

Epidemiology Of Measles (Rubeola)

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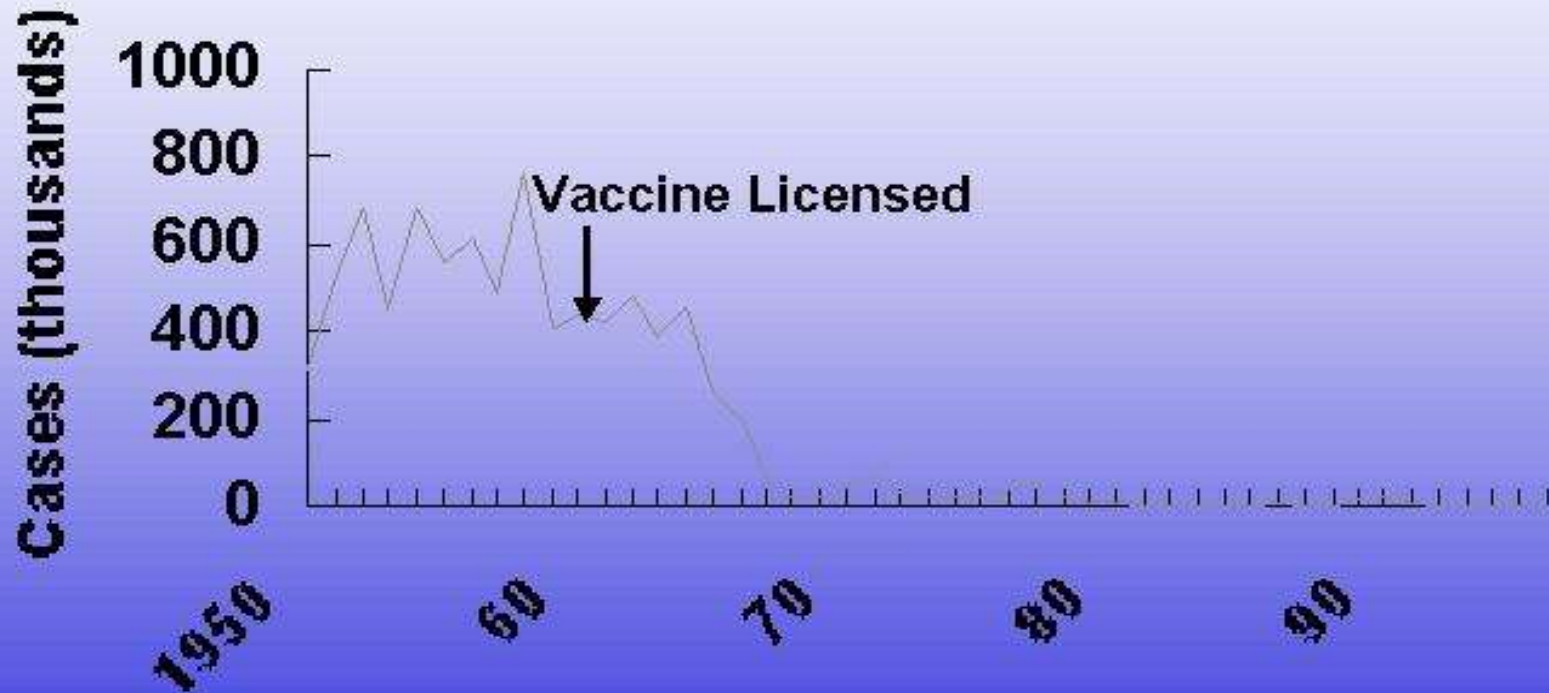


Aorl/nanl mata

Acute highly infectious disease of childhood caused by an RNA paramyxovirus, clinically characterised by **fever** and catarrhal symptoms of upper respiratory tract, followed by **typical rash**.

Important cause of childhood mortality in developing countries

Measles 1950-1996



*1997 provisional data

- Measles is a highly contagious airborne virus that is spread by sneezing, coughing or talking.



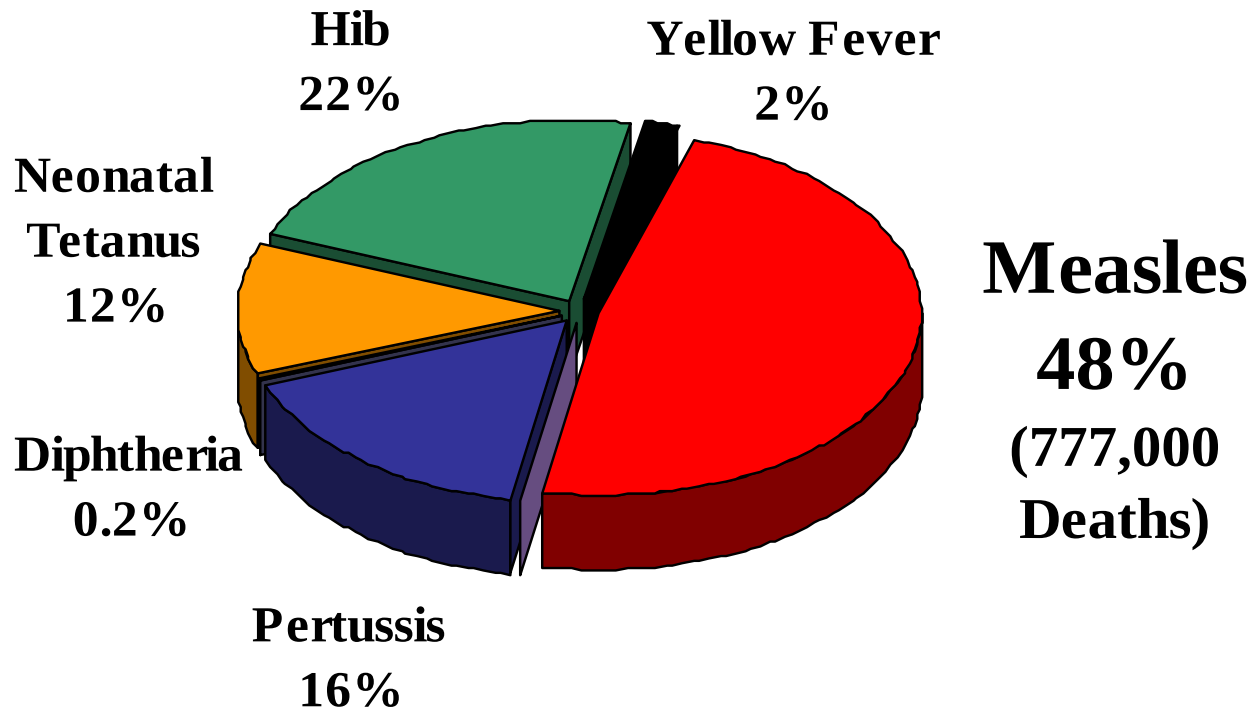
Discovery of Measles:

- The Measles virus was discovered by John F. Enders in 1954.
- He also developed the measles vaccine.

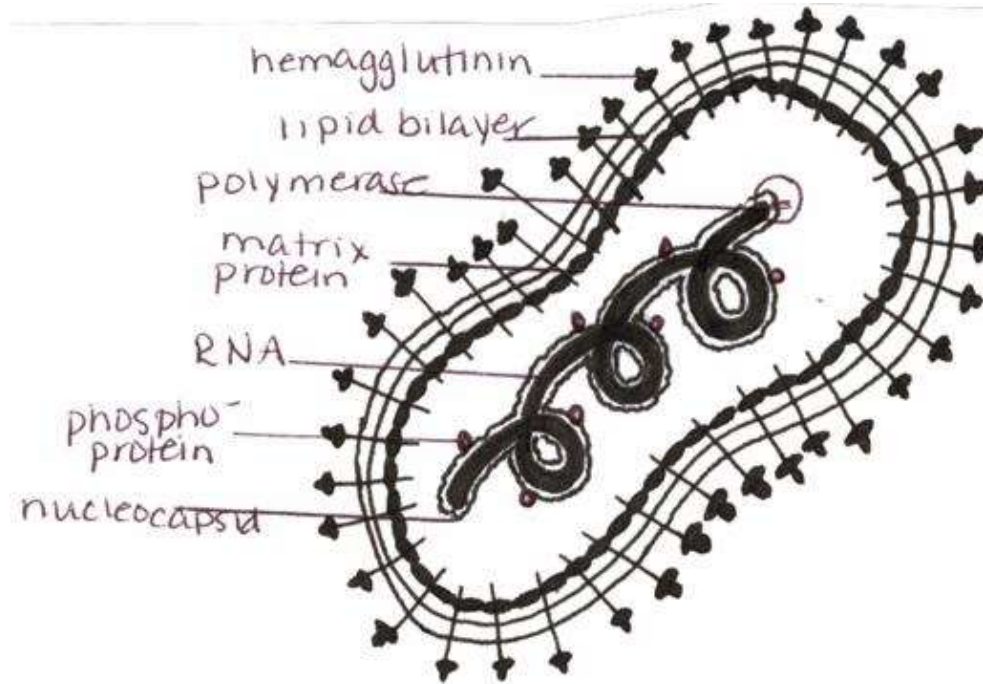
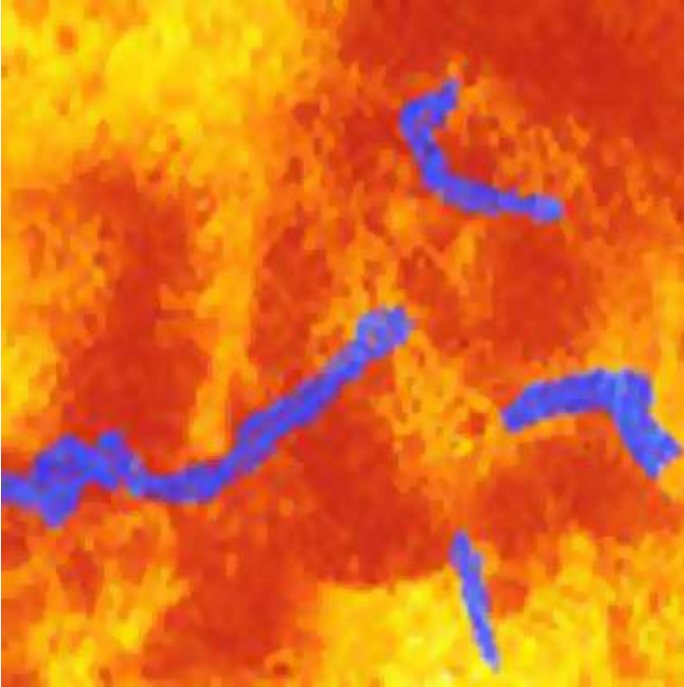
Magnitude Of Problem Global

- 40 million infections\ year
- 1-2 million deaths.
- Endemic in all parts of world
- India
 - Year 2005- 50,000 cases
 - 55 deaths

Causes of 1.6 million vaccine-preventable deaths among children, 2000

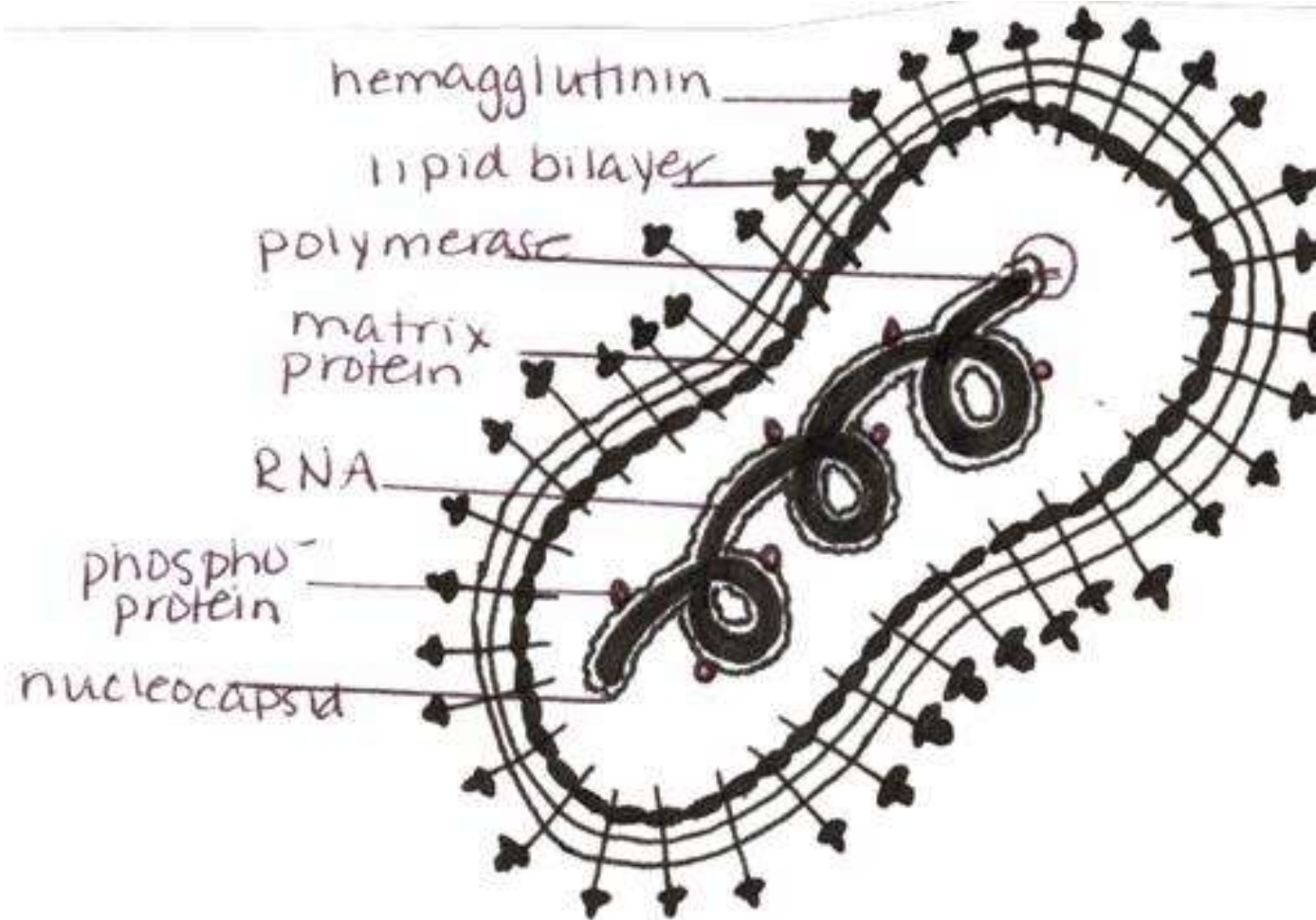


Agent



- genus Morbillivirus, family RNA Paramyxoviridae
- One serotype, humans only host

Family: RNA Paramyxoviridae Genus: Morbillivirus



- Measles virus, retains infectivity when stored at sub zero temperature.
- Can remain active at least for 24 hr at room temperature

- Source of infection
 - Case
 - No sub clinical or carrier
- Infective material
 - Bronchial secretions,
 - Nasopharyngeal secretions
 - Droplet of nuclei

Period of Infectivity

- 4 days before the onset of rash to 5 days after rash
- SAR- >90%

- RESERVOIR & SOURCE

Human is the only host & sole reservoir

Spread Of Infection

- Sneezing, coughing or talking
- Watering eyes
- Contaminated objects
- Direct face- face contact



-coughing or sneezing

-

- Portal of entry -
Respiratory tract

- CFR - 2 to 15 % developing country
- <0.2 per 10,000 notified cases in developed countries.

Host

Only host & sole reservoir

- **Age** - 6 months- 3 years in developing
> 5 years in developed countries.
- **Sex** - equal
- Poor socioeconomic condition
- **Nutrition**- 400 times more mortality in
malnourished due to poor
cell mediated
immunity.
 - Excretes virus for longer period

Host Immunity

- No age is immune,
- Passive maternal IgG -protect up to 6 mths.

IMMUNITY TO MEASLES

- Recovery - cell-mediated
- Protection - Humoral immunity (specific Ig G)
- Lifelong immunity after natural infection or immunization

Malnourished



Depressed cellular Immunity



Delay production of immune cells



By the time immune cells available

More cells infected with virus



Longer infectivity

Higher complication, severity

Environment

Environmental factors

- India - Winter - epidemics are common in (January to April) due to over crowding.
- In tropical climate transmission increases after rainy season.
- Over crowding, poor ventilation

At risk

- Under five
- Malnourished
- Slum dwellers
- Un-immunized
- Developing countries

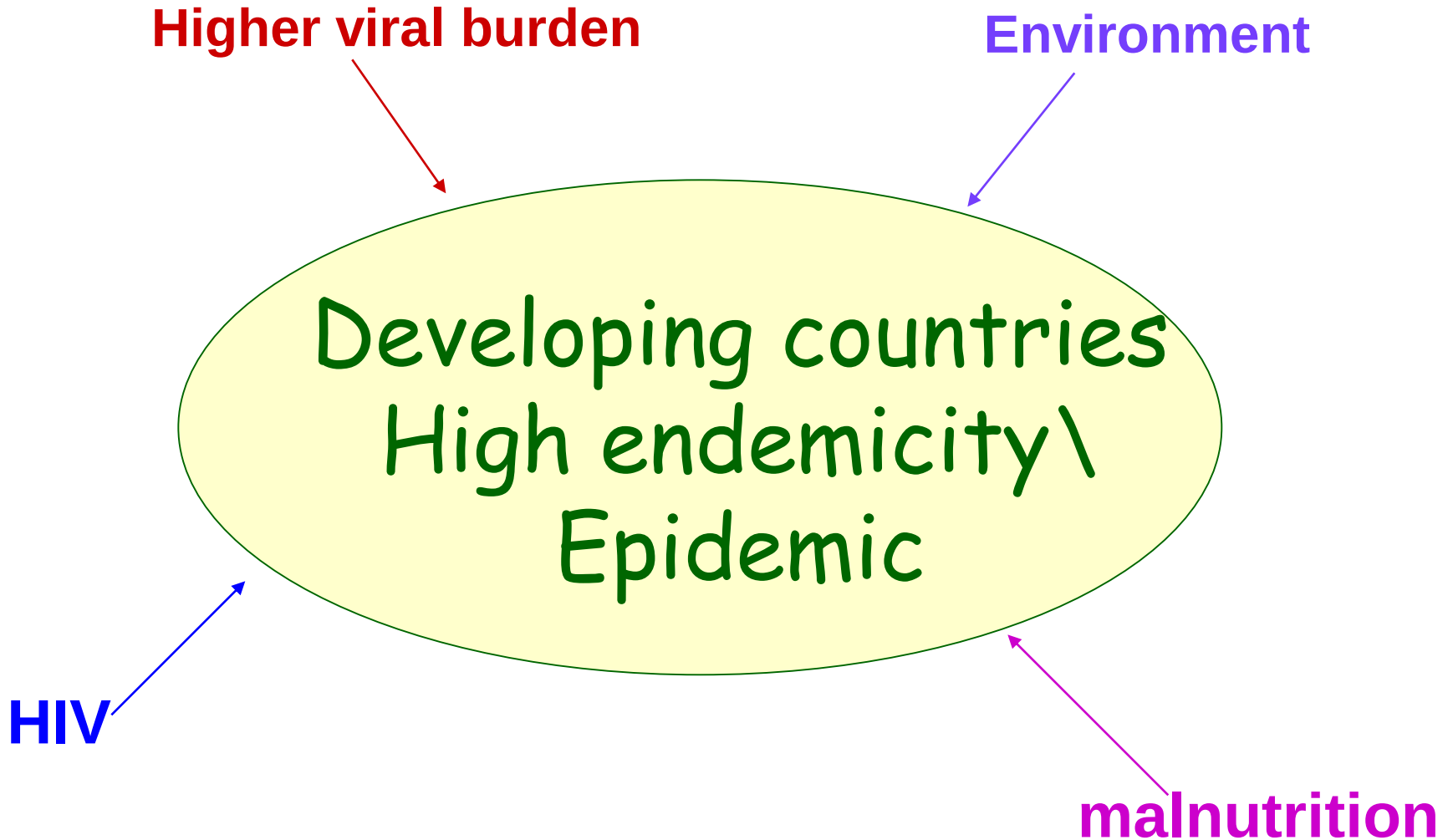
Higher viral burden

Environment

Developing countries
High endemicity\
Epidemic

HIV

malnutrition



- Epidemics when susceptible population reaches 40%
- If introduced in virgin community more than 90% population infected.

Invade Respiratory tract



lymphatics



Regional lymph nodes



Enters bloodstream



Reticuloendothelial system (primary viraemia)



Target organs (secondary viraemia)

Target organs - epithelial, endothelial cells

- Epithelial cells-

Eyes, skin, respiratory tract,
gastrointestinal tract, including
mouth

- Endothelial cells - vasculitis

- Incubation Period

10-14 days from- fever

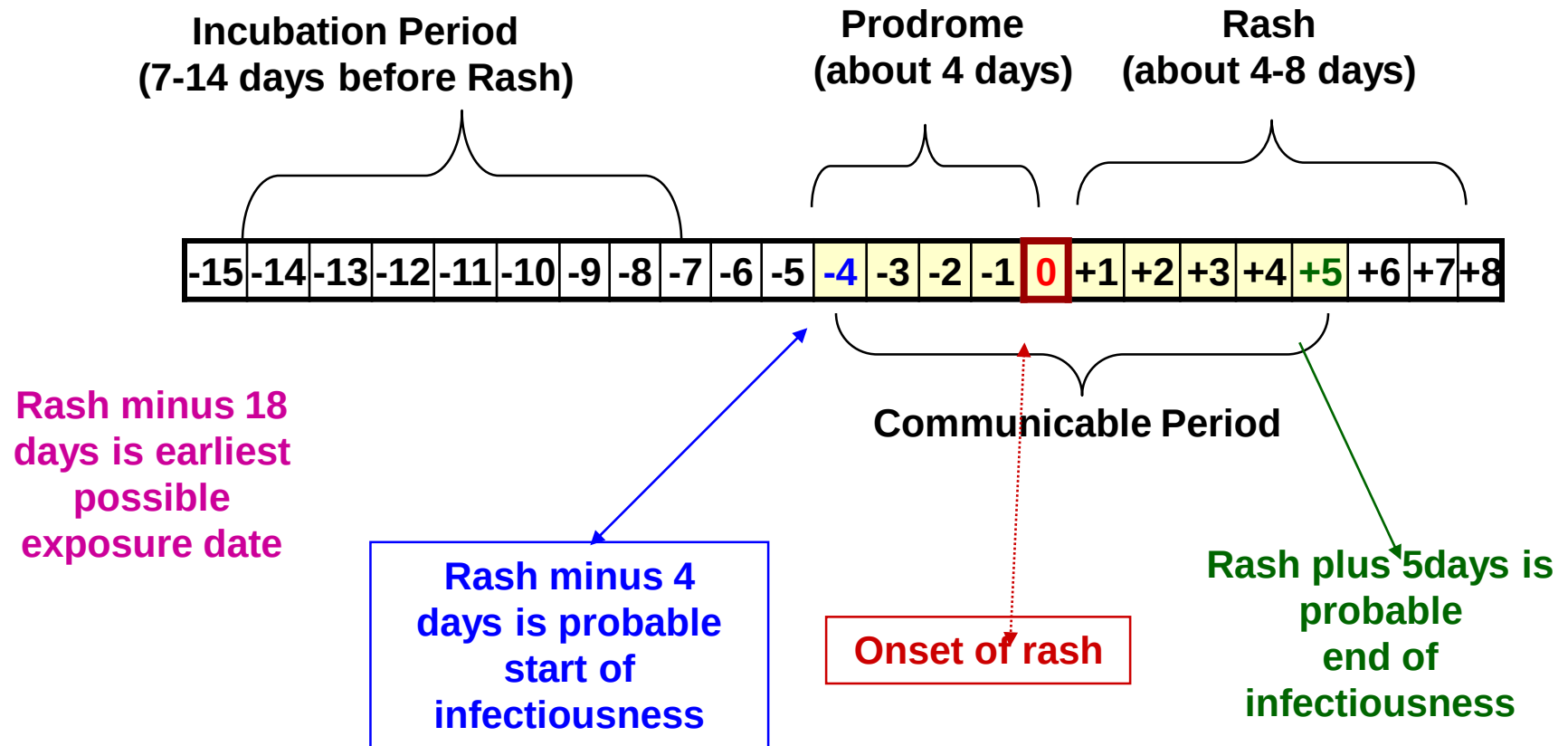
14-18 days from rash

Clinical Features

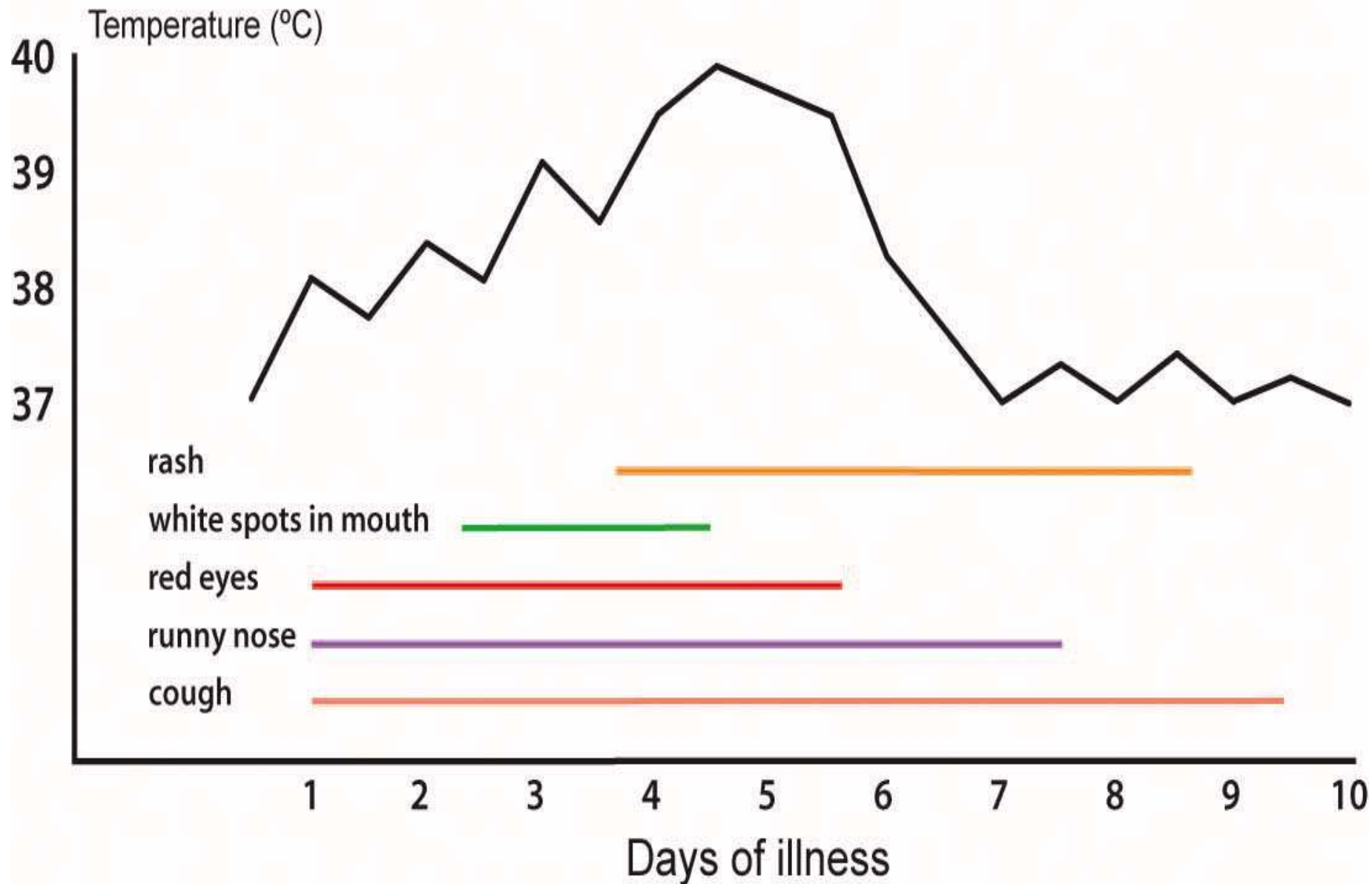
- Measles causes rash, cough, and fever, and can lead to ear infection, pneumonia, conjunctivitis, diarrhea, seizures, brain damage, and death.

- Three stages
 - 1) Prodromal stage or pre-eruptive stage
 - 2) Eruptive stage
 - 3) Post measles stage

Clinical Course of Measles



CLINICAL COURSE OF MEASLES



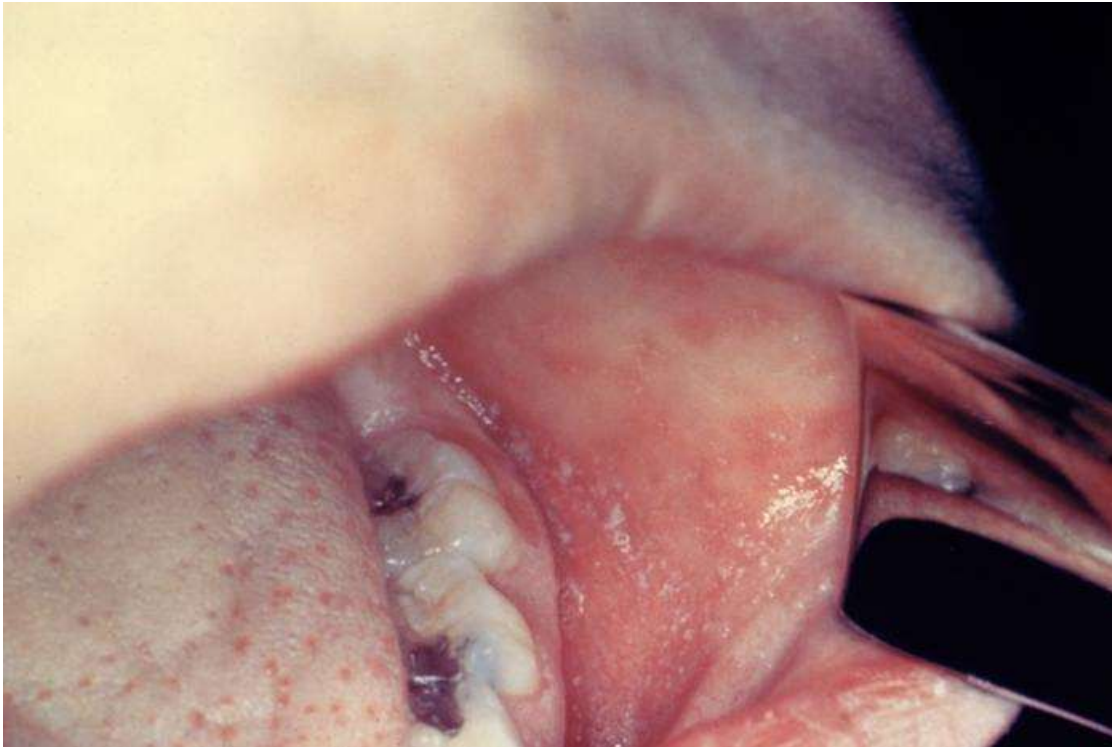
Red eye in measles
Tears-- Photophobia



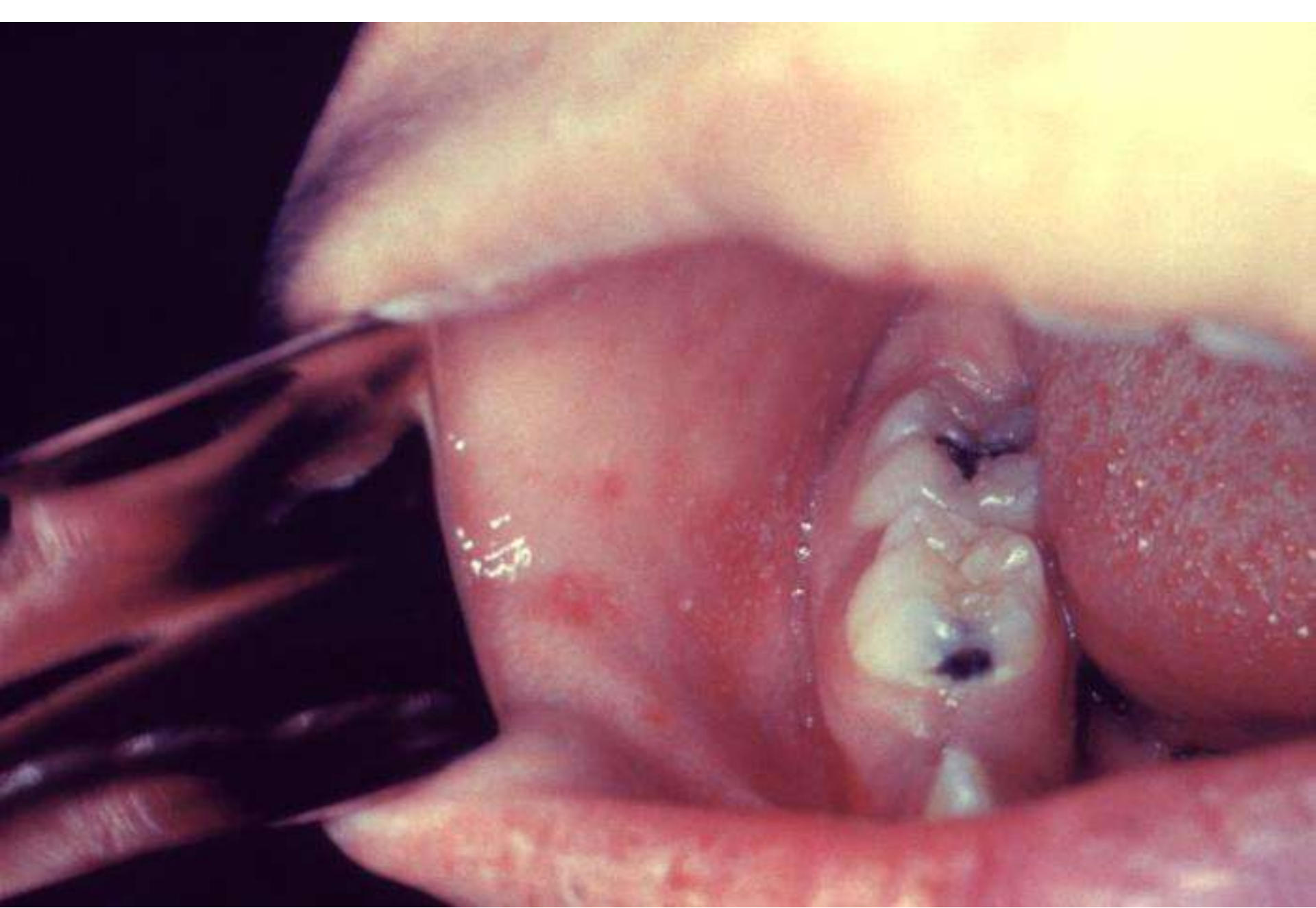
1) Prodromal stage

- Begins 10 days after infection until day 14.
- High grade Fever(103°F), coryza with sneezing and nasal discharge, cough, redness of eyes, lacrimation and photophobia. May be diarrhoea or vomiting
- Koplik's spot pathognomic sign.

Koplik's spots



- Appear as punctate blue-white spots on the bright red background of the oral buccal (cheek) mucosa.



- Occur 1-2 days before to 1-2 days after the cutaneous rash.
- Appear as punctate blue-white spots on the bright red background of the oral buccal (cheek) mucosa.

Their presence is considered to be pathognomonic for measles,

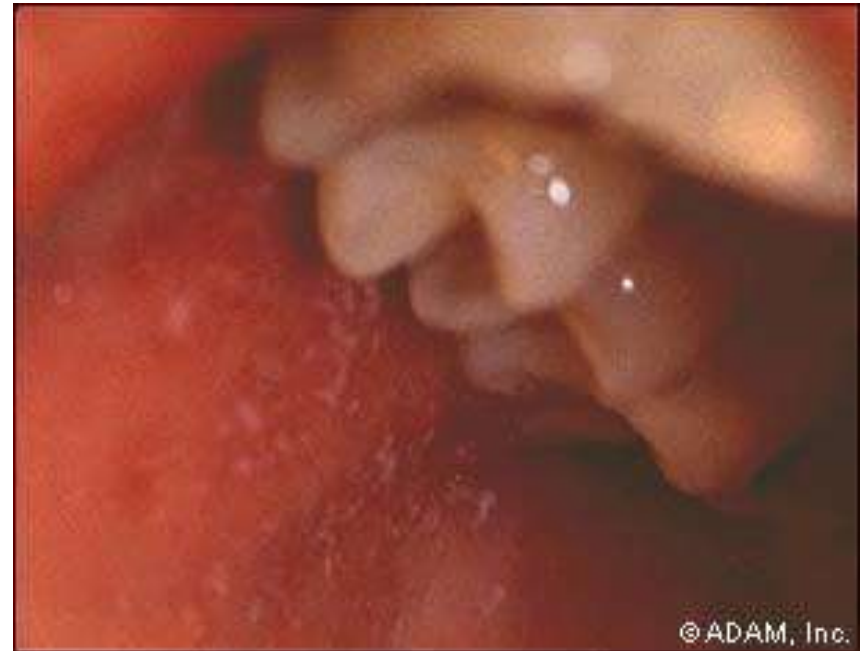
koplik spots - close-up

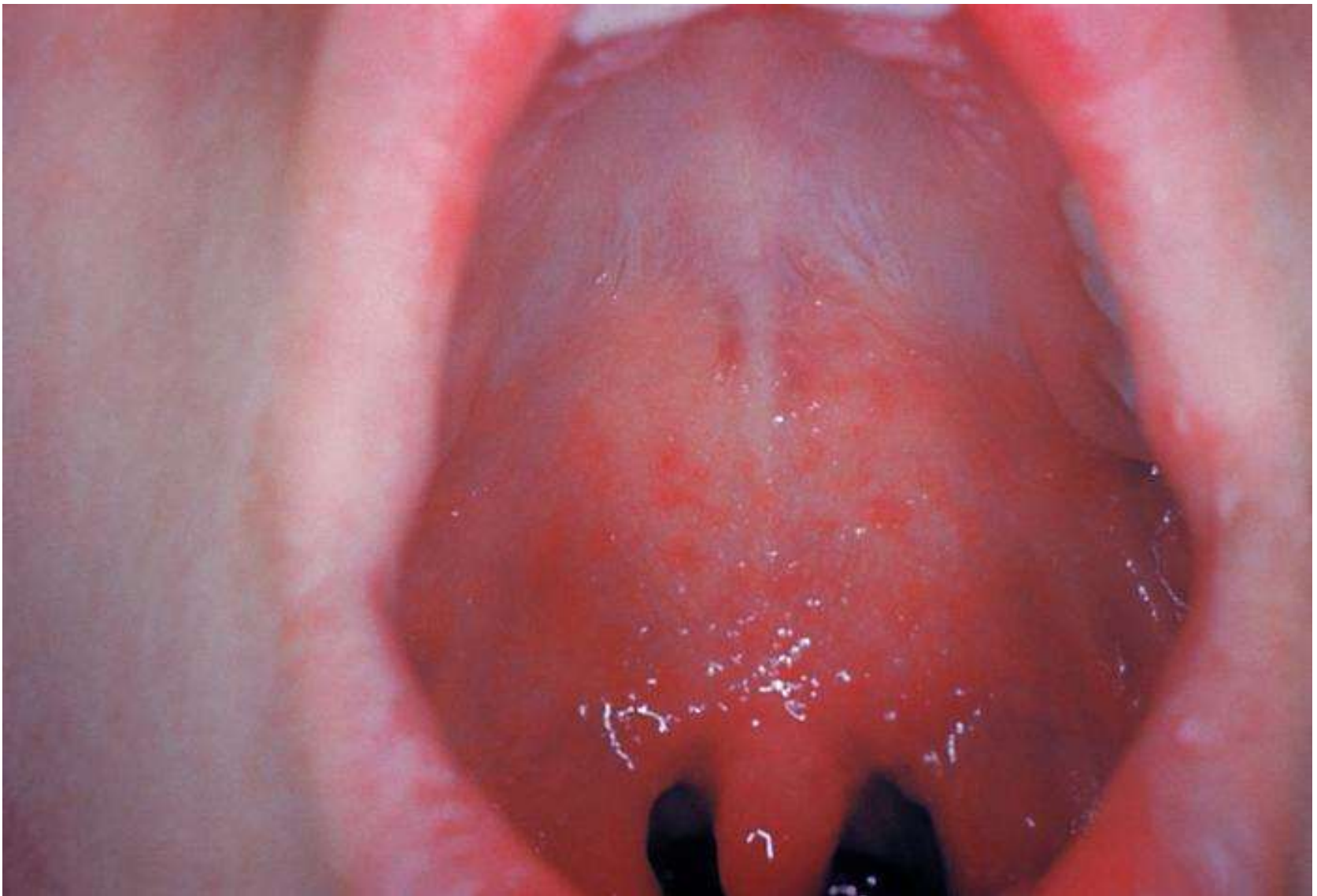


Koplik spots

Pre-eruptive measles on day 3 of the illness.

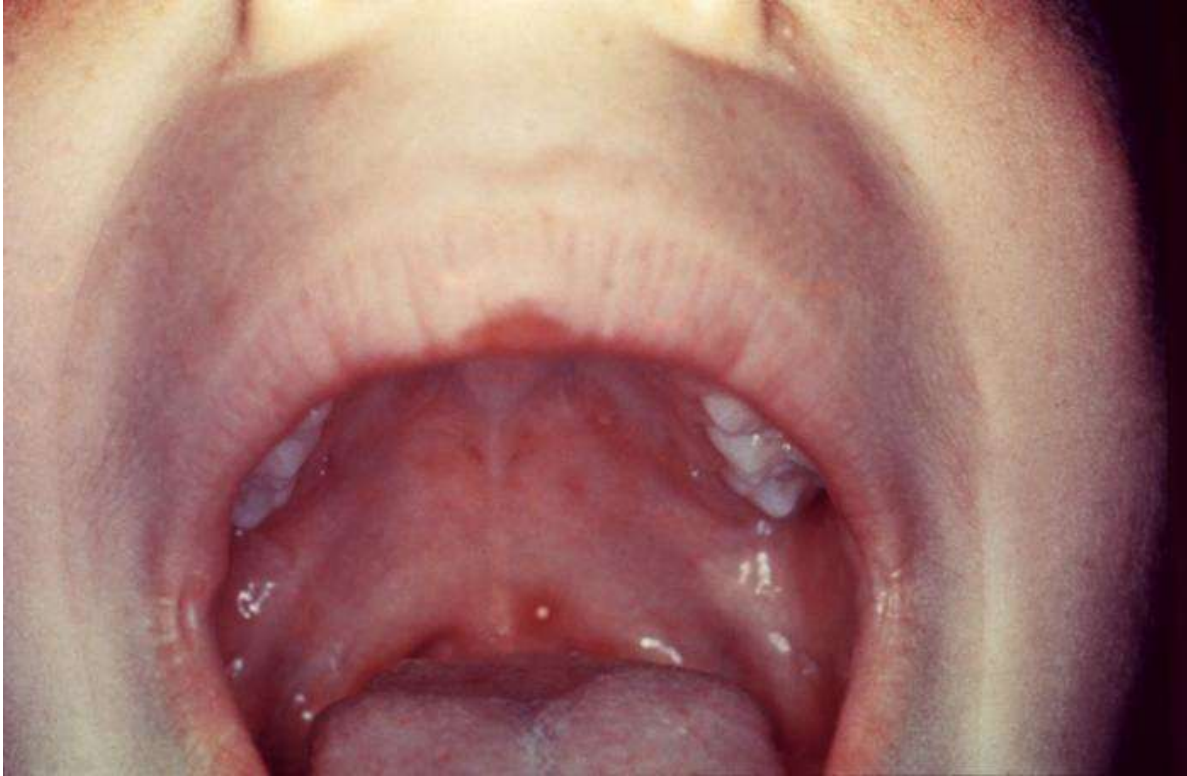
- They are small, blue-white spots (often on a reddened background)
- It occur on the inside of the cheeks early in the course of measles



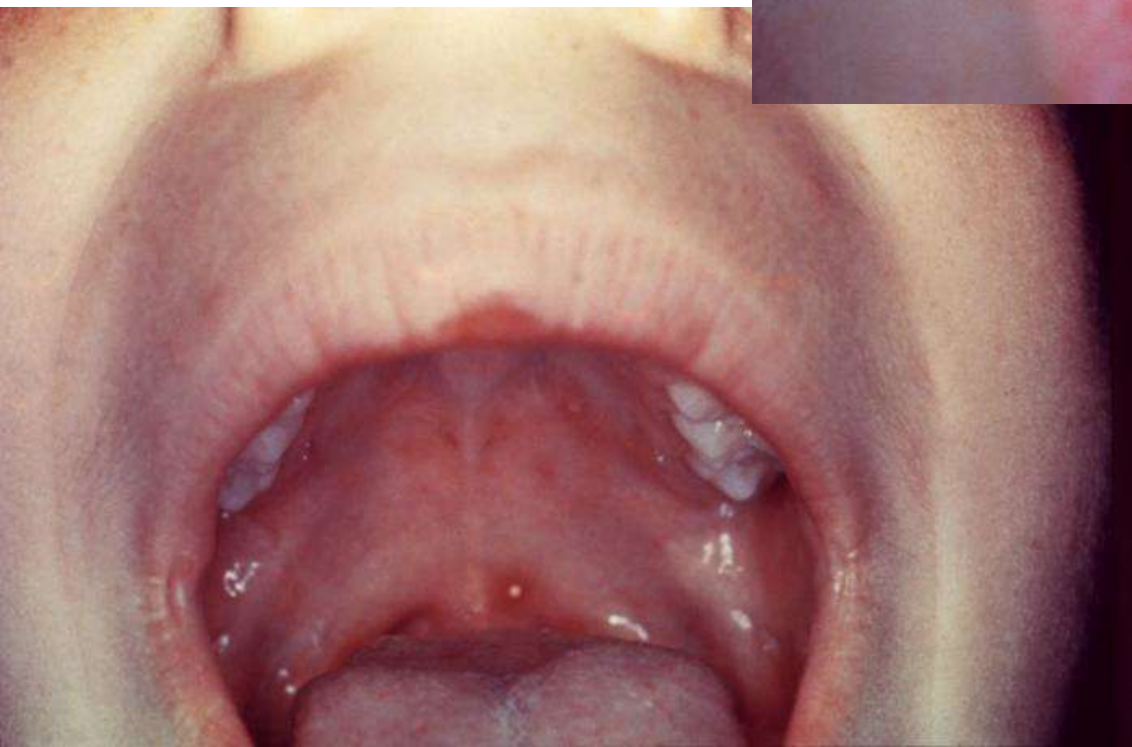
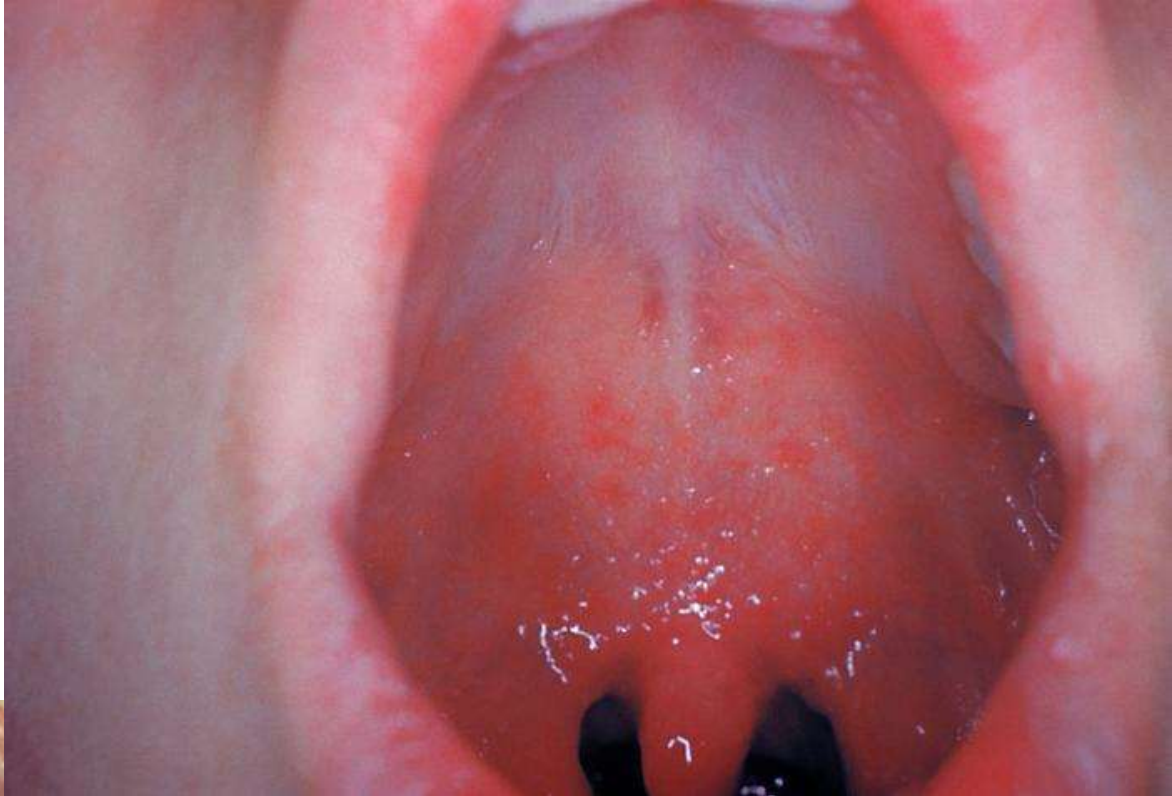


One of the signs of the onset of measles is the eruption of "Koplik spots" on the mucosa of the cheeks and tongue

Chickenpox



chickenpox. Chickenpox is an infectious disease caused by the varicella-zoster virus resulting in an itchy blister-like rash, tiredness and fever. It appears first on the trunk and face, but can spread over the entire body causing between 250 and 500 itchy blisters.





- Three stages

- 1) Prodromal stage or pre-eruptive stage

- 2) Eruptive stage**

- 3) Post measles stage

Eruptive stage ...

- Typical dusky red blotchy, macular or maculo-papular rash



Face of
child
with
measles





This child with measles is showing the characteristic red blotchy rash on his buttocks and back during the 3rd day of the rash.



Measles Vs. Chicken Pox



Photo courtesy of CDC - Dr. Henry F. Eichensfeld

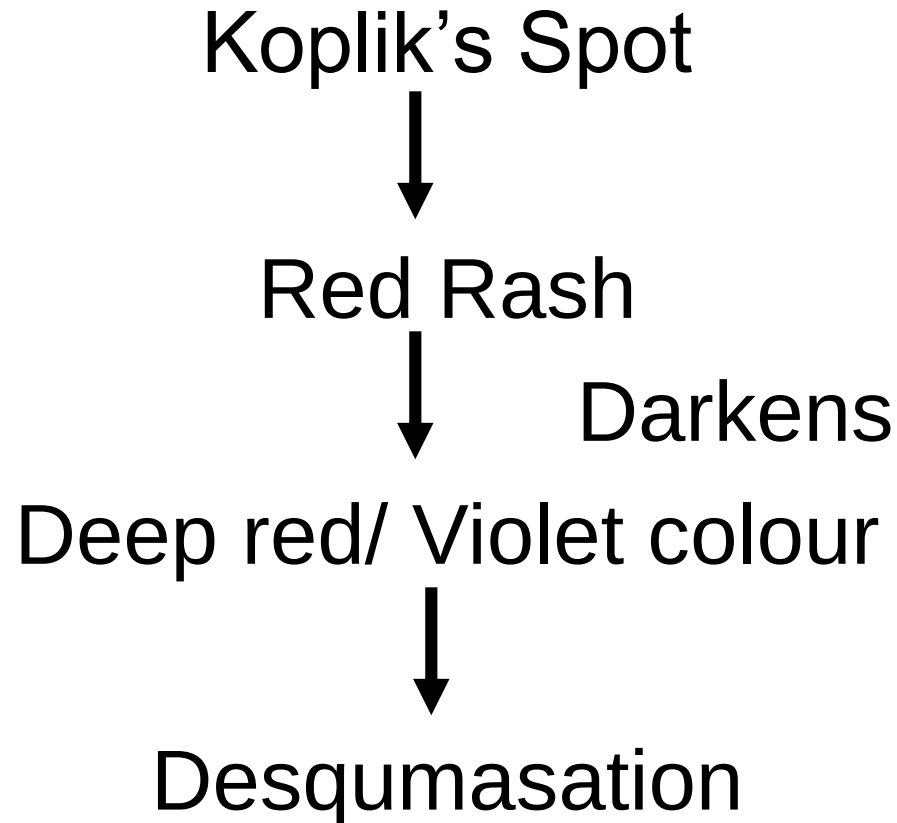


- Red spot multiplied & joined together.

- Child with a rash characteristic of the fourth day of the rash.
- As the rash progresses, it's hard to make out each individual spot.



Course OF the Rash



Spread Of The Rash



Spread Of rash

- A red blotchy rash appears around day 3 of the illness begins behind the ears and spreads rapidly over the face and neck and extends down the body in 2 to 3 days

Spread Of rash

- When the rash goes away, it starts fading on the face first, then fades down the rest of the body
- If no complication fever and rash disappear in 3-4 days



- The rash fades in the same order of appearance leaving a **brownish discoloration** which may persist for >2 months

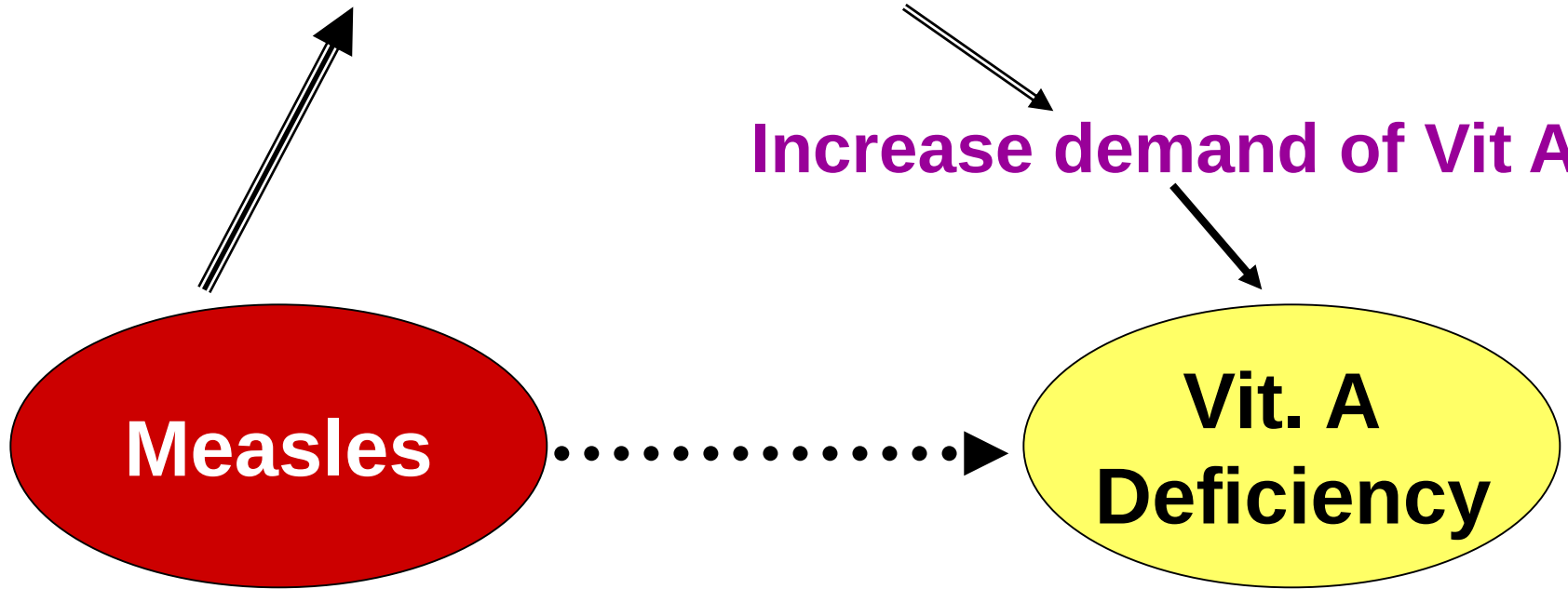
3) Post measles stage

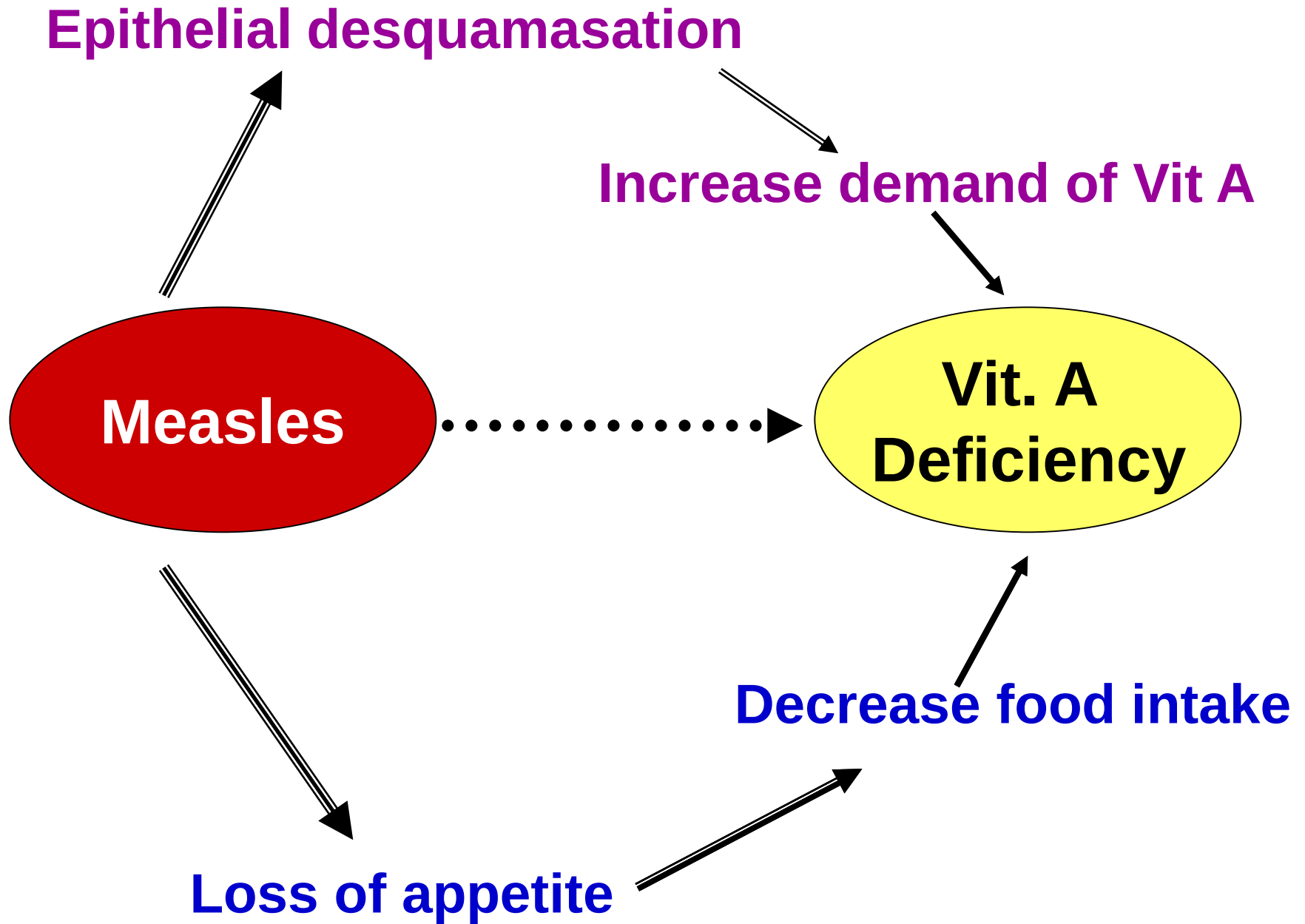
- Weight loss
- Remain weak for a no of days
- Increased susceptibility to other bacterial and viral infection
- Growth retardation and diarrhea, pyogenic infection, cancrum oris, candidosis, reactivation of pul TB

Measles And Vitamin A

Epithelial desquamation

Increase demand of Vit A





Less Mucous secretion

Loss Of Globlet cells

**Loss of Protection
Of Epithelial Cells**

**Severe
Measles**

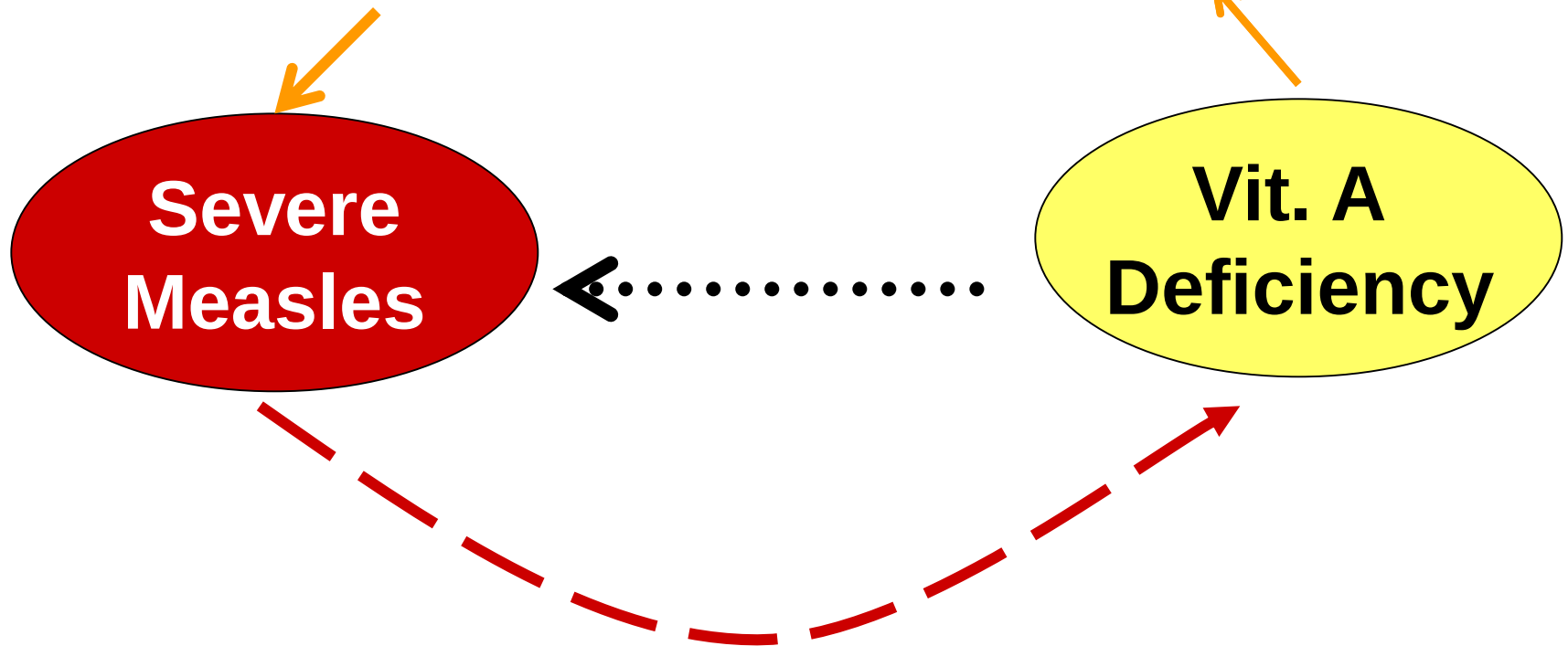
**Vit. A
Deficiency**



Less Mucous secretion

**Loss of Protection
Of Epithelial Cells**

Loss Of Goblet cells



**Severe
Measles**

**Vit. A
Deficiency**

Severe Case

Larger epithelial surface involvement

- S/s severe
- More Rash>>
- Severe conjunctivitis, sore mouth
- Laryngitis, Loss of voice
- Broncho Pneumonia
- Diarrhoea- Change in Bowel mucosa

Severe Measles Complications



**Corneal scarring
causing blindness**



**Pneumonia &
diarrhea**

Encephalitis



Complication

30% of cases

- CFR in India: 0 - 23.9% (Median 3.7%)
- Reasons
 - Virus itself
 - Secondary Bacterial Infection
 - Vitamin A deficiency

Complications...

- Secondary viral or bacterial infections
 - post measles **pneumonia, diarrhoea**
- Vitamin A deficiency and/or conjunctivitis-

Blindness due to corneal scarring.

Complications...

Measles virus itself-

- **Encephalitis** occurs on about the 5th day of the rash.
 - Otitis media
- Uncommon: Myocarditis, Pneumothorax, Pneumomediastinum, Appendicitis,
- **Subacute Sclerosing Panencephalitis (SSPE)**

Complications

Complications develop in up to 30% of cases.

- Diarrhea - 8%
- Otitis media - 5 to 15 %
- Pneumonia - 5 to 10%
- Encephalitis once in about 1000cases
- SSPE – extremely rare ,1case per 100,000 cases

Severe Case

```
graph TD; A([Severe Case]) --> B[Higher conc. Of virus in secretion]; A --> C[Late recovery]; A --> D[More Severe & longer duration of S/s]; B --> E[Viral exit— In high concentration For long duration]; C --> E; D --> E; E --> F([More Infectious]);
```

More Severe
& longer duration
of S/s

Late
recovery

Higher conc. Of
virus in secretion

Viral exit—
In high concentration
For long duration

More Infectious

High prevalence Of Malnutrition



High risk of Infectious disease



Severe Measles

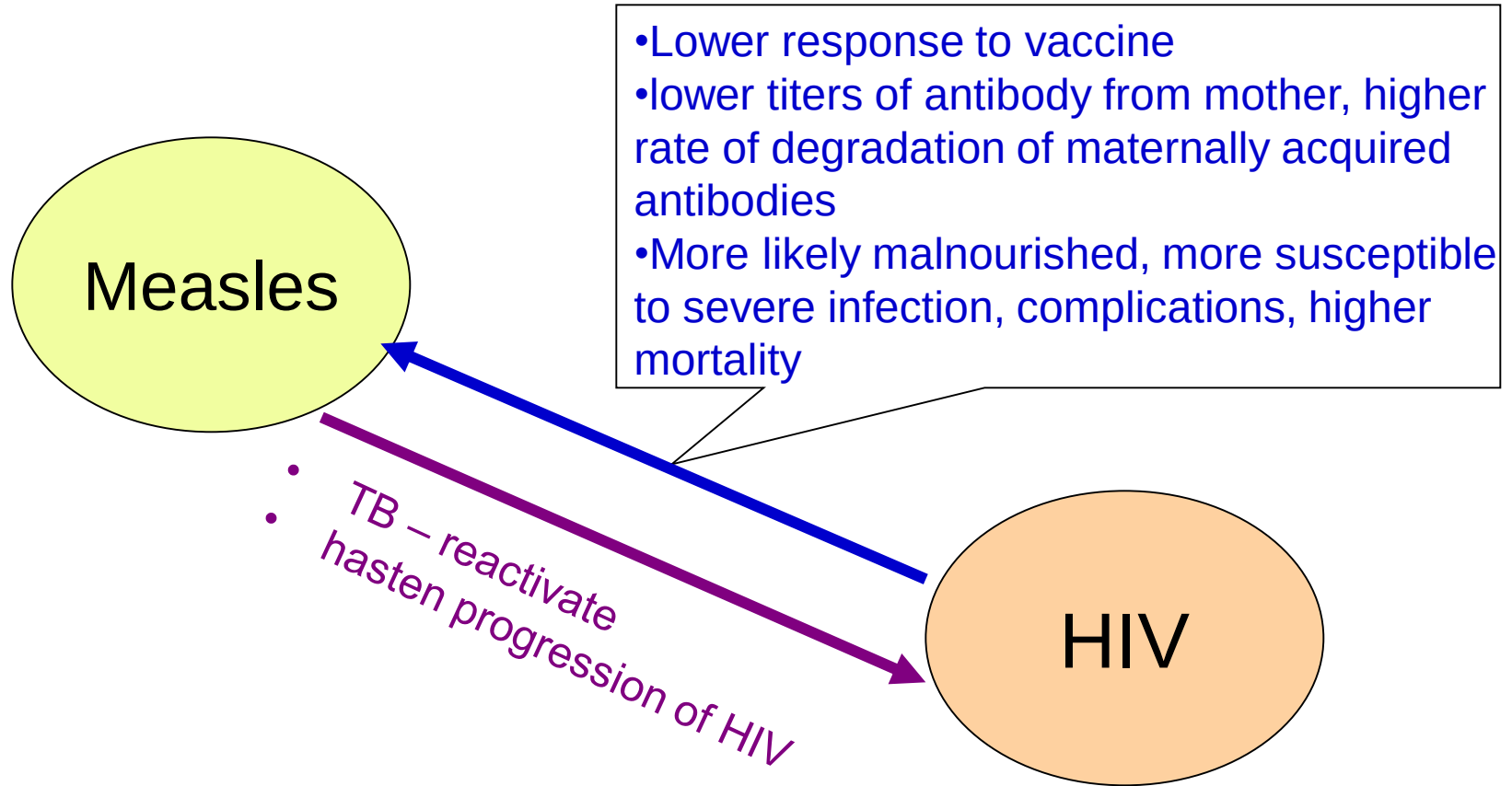


High SAR



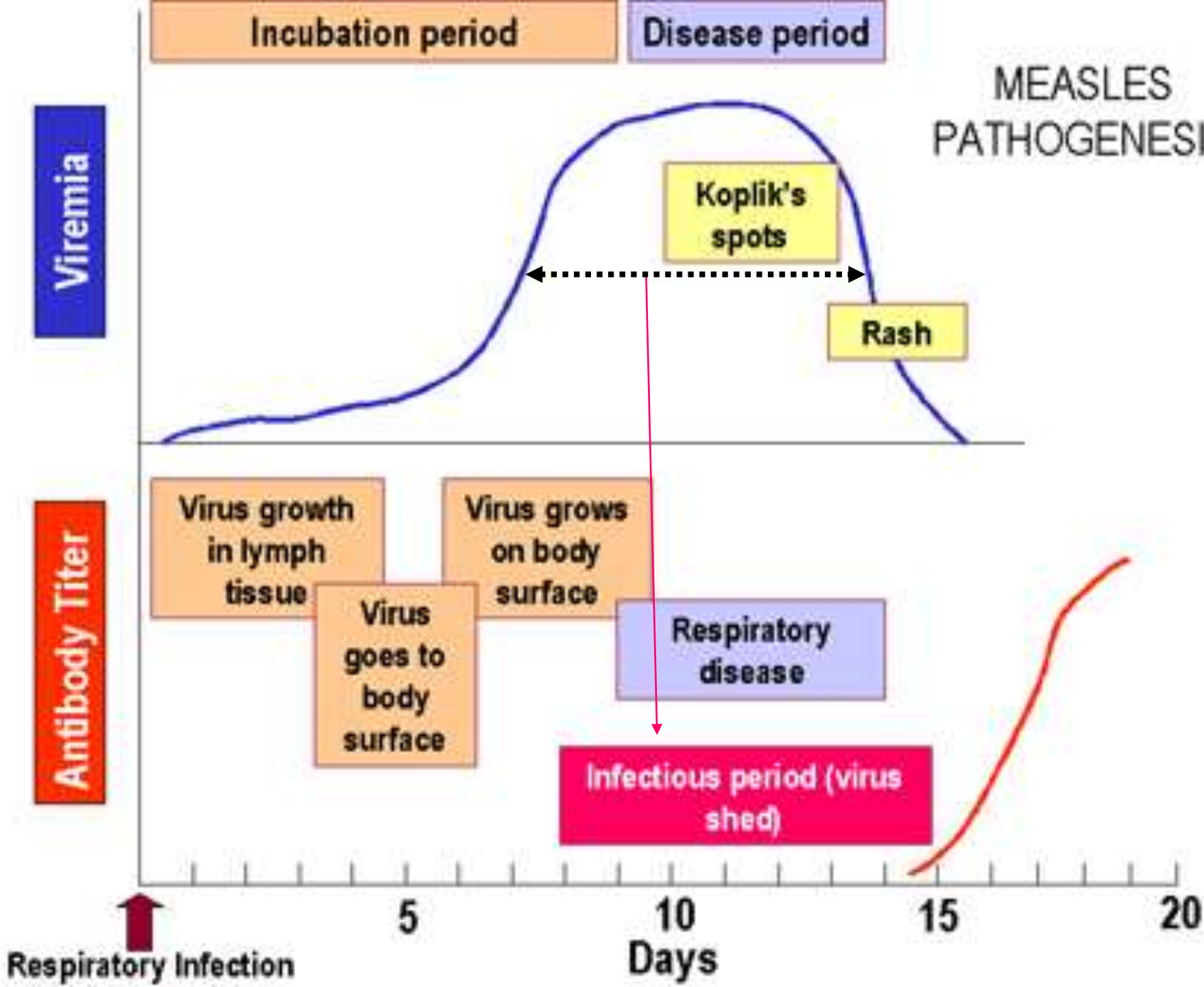
Severe Epidemic with High CFR

HIV-Measles co infection



Diagnosis

MEASLES PATHOGENESIS



Lab findings

- CBC, differential - lymphopenia, neutropenia
- Raised transaminases
- Measles encephalitis - raised protein, lymphocytes in CSF
- Virus detection
 - Microscopy of respiratory epithelial cells (throat swab) - giant cells
 - Immunofluorescence - detects Measles antigens
 - Culture virus from respiratory secretions/ urine (1-2 weeks)
- Serology
 - IgM (appear first and can be detected 3-4 days after onset of rash. They attain peak one week later and then gradually decline and are rarely detectable at six weeks after rash onset)
 - IgG (rises after 10 days)

Prevention

Treatment

- No specific treatment
- Some benefit of the antiviral drug ribavirin
- Vit A
- Antibiotic for secondary bacterial infection.

Primary Prevention

- Treatment of susceptible
- Immunization
- Health education
- Surveillance
- Measles Control Strategy

Treatment of exposed susceptible

- Vaccinate within 72 hours of exposure
- Immune globulin between 72-96 hours after exposure

- Consider contact as susceptible unless:
 - Proof of receipt of 2 doses of live vaccine, or 1 after 1st birthday
 - Proof of previous diagnosed measles infection
 - Laboratory evidence of immunity

Prevention: Measles vaccine

- Edmonston Zagreb (EZ) - human diploid cell culture
- Subcutaneous
- Live attenuated virus
- 1000 to 5000 TCID 50
- Maternal antibody inhibition
- Given at 9 months
- Vaccine efficacy - 85% at 9 months
(90% at 12 mo, 95% at 15 mo)

Measles Vaccine for college:

- 32 states require proof of 2 measles vaccinations prior to college enrollment.

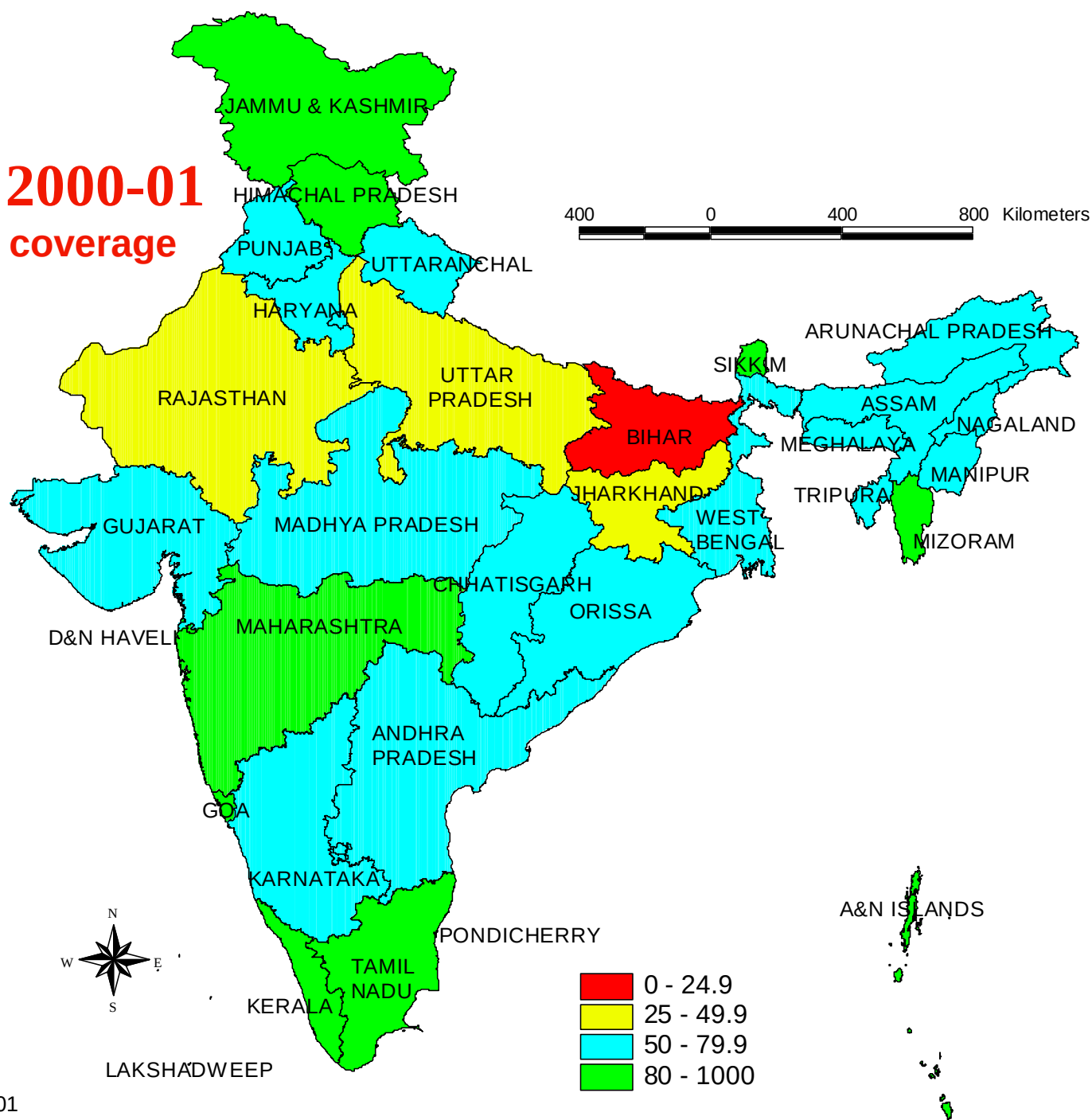


Rationale for vaccination strategies (developing countries):

- Higher risk during 1st year **BUT** lower rates of seroconversion (60% - 6 months, 80% - 9 months, 95% - 15 months)
 - 1st vaccine at 9 months
 - 2nd at 18 months
 - **NOT** a "booster" - rather a "second chance" at seroconversion
- **Developed countries -**
 routine MMR at 15 months,
 2nd MMR at 4-5 years, or 12 years

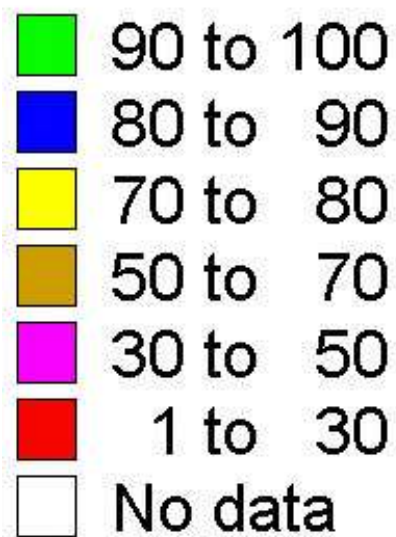
Measles 2000-01

Evaluated coverage





Ledgen



Accumulation of susceptibles

- **Area X**
- **Annual births = 1,000**
- **Annual vaccine coverage = 70%**
- **Vaccine effectiveness = 85%**

1,000 newborns
vaccine coverage = 70%

700 vaccinated
vaccine efficacy = 85%

300 unvaccinated

plus

595 immune

105 vaccinated
but not immunized

595 immune

405 susceptible

Population immunity = 59.5%

Coverage with Measles vaccine - India

- Routine Immunization
 - Measles vaccination - 9 to 12 months
 - Reported Coverage Over 80%
 - Evaluated Coverage: **56%** (wide variation ranging 10.4 to 99.1%) - (2002-04)

Epidemiological basis of smallpox eradication:

- No known animal reservoir
- No carrier
- Life-long immunity
- Easy case detection
- Sub clinical infections did not transmit the disease
- Vaccine highly effective; heat stable and confers long-term protection
- International cooperation

Problems- Measles

- Poor vaccine coverage
- Poor case detection

Measles Surveillance

- Active
- Passive

Passive surveillance

- Data not used for local action
- Limited epidemiological data
(Seasonality, Age distribution,
Geographical incidence, Age specific
incidence)

WHO-Measles elimination Strategy

- Catch up
- Keep up
- Follow up

Catch up

One time nation wide vaccination campaign targeting usually children aged 9 months to 14 years regardless of H/O disease or measles vaccination.

Keep up

Routine service aimed at vaccinating more than 95% of successive birth cohort.

Follow up

Subsequent nation wide vaccination campaign conducted every 2-4 years targeting usually all children born after catch up campaign.

WHO-Category

- Control
- Outbreak prevention
- Elimination

Control

- Reduction of an incidence to an acceptable level as a result of deliberate efforts, requiring continued control measures

- Objective**

To achieve high routine coverage with one dose of vaccine among infants to reduce morbidity & mortality

- **Outbreak Prevention**

aggressive immunization strategies for
forecasted measles immunization

- **Elimination**

Reduction of an incidence to a "Zero"
as a result of deliberate efforts
requiring continued control measures

Measles Control:

Current Strategies in India

Multi-year strategic plan, India - 2005

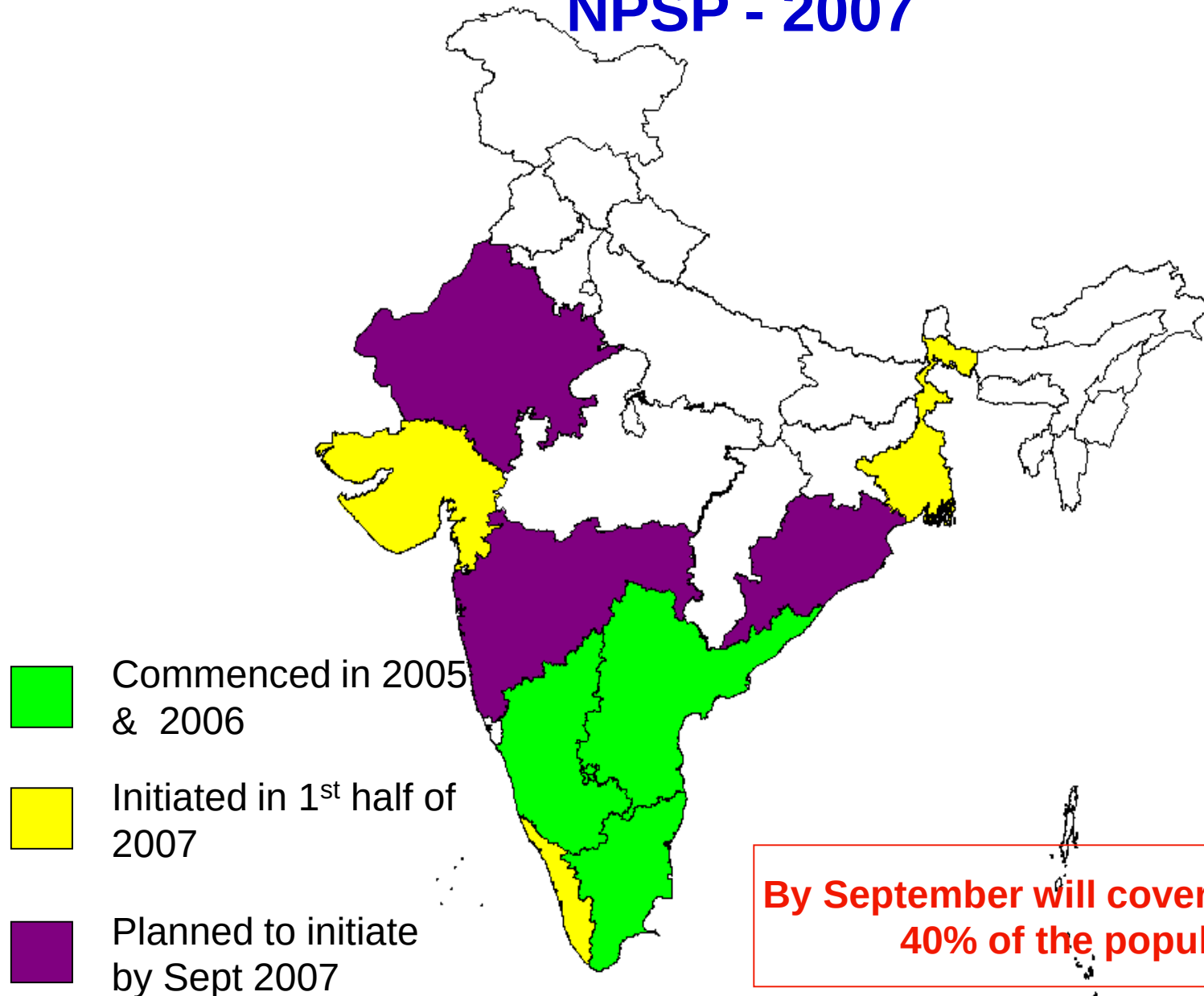
- Reduce measles mortality by **two thirds by 2010** compared to 2000 estimates
- Achieve at least **90% coverage** with measles vaccine in **80% districts** of country by 2009
- Collect good quality epidemiological data through **active surveillance and outbreak investigation** and use it for further action

- Measles laboratory -
 - PII, Coonoor,
 - KIPM Chennai,
 - NIV Bangalore,
 - IPM Hyderabad,
 - NICD Delhi &
 - NIV, Pune
- Network of labs not fully established

Key steps

- GoI initiated a consultative process with WHO, UNICEF, IAP, ICMR, NTAGI
- Strategic plan for Measles Control was endorsed
- National measles surveillance guidelines published
- Integrated measles surveillance to AFP surveillance
 - State by state approach
 - Integrated reporting from AFP surveillance sites
 - Track and investigation of measles outbreaks

Integrated AFP and measles surveillance assisted by NPSP - 2007



By September will cover 9 states and 40% of the population

GOI Measles Strategic Plan

- Strengthen Routine Immunization: Achieve 90% coverage
- Strengthen Surveillance
 - Outbreak Investigations- Standard guidelines
 - Lab confirmation of Cases
 - Active Surveillance
 - Data to guide action
- Standard guidelines for Case Management

Measles Mortality Reduction Strategies

- Achieve high 1st-dose routine vaccination coverage
- Effective disease surveillance
- Improved Case Management
 - Vitamin A supplementation
- Provide 2nd opportunity for vaccination through routine or supplemental activities

Measles Surveillance

Measles Surveillance

Objectives

- Detect all areas of measles virus circulation, in a timely manner
 - Detect and investigate suspected measles outbreaks
 - Identify high-risk populations/areas for measles
 - Strengthening measles immunization coverage in these areas
- Monitor progress in reduction of measles mortality

Measles Surveillance

Activities

- Case Definition
- Activities at reporting site level
- Activities at district level
- Activities at state level

Case Definition

Any person in whom
clinician suspects measles infection

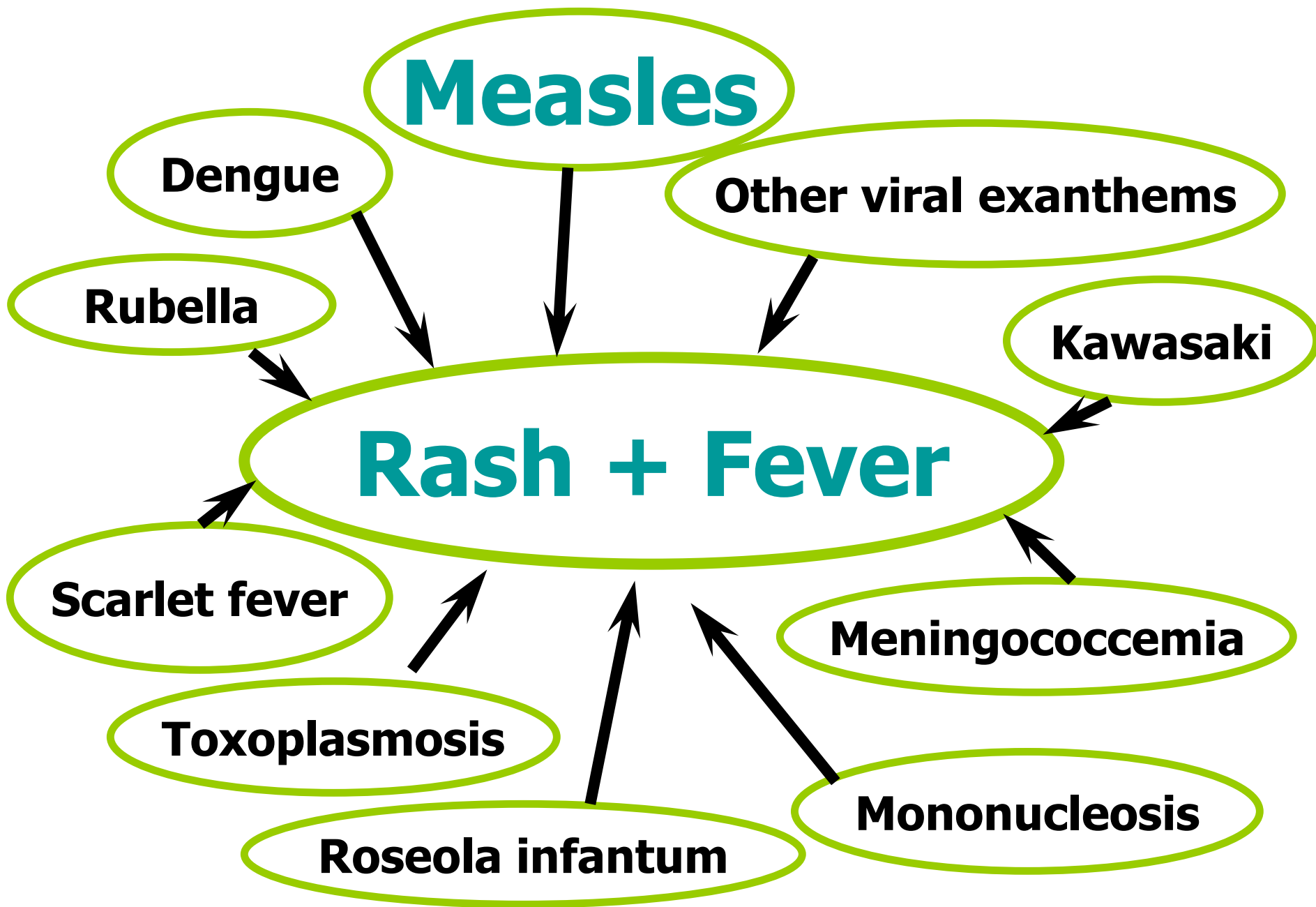
or

Any person with fever and maculo papular rash
with cough or coryza (running nose) or conjunctivitis
(red eyes)

**For epidemiological investigation, clinical measles
would be a case within last 3 months**

Definition of Measles Death

- Any death with a History of Suspected Measles (Fever with maculopapular rash) within one month of onset of rash



Measles Surveillance

Activities

- Case Definition
- Activities at reporting site level
- Activities at district level
- Activities at state level

Reporting measles cases

- **Who reports** → All reporting sites (RUs) + informers participating in AFP surveillance
- **What** → Clinical/Suspected measles cases
- **When** → RUs : Weekly (Every Monday)
Informers: Immediately
- **How** → Weekly reporting format (VPD-002) / Telephone
- **To whom** → District Immunization Officer (DIO)

Nil report to be sent by RUs if no case
seen during the week

Key Information to be Collected on Clinical Measles Cases by Reporting Sites

- **Person**
 - Age
 - Vaccination status (+ date of last vaccination)
- **Place**
 - Residence at time of rash onset
- **Time**
 - Date of rash onset = "Date of Onset"

**Objective is to detect clustering of clinical measles cases
and initiate outbreak investigation**

Detection of clustering is done at district level

Suspected Measles cases



Preliminary Search in adjacent areas



**Outbreak investigation
to**

**Collect Data, Confirm outbreak and
Provide Vit- A, Care and Referral to affected**

Measles Surveillance

Activities

- Case Definition
- Activities at reporting site level
- Activities at district level
- Activities at state level

Surveillance Activities: District level

- Orient all the district Health Staff and AFP Reporting Sites
- Detect outbreaks based on reported cases/ weekly reports
- Form an Epidemic Resopnse Team (ERT) at the District Hq.
- Identify key members for ERT from Govt, IDSP and NPSP

District level DIO/SMO

all cases reported in the week/weekly
reports



Identifies an Outbreak in a contiguous
geographical area



Take decision to **conduct investigation** or not



If yes

an action plan and train the staff

DMO\SMO

Oversee the Outbreak investigation, sample collection and shipment, data analysis, Report writing and feedback

Operational criteria for conducting extensive outbreak investigation

- ≥ 5 clinical cases of measles in a block/ward in a week
OR
 - ≥ 1 death due to measles
OR
- ≥ 5 clinical cases in an area bordering a block/ward with continuous areas

**Remember Measles never occurs
as an isolated case.**

Which potential outbreaks to investigate?

Desk Review of Measles data every Tuesday at district level



Identify blocks with 5 cases or 1 death in a week



5 cases in a block



Any Death in a block



**Assess if these cases are clustered
in same/ adjacent villages**



**If yes, ASSIGN OUTBREAK ID & conduct preliminary field search in area
to look for additional cases**



If additional cases found (~20 cases), conduct detailed investigation

Outbreak Investigations and (Epidemic Response Team) ERT

Objectives of Outbreak Investigations

- To study the epidemiology of measles and define the population at risk
- To reduce complications and deaths due to measles
- To review the dynamics of measles infection and impact of measles vaccination
- To suggest ways to improve measles vaccine coverage

Benefits of outbreak investigations

Provides an opportunity to
Identify

- High-risk groups
- Changes in measles epidemiology
- Weaknesses in the routine immunization programme
- Measles cases for management

Planning for measles outbreak investigations

1. Identifying the suspected measles outbreaks
2. Confirming the outbreak and assigning an Outbreak Number
3. Mobilisation of Epidemic Response Team (ERT)
4. Orientation & planning meeting at the local level
5. Conducting Measles case search
6. Collection and shipment of specimens to the laboratory

Planning for measles outbreak investigations contd..

7. Lab confirmation of the outbreak
8. Data analysis
9. Conversion of data to information for action
10. Report writing
11. Giving feedback
12. Initiating actions

Mobilisation of the Epidemic Response Team (ERT)

- **When:** as soon as an outbreak is discovered
- **Who:** DIO convenes a meeting of all members of the ERT
- **Action:** Micro planning implementation of House to House Searches, Sample Collection, Sample shipment and Data Analysis

Conducting case searches...

- Children suffering from Measles should be given
 - First dose of Vit A by health worker
 - Supervisor to follow up with second dose of Vit A
- Ask the family to the local health worker/nearest health center immediately
 - new Measles case\
 - any further complications developing in the already affected child

Conducting case searches...

- Mark the house with chalk.
This will tell us which house has not been visited

M

Date

Proceed to the next house and repeat the process

Role of Supervisor in case searches

- S/He provides hands on support to the health worker
- Ensures adequate supply of logistics
- Checks a few Houses randomly for quality of work
- Provides Vit A 2nd Dose
- Refers Measles cases with complications
- Collects all forms sends them at the end of the day
- Collects Blood Samples from 5 cases and urine samples from 2 cases or helps the Sample collection

Specimens for Laboratory confirmation

- Blood Samples must be collected from 5 suspected cases within 4 -28 days from the day of rash onset
 - Serum is tested for Measles specific IgM antibodies in WHO accredited laboratories - BJMC in Gujarat
- Urine samples collected from at least 2 cases during the acute phase (within 3 days of onset of rash)
- Blood and urine samples Collected must be shipped IMMEDIATELY in cold chain to laboratory. Sample should reach with in 24hr

Shipment of Samples

Option 1:

Transport whole blood specimen to laboratory in ice, if it can reach the laboratory **within 24 hours**.

Option 2:

- The blood should be kept at room temperature until there is complete retraction of the clot from the serum
- This should be centrifuged at 1000g for 10 minutes to separate the serum, serum collected and transported
- If centrifuge is not available, carefully remove the serum using a pipette, avoid extracting red cells
- Transfer the serum aseptically to a sterile externally threaded labeled vial.

Store the serum at 4-8°C until shipment takes place

Conversion of data to information for action

- Outcome expected
 - Reasons of outbreak
 - Identifying populations and Age groups at risk
 - Suggestions and recommendations
 - Complete the MOB - 004 form and send to State/NPSP office
- Action
 - Strengthen immunisation coverage in the area/ district/ state
 - Use the data and experience in the future Measles Control activities

MEASLES OUTBREAK INVESTIGATION: DATA ON CASES

Deaths and CFR

Village / Area: _____ PHC: _____ District: _____ State: _____

Outbreak ID: _____ Urban / Rural _____ Report sent by _____ Date Sent: _____

Patient number	Patient's name, father's name and address	Sex (M/F)	Age in years & months	Received measles vaccine (circle)	Date of last measles vaccine (dd/mm/yyyy)	Date of onset of rash (dd/mm/yyyy)	Death (circle)	Date of blood specimen collection (dd/mm/yyyy)
1				Yes No Unknown			Yes No Unknown	
2				Yes No Unknown			Yes No Unknown	
3				Yes No Unknown			Yes No Unknown	
4				Yes No Unknown			Yes No Unknown	
5				Yes No Unknown			Yes No Unknown	

Age and Sex Break-up of cases

Proportion vaccinated in each age group

Count of cases

EPI Curve

Note: - Outbreak ID should consist of State code / District code / Year / Outbreak Number; should be filled by the district team

Weekly routine reports

- Routine measles forms merged with AFP forms

- Data flow:

Reporting Units (VPD-H002)  Districts
Mondays

Districts (VPD-D001)  State
Tuesdays

State (VPD-S001)  GoI/NPSU
Wednesdays

Form VPD-H002

Name	Weekly hospital report
Purpose	Transmits hospital surveillance findings to the RCHO
Prepared by	Nodal person of the hospital
Sent to	RCHO
Report day	Monday

ACUTE FLACCID PARALYSIS AND MEASLES SURVEILLANCE SYSTEM - WEEKLY HOSPITAL REPORT

After review of all wards and registry books, please send this report to the following person every Monday.

Name: _____

Address: _____

Fax: _____

Name of Reporting Hospital: _____

Year: Week No.

Period included in the report:

From:

To:

Number of cases Identified:

AFP*

Clinical Measles**

If no cases were identified, write Zero (0)

Fill up information on all Measles cases below:

Patient's name and Father's name	Age in months	Sex	Received measles vaccine (Y/N/U) [†]	Village name and landmark	PHC name	Block name	District name	Outcome: Died? (Y/N/U) [†]

* Y=Yes, N=No, U=unknown

Name of person filling this report: _____

Date report sent to District: _____

Approval of Medical Director: _____

[†] All cases of AFP in children under 15 years of age should be reported and investigated^{**} All cases of clinical measles of any age should be reported

Form VPD-D001

Name	Weekly district report
Purpose	- Transmits district surveillance findings to the Addnl Dir - Helps RCHO to trigger investigation
Prepared by	RCHO
Sent to	Addnl Dir
Report day	Tuesday

ACUTE FLACCID PARALYSIS AND MEASLES SURVEILLANCE SYSTEM - WEEKLY DISTRICT REPORT

Please send this report to the following person every Tuesday:

Name: _____ Address: _____ Fax: _____

Name of reporting district: **District X**Year: Week No: Period included in the report: From: To:

No of units expected to report: _____

No of units reporting on time: _____

Number of AFP Cases identified: _____

Names of Reporting Units not reported on time this week:

Write EPID numbers of AFP cases identified and reported this week:

Fill up information on all clinical measles cases below

	Block name	Put a tally mark for each clinical measles case	Total cases	Put a tally mark for each clinical measles death	Total deaths
Blocks within the reporting district	AAA	III	3	I	1
	BBB	I	1		
	CCC	III	5		
	District total clinical measles cases		9	District total clinical measles deaths	1

Blocks outside of reporting district

District name	Block name	Put a tally mark for each clinical measles case	Total cases	Put a tally mark for each clinical measles death	Total deaths
Y	ZZZ	I	1		

Write the number of measles outbreaks identified this week

Note: Use another sheet, if required

The number of measles deaths should be counted as measles cases also

Investigation is triggered if there are ≥ 5 clinical measles cases per block per week OR ≥ 5 clinical measles cases on the borders of the contiguous blocks in a week OR ≥ 1 death due to measles per block per week

Form VPD-S001

Name **Weekly state report**

Purpose **Transmits state surveillance
findings to GoI**

Prepared by **Addnl Dir**

Sent to **GoI / NPSP**

Report day **Wednesday**

ACUTE FLACCID PARALYSIS AND MEASLES SURVEILLANCE SYSTEM - WEEKLY STATE REPORT

Please send this report to the following person every Wednesday:

Name: _____ Address: _____ Fax: _____

Name of reporting state: _____

Year: Week No:

Period included in the report:

From: To:

No of units expected to report: _____

No of units reporting on time: _____

Number of AFP Cases identified: _____

Write EPID numbers of AFP cases identified and reported this week:

--

Fill up information on all clinical measles cases below:

Districts within the reporting state	District name	Block name	Total cases	Total deaths	Number of clinical measles outbreak identified
	District X	AAA	3	1	1
		BBB	1		
		CCC	5		1
	District Y	ZZZ	1		
	State total		10	1	2

Districts outside of reporting state:

State name	District name	Block name	Total cases	Total deaths	Number of clinical measles outbreak identified

Write measles outbreak ID of outbreaks being investigated this week:

--

Note: Use another sheet, if required

The number of measles deaths should be counted as measles cases also

Investigation is triggered if there are ≥ 5 clinical measles cases per block per week OR ≥ 5 clinical measles cases on the borders of the contiguous blocks in a week OR ≥ 1 death due to measles per block per week

Name of person filling out report: _____

Date report sent to GoI: _____

Approval of State Immunization Officer: _____

Form VPD-D003

Name	Active case search form
Purpose	To assure each reporting unit is actively searched for AFP cases and Measles cases
Prepared by	Person conducting active case search
Sent to	State

Year: _____

District: _____

District code _____

State: _____

Reporting officer: _____

Indicate the date of each active search and the number of unreported cases found.

Name of reporting site	Code	VHP/ HP/ LP*	Action / findings	Month												Totals
				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
			date searched													
			No. AFP cases													
			No. Measles cases													
			date searched													
			No. AFP cases													
			No. Measles cases													
			date searched													
			No. AFP cases													
			No. Measles cases													
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			No. Measles cases													
			date searched													
			No. AFP cases													
			No. Measles cases													
			date searched													
			No. AFP cases													
			No. Measles cases													
Total number of searches																
Total number of unreported AFP cases found																
Total number of unreported Measles cases found																

* Prioritization of reporting units will remain same as in AFP surveillance system

Outbreak investigation reports

MEASLES OUTBREAK INVESTIGATION: SUMMARY

Page 1 of 2

Outbreak ID: MOB-KA-BLK-06-001

Notification

First case reported by: Mrs.Mahadevi PattanashettyName of DIO: Dr.A.N.DesaiDesignation Anganwadi Supervisor(Konnur Sector)Name of SMO: Dr.Mukund GalagaliDate of notification of the first case: 12/07/2006

Location of the outbreak

Village / Urban ward affected: KonnurSub-center KonnurPHC/UHC: KonnurBlock: JamakhandiDistrict: BagalkotState: KarnatakaCross notification needed Yes / No

Preliminary search

Date/s of preliminary search: 14,19 & 21/7/06Number of health facilities searched: 1Number of sub-centers/ urban wards searched: 1Number of areas* searched: 1Total number of clinical measles cases: 22Date of Epidemic Response Team meeting: 24/07/2006Whether considered as an outbreak requiring house to house investigation: Yes / NoIf No, reason:

Too small a sample

House to house outbreak investigation done in last three months in the same area

Others (specify) _____

If Yes, provide details of outbreak investigation below

Details of outbreak investigation

Date of pre outbreak investigation orientation:[27/07/2006](#)

Date of outbreak investigation From:[27/07/2006](#) To: [31/07/2006](#)

Number of health facilities involved:[1](#)

Number of sub-centers/ urban wards involved:[2\(Konnur A & B\)](#)

Number of areas* involved:[1](#)

Total population investigated:[6350](#)

Total number of measles cases:[22](#)

Total number of deaths due to measles:[1](#)

Date of onset of first case:[04/07/2006](#)

Date of onset of most recent case:[29/07/2006](#)

Laboratory investigation details

Specimen code**	Age	Sex	Date of last measles dose	Date of collection	Date sent to lab	Date received in lab	Result Measles / Rubella/ Negative	Date of Result
MOB KA BLK 06 001-B2	5 Yrs	F	UNKNOWN	01/08/2006	02/08/2006	03/08/2006	MEASLES	07/08/2006
MOB KA BLK 06 001-B4	2 Yrs	M	UNKNOWN	01/08/2006	02/08/2006	03/08/2006	MEASLES	07/08/2006
MOB KA BLK 06 001-B8	4 Yrs	M	UNKNOWN	01/08/2006	02/08/2006	03/08/2006	NEGATIVE	07/08/2006
MOB KA BLK 06 001-B17	1 Yr 6 mths	F	UNKNOWN	01/08/2006	02/08/2006	03/08/2006	MEASLES	07/08/2006
MOB KA BLK 06 001-B18	3 Yr 6 mths	F	UNKNOWN	01/08/2006	02/08/2006	03/08/2006	NEGATIVE	07/08/2006

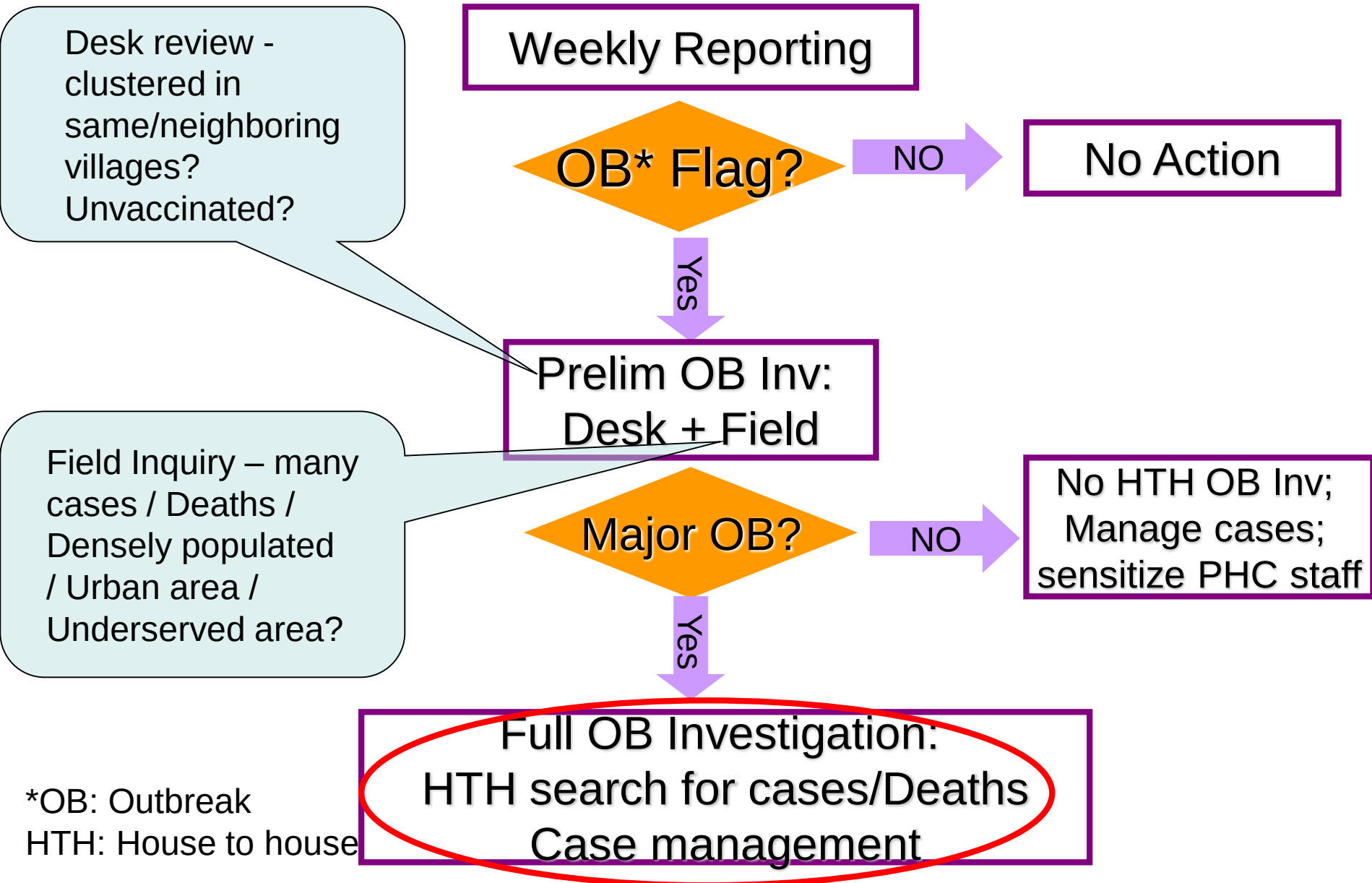
Note: * Areas are villages, towns, municipalities or corporations.

** Specimen code is the code given to each sample of blood or urine. If sample collected is blood, specimen code will be outbreak ID-B-patient number or if the sample is urine, specimen code will be outbreak ID-U-patient number.

AMC activities

- H-H search for case from feb. 2008
- If 2 or more case of measles-
Immunization campaign in that area

Measles Surveillance: System Flow



- Epidemiology of measles
- Prevention of measles
- Measles vaccine
- WHO vaccination strategy
- National guideline for measles control
- National guideline for investigation of measles outbreak

Summary

Measles Surveillance

Activities

- Case Definition
- Activities at reporting site level
- Activities at district level
- Activities at state level

H-H survey (Reporting site)



Suspected C/o measles or death

No

Yes

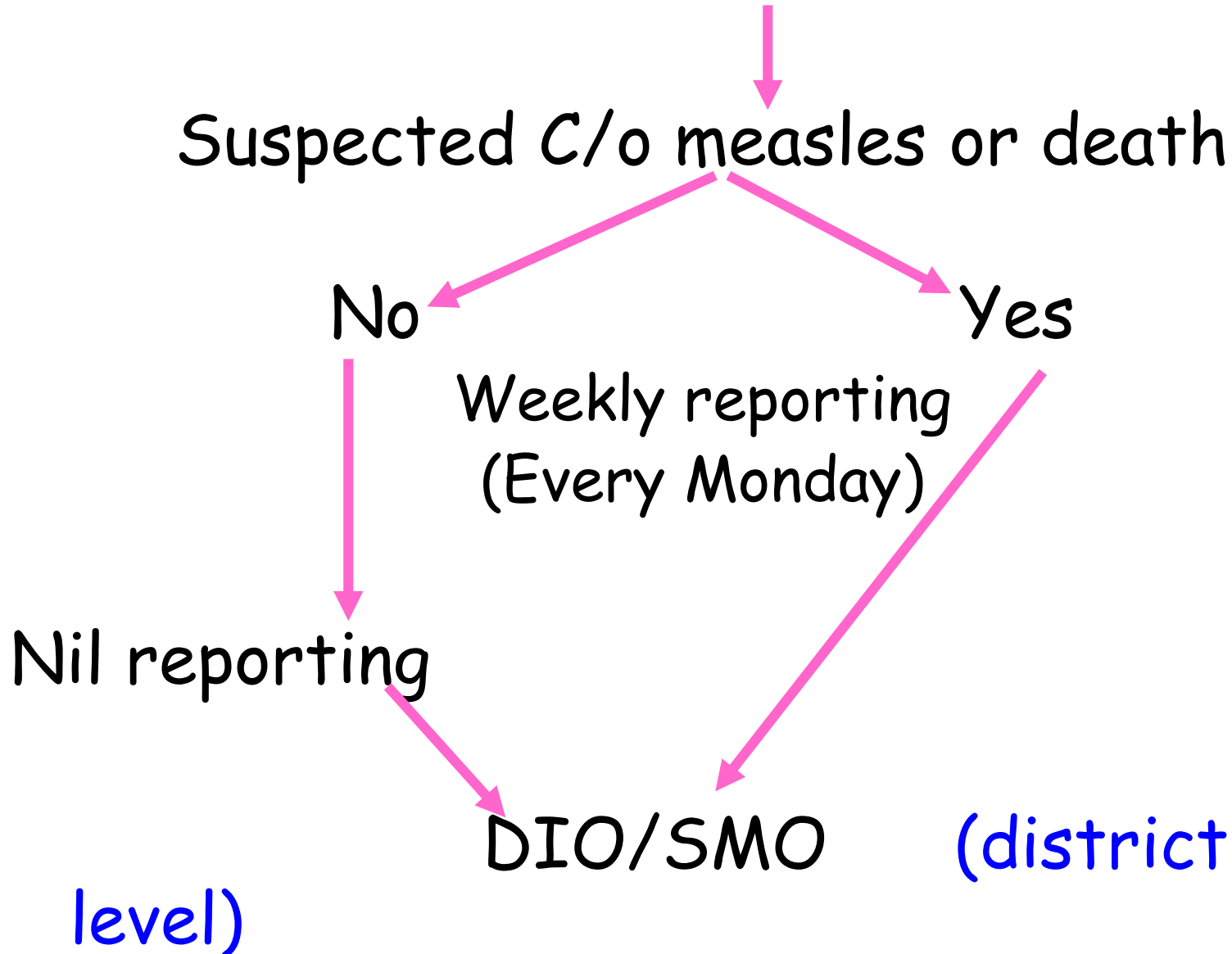
Weekly reporting
(Every Monday)

Nil reporting

DIO/SMO

(district

level)



Desk Review of Measles data every Tuesday at district level

Identify blocks with 5 cases or 1 death in a week

5 cases in a block

Any Death in a block

**Assess if these cases are clustered
in same/ adjacent villages**

**If yes, ASSIGN OUTBREAK ID & conduct preliminary field search in area
to look for additional cases**

DIO/SMO-Takes Decision

If additional cases found (~20 cases), conduct detailed investigation

Preliminary Search

Suspected Measles cases



Preliminary Search in adjacent areas



Outbreak investigation
to

Collect Data, Confirm outbreak and
Provide Vit- A, Care and Referral to affected

District level DIO/SMO

all cases reported in the week/weekly
reports



Identifies an Outbreak in a contiguous
geographical area



Take decision to **conduct investigation** or not



If yes

an action plan and train the staff

Identify the out break in adjacent area

↓ If yes

Desk review -
clustered in
same/neighboring
villages?
Unvaccinated?

-Makes ERT
-Confirms out break

Initiate Ix

Take action

H-H survey

Vaccination in area

Case

- First dose of Vit. A by health worker
- Supervisor to follow up with second dose of Vit. A
- Care and Referral to affected

Surveillance Activities: State level

- Collect information from all districts
- Identify any clustering of cases in adjacent blocks/ districts
- Monitor investigation of outbreaks
- Share the data with partner agencies.
- Transmit information to Government of India/ NPSP
- Take appropriate decisions to strengthen Measles Immunization based on the outcome of Outbreak investigations

Links

- Rubeola (Measles)
- Picture & text from CDC/PHIL. For more information see Measles Pictures from CDC
- <http://www.nlm.nih.gov/medlineplus/measles.html>

- <http://www.stanford.edu/group/virus/retro/2000/measles.html>
- <http://www.ifrc.org/WHAT/health/archi/fact/fmeasles.htm>
- http://kidshealth.org/parent/infections/bacterial_viral/measles.html
- <http://www.nfid.org/factsheets/measlesadult.html>