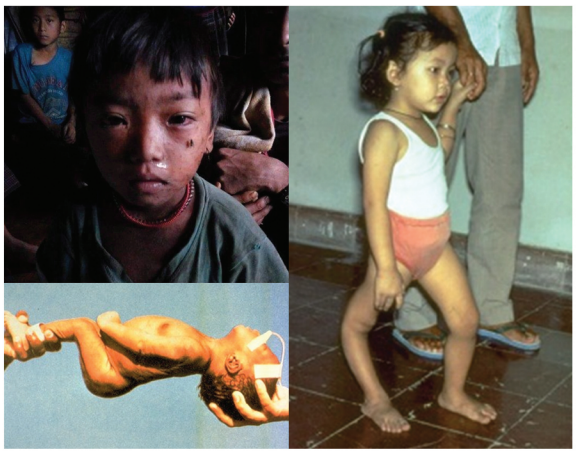
QUICK GUIDE

Vaccine Preventable Disease and Surveillance

VPD Surveillance



World Health Organization
Country Office for Myanmar

Central Epidemiology Unit
Department of Public Health
Ministry of Health and Sports

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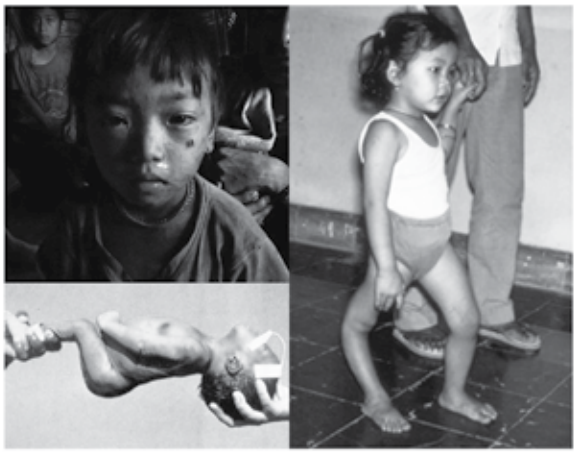
Vaccine Preventable Disease and Surveillance (VPD Surveillance)



Central Epidemiology Unit
Department of Public Health
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Introduction

This Quick Guide is intended to provide a quick and pocket reference for vaccine preventable diseases and their surveillance in Myanmar especially for Township Public Health Officer and MOs from Township level.

This guide was developed using various WHO resources, including the Guideline for AFP and Measles case based surveillance in Myanmar, Seasonal and Communicable Disease and Prevention of Antibiotic Resistance, and the Control for Communicable Disease Manual (19th Edition)

This guide does not replace the information or directives provided in national guideline for Surveillance of Vaccine Preventable Diseases. For additional information please refer to references at theend of this document.

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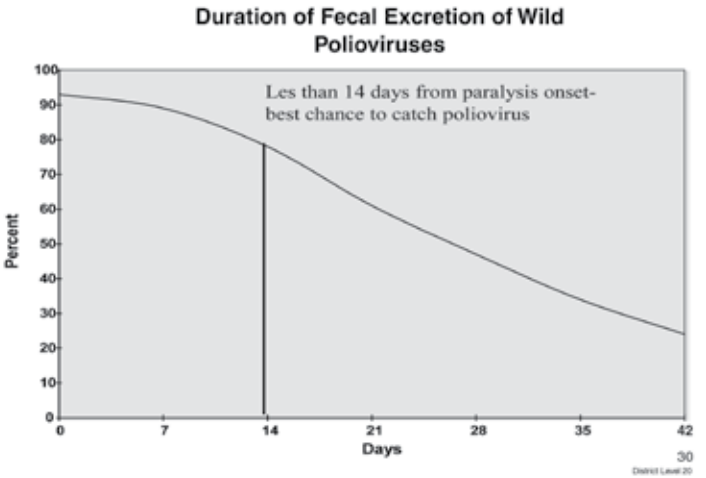
I. Poliomyelitis

1.1. Causative Agent

The disease Polio is a highly infectious disease caused by a virus, a member of the enterovirus subgroup, family Picornaviridae. It invades the nervous system and can cause irreversible paralysis in a matter of hours. There are three poliovirus serotypes (P1, P2, and P3) and out of these, Type 2 has been eradicated since 1999. Only 1 in 200 infections cause paralysis, with paralysis most common with Type 1 virus. There is minimal heterotypic immunity (i.e immunity to one serotype does not produce significant immunity to the other serotypes.) The poliovirus is rapidly inactivated by heat, formaldehyde, chlorine, and ultraviolet light.

Polio is infected only upon humans, No animal reservoir, does not survive long in the environment and no long term carrier state.

Figure (1)



1.2. Communicability

Poliovirus is highly infectious with seroconversion rates among susceptible household contacts of children nearly 100,and greater than 90% among susceptible household contacts of adults. Person infected with poliovirus are most infectious from **7 to 10 days before and after the onsets of symptom.**

1.3. Diagnosis for poliomyelitis

Clinical suspicion and Laboratory testing

Stool : Recommended in every case of Acute Flaccid Paralysis. Virus usually can be

found in the feces from onset to up to 8 or more weeks after paralysis, with the highest probability of detection during the first 2 weeks after paralysis onset.

1.4. Treatment/ Rehabilitation of Children With Paralytic Poliomyelitis

Mainly supportive treatment and specific therapeutic techniques should be used from the earliest stage of poliomyelitis to promote recovery, to minimize residual muscle paralysis and disability.

Treatment of the child with paralytic poliomyelitis varies with stage of illness and the severity of paralysis. Children with bulbospinal polio and respiratory paralysis would require hospitalization.

In acute stage children with isolated limb/limbs paralysis can be managed at home.

- They should be advised complete rest, proper positioning of the affected limb and passive range of movement at the joints. Massage and intramuscular injection should be avoided during acute phase of illness. Complete bed rest is essential during acute phase to avoid stress on the paralyzed muscles.
- Warm moist fomentations can be given with soft towels, dipped in warm water & squeezed 2 -3 times/ day for 10-15 minutes each time to relieve pain and spasms.
- Analgesics can also be given to relieve pain and fever. Passive range of movements of all the joints of affected limb/limbs should be given 2 - 3 times / day for 10 times at each joint to prevent joint stiffness. This also helps to stimulate proprioceptive impulses from muscles and tendons thus helping improvement in muscle power.
- As the acute phase of illness subsides, recovery in muscle power is helped by giving physiotherapy in form of active exercises aimed at strengthening weak muscle groups, improvement of functional skills of the child, helping ambulation and prevention of deformities. Physiotherapy plays an important role in management of children during recovery and post polio residual paralysis stage.
- Some children with fixed deformities and contractures may require orthopedic surgery.

Medical officer can play an important role in advising simple supportive measures in acute stage of illness, which would go a long way to help in prevention of deformities.

Table 1. Criteria for the differential diagnosis of poliomyelitis

	Polio	Guillain-Barré syndrome	Traumatic neuritis	Transverse myelitis
Time from onset of paralysis to full progressio	Usually from two to three day	From hours to 10 day	From hours to four days	From hours to four days
Fever	Fever with onset of paralysis, usually disappearing within three to four days	Not common	Commonly present before, during, and after flaccid paralysis	Rarely present
Flaccid paralysi	Acute, asymmetrical, principally proximal (upper part of arms and legs	Generally acute, symmetrical, and distal (lower part of arms and legs	Asymmetrical, acute, usually affecting only one limb	Acute, lower limbs affected symmetrically
Muscle tone	Reduced or absent in the affected limb	Reduced or absent	Reduced or absent in the affected limb	Deduced in lower limbs
Deep-tendon reflexes	Decreased or absent	Absent	Decreased or absent	Absent in lower limbs
Sensation, pain	Sensation usually normal; severe myalgia, backache	Cramps, tingling, reduced sensation on palms and soles	Pain in buttocks, reduced sensation to cold and heat	Anesthesia of lower limbs with sensory perception
Cranial nerve involvement	Only when bulbar involvement is present	Often present, low and high: Miller/Fisher variant	Absent	Absent
Respiratory insufficiency	Only when bulbar involvement is present	In severe cases, complicated by bacterial pneumonia	Absent	Often thoracic paralysis, with sensory perception
Autonomic signs & symptoms	Rare	Frequent blood pressure alterations, sweating, blushing, body temperature fluctuations	Hypothermia in affected limb	Present
Cerebrospinal fluid	Inflammatory	High protein content with relatively few cells	Normal	Normal or mild increase in cells
Bladder dysfunction	Absent	Transient	Never	Present
Nerve conduction velocity at 3 weeks	Abnormal: anterior horn cell disease (normal during the first 2 weeks)	Abnormal: demyelinization	Abnormal: axonal damage	Normal or abnormal, no diagnostic value
Sequelae at 3 months up to 1 year	Severe, asymmetrical atrophy; skeletal deformities appear later	Symmetrical atrophy of peroneal muscles (outer side of leg)	Moderate atrophy, only in affected lower limb	Atrophy, flaccid diplegia years later

Source. "The Diagnosis of Polio and Other Acute Flaccid Paralyses: A Neurological Approach." Document presented at the Ninth Meet¬ing of the Technical Advisory Group on Vaccine-preventable Diseases, held in Guatemala City, Guatemala, 12–15 March 1991. (Doc. EPI/TAG/91-10).

1.5 Prevention of Polio

There are currently two effective polio vaccines, the inactivated poliovirus vaccine (IPV) and the live attenuated oral polio vaccine (OPV), To ensure that all children develop immunity to all three poliovirus serotypes, all <5 years age group of children should receive 3 doses of bOPVand one dose of IPV that are offered through the routine EPI and through all supplemental Immunization rounds.

(Refer to EPI Routine schedule)

1.6 Acute Flaccid Paralysis (AFP) Surveillance

All AFP cases should be reported immediately to Medical Officer/ Regional Surveillance Officer or Team Leader (SDCU) who should investigate within 48 hours.

This system was developed to detect AFP cases to find wild poliovirus circulation, identify high-risk areas and certify absence of polio.

AFP has sudden onset, leads to loss of muscle tone and causes weakness and loss of voluntary movement.

Surveillance is conducted for all AFP cases and not just that caused by polio.

Goal is to find at least 2 case of non-polio AFP /100,000 in children < 15 years in each township.

1.6.1 AFP Case Definition:

Any case of acute flaccid paralysis in a child aged less than 15 years, including Guillain-Barre Syndrome and transversemyelitis **This excludes adults, spastic paralysis, "old cases", obvious causes (e.g. trauma)**

OR

Any case of paralytic illness (regardless of age) in which clinician suspects polio

Acute : rapid progression of paralysis from onset to maximum paralysis

Flaccid : loss of muscle tone, "floppy" – as opposed to spastic or rigid

Paralysis : weakness, loss of voluntary movement

Any case meeting this definition undergoes a thorough investigation to determine if the paralysis is caused by polio.

1.6.2 Components of AFP Surveillance

- The AFP surveillance notification and investigation
- laboratory investigation by stool specimen collection and testing at NHL Yangon
- Outbreak response and active case search in the community
- 60-day follow-up, cross-notification and tracking of cases
- Data management and case classification
- Virologic case classification scheme
- Surveillance performance indicators

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6/ **<u>Symptoms Physical Examination</u>**

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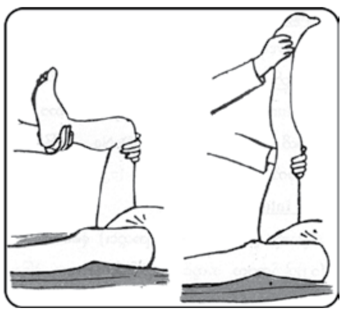

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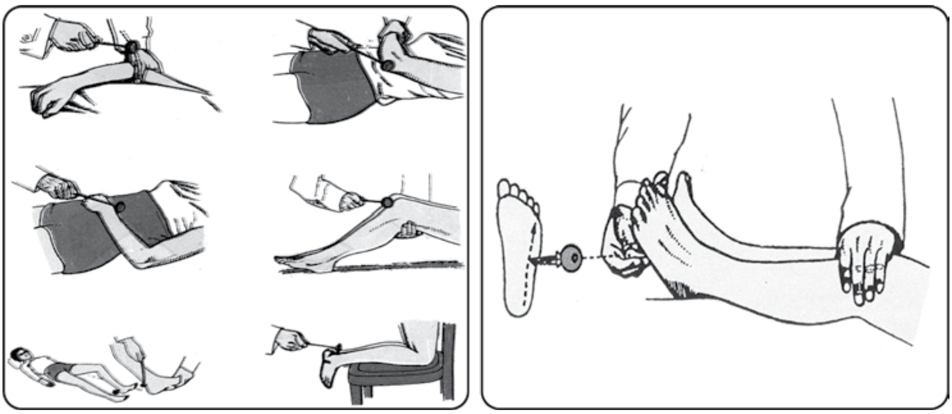

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1.6.3 Adequate Stool Sample Collection

- Two stool samples are collected for each AFP case within 14 days of paralysis onset
- Samples taken at least 24 hours apart
- Label samples using ID format:

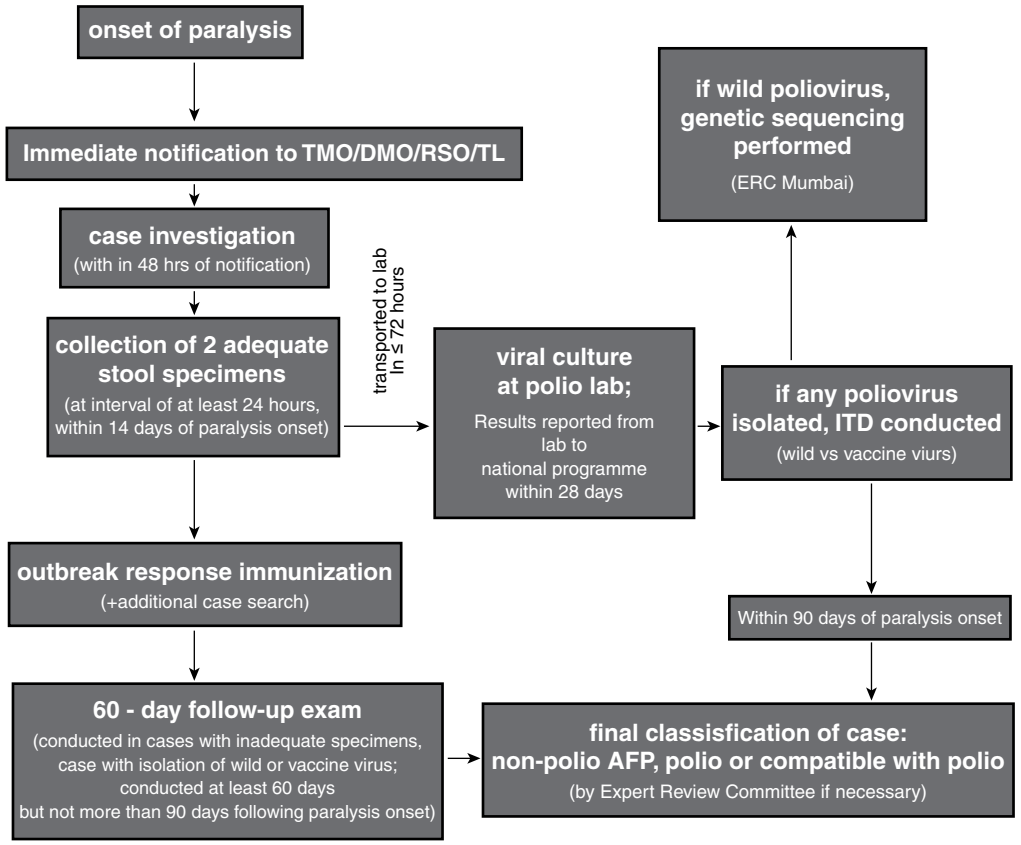
» Maintain reserve cold chain for specimens using specimen carrier at 2-8oC. Pack the specimens securely to ensure they do not leak or are damaged during transport.

» Specimens should be send from field to NHL (yangon) with 3 days of collection

» For additional information please refer to National guideline for AFP Surveillance

1.6.4 AFP cases should be followed up 60 days after onset of symptoms

Figure 2. Flow diagram of AFP case investigation



1.6.5 Outbreak Response Immunization (ORI) and active case search for all reported AFP cases in the community

Following the AFP case investigation and stool specimen collection, ORI is organized in the community and performed as soon as possible. Children aged 0-59 months (in 500 households of village/ward of case residing/travelling) are given two dose of oral

poliovirus vaccine (OPV) regardless of the number of doses received previously. The travel history of the child with AFP may suggest additional places of stay where ORI should also be conducted. While conducting the house-to-house immunization during ORI, the investigation team searches for additional AFP cases in the community, which – if present – could signal clustering of AFP case and contact stool specimen examination should be conducted.

1.6.6 AFP surveillance performance indication

Indicator	Target	Calculation	
1. Non-polio AFP rate	≥ 2/100,000	No. of discarded non-polio AFP cases among 15 years of age group / Total number of children < 15 years of age	x 100000
2. Reported AFP cases with 2 specimens collected ≤ 14 days since onset.	≥ 80%)	No of AFP cases with 2 specimens collected with 14 days of paralysis onset / Total no of stool specimens collected from AFP cases	x 100
3. Reported AFP cases investigated ≤ 48 hrs of report	≥ 80%	No of AFP cases investigated ≤ 48 hrs of notification / Total no of AFP cases	x 100
4. Timeliness of weekly reporting		Number of reports received before a specified deadline / Number of weekly reports expected	x 100
5. Completeness of weekly reporting.	≥ 90%	Number of weekly reports received / number of weekly reports expected	x 100
6. Reported AFP cases with a follow-up exam at least 60 days after paralysis onset to verify the presence of residual paralysis or weakness.	≥ 80%	No of AFP cases investigated for follow up examination at least 60 days after paralysis onset / Total no of AFP cases	x 100
7. Specimens arriving at National Health Laboratory, Yangon ≤ 3 days of being sent	≥ 80%	No of Specimens arriving at National Health Laboratory, Yangon≤ 3 days of being sent / Total no of stool specimens collected from AFP cases	x 100
8. Specimens arriving at NHL in⇒good condition	≥ 80%	No of Specimens arriving at NHL in good condition / Total no of stool specimens collected from AFP cases	x 100
9. Specimens with a turn-around time ≤ 14 days	≥ 80%)	No of specimens with a turn- around time ≤ 14 days by the National Polio Laboratory / Total no of specimens tested	x 100

10. Stool specimens from which non-polio enterovirus was isolated	10%	No of stool specimen positive for NPEV / Total no of stool specimen tested	x 100

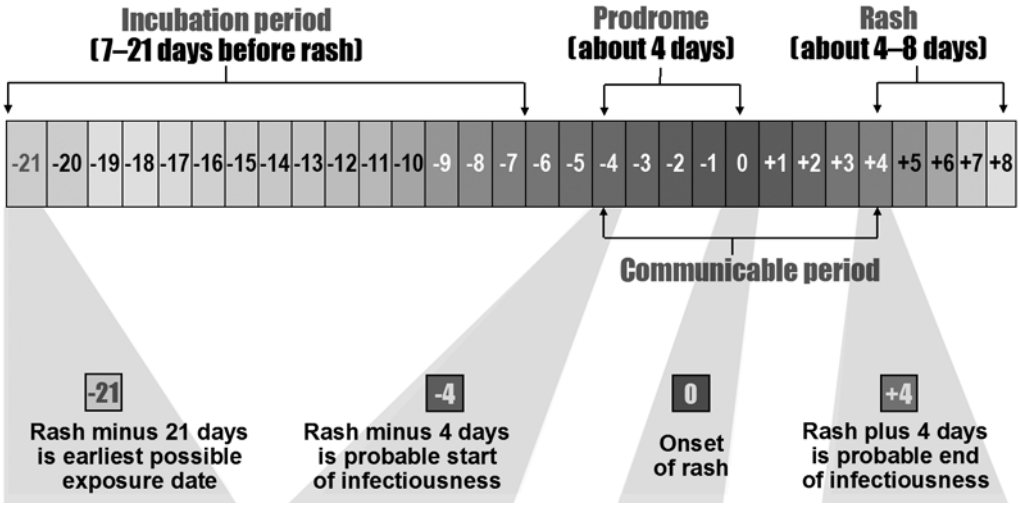
II. Measles

2.1 Causal agent and mode of transmission

Measles is a viral disease and usually causes mild illness in children. It spreads by airborne droplets from coughing and sneezing of infection persons, and through close physical contact with them.

Measles is one of the most infectious diseases and has high potential to cause outbreaks among unimmunized adults and children. Suspected outbreak is when there are 5 or more cases in a village, rural area, ward or municipality in one month.

Figure 3. Clinical course of measles



Measles can be severe sometimes and may even cause death in children. Young, un-immunized children are at highest risk.

2.2 Signs and symptoms

Measles is manifested by fever (peaking at 39–40 °C), rashes and cough, coryza or conjunctivitis.

The rashes first appear on face and then gradually spread to body and limbs and fading after about 3 days. The rashes are macula-papular in nature and are characteristic that they are non-vesicular. At the onset of rash, bluish-white Koplik's spots, which are pathognomonic of measles, may be seen in the oral mucosa. Patients normally improve by the third day of rash, and are fully recovered 7–10 days from the onset of disease.

Complications may include one of more of the following:

- Severe diarrhea
- Pneumonia
- Encephalitis
- Blindness
- Ear infections

Complications can cause death or disability.

2.3 Prevention: Measles Immunization

Myanmar uses MR Vaccine containing live attenuated measles vaccine and Rubella vaccine in routine EPI and therecommended age for measles vaccination is from 9 to 11 months (i.e., after completion of 9 months to before the first birthday). Since February 2008, second dose of measles vaccine is being provided to children 18 to 24 months of age through routine EPI

(Refer to EPI Routine schedule)

2.4 Laboratory Diagnosis:

Measles are confirmed by at least a four-fold increase in antibody titer, or isolation of measles virus, or presence of measles-specific IgM antibodiesin the blood of a clinical case.

2.5 Treatment

Although there is no specific treatment for measles, administration of vitamin A to children with measles has shown to decrease both the severity of disease and the case fatality rate.

Appropriate treatment of bacterial complications with antibiotics is essential. For uncomplicated cases, fluids, antipyretics and nutritional therapy are commonly indicated. Many children require four to eight weeks to fully recover their pre measles nutritional status.

Complicated cases with eye lesions, encephalitis, purulent ear discharge, pneumonia and severe diarrhea and malnutrition need expert care and should be referred.

Recommended Vitamin A Schedule for measles treatment

Vitamin A dose should be given as recommended in the table and dosage should never exceed under any circumstances. Only a properly trained field worker should be allowed to administer vitamin A dose.

The above schedule is for treatment of measles cases and not for vitamin A prophylaxis. In case of severely complicated measles with corneal clouding 3rd dose should be given after 14th day.

Vitamin A schedule

Age	Immediately on diagnosis	Next day
< 6 months	50,000 IU	50,000 IU
6 – 11 months	1,00,000 IU	1,00,000 IU
> 12 months	2,00,000 IU	2,00,000 IU

2.6 Case based Measles surveillance

2.6.1 Measles Elimination Goals:

"The absence of endemic measles transmission in a geographical area (e.g. region or country) for more than 12 months in the presence of well-per¬forming surveillance system." It also notes that the verification of measles elimination takes place after 36 months of interrupted endemic measles virus transmission.

Myanmar has committed to the goal of measles elimination from the country by 2020. In this context various activities need to be established and strengthened. This guide is prepared keeping in view the measles elimination goal.

WHO has defined measles elimination as follows:

All suspected cases of measles at a Health Facility/ reporting unit of weekly integrated disease surveillance MUST be reported to allow for case based measles surveillance.

2.6.2 Case Definition:

For the purpose of surveillance, various definitions are accepted and are given below:

Suspected case of measles:
A patient in whom a health- care worker suspects measles infection, OR

a patient with fever and maculo-papular (non-vesicular) rash.

Laboratory confirmed measles:
A suspected case of measles, that has been confirmed by a proficient laboratory

Epidemiologically linked confirmed case of measles:
A suspected case of measles, that has not been confirmed by a laboratory but was geographically and temporally related, with dates of rash onset occurring 7 - 21 days apart to a laboratory confirmed case, or, in the event of a chain of transmission to another epidemiologically confirmed measles case.

Clinically compatible measles case:
A case with fever and maculo-papular (non-ve¬sicular) rash and one of cough, coryza or conjunctivitis for which no adequate clinical specimen was taken and which has not been linked epidemiologically to a laboratory confirmed case of measles or another laboratory-confirmed communicable diseases. (WHO- WER, NO 9, 2013, 88, 89 - 100)

A measles-related death is adeath of an individual with confirmed (clinically, laboratory-confirmed or epidemiologically) measles in which death occurs within 30 days of rash onset and is not due to other unrelated cause e.g., a trauma or chronic disease.

2.6.2 Laboratory Confirm Measles Cases

While IgM ELISA tests are more sensitive between 4 to 28 days after the onset of rash, a single serum sample obtained within 4-28 days after onset rom suspected measles cases is considered adequate for confirmation of measles case.. All measles negative sera are further tested for rubella specific IgM antibody.

2-5 ml of whole blood is required and should be collected between 4-30 days after the onset of the rash.

- Allow the whole blood to clot (about 1 hour at tilting position)
- Separate serum from cells (centrifuge/clotting)

Send serum for testing to NHL (Yangon or Mandalay) with reverse cold chain along with filled up CI and Lab forms.

For additional information please refer to National Guideline on Measles Case based

Measles Outbreak Investigation

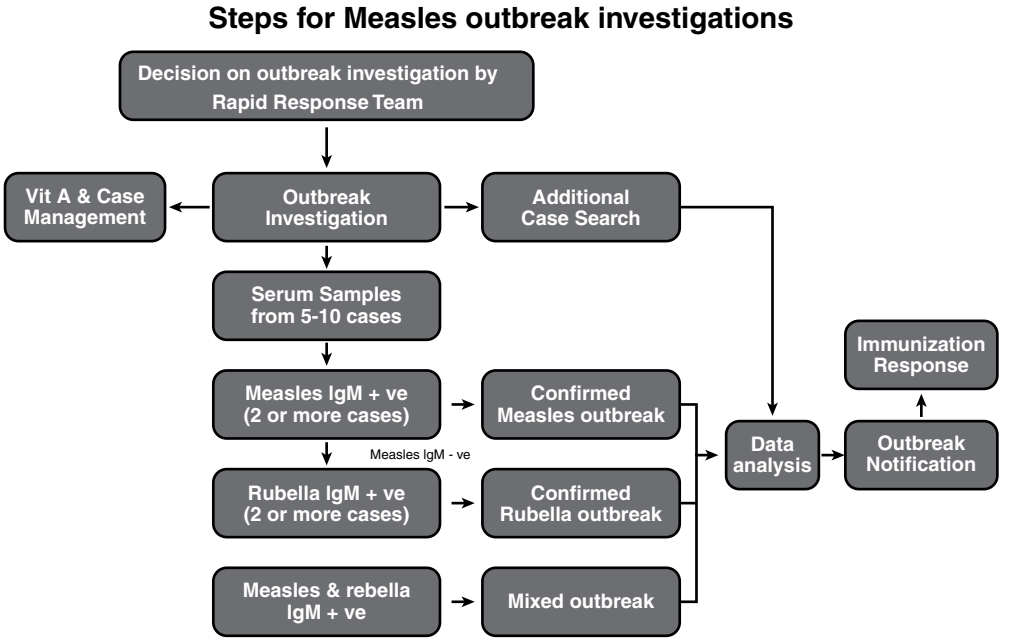
For timely measles outbreak investigations, it is imperative that routine measles data is collected, collated and analyzed regularly by the Township Public Health Officer, SDCU team leader and RSO.

Measles Outbreak Definition

Any single case of confirmed measles or rubella is considered as an outbreak in elimination setting

Every suspected case is identified and investigated comprehensively and confirmed by laboratory tests. Therefore it is very important that routine surveillance data for fever and rash should be collected, collated and analyzed regularly by the TPHO / THO of the respective townships or the DPHO in the districts.

Figure 4. Steps for Measles Outbreak Investigations



2.6.3 Response for outbreak (ORI)

2.6.3.1 Selective vaccination activities:

As soon as a measles outbreak is suspected, the following steps should be taken

- Enhance social mobilization activities to inform the affected communities about the suspected outbreak, which specific age-group of previously unvaccinated chil-

dren is targeted for measles vaccination and where parents should bring their at-risk children for vaccination.

- Vaccinate all children **(6 months to 5 years)** presentingto a health facility or an outreach vaccination site **without a history of measles vaccination** (either written or verbal). Children receiving measles vaccine before the age of 9 months **must be revaccinated after the age of 9 months** (with at least a one month interval between the doses).
- Vaccinate hospital staff if indicated
- Ensure sufficient supplies: Use stock management records to determine available quantity and location of vaccine, AD syringes, mixing syringes and other supplies (e.g. cold chain equipment and Vitamin A) that are immediately available for use. Estimate and request the additional supplies needed so that activities are not interrupted due to supply stock outs.

Reinforcement of routine vaccination:

A measles outbreak provides an opportunity to identify programme weaknesses causing the outbreak and a chance to correct them. As soon as a measles outbreak is suspected, without waiting for the laboratory confirmation of the suspected measles cases, the following steps to re-enforce routine vaccination should be taken

- Township staff, health facility staff and partners should rapidly identify priority areas within the affected township (e.g. communities with low vaccination coverage and high risk of morbidity and mortality).
- Jointly work on strengthening the available township immunization work plans.
- Locate health centers conducting immunization sessions that may need additional staff or vaccine supplies.
- Organize corrective measures such as additional outreach services to communities with a high proportion of unreached children.

2.6.3.2 Non-selective mass vaccination activity

As soon as the outbreak is confirmed, and if the risk assessment results indicate that there is a high risk of a large measles outbreak, then the capacity to carry out a high quality large scale immunization campaign through a **Non-selective mass vaccination activity** should be rapidly evaluated by

- Evaluating the availability of staff and financial resources (both internal and exter-

nal) for the operational and logistical aspects of the campaign

- Evaluating if the vaccine and other supplies can be made available at the time needed.

If there is sufficient capacity (human and financial resources and vaccine and other supplies), to carry out a safe and timely vaccination campaign, then a mass vaccination campaign should be carried out in the targeted areas (affected and neighboring areas as determined by the risk assessment). However, if the outcome of the assessment does not indicate a mass vaccination response, then selective immunization of unimmunised children presenting to health facilities as outlined above should be continued and the number of reported cases closely followed to monitor the progression of the outbreak.

For the non-selective mass vaccination response, the timing, target age group and area for vaccination should be defined as outlined below. An accelerated micro-planning exercise should be performed to determine the bundled vaccine, logistics, staffing and communications needs for the campaign. Existing guidelines for conducting mass measles vaccination campaigns should be used

2.6.4 Measles Surveillance and Response Indicator

Indicator	Target	Definition
Disease incidence Annual incidence of con¬firmed measles cases Annual incidence of con¬firmed rubella cases	Absence of indig¬enous measles transmission	The numerator is the confirmed number of mea¬sles or rubella cases of the year denominator is the population in which the cases occurred multiplied by 1,000,000. When numerator is zero, the target incidence would be zero
Adequacy of investigation Proportion of all sus¬pected measles cases and rubella cases that have had an adequate investi¬gation initiated within 48 Hours of notification	>80%	The numerator is the number of the suspected cases of measles or rubella for which an adequate investigation was initiated within 48 hours of noti¬fication and the denominator is the total number of suspected measles and rubella cases, multiplied by 100. Note: An adequate investigation includes collec¬tion of all the following data elements from each suspected measles or rubella case: name or identi¬fiers, place of residence, place of infection (at least to district level), age (or date of birth), sex, date of rash onset, date of specimen collection, measles-rubella vaccination status, date of last measles rubella or measles-mumps-rubella vaccination, date of notification, date of investigation and travel history

Outbreak investigation Percentage of suspected measles outbreak fully investigated Percentage of suspected outbreak tested for virus detection	 >80% >80%	(i) The numerator is the number of confirmed outbreaks that denominator is the total number of suspected outbreaks multiplied by 100. (ii) The numerator is the number of confirmed outbreaks tested for virus detection and the num¬ber denominator is the total number of suspected outbreaks multiplied by 100.
Immunization Coverage MCV1 & MCV 2 coverage nationally and by district administrative	95% national 95% Districts	The numerator is the number of infants who received MCVI &MCV2 and the denominator is the surviving birth cohort multiplied by 100
III. Representative of reporting: IV. Proportion of sub-national administrative units reporting at least 2 discarded non measles ,non rubella cases per 100,000 population	>80%	The numerator is the number of sub-national units reporting at least 2 discarded non-measles non rubella cases per 100,000 and the denominator is the total number of sub-national units multiplied by 100
Proportion of suspected cases with adequate specimen for detecting acute measles or rubella infection and tested in a proficient laboratory	≥ 80%	The **numerator** is the number of suspected cases from whom adequate specimens for detecting measles or rubella were collected and tested and the **denominator** is the total number of suspected measles or rubella cases multiplied by 100 (EPI linked cases should be removed from the denominator)
Timeliness of specimen transport : Proportion of specimen received at the laboratory within 5 days of collection	≥80	The **numerator** is the total number of specimens received in the laboratory within 5 days collection and the **denominator** is the total number of specimens received by the laboratory multiplied by 100.
Timeliness of reporting results: Proportion of result reported by the laboratory within 4 days of receiving the specimen	≥80	The **numerator** is the total number of specimens for which laboratory results were available within 4 days of receiving the specimen and the **denominator** is the total number of specimen received for testing multiplied by 100.
Viral detection:Proportion of laboratory-confirmed chains of transmission with samples adequate for detecting measles or rubella virus collected and tested in an accredited laboratory	≥80	The **numerator** is the number of chains of transmission for which adequate samples have been submitted for viral detection and the **denominator** is the number of chains of transmission identified.

III. Rubella

5.1 Causal agent and mode of transmission

Rubella is a viral disease and usually causes mild rash illness in children and adults. Most infected persons do not show symptoms of infection. Rubella virus is transmitted from person to person contact through airborne droplets from coughing and sneezing of infected persons, and through close physical contact with them.

Rubella is highly infectious and can cause outbreaks among unimmunized adults and children.

5.2 Rubella symptoms usually include:

- A mild fever, conjunctivitis and coryza
- Swollen glands, especially behind ear and neck
- Mild rash that starts on face and spread to neck, the chest and the rest of the body

Unlike measles, rubella patients do not have a cough.

Adults, especially women may also get joint pain. Older children and teens may also have eye pain, sore throat and body aches.

5.3 Complications of rubella include:

- Thrombocytopenic purpura (bleeding spots on skin)
- Encephalitis
- Pregnant women during first trimester are especially at risk of complications
- Congenital rubella syndrome among newborn children of mothers infected during pregnancy

5.4 Prevention

Myanmar uses MR Vaccine containing live attenuated measles vaccine and Rubella vaccine in routine EPI and therecommended age for MR vaccination is from 9 to 11 months (i.e., after completion of 9 months to before the first birthday).

5.5 Rubella Surveillance

Rubella is detected as part of measles surveillance and investigation of suspected mea-

sles outbreaks. Measles Surveillance includes case investigation of all the suspected measles cases reported by health facilities including Case Based Surveillance sites and outbreaks.

Surveillance of Rubella is done together with Measles Surveillance as integrated with VPD Surveillance

IV. Congenital Rubella Syndrome (CRS)

4.1 Congenital Rubella Syndromes(CRS) are caused by rubella virus infection early in the pregnancy (before week 10). 90% of cases may have multiple fetal defects and miscarriage or frequent stillbirth.

Fetal defects are rarely seen after the 16th week of pregnancy.

4.2 CRS clinical manifestations

- General presentation such as fetal loss, low birth weight and small jaw at birth
- Ear and central nervous system defects such as deafness, mental retardation and speech defects
- Cardiovascular system defects
- Eye defects such as cataracts, retinopathy
- Various transient neonatal complications
- Late-emerging or development such as chronic diarrhea

4.3 CRS Surveillance

Congenital Rubella Syndrome (CRS) Standard Case Definitions

Classification of cases for CRS surveillance purposes is based on clinical, epidemiological and laboratory data. The case definitions for CRS surveillance include the following categories: suspected, laboratory confirmed, clinically compatible, epidemiologically linked and discarded.

Suspected case of CRS: Any infant less than one year of age in whom a health worker suspects CRS.

CRS should be suspected when infant aged 0-11 months presents with:

Heart disease	AND /OR	Suspicion of deafness	AND /OR	**One or more of the following eye signs** • White pupil (cataract), • Diminished vision • Pendular movement of the eyes (nystagmus) • Squint, • Smaller eye ball (microphthalmus) • Larger eye ball (congenital glaucoma)

OR

Suspect CRS, even when signs missing, if mother had suspected or confirmed rubella during pregnancy

Clinically Confirmed CRS case: Any infant in whom a physician detects

- At least two of the conditions from list A below (OR)
- One from list A and one from list B below

List A	List B
Cataract(s)	Purpura
Congenital Glaucoma	Splenomegaly
Congenital Heart Disease	Microcephaly
Hearing Loss	Mental Retardation
Pigmentary Retinopathy	Meningoencephalopathy
	Radiolucent Bone Disease
	Jaundice (within 24 hours after delivery

Laboratory confirmed CRS case: An infant with clinically confirmed CRS who has a positive blood test for rubella-specific IgM. Follow blood collection procedures presented in rubella section.

V. Neonatal tetanus(NT) (Maternal and Neonatal Tetanus Elimination)

7.1 Causative Agent and disease pathogeneses of Tetanus

Causal organism - Tetanus is caused by the spore-forming bacterium Clostridium tetani. The most important toxin of C. tetani is the highly potent tetanospasmin. This toxin blocks inhibitory neurotransmitters in the central nervous system and causes the muscular stiffness and spasms typical of generalized tetanus.

The incubation period of tetanus usually varies between 3 and 21 days (median 7 days, range 0–>60 days). In most cases, neonatal tetanus starts 3–14 days after birth.

5.2 Sign and Symptoms

In more than 80% of cases, tetanus presents as a generalized spastic disease. Characteristic features are early spasms of the facial muscles (trismus or "lock-jaw" and "risussardonicus") followed by spasm of the back muscles (opisthotonos) and sudden, generalized tonic seizures (tetanospasms).

Spasm of the glottis may cause sudden death.

In neonatal tetanus, generalized spasms are commonly preceded by inability to suck or feed and excessive crying.

5.3 Complications of tetanus include

- Laryngo-spasm (difficulty breathing and swallowing)
- Aspiration
- Fractures of long bone or spine
- Venus thrombosis
- Pulmonary embolism
- Unstable blood pressure

80-90% of neonatal tetanus cases can die. Tetanus does not spread from person to person and can be prevented through vaccine.

5.4 Prevention and control

- Neonatal tetanus can be prevented by immunizing women of childbearing age with TT, either during pregnancy or outside of pregnancy. This protects the mother and – and through a transfer of tetanus antibodies to the fetus – also her baby.

- Clean practices when a mother is delivering a child are also important to prevent neonatal and maternal tetanus.
- To be protected for life, an individual should receive 3 doses of diphtheria/tetanus/pertussis vaccine in infancy, followed by a TT-containing booster at school-entry age (4-7 years), in adolescence (12-15 years), and in early adulthood.

5.5 Treatment includes

includeswound care, where required, as well as management of the symptoms and complications associated with the disease. Prompt treatment with antitetanusimmunoglobulins and appropriate antibiotics may prevent further progression of the disease but is unlikely to influence existing pathology.

5.6 MaternalNeonatalTetanus (MNT) Surveillance

Surveillance of neonatal tetanus is an essential component of MNT elimination. Currently, NT Surveillance is health facility based but in many instances NT cases are never registered at health facilities. Hence, health facility-based NT Surveillance can be considered a sentinel site system that monitors trends in NT incidence but cannot assess a full burden of NT in the community accurately.

Confirmed Case definition of NT:

Any neonate with normal ability to suck and cry during first two days and who during 3 to 28 days cannot suck or cry and has convulsion or spasms, by triggered by minimal stimuli such as light, noise or touch or who has signs of stiffness and rigidity, which include any of the following: trismus, clenched fists or fits, continuously pursed lips, curved back (opisthotonus).

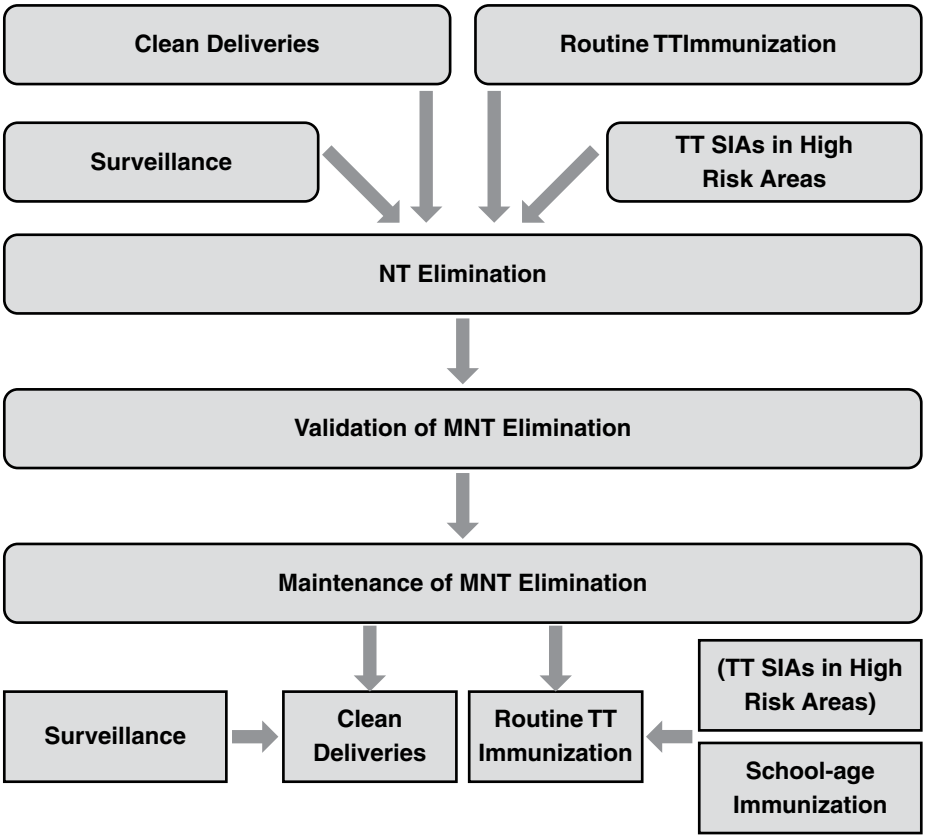
Suspected case

Any neonatal death 3-28 days of age in which cause is unknown (OR)

Any neonatal 3-28 days of age in which tetanus was reported but not investigated

Inform any case of neonatal tetanus / deaths to nearby health facilities, district health officer RSO and Team Leader, SDCU.

vFigure 5. Summary of NNT elimination strategies



VI. Diphtheria

6.1 Causal Agent and Mode of Transmission

Diphtheria is a Bacterial infection and caused by: Corynebacteriumdiphtheria (C. diphtheriae)

Respiratory transmission through droplets, nose, throat and eye discharges are most common.

6.2 Clinical manifestations

Infection with C. diphtheriae can involve any mucous membrane.

A toxin produced by bacteriophage-infected strains is associated with increased disease severity.

Disease classification is based on the site of infection as follows:

- Tonsillar and pharyngeal
- Laryngeal
- Anterior nasal
- Cutaneous

Incubation period - 2-5 days (range 1-10 days).

6.3 Period of communicability

- Without antimicrobial treatment, communicability may range from 2 to 6 weeks from the time of infection.
- With antibiotic treatment, patients may be infectious for fewer than 4 days.
- Chronic carriers may shed organisms for over 6 months.

6.4 Case definition for surveillance

Clinical description

An upper respiratory tract illness characterized by sore throat, low-grade fever, and an adherent membrane of the tonsil(s), pharynx, and/or nose.

Laboratory criteria

Isolation of C. diphtheriae from a clinical specimen, OR

Histopathologic diagnosis of diphtheria.

6.5 Laboratory Diagnosis

Diagnosis of diphtheria is usually made on the basis of clinical presentation since it is imperative to begin presumptive therapy quickly. Isolation of C. diphtheriae by bacteriological culture is essential for confirming diphtheria.

Serology

Before administering antitoxin, obtain serum antibodies to assess for a lownonprotective diphtheria antibody titer, which can aid in presumptive diagnosis.

Specimen collection

Specimen: Nasopharyngeal and pharyngeal specimens should both be taken from all cases and close contacts.

Samples from cases should also be taken from the membrane and if possible from beneath the membrane.

6.6 Preventive and Control measures

- Initiate mass immunization as rapidly as possible of all age groups in the population with at least one dose of diphtheria toxoid
- Provide early detection and proper management of diphtheria cases.
- Provide early identification and proper management of close contacts of diphtheria cases

6.7 Treatment of Diphtheria Patient

- If respiratory diphtheria is strongly suspected, specific treatment with antitoxin and antibiotics should be initiated without awaiting laboratory confirmation by culture and continued even if the laboratory report is negative.

Antibiotic	Dose	Route	Frequency	Duration
Procaine Penicillin G	25,000 – 50,000 units/ kg/ day for children 1.2 million units/ day for adult	IM	12 hourly	14 days
Penicillin V	125-250 mg	Oral	6-8 hourly	
Erythromycin	40 mg/kg/day, Maximum, 2g/ day	Oral (or) IV	6 hourly	

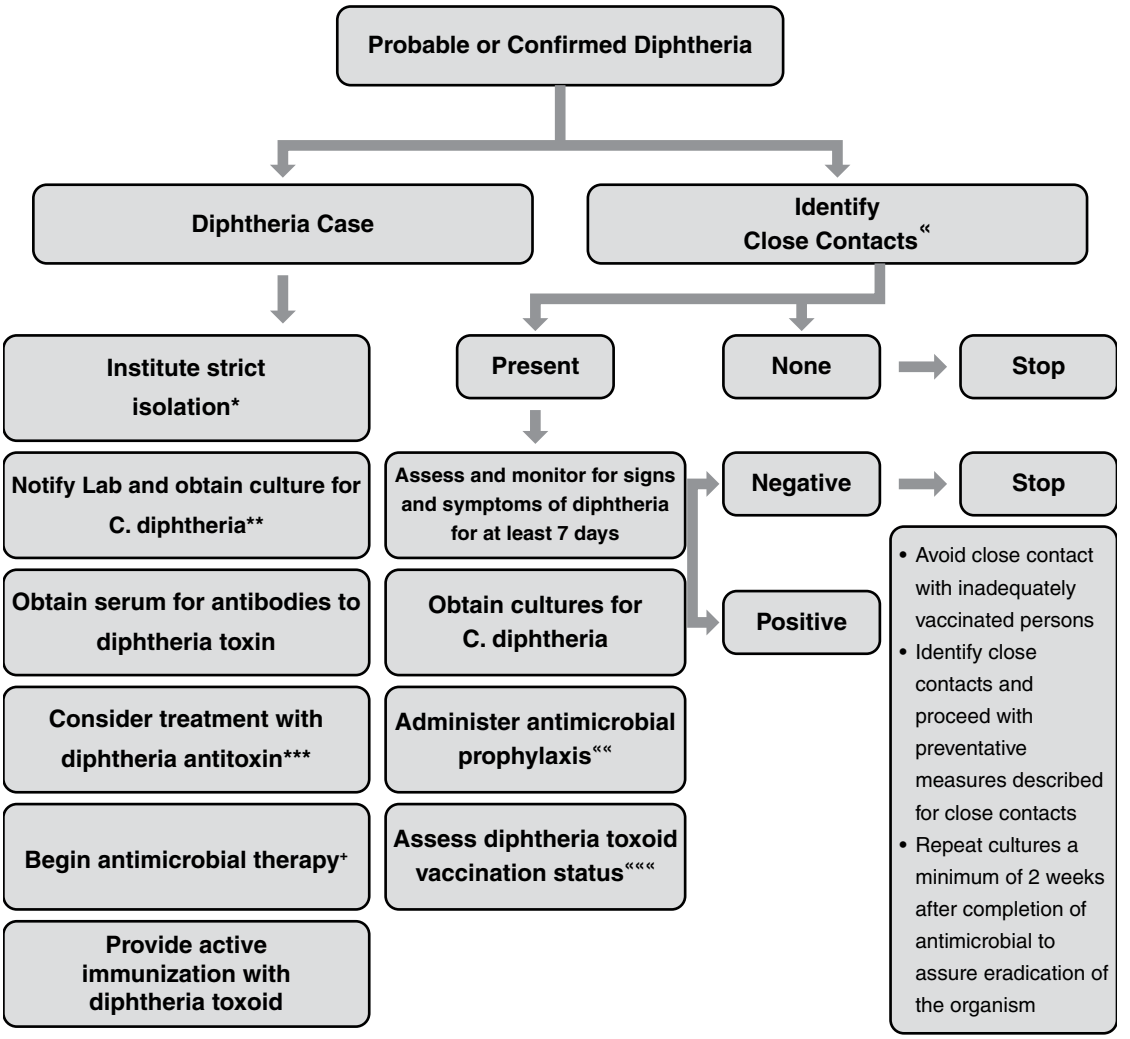
Diphtheria Antitoxin

Types of Diphtheria	Dosage	Route
Pharyngeal (or) Laryngeal disease with 2 days duration	20000 to 40000 Units	IM (or) IV
Nasopharyngeal Disease	40000 to 60000 Units	IM (or) IV
Systemic disease of 3 or more days duration Any patients with diffuse swelling of neck	800000 to 100000 Units	IV

6.8 Case Investigation and Control

Immediate action on all highly suspect cases is warranted until they are shown not to be caused by toxigenic C. diphtheriae.

The following actions should also be taken for any toxigenic C. diphtheriae carriers who are detected.All suspected Case should be examined and investigated by medical doctor and fill the CI forms and report to CEU, DoPH



**** Maintain isolation until elimination of the organism is demonstrated by negative cultures of two samples obtained at least 24 hours apart after completion of antimicrobial therapy***

*****Both nasal and pharyngeal swabs should be obtained for culture***

******Before administration of equine diphtheria antitoxin, patient should be tested for sensitivity to horse serum and, if necessary, desensitized***

+ Antimicrobial therapy is not a substitute for antitoxin treatment. Intramuscular procaine penicillin G (25,000-50,000 unit/kg/d for children and 1.2 million unit/d for adults, in two divided doses) or parenteral erythromycin in four divided doses or oral penicillin V (125-250 mg four times daily) may be substituted for a recommended total treatment period of 14 days.
+ +Vaccination is required because clinical diphtheria does not necessarily confer immunity

«Close contacts include household members and other persons with a history of direct contact with a case/ patient (eg. Caretakers, relatives, or friends who regularly visit the home) as well as medical staff exposed to oral or respiratory secretions of a case/patient.

«««A single dose of intramuscular benzathine penicillin G (600,000 units for persons < 6 years of age and 1.2 million units for persons = 6 years of age: or a 7-10 days course of oral erythromycin (40 mg/kg/d) for children and 1 g/d for adults) has been recommended

«««««< 3 doses or unknown

Administer immediate dose of diphtheria toxoid and complete primary series according to schedule

= 3 doses, last dose > 5 years ago

Administer immediate booster dose of diphtheria toxoid.

= 3 doses, last dose 5 years ago

Children in need of their 4th primary dose or booster dose should be vaccinated; otherwise vaccination not required

VII. Whooping Cough

7.1 Causal Agent

Pertussis, more commonly known as whooping cough, is a contagious, respiratory dis-

ease caused by the **bacterium Bordetella pertussis**. The illness is characterized by a prolonged paroxysmal cough,

which is often accompanied by an inspiratory whoop.

7.2 Clinical presentation

Disease presentation varies with age and history of previous exposure or vaccination. Young infants may present to a clinic or hospital with apnea and no other disease symptoms. Adults and adolescents with some immunity may exhibit only mild symptoms or have the typical prolonged paroxysmal cough. In all persons, cough can continue for months.

7.3 Complication

Pertussis rarely causes severe complications among healthy, vaccinated persons. Infants, however, are at greatest risk for pertussis-related complications and mortality. Pneumonia is the most common complication in all age groups; seizures and encephalopathy generally occur only among very young infants. Death is infrequent and most likely to occur in unvaccinated infants, although fatalities are occasionally reported among older children and adults with serious underlying health conditions.

7.4 Case Definitions

Clinical case definition

In the absence of a more likely diagnosis a cough illness lasting ≥2 weeks with one of the following symptoms:

- Paroxysms of coughing, OR
- Inspiratory "whoop," OR
- Posttussive vomiting, OR
- Apnea (with or without cyanosis) (FOR INFANTS AGED <1 YEAR ONLY)

Laboratory criteria for diagnosis

- Isolation of B. pertussis from a clinical specimen
- Positive polymerase chain reaction (PCR) assay for B. pertussis DNA

Epidemiologic linkage

- Contact with a laboratory-confirmed case of pertussis.†*

7.4 Laboratory Testing

Laboratory confirmation of pertussis is important because other pathogens can cause symptoms similar to pertussis.

Culture

- Isolation of B. pertussis by bacterial culture remains the gold standard for diagnosing pertussis. A positive culture for B. pertussis confirms the diagnosis of pertussis. Culture of the organism is also necessary for antimicrobial susceptibility testing and molecular typing.

All persons with suspected cases of pertussis should have a nasopharyngeal aspirate or swab obtained from the posterior nasopharynx for culture. Specimens should be transported on cold packs and plated at the laboratory within 24 hours.

7.5 Treatment and chemoprophylaxis

Antimicrobial treatment does not generally lessen the severity of disease unless it is begun in the catarrhal phase, prior to paroxysmal coughing.

Early treatment reduces transmission and is essential for disease control. The spread of pertussis can be limited by decreasing the infectivity of the patient and by protecting close contacts.

7.6 Outbreak Control

Pertussis outbreaks can be difficult to identify and manage. Other respiratory pathogens often cause clinical symptoms similar to pertussis, and co-circulation with other pathogens does occur. To respond appropriately (e.g., provide appropriate prophylaxis), it is important to confirm that B. pertussis is circulating in the outbreak setting and to determine whether other pathogens are contributing to the outbreak. PCR tests vary in specificity, so obtaining culture confirmation of pertussis for at least one suspected case is recommended any time there is suspicion of a pertussis outbreak.

VIII. Acute Encephalitis Syndrome (AES) Surveillance

It is difficult to separate JE encephalic causes from other causes of encephalitis. For this reason surveillance is done for acute encephalitic syndrome rather than JE, where there is aim to find AES cases and confirm JE using laboratory techniques.

8.1 Surveillance of AES

All cases of acute encephalitis syndrome should be reported

Clinical case definition: A person of any age, in any geographical region, at any time of year with acute onset of fever and a change in mental status (including symptoms such as confusion, disorientation, coma, or inability to talk) AND/OR new onset of seizures (excluding simple febrile seizures).

FEVER (Acute onset)	+	**CHANGE IN MENTAL STATE** Such as Confusion, Disorientation • Coma and Inability to talk	**AND/ OR**	**SEIZURES** **Not including simple febrile seizures**

8.2 Diagnosis:

A definitive diagnosis of JE is made with viral isolation from cerebrospinal fluid (CSF) or, in fetal cases, CNS tissues as CSF usually have a pattern that is consistent with viral infection.

CSF is desired for diagnosis as it confirms a CNS infection and has high titers than serum, however a single serum specimen drawn at least 7 days after the onset of fever in a patient with a clinical syndrome consistent with encephalitis can be diagnostic.

Laboratory Sample Collection Procedures

Two specimens are needed; first specimen (blood or CSF) should be collected as soon as possible after the admission to hospital or when patient is first seen . Second specimen should be collected on 10th day of symptoms onset, discharge or death. CSF is preferred to blood samples.

Label samples with patient's name or identifier, data of collection and specimen type.

CSF Collection

- Collect 2 ml CSF and transport within 1 hour to laboratory.
- Do not expose to light or health, freeze or refrigerate samples being transported to lab. Only refrigerate if delay in transport more than 1 hour.
- If transport delayed, samples should be kept at 4oC for 1-3 days or -20oC or below for long-term storage. Repeated freezing and thawing of CSF should be avoided as it may lead to instability.

Blood Collection

- Collect 5 ml for older children and adults (1 ml for infants and younger children).
- Clot whole blood at room temperature and store in cold box or refrigerator at 4-8oC kept and sent to hospital laboratory in 24 hours.
- If centrifuge available; separate serum from clotted blood and centrifuge at 1000G for 20 minutes. Store extracted serum at 2-8oC and ship within 48 hours or 7 days maximum. Long-term storage should be at -20oC or below.

Specimens from field need to be sent to Nepal Public Health Laboratory (Yangon). Samples should be stored and transported to laboratory maintaining cold chain.

QUICK GUIDE

Vaccine Preventable Disease and Surveillance
(VPD Surveillance)

World Health Organization
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