دانشگاه علوم پزشکی تهران

دانشکده پزشکی

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مرکز طبی کودکان

- **تاسیس:۱۳۴۷**
- **قطب علمی اطفال در ایران**
- **بیمارستان فوق تخصصی و تخصصی کودکان با بیش از ۴۰۰ تخت بستری**
- **۱۴۹ نفر هیئت علمی در تمامی رشته های فوق تخصصی کودکان شامل :**

عفونی، هماتولوژی وانکولوژی، اندوکرینولوژی ومتابولیسم، نفرولوژی ،نوزادان ،گوارش ،روماتولوژی ،ایمونولوژی وآلرژی، کاردیولوژی، پاتولوژی ،جراحی کودکان، ارولوژی ارتوپدی و کاردیو سرجری کودکان ، آزمایشگاه و بیهوشی

- **مجهز به ۳ بخش ICU جنرال کودکان با ظرفیت ۴۰ تخت**
- **۲ بخش بخش ICU قلب وجراحی قلب کودکان با ظرفیت ۵۰ تخت**
- **بخش NICU نوزادان با ظرفیت ۳۰ تخت**
- **بخش بخش NICU قلب نوزادان با ظرفیت ۱۳ تخت**

Measlses

in children

Measlses disease*

- Measles virus is a single-stranded RNA virus that cause a disease characterized by fever, cough, coryza, conjunctivitis,an erythematous maculopapular confluent rash, and a pathognomonic enanthem.
- Highly contagious disease in nonimmune persons.
- No animal reservoir exists.
- MV is inactivated rapidly by *heat*,*ultraviolet light*, *lipid solvents* such as *ether* and *chloroform*, and extreme degrees of *acidity and alkalinity* (i.e., pH <5 and >10)
- Asymptomatic Contagious carriers are *unknown*, and persons with *acute asymptomatic infection probably are not contagious.*

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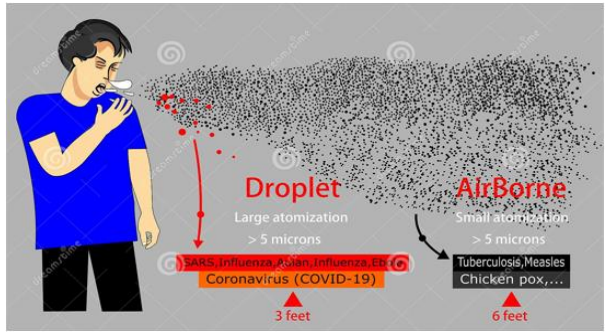
* *Other names:Morbilli, Rubeola*

The routes of transmission

- Respiratory
  - Droplet
  - Air born
- Contact
  - Direct
  - indirect

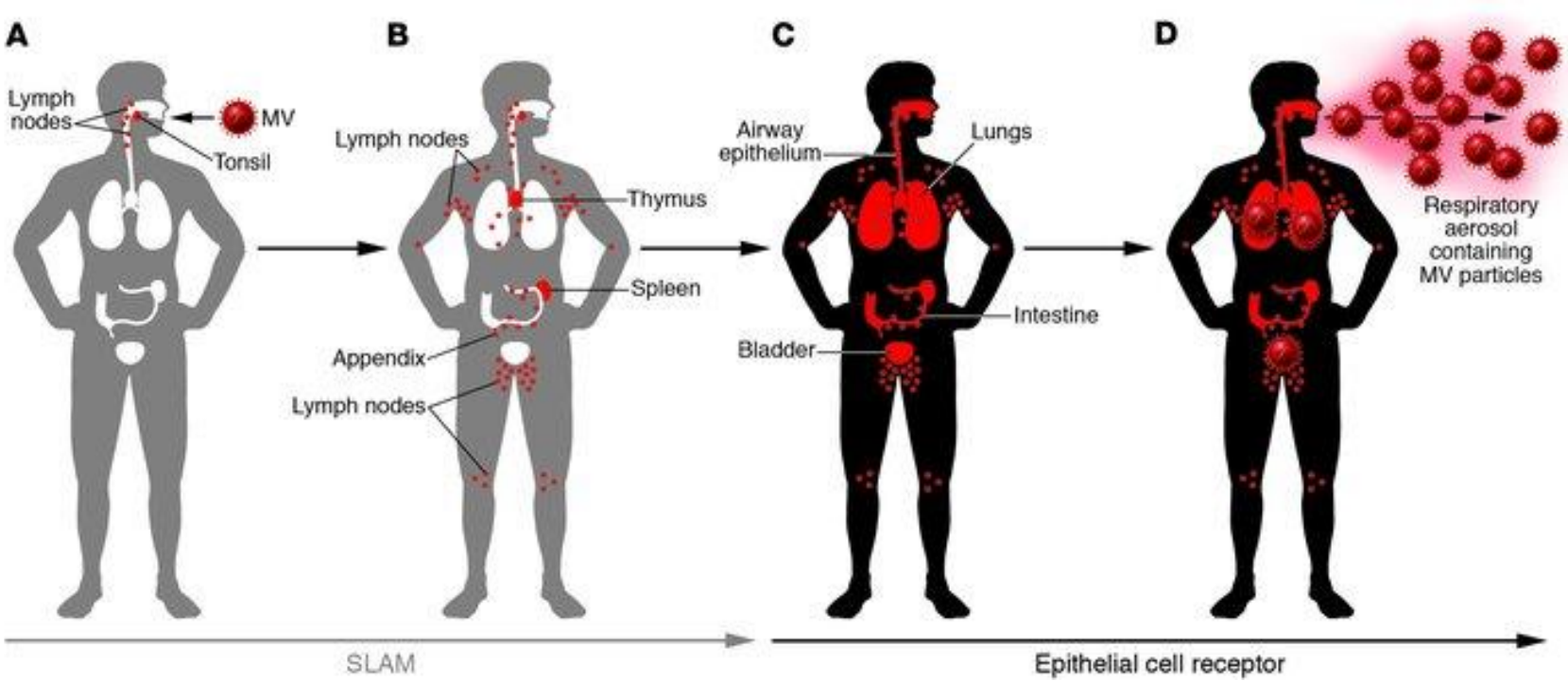


❖The measles virus can live on contaminated surfaces and in the air for **up to two hours**.

Age Incidence

- The age-related incidence and percentage Of measles cases by age group have changed markedly aftrr global immunization.
- However children under the age of 5 still seem to make up a large population of measles patients.
- Measles in heavily populated but developing countries has its greatest incidence in children younger than 2 years.

Pathogenesis



A

MV enters humans through the respiratory route and initiates its infectious cycle in lymphoid organs in the upper respiratory tract by using SLAM as a receptor.

B

MV-infected lymphocytes enter the bloodstream, and MV propagates in lymphoid organs throughout the body

C

MV-infected immune cells appear to transmit MV to epithelial cells in various organs (e.g., airway, intestine, bladder). A putative epithelial cell receptor appears to play an important role in MV infection of epithelial cells

D

MV then replicates in epithelial cells and actively releases progeny viruses into the airway. Consequently, respiratory aerosols of patients contain large amounts of MV particles.

Clinical stages

❑There are three distinct phases:

I. Incubation :10 days (range, 8−12 days).

II. Prodromal :3 days (range, 2−4 days). characterized by:

- Fever, Malaise, Conjunctivitis, and upper respiratory symptoms such as Cough, Nasal discharge, and Sneezing.These symptoms worsen during a 2- to 4-day period.

III. Exanthem which begins as a rash on the scalp and behind the ears.

- Infectious period: 3-5 days before to 4 days after the appearance of the rash.

❑ Conjunctivitis

- Bulbar and palpebral
- Associated with considerable lacrimation older patients in particular are bothered by photophobia, which frequently is severe.
- Conjunctivitis of varying severity is noticed in the **half of the cases** without using ophthalmological instrumentation.
- Using ophthalmological instrumentation, the mild forms of conjunctivitis can be diagnosed,in near to all of patients
- Slit-lamp examination reveals both *corneal* and *conjunctival* lesions

❑ Cough

- Frequently is troublesome.
- It worsens throughout the prodromal period and often has a brassy quality(hard&loud) suggesting laryngeal and tracheal involvement.
- The cough may persist for 10 days or more.

❑ Koplik spots*

- On day 10 ± 1
- Pathognomonic enanthem of measles.
- White or bluish-white specks on a bright-red mucosal surface.
- First arise on the buccal mucosa opposite the lower molars but usually

Spread quickly to involve most of the buccal and lower labial mucosa.

- Initially, only a few lesions appear, but within 12 hours the number usually is uncountable.

** The term Koplik spot derives its name from Dr. Henry Koplik of New York, who first described them in 1896.*

❑ Enantem

- During the prodromal period, Erythematous maculopapular lesions also are observed occasionally on the palate.

- At the end of the prodromal period, the posterior pharyngeal wall usually is erythematous, and the patient may complain of a **sore throat.**

❑ Notice

- Early in the prodromal phase,a transitory rash occasionally has been observed.
- It has been *urticarial* or *macular*,has occurred with the initial onset of fever, and has disappeared before onset of the typical exanthem.

❑ Exanthem Period

- In typical measles, the exanthem appears on approximately the **14th**day after exposure.
- The exanthem occurs at approximately the **peak of the respiratory symptoms** and when the temperature usually is approximatel 39.5°C.
- First appears behind the ears and on the forehead at the hairline.
- Spread of the rash is centrifugal from the head to the feet

- By the third day, the rash has involved the face, neck, trunk,upper extremities, buttocks, and lower extremities sequentially.

- The rash initially is erythematous and maculopapular but progresses to confluence in the same centrifugal manner as it is spread.

- Confluence always is more prominent on the face; frequently, the lesions on the lower extremities remain discrete.

- The exanthem begins to clear on the third to fourth day, again following the centrifugal course of progression.
- The duration of the exanthem usually is 6 to 7 days.

- With healing, a fine desquamation frequently occurs in confluent areas with brownish discoloration.

Clinical course

The patient is a child who develops fever, runny nose, and sneezing about 10 days after contact

Gradually the fever increases. Conjunctivitis and caugh appear and about 3 to 4 days after the onset of the symptoms, skin rashes appear

1-2 days befor until 1day after skin rash koplic spots are visible

On the second or third day of the rash fever generally peaks, and then falls by lysis during next 24-hour

Conjunctivitis and nasal discharge usually improves as the fever subsides

Maculopapular rash begin from the head &neck and distribute downward

Rash last for about 6-7 days and will be disappear at the same manner

Pilling may appear after skin rash

Clinical course

- Fever that persists after the third or fourth day of exanthem usually is an indication of a complication.
- Conjunctivitis and nasal symptoms generally subside at about the time of defervescence.
- Continued nasal discharge, whether purulent or not, suggests bacterial secondary infection.
- With the appearance of the rash, the cough loosens up, and in older persons it frequently becomes productive.

Diagnosis

❑In the absence of a recognized measles outbreak, confirmation of the clinical Diagnosis by Serologic evidences is often recommended.

➢IgM

- Appears 1-2 days after the onset of the rash and remains detectable for about 1 mo.
- If a serum specimen is collected <72 hr after onset of rash and is negative for antibody, a 2nd specimen should be obtained.

➢ IgG

4-fold rise in in acute and convalescent specimens collected 2-4 wk apart

Laboratory Findings

- During the periods of prodrome and rash, the total WBCis low.

  (The most marked reduction, in absolute lymphocytes Counts)
- Thrombocytopenia (maybe)
- Elevated CRP (maybe)

Modified Illness

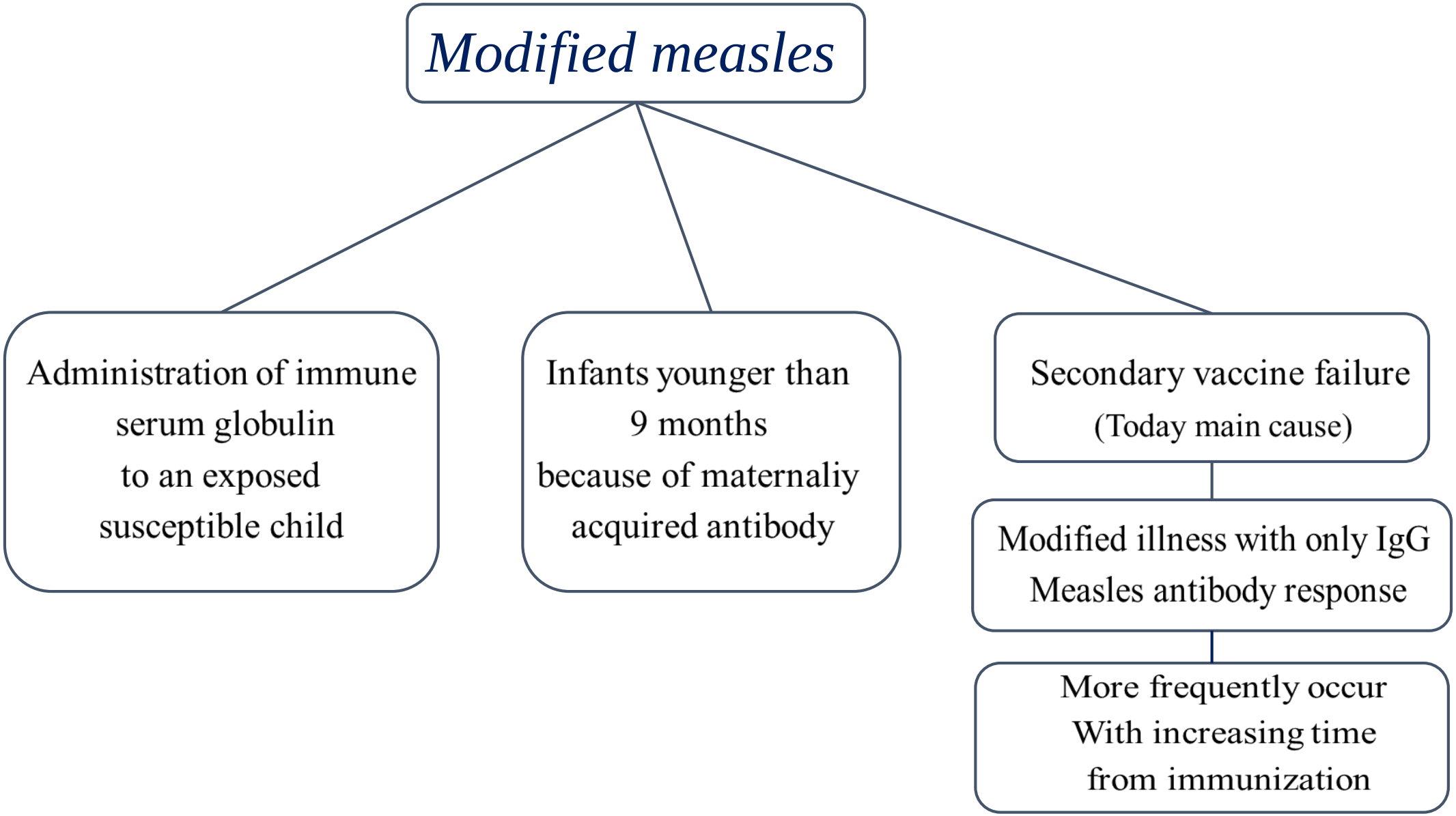
- Modified measles is an infection that occurs in a partially immune person.
- Mild illness & regular sequence of events:

➢ Shorter prodromal period

➢ Minimal cough, coryza, and fever

➢ ± Few and transient koplik spots

➢ The Regular progression pattern of the exanthema without confluence.


Modified measles
Administration of immune serum globulin to an exposed susceptible child
Infants younger than 9 months because of maternaliy acquired antibody
Secondary vaccine failure (Today main cause)
Modified illness with only IgG Measles antibody response
More frequently occur With increasing time from immunization

Measles in Developing Countries

- High mortality rate(in much of Africa 10%,)
- Risk factors of mortality :
  - Age (disease of young children)
  - Medical facilities
  - Nutritional status of the infected children (thought to be the single overriding factor)
- Low serum retinol concentrations nearly always are present in children with measles in developing countries.
- Low retinol levels correlate directly with measles mortality, and treatment with vitamin A reduces this mortality rate

Complications of Measles

Risk factors:

1. Age: younger than 5 yr (especially <1 yr of age) and older than 20 yr
2. Crowding
3. Severe malnutrition in children (suboptimal immune response)
4. Low serum retinol levels in children(morbidity and mortality)*
5. Immunocompromised situation(malignancy,chemotherapy,organ transplant …)

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*Measles infection decrease serum retinol concentrations,subclinical cases of hyporetinolemia may be made symptomatic during Measles

Complications of Measles

- Pneumonia (most common cause of death)
- Other respiratory Complications
- Gastrointestinal
- Cardiac
- Neurologic

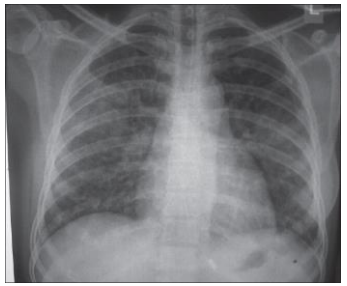
Pneumonia

Giant cell pneumonia

Primary viral infection

- Early in the course of the illness
- Most common

Hillar adenopathy



Bilateral hyperinflation with diffuse fluffy infiltrates

Unilateral segmental lobar pneumonias

Secondary pneumonia

Bacterial

Streptococcus pneumoniae,
Haemophilus influenzae
Streptococcus pyogenes
Staphylococcus aureus

Viral

Parainfluenza
Adenoviruses

❑Other Respiratory Complications

- Otitis media:

✓Most common complication

✓Pathogens are the same as otitis media without measles

- Mastoiditis

✓ today it is rare

- Laryngitis, Croup, Bacterial tracheitis

- Deep neck abscess
  (Secondary bacterial infection of the cervical lymph nodes)

- Gastrointestinal

✓ Dehydration (Diarrhea and vomiting are common in acute measles)

✓ Appendicitis or abdominal pain (Obstruction of the appendiceal lumen by lymphoid hyperplasia)

✓ Hepatitis

- Cardiac Manifestations

✓ Myocarditis and pericarditis

- Other Manifestations

✓ Postinfectious thrombocytopenic purpura

✓ Mesenteric lymphadenitis

✓ Febrile seizures (<3%)

Neurologic

Encephalitis

- 1-3 / 1,000 cases
- Adolescents&adults > preschool&school-age
- Postinfectious in normal host (immune mediated)
- Direct viral invasion in immunocompromised patients
- Begins during the exanthema
- Seizures , lethargy , irritability, headache and involuntary movements
- CSF:lymphocytic pleocytosis ,↑ protein, Nl glucose
- Mortality :15%
- long-term sequelae :20–40% (cognitive impairment,motor disabilities, deafness)

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SSPE

- Subacute Sclerosing Panencephalitis
- Slowly progressive disease of the CNS, with an Almost invariably fatal outcome
- Relatively common in endemic countries
- Possible mechanisms;abnormal host immune response to a common infection or mutant virus
- Begin insidiously 7-13 yr after primary infection.
- **Stage 1** :subtle changes in behavior
- **Stage 2:**involuntary movements and repetitive myoclonic jerks
- **Stage 3:**choreoathetosis,immobility, dystonia, and lead pipe rigidity
- **Stage 4:** loss of critical centers of breathing, heart rate, and blood pressure
- Diagnosis at least 1 of (1)measles antibody in CSF (2) characteristic EEG,(3) typical histologic findings in and/or Isolation of virus inbrain tissue

Measlse in pregnancy

- **Spontaneous abortions**
- **Stillbirths**
- **Congenital measles**

✓Clinical measles infection of mother shortly before birth,

✓Mortality rate:32%

Treatment

❑Supportive :there is no approved specific antiviral therapy

- Antipyretics for discomfort and fever
- Airway humidification
- Rehydration
- Ribavirin in immunocompromised patients ?
- **Vitamin A**

Vitamin A

- In the United States, studies in the early 1990s documented that 22–72% of children with measles had low retinol levels.
- It seems that there is an inverse correlation between the level of retinol and severity of illness.
- Vitamin A therapy is indicated for all patients with measles.

< 6 mo : 50,000 IU
6 -11 mo : 100,000 IU
12 mo ≤ : 200,000 IU

} once daily for 2 days

- 3rd dose is recommended 2-4 wk after the 2nd dose,if there are signs and symptoms of vitamin A deficiency

Prophylaxis

1. **Pre-exposure**:

- Vaccine

1. **Postexposure:**

a) Vaccine : up to 72h

b) Immunoglobulin: up to 6 days

- Ig is indicated for susceptible household contacts of measles patients, especially infants younger than 6 mo of age, pregnant women, and immunocompromised persons
- Immunocompetent children :intramuscularly immunoglobulin (IMIG):0.5 mL/kg (maximum dose in both cases is 15 mL/kg)
- Severely immunocompromised children and pregnant woman, intravenously immunoglobulin(IVIG) :400 mg/kg

Vaccination of measles

in IRAN

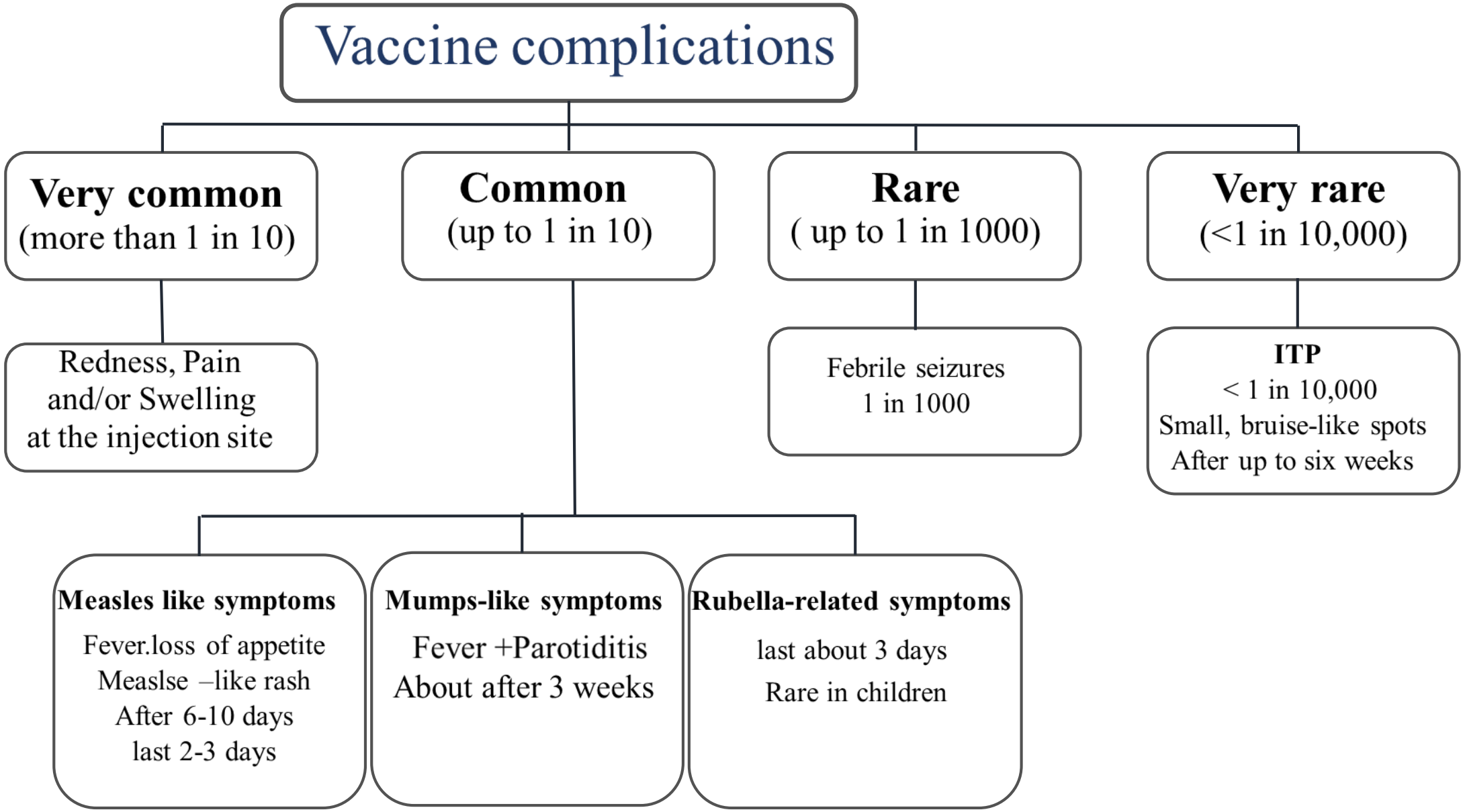
➢MMR

- live attenuated vaccine
- 2 doses in : 12m and 18 m
- 0.5 cc Sub cutaneous,Deltoid mussle

➢Contraindication :

- Pregnancy
- HIV/AIDS
- Immunocompromised situations:

✓Immune deficiency syndroms, Receiving immunosuppressives, Cancer and recent trasplantation


Vaccine complications
Very common
(more than 1 in 10)
Common
(up to 1 in 10)
Rare
(up to 1 in 1000)
Very rare
(<1 in 10,000)
Redness, Pain
and/or Swelling
at the injection site
Febrile seizures
1 in 1000
ITP
< 1 in 10,000
Small, bruise-like spots
After up to six weeks
Measles like symptoms
Fever.loss of appetite
Measlse –like rash
After 6-10 days
last 2-3 days
Mumps-like symptoms
Fever +Parotiditis
About after 3 weeks
Rubella-related symptoms
last about 3 days
Rare in children

for
your attention

Thank you