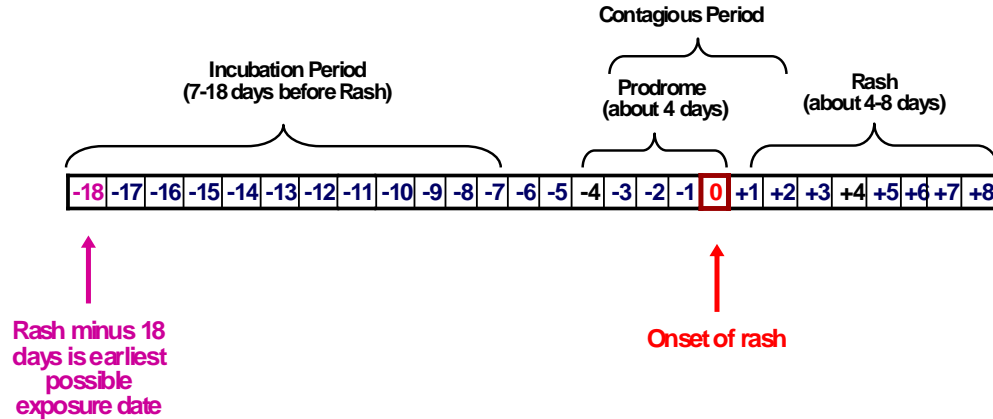


The epidemiologic basis of measles surveillance

- Measles virus is probably the most infectious agent causing human disease.
 - Exclusive human pathogen – it has no animal reservoir and no vector
 - Transmitted by respiratory droplets (aerosol and direct contact)
- Measles virus is an enveloped, RNA virus of the genus Morbillivirus, a member of the Paramyxoviridae family.
- **Only one serotype exists**
- Measles virus is inactivated rapidly in sunlight, heat and extremes of pH, but remains viable over long periods when stored at $-20\text{ }^{\circ}\text{C}$ to $-70\text{ }^{\circ}\text{C}$.

Clinical Course of Measles



Serology after measles virus infection

When laboratory confirmation of the clinical diagnosis is needed, the suggested test is the capture measles IgM antibody assay. This is a highly sensitive and specific test that becomes positive shortly after the onset of rash and remains positive for up to 4 weeks following measles infection

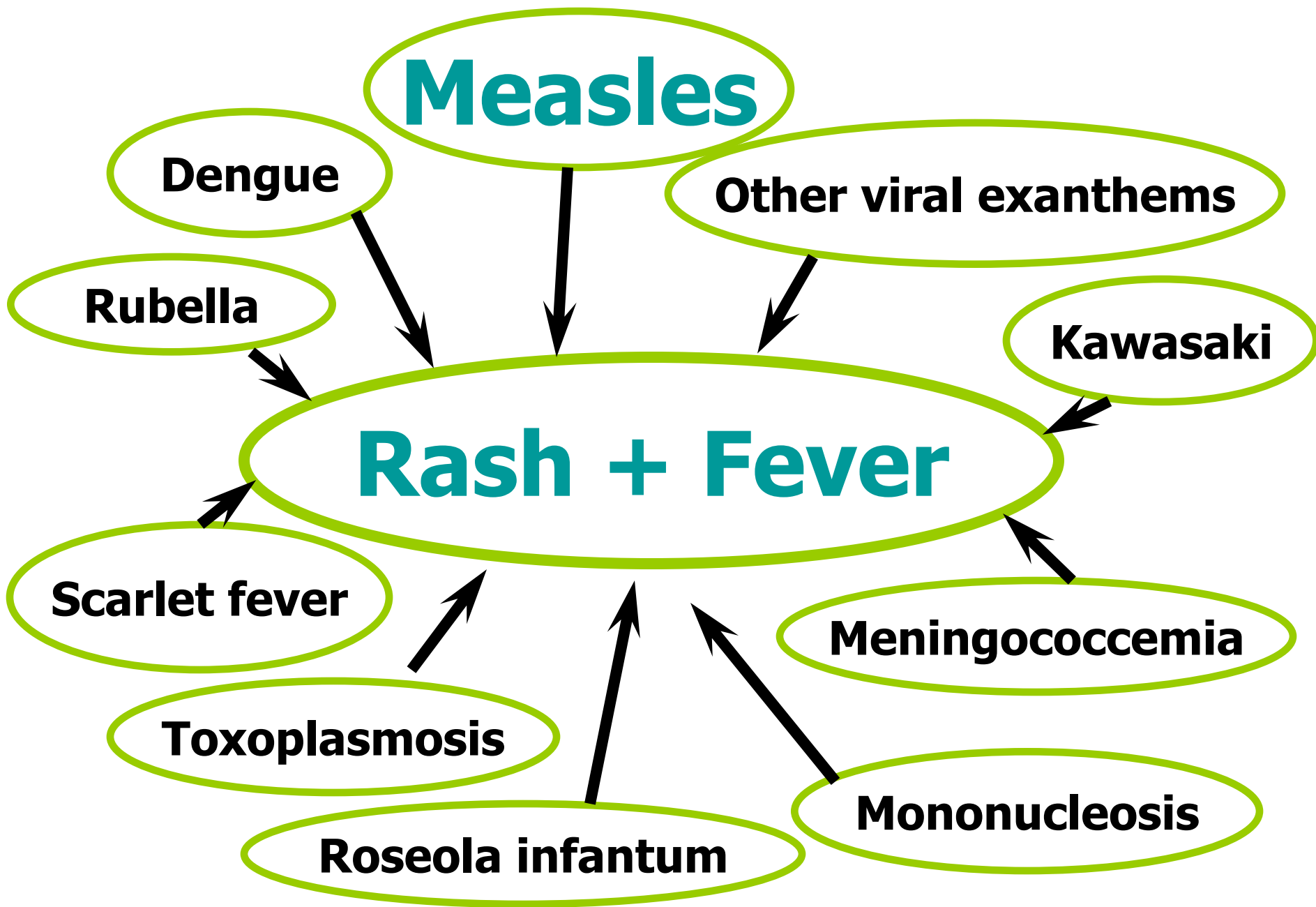
Case Definition of Clinical Measles

**Any person in whom
clinician suspects measles infection**

or

**Any person with fever and maculo papular
rash**

**with cough or coryza (running nose) or
conjunctivitis (red eyes)**



Summary framework for measles surveillance

Source of data	Key components	Country Goal		
		Mortality Reduction		Elimination
		Not Completed catch-up campaigns	Completed catch-up campaigns	Very few cases detected
Patients coming to Health facilities	Surveillance type	Aggregate data	Case Based data	Case Based data
	Serology		As many cases as possible	All cases
	Virus isolation		In some cases	All cases
	Data transmission	Summary table	Line list	Case investigation report
	Desired information	Number of cases by location and age	Age, sex, location, vaccination status, outcome, serology	Age, sex, location, vaccination status outcome, serology+ in investigation of all epidemiological links
Outbreak investigation	Surveillance type	Case based data	Case based data	Case based data
	Suspected outbreaks	Increase in the expected number of cases	5 per 100,000 population in one month	≥ 1 case
	Serology	At least 5 cases	At least 5 cases	At least 5 cases
	Virus isolation	Optional as per program needs	In some outbreaks	All outbreaks
	Data transmission	Line list	Line list	Line list

Measles out break

- **A Suspected outbreak of measles** is defined as the occurrence of 5 or more reported suspected cases of measles in one month per 100,000 population living in a geographic area (e.g. district/ block) It is mandatory that all measles outbreaks are fully investigated in this stage of the program
- **A Confirmed measles outbreak** is defined as the occurrence of 3 or more confirmed measles cases (at least two of which should be laboratory confirmed; IgM positive) in a health facility/district/block (approximate catchment population of 100,000) in a month

Measles outbreak is fully investigated if:

- At least one field visit for house to house survey is conducted in the affected area and
- Serologic testing for measles / rubella IgM antibody is done for at least 5 suspected cases and
- Case investigation forms or linelist of cases is available with information on geographic location, age, vaccination status for measles, date of last vaccination, date of rash onset and outcome of illness.

Surveillance Indicators

- Annual national incidence of non measles suspected measles cases (**Target more than 2 per 100,000 population**)
- Percentage of townships annually reporting at least 1 non measles suspected measles case per 100,000 population (**Target at least 80%**)
- Annual number of reported rubella cases
- Completeness of monthly VPD surveillance reports (**Target 100%**)
- Timeliness of monthly VPD surveillance reports (**Target 80%**)
- Percentage of suspected measles cases tested in a proficient laboratory, excluding from the denominator any cases that are epidemiologically linked to a laboratory confirmed case (**Target 80%**)
- Percentage of outbreaks tested for virus detection in a proficient laboratory (**Target 80%**)

Line list clinically suspected measles cases.

The reporting sites should send a line list to the Township on the clinically suspected measles cases that were detected by the system during reporting period (Form A).

The essential data include ;

- Unique identifier (ID Code)
- Date of onset of rash
- Place of occurrence
- Age
- Vaccination status
- Date of last vaccination
- Serological confirmation
- Case classification

Specimens for serology

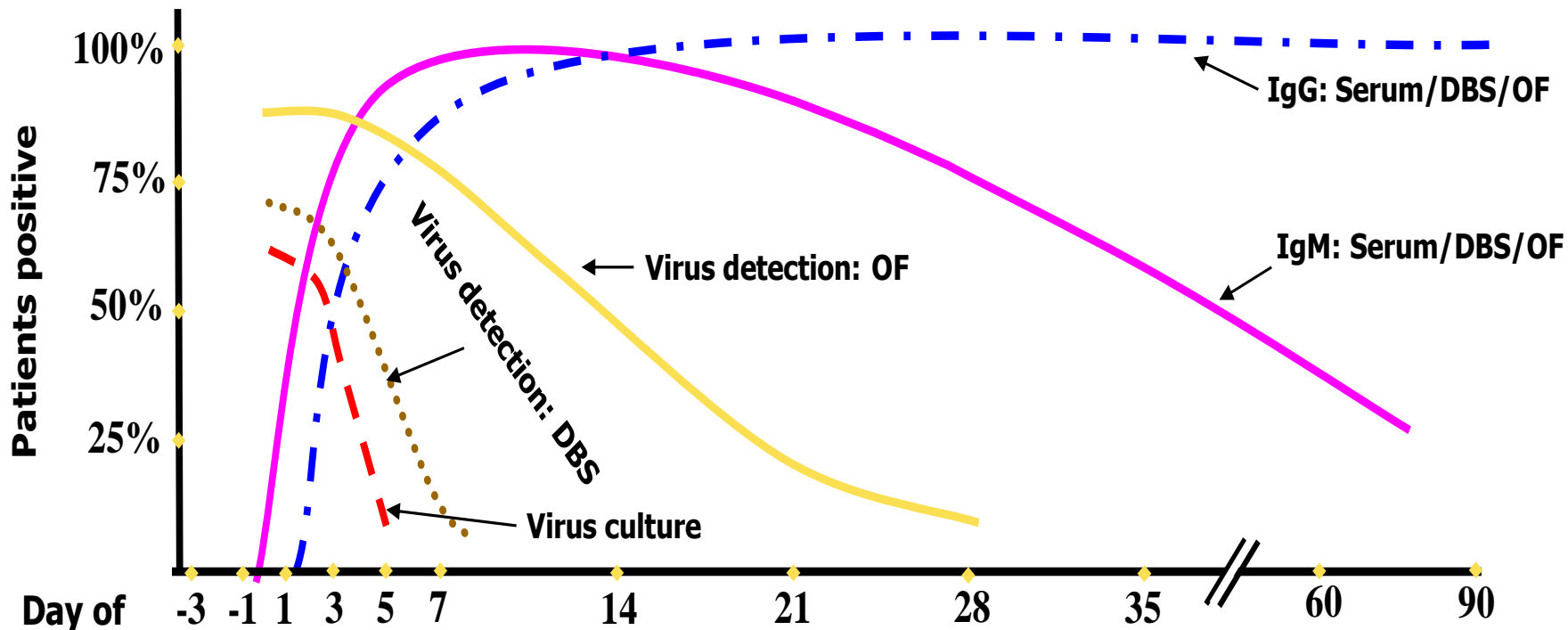
- While IgM ELISA tests for measles and rubella are more sensitive between days 4 and 28 after the onset of rash, a single serum sample obtained at the first contact with the health care system at any time within 28 days after onset is considered adequate for surveillance purposes.
- In outbreaks where 5-10 samples have been collected, individual diagnosis is not critical

Nasopharyngeal specimens for measles virus isolation

Nasopharyngeal/oropharyngeal swabs obtained by firmly rubbing the nasopharyngeal passage and back of the throat with sterile cotton swabs to dislodge epithelial cells. The swabs are placed in sterile viral transport medium in labelled screw-capped tubes

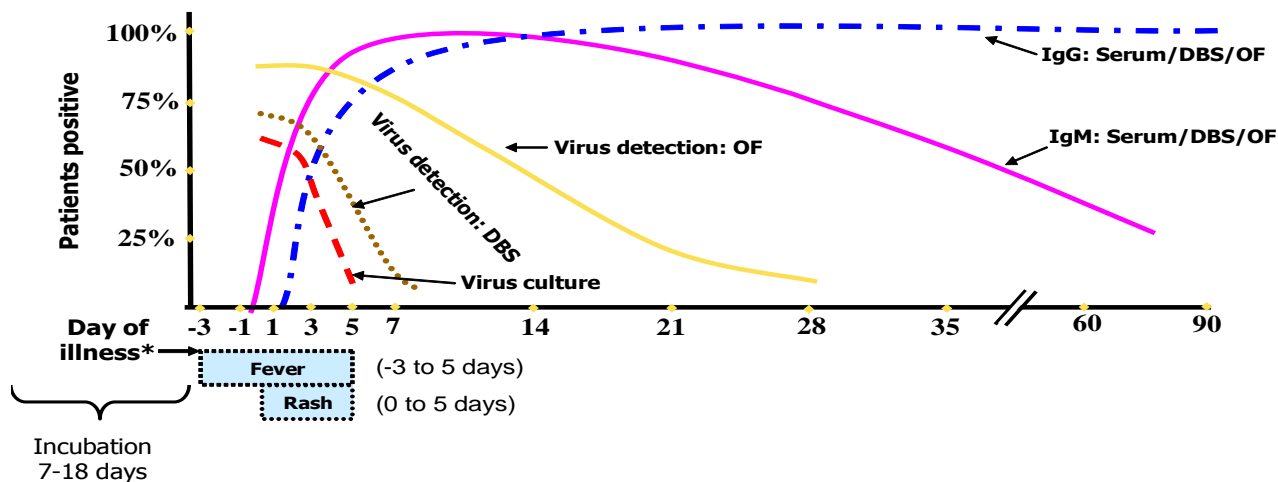


Collect throat swab, ensuring the back of the throat is vigorously swabbed. Use tongue depressor if necessary.



Incubation
7-18 days

*Day 0 = first day of rash

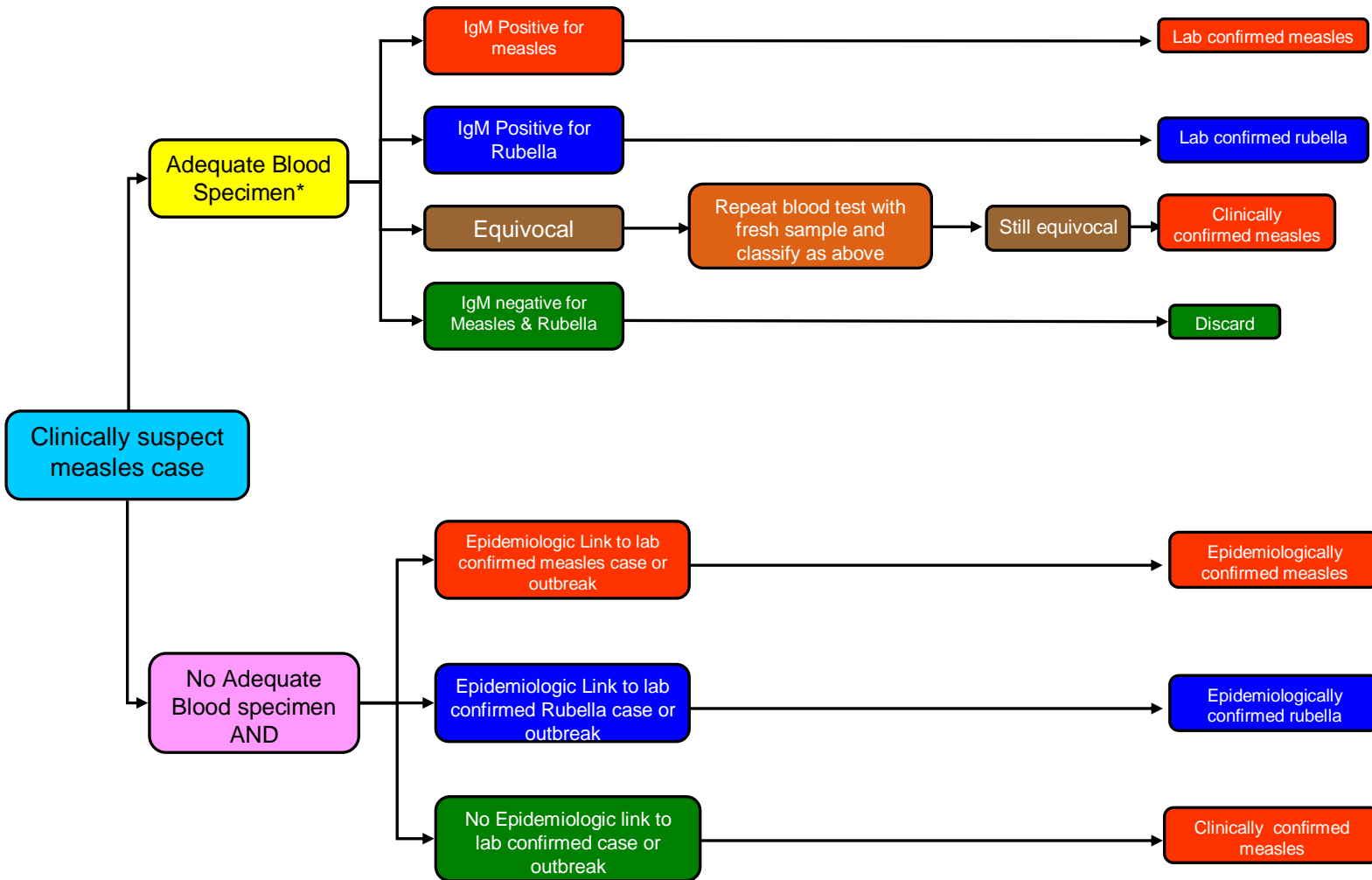


*Day 0 = first day of rash

Classification of cases with IgM-positive result and recent history of measles vaccination

Final classification	Vaccination history	Epidemiological findings
Discarded	History of measles vaccination within six weeks before onset of rash	Active search in community does not reveal evidence of measles transmission. No history of travelling to areas where measles virus is known to be circulating
Confirmed	History of measles vaccination within six weeks before onset of rash	Active search in community reveals other laboratory-confirmed measles cases

Measles Surveillance – Summary of Case Classification



*A single serum sample obtained at the first contact with the health care system within 28 days after onset is considered adequate for measles surveillance

Definitions: cases

- Clinically confirmed/suspected measles case
 - Clinician suspects measles infection
 - Fever with maculopapular rash and cough, coryza or conjunctivitis
- Laboratory confirmed case
 - Meets clinical case definition + Presence of measles IgM antibodies
- Epidemiologically confirmed
 - Meets clinical case definition + linked epidemiologically to lab confirmed case

Immunization response

- immunization response must be initiated based on the prevailing epidemiologic situation in the outbreak area.
- Vaccination within 72 hours of exposure may help to prevent the disease or mitigate its severity.
- Vaccination of previously unvaccinated persons should start immediately. All children 9 months to 15 years of age without a history of Measles vaccination should be vaccinated.
- If the outbreak is large and many cases are occurring in infants aged less than 9 months, the age of routine vaccination should be decreased to 6 months. These infants should be revaccinated when they reach 9 months of age.
- Children hospitalized or attending outpatient clinics for any reason and who cannot provide written proof of Measles vaccination should be vaccinated with Measles vaccine, if not contraindicated.

What triggers an investigation of a potential outbreak?

- **≥ 5 clinical cases of measles in a RHC in a month ???**

OR

- **≥ 5 clinical cases in an area in a month ???**

Outbreak Investigation and Response

- One officer visit the area of potential outbreak
 - to confirm whether cases look like measles and
 - presence of additional cases
- If the outbreak seems like measles
 - Form a team to collect information
 - collect information to a linelist by doing a house to house survey in the affected area
- Collect specimen for outbreak confirmation
 - Collect blood from 5 cases with rash onset with in 28 days
- Analyze data and give feedback
- Decide on level of response
 - Ensure proper case management
 - Optimum immunization response.

Thank you