized populations and in industrialized countries, among populations whose immunity has weakened, largely because of the lack of routine and booster immunizations for children and adults. In areas with low coverage of diphtheria immunization, asymptomatic carriers may play an important role in sustaining the infection.

### How is diphtheria treated?

Diphtheria antitoxin (DAT) and antibiotics (erythromycin or penicillin) are prescribed for suspected cases. Infected persons are isolated and contacts are prescribed prophylaxis dose of antibiotics and vaccinated with diphtheria toxoid to prevent additional cases.

### How is diphtheria prevented?

The most effective way to control diphtheria is to prevent it through immunization of children in their first year of life with three doses of diphtheria vaccine and appropriate booster doses.

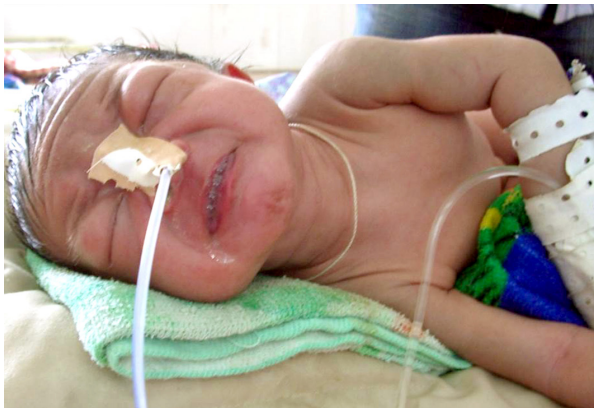
### How is diphtheria controlled?

During diphtheria epidemics, the largest possible proportion of the population group involved should be vaccinated, with priority given to infants and pre-school children. Those who have been previously immunized should receive booster doses. Unimmunized infants and children should receive the primary series of three doses. Patients and close contacts should be given antibiotics.

## D.5 Tetanus

### What is tetanus?

Tetanus is caused by the bacterium *Clostridium tetani*. The *Clostridium tetani* bacilli are present in the soil everywhere. It is the vaccine-preventable disease that is not spread from person to person. A typical feature of the spasms associated with tetanus is the facial expression known as "risus sardonicus," or sardonic smile.



***Muscular spasms and contractions in a neonatal tetanus patient***

### What are symptoms and signs of tetanus?

Signs and symptoms of tetanus may appear anytime from a few days to several weeks after the tetanus bacteria enters the body through a wound. The bacterium produces a toxin that makes muscles rigid, causes spasms, and makes breathing difficult or impossible, resulting in death.

The average incubation period is 3 to 21 days. Common signs and symptoms of tetanus, in order of appearance, are:

- Spasms and stiffness in your jaw muscles
- Stiffness of your neck muscles
- Difficulty swallowing
- Stiffness of your abdominal muscles
- Painful body spasms lasting for several minutes, typically triggered by minor occurrences, such as a draft, loud noise, physical touch or light

### How is tetanus transmitted?

Tetanus is not contagious. The disease can occur in any incompletely immunized person when tetanus spores in dirt, dung, or ashes enter a person's body through a break in the skin. Clusters of cases are sometimes seen among unimmunized populations sharing the same risk factors (such as living and working in construction sites).

### Who are the population at risk?
Everyone who is unprotected through immunization is at risk.

### Where does tetanus occur?
Tetanus occurs worldwide. In the Philippines, there were 10 provinces identified as high risk for MNT, which became the focus of special immunization activities in the past five years.

The following characteristics may indicate that tetanus is a problem in a particular location:

- Low tetanus toxoid vaccination coverage among women and children
- Poor access to or use of any health service
- Poor access to or use of antenatal care services
- Home deliveries not assisted by skilled birth attendants

### How is tetanus treated?
Advance intensive neonatal care and usage of Tetanus Immunoglobulin can reduce the case fatality rate in neonatal tetanus.  Recovery from tetanus does not provide immunity.

### How is neonatal tetanus prevented?
Neonatal Tetanus can be prevented if in pregnancy women receive at least two Td doses of vaccine, appropriately spaced following the NIP schedule.

### What are the strategies to eliminate maternal and neonatal tetanus?
Because tetanus spores are found in the environment, tetanus cannot be eradicated. However, it can be eliminated as a public health problem with appropriate measures such as high immunization coverage and delivery at the health facility.

***Maternal and Neonatal Tetanus Elimination – Definition***

Maternal and neonatal tetanus elimination is defined as the reduction of neonatal tetanus cases to fewer than one case per 1000 live births in every district (100,000 population) of every country.

The strategy to sustain Tetanus elimination involves:

- Routine vaccination of pregnant women with tetanus toxoid until childhood immunization with booster doses is fully achieved.
- Routine vaccination of infants with three doses of Pentavalent vaccine.
- School-based vaccination programs with Td in Grade 1 and Grade 7 act as 4th and 5th dose of tetanus vaccine.
- Access to and use of clean delivery services.
- Surveillance to identify high-risk areas, assess service quality, and monitor the maintenance of elimination status.

## D.6 Pertussis

### What is pertussis?

Pertussis, also called whooping cough, is a highly contagious, acute bacterial disease affecting the respiratory tract. It is caused by the bacteria *Bordetella pertussis*.

***Patient with whooping cough***

### What are signs and symptoms of pertussis?

Patients usually present with symptoms similar to common cold: runny nose, watery eyes, sneezing, fever and a mild cough. The cough worses to many rapid bursts. At the end of these bursts, the typical patient takes in air with a high-pitched whoop. Vomitting and exhaustion often follow after the coughing attacks. The incubation period is 9-10 days (range 6-20 days).

### How is pertussis transmitted?

Pertussis is spread in droplets from the nose and throat that are expelled when an infected person coughs or sneezes. The disease spreads easily among susceptible people who live in crowded conditions.

### Who are the population at risk?

Newborns receive minimal antibody protection from their mothers, and it quickly wanes. Approximately one third of all cases occur in infants under 6 months old and half of all deaths are in children under one year.

### Where does pertussis occur?

Pertussis occurs in any setting.The majority of pertussis cases occurs in areas with low primary immunization coverage and incidence is high among unimmunized infants. There are also cases among adolescents and young adults with waning immunity.

### How is pertussis treated?

Antibiotics (Erythromycin) may be given to shorten the period of communicability (approximately three weeks), but they do not cure the disease or even reduce symptoms unless the pertussis toxin in the body is eliminated.

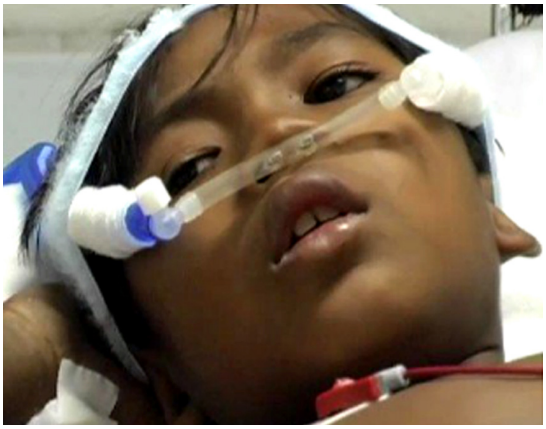
### How is pertussis prevented?

The most effective strategy for preventing pertussis requires the timely delivery of three doses of vaccine at proper intervals during the child's first year of life.

## D.7 Hib Disease

### What is Hib Disease?

*Haemophilus influenza* type b is a bacterium found commonly in the nose and throats of children.



*A child with Hib pneumonia*

### What are symptoms and signs of Hib?

The serious diseases caused most frequently by Hib are pneumonia and meningitis. Children with pneumonia can have fever, chills, cough, rapid breathing and chest wall retractions. Children with meningitis can have fever, headache, sensitivity to light, neck stiffness and sometimes confusion or altered consciousness. The time between infection with Hib and the appearance of symptoms is between 2 and 10 days.

### How is Hib transmitted?

Hib is spread from person to person in droplets released when sneezing and coughing. Children may be healthy carriers without showing any signs and symptoms of the disease but they can still infect others.

### Who are the population at risk?

Children under five years of age are at highest risk for Hib disease. The disease is rare in children older than five years.

### Where does Hib occur?

Research and evidence clearly indicates Hib as a cause of pneumonia, meningitis, and other childhood diseases worldwide.

### How is Hib treated?

Antibiotics such as ampicillin, cotrimoxazole, cephalosporins and chloramphenicol are used for treatment. Drug resistance is now being seen with some antibiotics.

### How is Hib prevented?

Hib vaccination of children in the first six months of life is the most effective means of controlling invasive Hib disease. Hib vaccine will not prevent meningitis and pneumonia caused by other types of *Haemophilus influenzae* or other agents

## D.8 Pneumococcal Disease

### What is pneumococcal disease?

Pneumococcal disease is an infection caused by the *Streptococcus pneumoniae* bacterium, also known as pneumococcus. Infection can result in pneumonia, infection of the blood (bacteremia/sepsis), bacterial meningitis or milder forms such as sinusitis and otitis media.

*A child with pneumococcal disease.*

### What are symptoms and signs of pneumococcal disease?

As outlined above, pneumococcus can affect many parts of the body. Symptoms and signs vary depending on the site of infection. Fever and shivering or chills can occur with all types of pneumococcal disease. Children with pneumonia can present with cough, rapid breathing and chest wall retractions; older patients may complain of shortness of breath and pain when breathing in and on coughing. Patients with meningitis can present with headaches, sensitivity to light, neck stiffness, convulsions and sometimes confusion or altered consciousness. Those with otitis or sinusitis may have pain and tenderness and or discharge from the nose or ears.

### How is pneumococcal disease transmitted?

Pneumococcal disease is spread from person to person by coughing, sneezing or close contact. A person can be infected mainly through pneumococci contained in respiratory droplets from people who have the bacteria in their noses and/or throats. In some groups, up to 70% may be healthy carriers.

### Who are the population at risk?

This high-risk group includes children younger than two years of age and adults 65 years or older. People with conditions that weaken the immune system (like diabetes, heart disease, lung disease, and HIV/AIDS), or people who smoke or have asthma are also at increased risk for getting pneumococcal disease.

### Where does pneumococcal disease occur?

Pneumococcal disease occurs around the world. Pneumococcal disease is more common in developing countries. It is also more common during winter and early spring but occurs year-round in the tropics.

### How is pneumococcal disease treated?

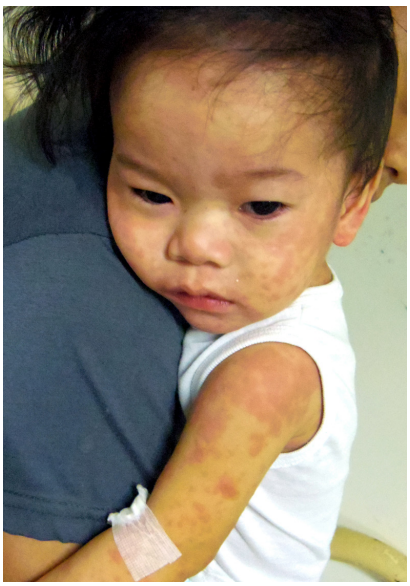
Pnemococcal disease are treated with antibiotics such as amoxicillin and other new antibiotics as needed and based on particular symptoms. In many cases some commonly used antibioics are no longer effective since the bacteria has become resistant.

### How is pneumococcal disease prevented?
Pneumococcal disease can be prevented by vaccination. Improved living conditions and nutrition can also reduce the risk.

### What are the strategies to control pneumococcal disease?
The DOH now includes routine immunization using the Pneumococcal Conjugate Vaccine (PCV) given to children in the country's health centers. The elderly - at the age of 60 and 65 – are given Pneumococcal Polysaccharide Vaccine (PPV) nationwide.

## D.9 Measles

### What is measles?
Measles is an acute viral infection caused by measles virus. Measles is one of the most contagious diseases of humans.


*Rashes characteristic of measles*

### What are symptoms and signs of measles?
Measles is characterized by the presence of high fever and maculopapular rash, and associated "3C's" - cough, coryza (runny nose), conjunctivitis. Small white spots (Koplik's spots) inside the cheeks is also a sign of measles.

The rash usually appears on the face and upper neck. Over a few days the rash spreads to the body and then to the hands and feet. It usually resolves in about 5 to 6 days.

Complications from measles include pneumonia, diarrhea, blindness, meningitis, encephalitis, SSPE (Subacute sclerosing panencephalitis). SSPE rarely occurs as a delayed complication several years after measles infection. The incubation period for measles usually lasts 10 – 14 days (range: 7 – 23 days).

### How is measles transmitted?
Measles is extremely infectious. The virus is transmitted through the air by respiratory droplets expelled by infected individuals or exposure to persons suspected with measles.

### When and where does measles occur?
In tropical zones, most cases of measles occur during the dry season. In temperate zones, incidence peaks during late winter and early spring. In large, crowded areas with low measles vaccine coverage, incidence of measles can be much higher. Children younger than nine months can be affected before they are old enough to be vaccinated. The frequency of measles outbreaks depends on the density of people susceptible to the disease and the probability of exposure to infectious cases. In countries with low coverage, epidemics occur every two to three years. In countries with good coverage, epidemics may occur at five- to seven-year intervals.

### How is measles treated?

There is no specific antiviral treatment for measles. Antibiotics should be prescribed only for bacterial ear infection and pneumonia. Supportive care includes general nutritional support and treatment of dehydration and complications.

Vitamin A supplementation reduces the number of deaths from measles. Measles seriously depletes vitamin A in children, making them more susceptible to complications. All children in developing countries diagnosed with measles should receive two doses of vitamin A supplement given 24 hours apart.

### How is measles prevented?

Measles vaccination is one of the most effective preventive measures available. Maintaining coverage above 95% can have a major impact in controlling measles.

### What should be the response to a measles outbreak?

Measles importation should be expected even in areas that have eliminated the disease, and when outbreaks occur, control can be difficult because many susceptible people can be infected before a vaccination campaign can be organized. Health services can respond effectively by treating complications, providing Vitamin A supplementation and investigating cases to determine how to prevent recurrence. Routine measles vaccination coverage, supplemented by campaigns, should be the focus of management efforts to prevent outbreaks from occurring at all.

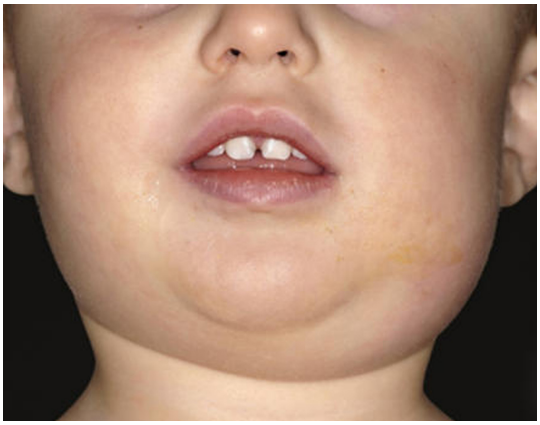
Supplemental campaigns are taken by the national authorities with consultation with regional units and by reviewing the epidemiological evidence of the outbreak.

A related reference is in the chapter on VPD surveillance, in the section on measles outbreak response.

## D.10 Mumps

### What is mumps?

Mumps is an infection caused by a virus. It is sometimes called infectious parotitis, and it primarily affects the salivary glands. Mumps is mostly a mild childhood disease, often affecting children between 5-9 years old. But the mumps virus can infect adults as well. When it does, complications are more likely to be serious.



*Swelling of the salivary glands in a patient with mumps.*

### What are the symptoms and signs of mumps?

Almost one third of children infected with the mumps virus have no symptoms. If symptoms appear, they usually begin 14 to 21 days after infection. Swelling of the salivary glands, just below and in front of the ears, is the most prominent symptom. The swelling may occur on one or both sides of the neck. Other symptoms include pain when chewing or swallowing, fever, weakness, and tenderness and swelling in the testicles. A person who has mumps can infect others from about six days before to about nine days after swelling in the neck appears.

### How is mumps spread?

Mumps virus is present throughout the world. It is spread by airborne droplets released when an infected person sneezes or coughs and by direct contact with an infected person.

### What are the complications of mumps?

Complications from mumps are rare, but they can be serious. In men and teenage boys, an inflammatory condition called orchitis may cause swelling and pain in one or both testicles and sometimes can cause sterility. Encephalitis, meningitis and hearing loss are other rare complications that can occur in people infected at any age.

### What is the treatment for mumps?

There is no specific treatment for mumps. Supportive treatment should be given to relieve the symptoms.

### How is mumps prevented?

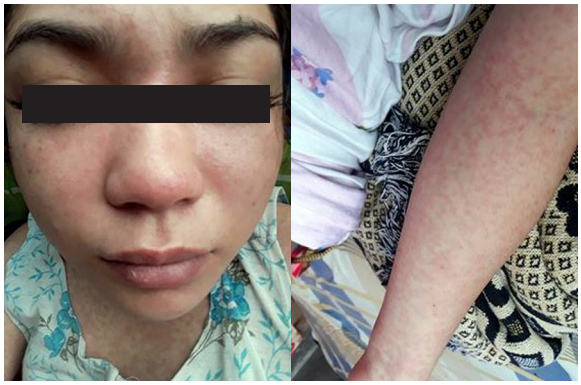
Mumps vaccines are highly effective and safe.

People who get mumps and recover are thought to have lifelong protection against the virus.

## D.11 Rubella and Congenital Rubella Syndrome

### What is rubella?

Rubella is an infection caused by a virus and is usually mild in children and adults. Congenital rubella syndrome (CRS) is an important cause of severe birth defects. When a woman is infected with the rubella virus during the first trimester of pregnancy, she has a 90% chance of passing the virus on to her fetus. This can cause the death of the fetus, or it may cause CRS. Deafness is the most common, but CRS can also cause defects in the eyes, heart, and brain.



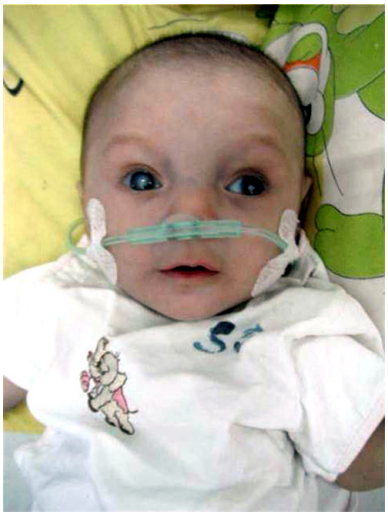
*An adult female with rubella infection, showing rashes on the arms and face*

### What are the symptoms and signs of rubella?

Symptoms are often mild, and between 20% and 50% of infected people may notice no symptoms at all. In children, a maculopapular rash is usually the first sign; other signs include low-grade fever and swollen lymph nodes in the neck. The rash most often begins on the face and spreads from head to foot. It usually lasts for about three days. The rash is pink, and fainter than measles. Many rashes mimic rubella, and a rash should not be considered a sure sign of infection with the rubella virus. Infants who are born with CRS usually show symptoms such as cataracts and loss of hearing in infancy, but they may not show symptoms for two to four years. The incubation period for rubella is about 14 days.

### How is rubella spread?

Rubella is spread in airborne droplets when infected people sneeze or cough. Once a person is infected, the virus spreads throughout the body in about five to seven days. During this time, pregnant women may pass the virus on to their fetuses. Infected people are most likely to pass on the virus when the rash is developing but the virus may be spread from seven days before to about seven days after the rash appears. Infants with CRS can transmit the virus for a year or more.



*Congenital rubella syndrome in a 4-month old baby. The baby has congenital heart disease and cataracts.*

### What are the complications of rubella?

Complications tend to occur more often in adults than in children. About 70% of adult women who are infected may develop pain in their joints or arthritis, especially in the fingers, wrists, and knees. Encephalitis occurs in about one in 5,000 cases and is most common in adult women. Problems with bleeding occur in about one in 3,000 cases, usually among children. Complications from CRS include deafness, cataracts, heart defects, and mental retardation.

### What is the treatment for rubella?

There is no specific treatment for rubella or for CRS. Supportive measures should be taken to alleviate symptoms. Infants with CRS are treated for their specific problems.

### How is rubella prevented?

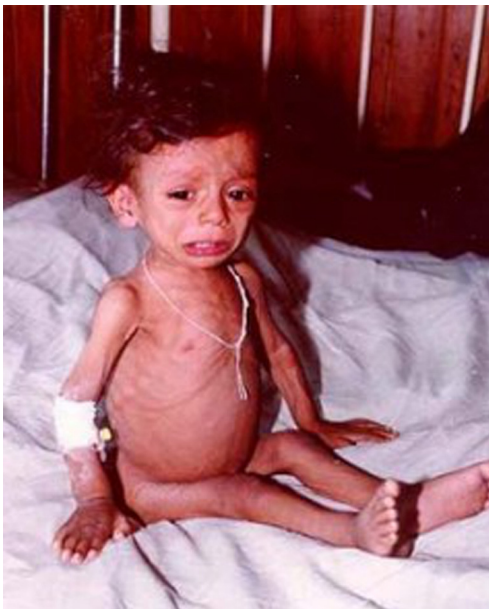
Rubella and CRS are prevented with safe and effective rubella vaccine. For infant immunization, these are usually given in combination with measles-rubella (MR) and/or measles, mumps and rubella (MMR). For prevention of congenital rubella syndrome (CRS), women of childbearing age are the primary target group for rubella immunization. Immunizing women between 15-49 years old will rapidly reduce the incidence of CRS without affecting childhood transmission of the virus.

## D.12 Rotavirus Gastroenteritis

### What is rotavirus gastroenteritis?

Rotavirus gastroenteritis is a highly infectious diarrheal disease caused by strains of rotavirus infecting small intestine.

Rotaviruses are a leading cause of severe diarrhoeal disease and dehydration in infants and young children throughout the world.



*A child with rotavirus gastroenteritis*

### What are the symptoms and signs of rotavirus?

Rotavirus gastoenterits can range from mild loose stools to severe watery diarrhea and vomiting leading to dehydration. Fever and vomiting can occur before diarrhea.

The incubation period can range from one to three days. The diarrhea can last from three days to a week.

### How is rotavirus transmitted?

Rotavirus spreads by the fecal to oral route. Large quantities of virus can be shed in the feces of an infected child. Shedding can occur from 2 days to 10 days after the onset of symptoms. Rotavirus is stable in the environment and can spread via contaminated food,water and objects.

### Who are the population at risk?

Most symptomatic episodes occur in young children between the ages of three months and two years.

### Where does rotavirus occur?

The disease occurs worldwide. In low income countries the median age of the primary rotavirus infection ranges from six to nine months (with 80% occurring among infants less than a year old). In high income countries, the first episode may occasionally be delayed until the age of 2–5 years, though the majority still occur in infancy (65% occur among infants less than a year old). In most low income countries in Asia and Africa, rotavirus epidemics are characterized by one or more periods of relatively intense rotavirus circulation against a background of year-round transmission. In high income countries with temperate climates, outbreaks usually occur in winter.

### How is rotavirus treated?

There is no specific drug treatment for rotavirus infection. As with other causes of diarrhea, key supportive measures are fluid replacement with oral rehydration solution (ORS) and treatment with zinc supplementation. Severe dehydration may require intravenous infusion of fluids in addition to ORS.

### How is rotavirus prevented?

Prevention consists of improved nutrition, good hygiene (handwashing) and sanitation. Two oral, live, weakened rotavirus vaccines, Rotarix™ and RotaTeq™, are available internationally. Both are considered safe and effective in preventing gastrointestinal disease.

### What are the strategies to control rotavirus?

It is recommended that rotavirus vaccines should be included in all national immunization programmes and considered a priority particularly in countries in Southeast Asia and sub-Saharan Africa. WHO continues to recommend that the first dose of either RotaTeq™ or Rotarix™ be administered as soon as possible after six weeks of age, along with PENTA vaccination. A second dose should be given after four weeks. Because rotavirus disease mainly affects very young children, vaccination after 24 months is not recommended.

WHO emphasizes that the use of rotavirus vaccines should be part of a comprehensive strategy to control diarrhoeal diseases with scaling up of both prevention (such as promotion of early and exclusive breastfeeding, handwashing with soap, improved water and sanitation) and treatment packages (including low-osmolarity ORS and zinc).

## D.13 Japanese Encephalitis (JE)

### What is Japanese encephalitis?

Japanese encephalitis (JE) is an infection of the brain caused by a virus carried by mosquitoes. It is found in Asia, Pacific Islands and Northern Australia. In recent decades outbreaks of JE have occurred in several areas previously non-endemic for the disease.

*Heavy sequela observed in a JE patient*

### What are the symptoms and signs of JE?

The majority of infections result only in mild symptoms or no symptoms at all. On average, only one in 300 people infected with the virus show symptoms. These usually appear within four to 14 days after infection, are flu-like, with sudden onset of fever, chills, headache, tiredness, nausea, and vomiting. In children, gastrointestinal pain may be the most prominent symptom during the early stage of the illness. Signs of confusion or coma occur after three or four days. Children often have seizures.

### How is JE transmitted?

JE is spread by *Culex* mosquitoes. The virus normally infects birds and domestic animals, especially pigs and wading birds. Children get the disease when a mosquito that has bitten an infected animal bites a person. In tropical and subtropical areas, the incidence of disease is highest during and shortly after the rainy season. People living in rural areas, especially where rice is grown, are at risk of getting the disease.

Recent surveillance data suggests that JE is endemic in Philippines, with a large number of positive cases being reported from all over the country.

### What are the complications of JE?

The illness can progress to a serious infection of the brain (encephalitis) and is fatal in about 20% of cases. Of those who survive the disease, 30% to 50% will have brain damage and paralysis. In areas where the disease exists all the time, about 85% of cases occur in children younger than 15 years old. Although JE is often a mild disease, leading to an uneventful recovery, some cases rapidly progress to severe encephalitis with mental disturbances, and progressive coma. A very high percentage of the JE infection survivors are left with neurological and psychiatric sequelae, requiring extensive care. Most fatalities and residual sequelae occur in children aged over 10 years.

### What is the treatment for JE?

There is no specific treatment for Japanese encephalitis. Supportive treatment for encephalitis is indicated. Antibiotics are NOT effective against the JE virus.

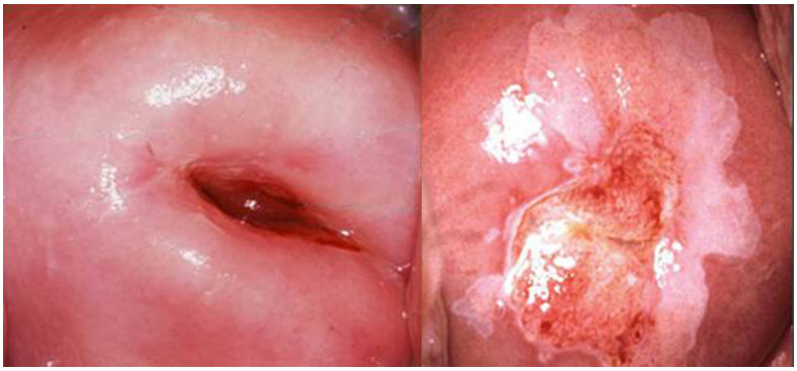
### How is JE prevented?

Immunization is the important measure to control Japanese encephalitis. There are four types of JE vaccines. Experiences in many countries suggests that environmental control of JE transmission is not an effective method. Although socioeconomic improvements and changes in agricultural practices are likely to reduce viral transmission in some places, large-scale vaccination of affected populations with effective and affordable vaccines appears to be the logical control measure.

## D.14 Human Papilloma Virus (HPV)

### What is HPV?

HPV is the most common sexually transmitted infection which infects the skin and mucous membranes of the genital areas of men and women. There are more than 100 types of HPV. It is of particular concern in women since it is now known to be the cause of 99% of cervical cancers.



***Normal cervix (left) and cervical cancer (right)***

### What are symptoms and signs of HPV?

Most HPV infections do not cause symptoms or disease and usually clear within a few months. About 90% of infections clear within the two years but some infections continue. Infection that continues can progress to cervical cancer.

Symptoms and signs of cervical cancer include abnormal vaginal bleeding (after sexual intercourse and/or between menstrual periods); pelvic, back and/or leg pain; vaginal discharge; fatigue and weight loss. Anemia, renal failure and fistula can also occur in advanced stages of cervical cancer.

### How is HPV transmitted?

HPV spread easily by skin to skin contact. Almost all sexually active individuals become infected with it at some point, usually early in their sexual lives.

### Who are the population at risk?

More than 80% of sexually active women will have been infected by age 50. People are more prone if they have risk factors such as cigarette smokers, high parity, increased age, immune suppression, long-term oral contraceptive use, co-infection with other sexually transmitted diseases (e.g., HIV, gonorrhoea), other host factors (diet, genetics), endogenous hormones.

### Where does HPV occur?

HPV occurs worldwide. Cervical cancer is the most common cancer among women worldwide. In 2012, approximately 270,000 women died from cervical cancer; more than 85% of these deaths occurred in low- and middle-income countries.

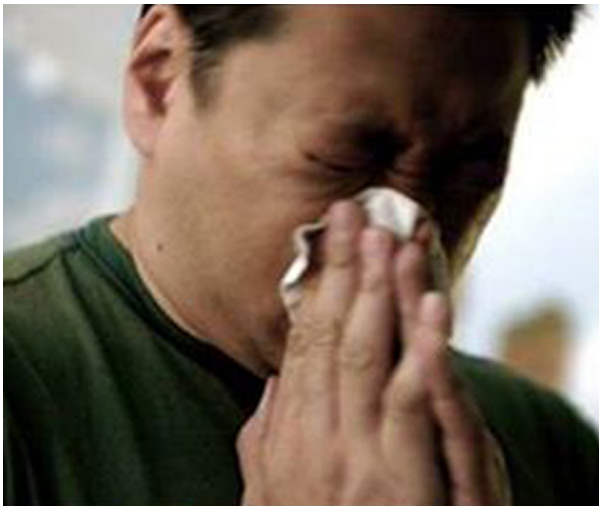
### How is HPV treated?

If cervical cancer is caught early by screening methods such as Pap smear or other methods, it can be removed and cured effectively with localized treatment (such as cryotherapy). Treatment of advanced cancer is complicated and usually involves a combination of surgery, drugs and radiation.

### How is HPV prevented?

Comprehensive cervical cancer prevention and control is through: a) primary prevention by HPV vaccination for girls nine to 13 years of age and, for both girls and boys, health education warning against tobacco use, sexuality education and promotion of condom use, and male circumcision; b) secondary prevention in women aged 30–49 years with a screen and treat approach, since vaccination does not protect against all cancer-causing HPV types; and c) tertiary prevention by treatment of invasive cancer at any age.

## D.15 Influenza



### What is influenza?
Seasonal Influenza is a respiratory disease caused by influenza viruses A and B. Globally, seasonal influenza can affect 5–10% of adults and 20–30% of children each year.

### What are the symptoms and signs of influenza?
It is characterized by sudden onset of high fever, myalgia, headache and severe malaise, non-productive cough, sore throat, and rhinitis. Signs of severe disease in children include difficulty breathing, increased respiratory rate, poor feeding, irritability, dehydration and decreased alertness.

The incubation period is usually about one to four days.

### How is influenza transmitted?
The virus is transmitted easily from person to person via droplets and small particles produced when infected people cough or sneeze. Influenza tends to spread rapidly in seasonal epidemics.

### Who are at risk?
Children under five years of age, pregnant women, the elderly (over 65 years of age) and people with HIV/AIDS, asthma, and other chronic heart or lung conditions are at greater risk.

### Where does influenza occur?
It occurs worldwide. In temperate regions of the northern and southern hemispheres, the main influenza season falls around the winter months (November – April for the Northern hemisphere, May – October for the Southern hemisphere) with sporadic infections at other times. In regions closer to the equator influenza may occur throughout the year and some tropical countries may experience two peaks of activity annually.

### How is influenza treated?
Antiviral agents are used within the first two days. Supportive measures include adequate rest, increased oral intake of fluids and nutritious food. Symptoms such as fever can be treated with antipyretics, antibiotics should only be given to complications of influenza (such as pneumonia and otitis media)

### How is Influenza prevented?
Annual vaccination is the principal measure for preventing influenza particulary for those in high-risk, particularly children and the elderly. Good personal health and hygiene such as frequent hand washing (with soap and water, or with alcohol-based hand rubs); proper coughing and sneezing; avoiding close contact with sick people; and staying isolated when sick.

Chapter 3

# VACCINE-PREVENTABLE DISEASE SURVEILLANCE

CHAPTER 3

# Vaccine-Preventable Disease Surveillance

## A. Rationale

The role of disease surveillance in achieving the goals of the NIP cannot be overemphasized. According to the Philippine Integrated Disease Surveillance and Response (PIDSR) Manual, disease surveillance is recognized as the cornerstone of public health decision-making and practice. Data gathered provide information which can be used for priority setting, policy decisions, planning, implementation, resource mobilization and allocation, prediction and early detection of epidemics. A surveillance system can also be used for monitoring, evaluation and improvement of disease prevention and control programs.

## B. Objectives

Chapter 3 provides an overview of the importance and role of disease surveillance in achieving the goal of the NIP. After reading this Chapter, we will be able to:

1. Describe the vital role of disease surveillance in the overall management and implementation of the NIP;
2. Define your tasks as a program manager and/or service provider in VPD surveillance; and
3. Specify appropriate measures you need to undertake in response to increasing VPD cases in your locality.

## C. Scope and Coverage

Chapter 3 contains the following topics:

- Definition of disease surveillance and a brief history of the development of VPD surveillance in the country.
- Role of VPD surveillance to achieve NIP goal/s, particularly toward polio eradication and elimination of measles and neonatal tetanus.
- Core VPD surveillance activities and expected tasks as NIP coordinator and service provider.
- Types of surveillance activity to be undertaken and measures in response to common VPDs in the country.

# D. VPD Surveillance

## D.1 Disease Control, Elimination and Eradication

Elimination and eradication of diseases are the ultimate goals of public health. This requires high commitment and participation of public and private health workers, dedicated focal point persons at the national and sub-national levels and strengthened linkages to health facilities through sensitive and efficient system and rapid response capability.

Disease surveillance has three components.

**Control:** The reduction of disease incidence, prevalence, sickness or death to a locally acceptable level as a result of deliberate efforts. Continued intervention measures are required to maintain the reduction.

**Elimination:** Reduction to zero of the incidence of a specified disease in a defined geographical area as a result of deliberate efforts. Continued intervention measures are required.

**Eradication:** The extinction of the pathogen that causes a particular infectious disease. So long as a single member of the species survives, eradication has not been accomplished. In other words, eradication is the reduction to zero of the worldwide incidence of infection caused by a specific agent, the complete interruption of transmission and the extinction of the causative agent so that it no longer exists in the environment. Hence, intervention measures are no longer needed.

Three NIP goals are targeted toward the eradication and elimination of the following VPDs: **Poliomyelitis, Measles and Neonatal Tetanus**. Surveillance of these diseases is described in the Philippine Integrated Disease Surveillance and Response (PIDSR).

## D.2 Definition of VPD Surveillance

VPD surveillance refers to the intensive case-based surveillance for VPDs targeted for eradication and elimination - cases of acute flaccid paralysis (AFP) or suspected polio, measles and neonatal tetanus (NT). It also includes the surveillance of adverse events following immunization (AEFI) cases discussed in the AEFI section under Injection Safety measures.

VPD surveillance is a process of systematic collection, consolidation, analysis, interpretation and dissemination of data on VPDs for policy development, guidelines formulation, decision making, planning for public health intervention, advocacy and health promotion, program implementation and program monitoring, assessment and evaluation.

## D.3 Brief History of VPD Surveillance in the Country

Key development milestones in the history of VPD surveillance in the country would include:

- Start of case-based reporting for measles surveillance in the Philippines in 1982 in selected sentinel sites under the National Epidemic Sentinel Surveillance System (NESSS). Since 1992, the DOH started sending case-based reports to the WHO. With the expansion of the sentinel sites in 1996, measles surveillance became geographically representative. Laboratory confirmation of all reported measles cases began.
- Start of AFP surveillance in 1993. In 2003, measles was integrated with AFP and neonatal tetanus (NT) surveillance and was called EPI Surveillance.
- Development of the Philippine Integrated Disease Surveillance and Response (PIDSR) in 2007. It replaced NESSS in 2008 and measles, NT and AFP surveillance became an integral part of PIDSR with reporting units expanded beyond the sentinel sites. At present, cases are now being reported from RHUs to epidemiology and surveillance units (ESUs) at regional, provincial and city levels for investigation by designated staff.
- Under the PIDSR, the name for EPI surveillance was changed to Vaccine Preventable Disease Surveillance. Likewise, surveillance for AEFI was added and staffing at the national level was increased.
- In 2012, laboratory-based surveillance for rubella was integrated with measles surveillance. This was considered as the most cost-effective approach in controlling rubella. Since then, data collected became a significant source of information to determine patterns of measles transmission and identify high risk areas based on susceptibility to measles outbreak and quality of measles surveillance. From 2016 onward parallel testing of Measles and Rubella was started for any suspected case of acute fever and rash.

## D.4 Purpose of Surveillance Activities of Selected VPDs

VPD surveillance varies depending on the level or stage of goals set for each VPD. The following targets are contained in the 2016-2022 NIP Strategic Plan:

- eradicate polio
- eliminate maternal-neonatal tetanus
- eliminate measles and rubella
- accelerate the control of Hep B
- control other VPDs (e.g. diphtheria, pertussis)

Each target is guided by the following criteria:

### Polio Eradication

- Maintain certification standards in polio-free countries;
- No cases of clinical poliomyelitis associated with wild poliovirus; and,
- No wild poliovirus found worldwide despite intensive surveillance.

### Measles Elimination

- Absence of endemic measles virus transmission for a period of 12 months or more, in the presence of adequate surveillance; and,
- Reduced incidence of measles to <1/1,000,000 population so that it is no longer a health threat.

### Neonatal Tetanus Elimination

- Achieve and maintain <1 NT case per 1,000 live births (LB) in every province/ city/ municipality every year.

The table below summarizes the common VPDs in our country with corresponding goal and the different purposes of surveillance activities.

**TABLE 2.**
***Case Definitions of AFP, MR, NT and AMES***

| ACUTE FLACCID PARALYSIS (AFP) | MEASLES-RUBELLA | NEONATAL TETANUS (NNT) | ACUTE MENINGITIS ENCHEPHALITIS SYNDROME (AMES) |
|---|---|---|---|
| Any child under 15 years of age with acute onset of floppy paralysis, **OR** a person of any age in whom poliomyelitis is suspected by a physician.<br>• **Acute:** sudden onset of paralysis. Usually the interval from the first sign of muscle weakness to inability to move the affected limb(s) takes 3-4 days but may extend to two weeks<br>• **Flaccid:** loss of muscle tone of the affected limb(s) giving it a floppy appearance (as opposed to spastic or rigid)<br>• **Paralysis:** reduced or lost ability to move the affected limb(s)<br>• If an AFP case is less than 5 years of age with less than 3 OPV doses and had fever at onset of asymmetrical paralysis **OR** if the client has L20B+ isolate, the case is considered a "**Hot Case**". | **Measles** - Suspected case: Any individual, regardless of age, with the following signs and symptoms:<br>• fever (38°C or more) or hot to touch; **and**<br>• maculopapular rash (non-vesicular); **and**<br>• at least one of the following: cough, coryza (runny nose) or conjunctivitis (red eyes).<br><br>The clinical diagnosis of measles is supported by the presence of **Koplik's spots** and if the rash progresses from the head to the trunk and to the extremities.<br><br>**Rubella** - Suspected case: Any individual regardless of age with the following signs and symptoms:<br>• fever (38°C or more) or hot to touch; **and**<br>• maculopapular rash (non vesicular); and/or<br>• one of the following: post auricular or axillary lymphadenopathy and/or joint pain and/ or conjunctivitis | Neonatal tetanus case classification is based solely on clinical criteria.<br><br>A suspected case is any neonatal death from 3 to 28 days of age in which the cause of death is unknown, OR any neonate reported as having suffered from neonatal tetanus from 3 to 28 days of age and not investigated.<br><br>A confirmed case is any neonate that sucks and cries normally during the first two days of life, and becomes ill from three to 28 days of age and develops both an inability to suck and diffuse muscle rigidity (stiffness), which may include trismus, clenched fists or feet, continuously pursed lips, and/or curved back (opisthotonus), OR a neonate from three to 28 days of age diagnosed as a case of tetanus by a physician. | A case of suspected AMES is any person who at any time of the year had sudden onset of fever and one of the following:<br>• Change in mental status (including symptoms such as altered consciousness, confusion, disorientation, coma, or inability to talk)<br>• New onset of seizures (excluding simple febrile seizures)<br>• Neck stiffness of other meningeal signs<br>• Case diagnosed by physician either as encephalitis or meningitis |

# E. VPD Surveillance Activities

This section summarizes the key steps in VPD surveillance and provides basic information on each step. Note that the details of each step including the forms to be used are all contained in the PIDSR.


## E.1 Case Detection and Notification

### 1. Identify cases using standard case definitions

1.1 A standard case definition for surveillance is a set of criteria used to determine if a person has a particular disease, syndrome or condition and if the case should be included in reporting or investigation. This ensures that every case is detected and reported in the same way, regardless of where and when it occurred or who identified it.

1.2 VPD cases are expected to be seen in the different health care facilities. Barangay Health Stations (BHS), Rural Health Units (RHUs), Municipal/City Health Offices (M/CHOs), government and private hospitals, clinics, laboratories and quarantine stations are called Disease Reporting Units (DRUs).

1.3 Detection of VPD cases is everyone's responsibility. You are encouraged to notify the Epidemiology and Surveillance Unit (ESU) of the next higher level within 24 hours of all suspect cases for complete case investigation.

### 2. Classify the case accordingly, carefully taking note of all the presenting signs and symptoms for each case.

2.1 **Suspected Case:** Indicative clinical picture without being a confirmed or probable case

2.2 **Probable Case:** Clear clinical picture, or linked epidemiologically to a confirmed case. Note that a "**case with an epidemiological link**" is a case that has either been exposed to a confirmed case, or had the same exposure as a confirmed case (e.g. eaten the same food, stayed in the same hotel, in the same periphery of the confirmed infected person).

2.3 **Confirmed Case:** Verified by laboratory analysis. Note that the classification on these different levels might vary according to the epidemiology of the individual diseases. Unless specifically stated, persons with symptoms are to be reported. Persons without symptoms are to be regarded as cases, however, if the infection has therapeutic or public health implications.

## E.2 Case Investigation

The first and most important step to  sensitive and timely surveillance is the immediate notification of any AFP, measles-rubella or NT case from a health facility or the community. Case investigation and specimen collection should be done within 48 hours upon notification. Once a Case Investigation Form (CIF) is completed by the CESU/PESU, this is submitted to the ESU of the next higher level (RESU) through the fastest means of communication.The CIF also serves as the laboratory request form; thus, a copy should be sent to the Research Institute for Tropical Medicine (RITM) along with the specimen/s.

The following are the generic steps in conducting a case investigation of AFP, measles and NT cases:

1. Verify if the case satisfies the case definition for AFP, Measles, NT, AMES or other VPDs.
2. Interview and examine the case.
3. Collect additional information by reviewing client's records and/or discussing the case with the attending physician.
4. Collect specimen(s) from each case.
5. Submit the completed CIF, client's medical chart and laboratory results.
6. Search for additional cases.
7. Conduct 60-day follow-up examination (ONLY FOR AFP).

## E.3 Case Confirmation

The RITM Department of Virology is accredited by the WHO as the National Reference Laboratory for AFP, Measles, Rubella, and Japanese Enchephalitis surveillance. All specimens are tested in the laboratory free of charge. Laboratory test results serve as proof to confirm or rule out a reported case. To ensure the efficiency of the laboratory test and accuracy of laboratory results, specimens should be properly collected, stored and transported to the laboratory in optimal condition.

**For AFP:** Poliovirus is shed in the stools at maximum quantity during the first two weeks after the onset of paralysis. Stools should thus be collected within 14 days of paralysis onset to increase the likelihood of isolating the virus. Two stool specimens should be collected at least 24 hours apart. It is important that all stool specimens from AFP cases are maintained in a "reverse cold chain" (that is, kept cold from the moment of collection until arrival in the National Polio Reference Laboratory). Otherwise, the virus may no longer be viable for culture.

**For Measles/Rubella:** Laboratory confirmation of suspect measles or rubella cases is very important since clinical diagnosis is not sufficient to confirm the infection. Documenting the results of laboratory tests provides evidence of the country's progress in eliminating measles and rubella and in maintaining that elimination status. It is important to collect serum specimen from every Acute Fever and Rash cases that is suspected for Measles and Rubella.

**For AMES:** Japanese Encephalitis is confirmed by conducting an ELISA test in the serum sample or Cerebrospinal fluid (CSF). The identification of JEV specific Immunoglobulin M (IgM) is the confirmatory factor for JE.

## E.4 Data Management

Data management is one of the core activities in VPD surveillance. It supports efficient data capture and information flow that can provide a master list of up-to-date case-based information. The data will be used for control activities of the disease under surveillance. Analyzed and disseminated surveillance data is also essential for development of policies and programs.

### Five Basic Components of Data Management

Data management is a *routine* process that consists of the following basic functions.

1. **Data Collection**
   Be aware of the established deadlines for reporting and submitting reports. Data should be submitted weekly by ESUs and DRUs.

2. **Consolidation**
   Ensure that forms submitted by ESUs/DRUs are compiled if the unit encodes data from the lower levels. Data review and validation must be done on a weekly basis, especially before performing data analysis.

3. **Data Analysis**
   Data analysis should be performed on a weekly basis. This includes:

   **Epidemiological Analysis.** This begins with summary of the data according to time, place and person.

   **Surveillance Indicators.** Surveillance indicators are categorized into two: (i) core performance indicators; and (ii) secondary indicators.

   - *Core performance indicators* are primarily for monitoring of surveillance performance. It is important that the system is sensitive to detect all cases of AFP, measles and NT.
   - *Seconday (System) indicators* are necessary to make sure that all data collected are complete, accurate and timely submitted so that appropriate analysis can be made.

4. **Production of Reports**
   Surveillance data should be reported in a regular or on-going basis. However, during outbreaks or any unusual health conditions, reports should be provided promptly for rapid and efficient response.

5. **Dissemination**
   Surveillance reports should be disseminated to program implementers and policy makers who can use the data to take public health action. The findings should be reviewed regularly and reported back to the ESUs and DRUs where the data was gathered from. This is called feedbacking and will be discussed below.

## Data Utilization

Surveillance provides "information for action". Evidence-based decision making is based on careful analysis of accurate data and proven research findings.

1. Surveillance data should be analyzed at all levels of the health system in the timeliest manner possible to determine the public heath response required from each level.
2. Public health programs must ensure that surveillance data are presented so that they can be used for public health action rather than mere transmission or dissemination of surveillance results to others.

## E.5 Case Reporting

Cases are reported weekly, monthly or, in some situations, an immediate notification to higher level is needed.

**Zero Case Reporting:** This refers to the regular, scheduled reporting of "zero case" when no cases have been detected by the reporting unit. As manager/ coordinator, ensure that your health facility reports zero cases on a weekly basis using the *Weekly Notifiable Disease Report Summary Page Form.*

Ensure that your health facility is not one of the "silent" Disease Reporting Units. This is a health facility that does not report VPD cases, including failure to maintain zero case reporting for two or more weeks. When a silent disease reporting unit is identified, the disease surveillance officer should conduct active surveillance in that health facility to determine the reason for non-reporting.

VPD cases identified as immediately notifiable diseases such as AFP, Measles etc at the DRUs are to be reported simultaneously to the CESU and PESU, Regional ESU and Epidemiology Bureau (EB) within 24 hours of detection through the fastest means possible. Initial notification can be verbal using telephone, text message, facsimile or email, followed by the completely filled out CIF once available.

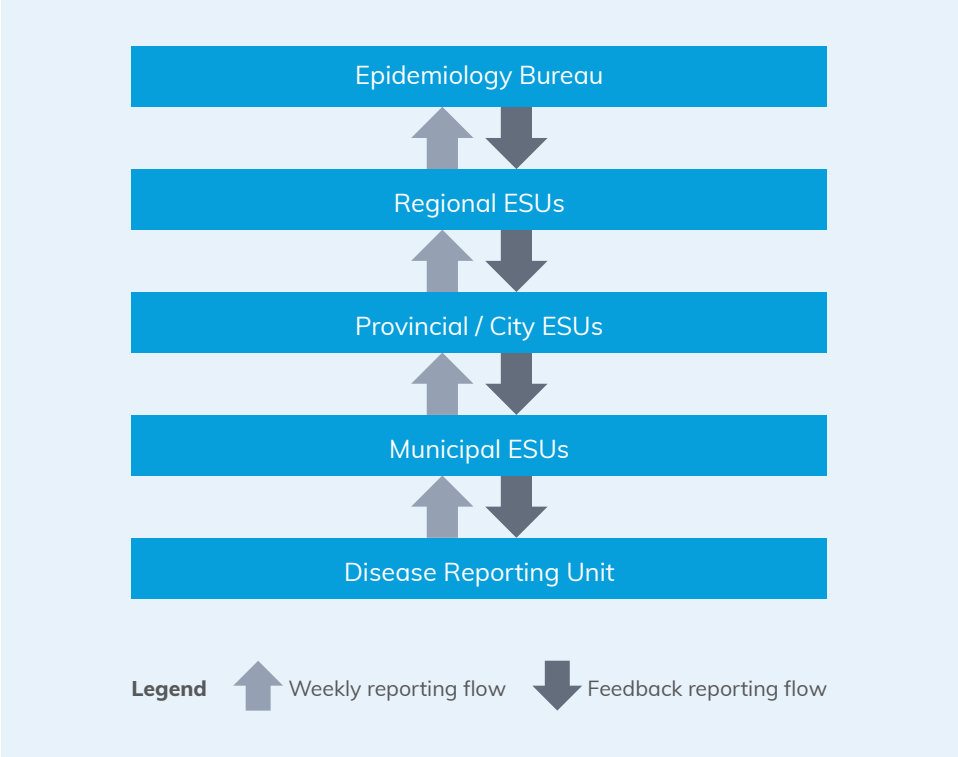
The other VPDs or vaccine related condition that are notifiable within 24 hours are Adverse Events Following Immunization (AEFI), Meningococcal Disease, Neonatal Tetanus, and Rabies.

## E.6 Feedback

Feedbacking is a process where the output or findings are notified to guide the next action or to verify accuracy of information. Regular and timely feedback is the key element in maintaining the surveillance system. Feedback such as laboratory results to the clinicians from the reporting hospital should be monitored carefully from the respective department in the Regional and Provincial level.

It is IMPORTANT that laboratory results of referred samples from DRUs especially hospitals are timely and properly sent back. The relationship among different levels of the health care system is shown in the figure.

*FIGURE 2.*
***Flow of Information Feedback for VPD Surveillance***




## E.7 Response

Appropriate actions and recommendations are needed when there are outbreaks of VPDs. The details of these responses will be included in the VPD Outbreak Response Manual, as well as various DOH Memorandum and AO which have been formulated and shared for some specific VPD outbreak. Please refer to the appropriate manuals and guidelines from DOH.

1. Investigation and Response to Poliomyelitis

   A suspicion of wild poliovirus importation merits immediate investigation. A single wild poliovirus (WPV) detection or detection of vaccine derived poliovirus (VDPV) is considered a **national public health emergency**.

   The detection of Vaccine Derived Polio Virus is an equally emergency situation arising from  low OPV coverage and resulting in low immunity in the population.

   The responses to confirmed wild or vaccine derived poliovirus importation must be composed of:

   - Strengthened Surveillance and Risk Assessment
   - Assessment of the Risk of Transmission
   - Enhanced Laboratory Surveillance for Polioviruses
   - Enhanced Immunization Program

   A detailed description of the steps to follow after an outbreak and the roles and

responsibilities of the relevant level of Immuniation and surveillance department is contained in **Administrative Order No. 2011-0016**.

2. Investigation and Response to Measles

   Measles is a highly infectious disease. One of the objectives of measles surveillance is to provide information about measles transmission so that the needed action can be initiated to interrupt measles transmission.

   All identified measles outbreaks require field investigations to search for additional cases in the community; determine the extent of the outbreak; and to implement effective action to immediately interrupt transmission. A single suspected measles case requires a full case-based investigation with laboratory confirmation and field investigation to determine if there are more cases in the community.

   A detailed description of the steps to follow after an outbreak and the roles and responsibilities of the relevant level of Immunization and surveillance department is contained in **Administrative Order No. 2014-0039**.

   **Measles outbreak:** The definition of an outbreak will vary according to the phase of measles control.

   - Measles Elimination setting:
     In a setting where a country is focusing on measles elimination a single case of laboratory confirmed measles is defined as measles outbreak. The outbreak immunization response to this scenario can be adopted as per the AO 2014-0039. If the Measles cases increase in number, this memo refers to intensive response strategy, the National level and regional level along with the local government units would have to consult and arrange for the necessary operational and logistics preparations including enough Measles containing vaccines.

   - Measles Endemic setting:
     If a country is in a state where there is continuous transmission of indigenous measles cases and country is more focused on the mortality reduction strategy, guide from World Health Organization mortality reduction would recommend two different definitions for measles outbreak depending on whether the country has conducted nationwide catch up SIAs or not.

     **For countries (or regions/provinces of large countries) that have completed nationwide catch-up measles SIAs:** A suspected outbreak of measles is defined as the occurrence of five or more reported suspected cases of measles in one month per 100 000 population living in a geographical area (e.g. barangay/municipality).

     A confirmed measles outbreak is defined as the occurrence of three or more confirmed measles cases (at least two of which should be laboratory-confirmed; IgM positive) in a barangay/municipality (approximate catchment population of 100 000) in a month.

     **For countries (or regions/provinces of large countries) that have not yet completed nationwide catch-up SIAs:** A suspected measles outbreak is defined as

**For countries (or regions/provinces of large countries) that have completed nationwide catch-up measles SIAs:** A suspected outbreak of measles is defined as the occurrence of five or more reported suspected cases of measles in one month per 100 000 population living in a geographical area (e.g. barangay/municipality).

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**For countries (or regions/provinces of large countries) that have not yet completed nationwide catch-up SIAs:** A suspected measles outbreak is defined as "an increase in the expected number of suspected measles cases being reported in a specific geographical area".

An increase in the number of suspected measles cases means a substantial increase in incidence compared to non-epidemic years, or incidence similar to the incidence in an epidemic year.

A confirmed measles outbreak is defined as the occurrence of three or more confirmed measles cases (at least two of which should be laboratory-confirmed; IgM positive) in a health facility/city/municipality (approximate catchment population of 100 000) in a month.

Outbreak response immunization is recommended depending upon the number of the measles cases. The immunization response needs to be conducted swiftly and can be selective (vaccinating only the defaulters who have missed routine measles doses) or non-selective (vaccinate irrespective of the history of measles vaccination).

Once outbreak is confirmed it is important to know the age group affected, the place affected and the potential for spread. The immunization program managers can analyze the routine measles immunization coverage of the area for the past 3 to 4 years to find out the number of susceptible children that have missed the routine measles immunization since the last SIA. Then the strategy can be to immunize all the defaulter children that have missed the routine measles vaccine in the age group of 9months to 59 months (selective outbreak response) or in a scenario where there are large accumulation of susceptible due to low routine vaccination coverage then vaccinating all the children with in the age group of 9 months to under 59 months can be considered (nonselective outbreak response). WHO recommends that in large measles outbreak where children below 9 months are also infected in large numbers, measles vaccination can be considered from the age of 6 months and above.

3. Investigation and Response to other common VPD outbreaks in the Philippines

   In recent years there have been many VPD outbreaks in Philippines, some of which are confined to certain regions while others are more widespread nationally. This requires that the outbreaks should be adequately investigated, reported to higher authorities and responded to appropriately.

   Please refer to the specific Memorandum or Admintrative Order for specific guidelines. For Diptheria outbreak refer to **Department Memorandum No. 2016-0337**.