



## “Review on: Measles”

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**Abstract:** Most global estimates indicate that more than 1 million children a year die from acute measles. The actual number of deaths may, however, be considerably higher than this. In addition, the impact of delayed mortality as a result of measles infection is only now being realized. Many months after they contract measles, children continue to experience higher levels of mortality & morbidity than those who do not. Immunization of children against measles therefore prevent mortality & mortality not only during the acute phase but also during subsequent months. The impact of measles immunization programmers may therefore have generally been underestimated. The increase in measles incidence is caused by the ongoing reduction of vaccination coverage. This event has triggered public & scientific interest. For this reason, we reviewed the pathophysiology of measles infection, focusing on mechanisms by which the virus spreads systemically through a “Trojan horse” strategy, measles induces an immunosuppression status. An overview of microbiology, symptoms, diagnosis, prevention & treatment completes & enriches the review.

**Keywords:** measles, immunity, viral-host, interaction, Lymphocytes.

### I. INTRODUCTION:

Measles virus belongs to the genus Morbillivirus of the family paramyxoviridae. It is an enveloped, nonsegmented, single stranded, negative-sense RNA virus, & its genome encodes at least six structural proteins [1]. Measles virus (also known as rubeola virus) causes measles, an acute highly contagious infection usually seen in children. Recovery from measles is the rule but severe complications may develop in some cases [2]. The virus can also be transmitted through direct contact with infected secretions, but MeV does not survive long on fomites (that is, any object that can carry pathogens, for example, skin hair, clotting & bleeding) as it is inactivated by heat & UV radiation within a few hours. The prodromal phase of measles involves coughing, which enhances the transmission of virus. The incubation period is approximately 10

days to the onset of fever & fever above 38.3 degree Celsius accompanied by cough, coryza & conjunctivitis. The clustered lesions that can be seen on the buccal mucosa lining the cheeks – Koplik spots – are considered pathognomonic for measles. People with measles are considered infectious from 4 days before to 4 days after the onset of rash, when the levels of MeV in the respiratory tract are highest [3]. Symptoms usually develop 10-12 days after exposure to an infected person & last 7-10 days [4]. Small white spots known as Koplik spots may form inside the mouth two or three days after the start of symptoms [5]. Measles is an airborne disease which spreads easily from one person to next through the coughs & sneezes of infected people [6].

Severe forms with non-pathognomonic clinical features may occur, especially in individuals with

compromised or deficient cellular immunity ,such as those being treated for malignant disease,transplanted ,individuals with acquired immunodeficiency syndrome (AIDS), or any form of congenital immunodeficiency[7]. With current

vaccination policies ,in population that have received two doses of measles vaccine,the age distribution of measles is shifted into adolescence & adulthood[8].



### **SIGN AND SYMPTOMS:[9-11]**

1. The classic symptoms include a four day fever&three C's –cough ,coryza(head cold,fever,sneezing)&conjunctivitis (red eyes)-along with a maculopopular rash.
2. .Koplik's spots seen inside the mouth are diagnostic for measles ,but are temporary & therefore rarely seen.Koplik spot are small white spots

- that are commonly seen on the inside of the cheeks opposite the molar.
3. The characteristic measles rash is classically described as a generalized red maculopapular rash that begins several days after the fever starts.It start on the back of the ears& after a few hours ,spreads to the head &neck before spreading to cover most of the body ,often causing itching.The measles rash appears two to four days.

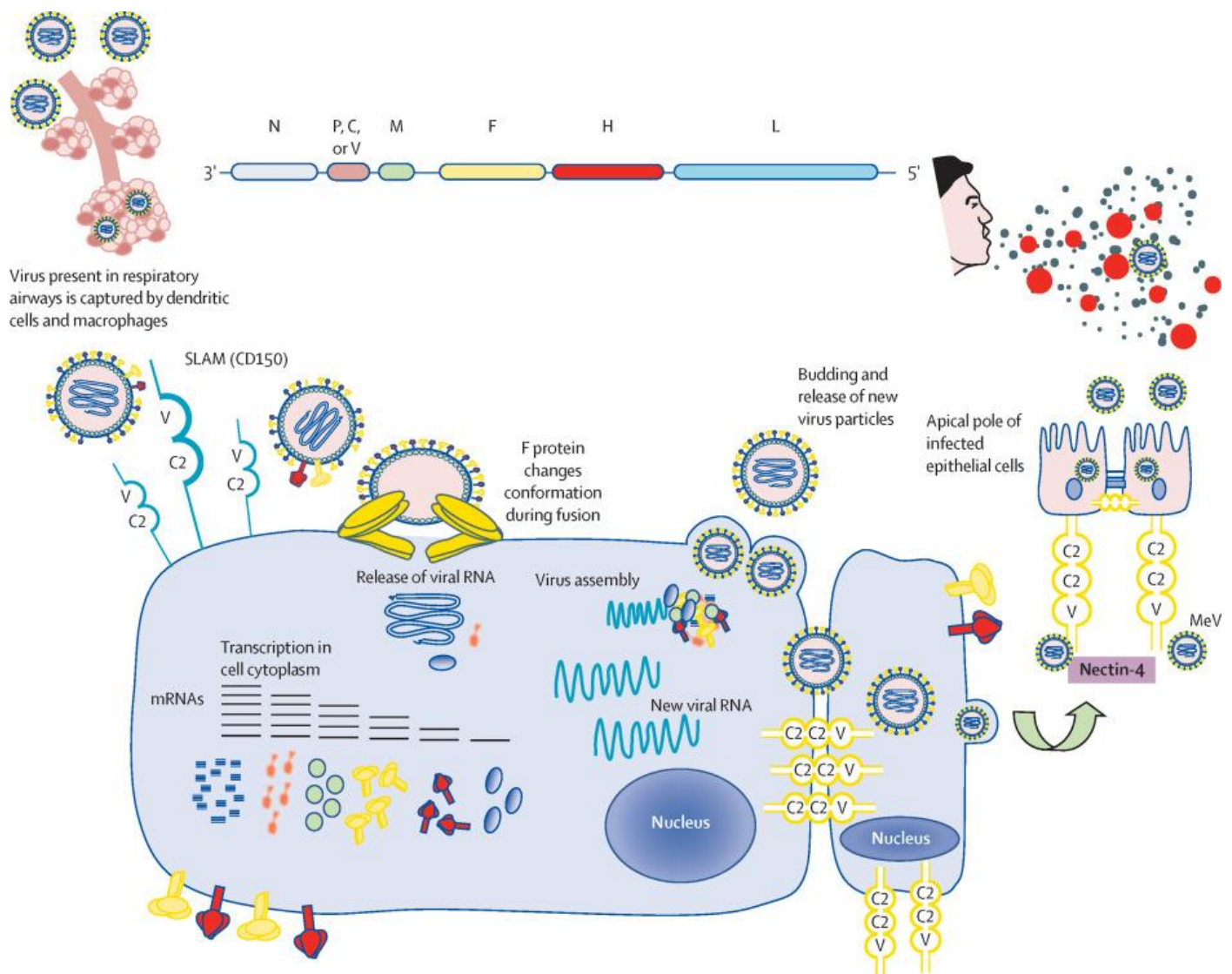
4. The rash is said to “stain”changing color from red to dark brown,before disappearing.

**COMPLICATION:**

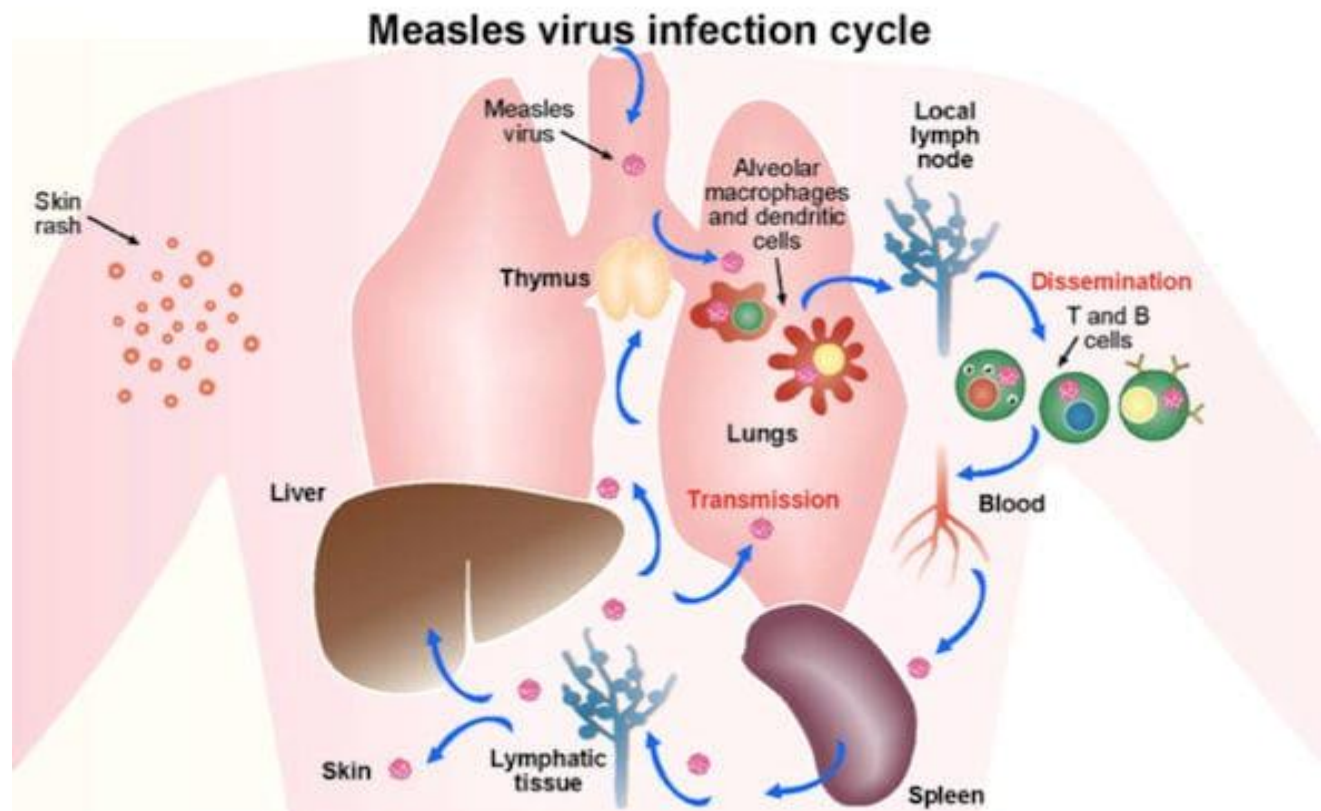
Complication of measles occur most commonly in young infants ,pregnant women ,&malnourished or immunocomprised children. The most common complication is pneumonia which can be due to the measles virus itself or a secondary croup,otitis media,& diarrhea from secondary infection.Pregnant women which measles are at

increased risk for maternal death,spontaneous abortion ,intrauterine fetal death ,&low birth weight infants.Measles keratoconjunctivitis occurs mostly in children with vitamin A deficiency& can lead to blindness. Central nervous system complications include acute disseminated encephalomyelitis (ADEM),measles inclusion body encephalitis (MIBE),&subacute sclerosing panencephalitis (SSPE)[12].ADEM is an autoimmune demyelinating disease that occurs within days to weeks[13].

**PATHOPHYSIOLOGY OF MEASLES:**







Once the measles virus gets onto the mucosa, it infects the epithelial cells in the trachea or bronchi. Measles virus uses a protein on its surface called hemagglutinin (H protein), to bind to a target receptor on the host cell, which could be measles which is expressed on all nucleated human cells, measles signaling lymphocyte activation molecule or SLAM, which is found on immune cells like B or T cells, and antigen-presenting cells, or nectin-4, a cellular adhesion molecule. Once bound the fusion, or F protein helps the virus fuse with the membrane and ultimately get inside the cell.

As the virus is a single stranded negative sense RNA-dependent RNA polymerase (RDRP) which is used to transcribe its genome into a positive sense mRNA strand.

After entering a cell, it is ready to be translated into viral proteins, wrapped in the cell's lipid envelope, and sent out of the cell as newly made virus. Within days, the measles virus spreads through local tissue and is picked up by dendritic cells and alveolar macrophages, and carried from that local tissue in the lungs to the local lymph

nodes. From there it continues to spread, eventually getting into the blood and spreading to more lung tissue, as well as other organs like the intestines and the brain. Functional impairment of the infected dendritic cells by the measles virus is thought to contribute to measles-induced immune suppression.

#### MEASLES PREVENTION:

Mothers who are immune to measles pass antibodies to their children while they are still in the womb, especially if the mother acquired immunity through infection rather than vaccination [14]. The vaccine is generally not given before this age because such infants respond inadequately to the vaccine due to an immature immune system [15]. A second dose of vaccine is usually given to children between the ages of 4 and 5, to increase rates of immunity. Measles vaccines have been given to over a billion people [16]. The vaccine should be given whether the child is HIV-infected or not [17]. The vaccine is less infective in HIV-infected infants than in the general population, but early treatment with

antiretroviral drugs can increase its effectiveness[18].The MMR vaccine is 95% effective for preventing measles after one dose if the vaccine is given to a child who is 12 months or older;if a second dose of the MMR vaccine is given ,it will provide immunity in 99% of children[19].

### TREATMENT:

1)There is no specific antiviral treatment if measles develop .Instead the medications are generally aimed at treating .

2)Superinfectioning,maintaining good hydration with adeaquate fluids and pain relief .Some groups like young children and the severally malnourished ,are also given vitamin A,which acts as an immunomodulator that boosts the antibody response to measles &decreases ,the risk of serious complications.

3)Treatment is supportive with ibuprofen or paracetamol to reduce fever &pain if required ,a fast acting medication to dilate the airways for cough.

4)As for aspirin ,some research has suggested a correlation between children who take apirin &the development of raeye syndrome.

5)The use of vit.A during treatmet is recommended to decrease the risk of blindness.However it does not prevent or cure the diseases.

6)A systematic review of trials into its use found no reduction in overallmortality,but two doses of vit,A was shown to reduce mortality for measles in children younger than two years of age.

7)It is unclear if zinc supplementation in children with measles affects outcome as it has not been sufficiently studied.

8)There are no adequate studies on whether Chinese Medicinal Herbs are effective.

9)You can do some things that might make you feel better such as;

- Taking acetaminophen or ibuprofen for aches,pains or fever.
- Getting plenty of rest
- Drinking enough fluids
- Gargling with salt water
- Avoiding harsh light if your eyes hurt

10)Immune serum globulin:- pregnant women,infants& people with weakened immune system who are exposed to the virus may receive an injection of proteins called immune serum globulin. When give within six days of exposure to the virus ,these antibodies can prevent measles or make symptoms less severe.

11) Antibiotics:-If a bacterial infection ,such as pneumonia or an ear infection develops while you or your child has measles, your health care provider may prescribe an antibiotic.

### PRECAUTIONS:

1)Always wash hands immediately after glove and other PPE removal and before touching the eyes , nose or mouth as gloves are not a replacement for hand washing. Always wash hands that are visibly soiled.

2)Frequently sanitizing surfaces can also help prevent exposure to measles when those surfaces are contaminated.

3) The best way to prevent measles get vaccinated.

4)people who work with children or who are in other industries are encouraged to avoid physical contact with sick people and to practice good hand washing technique.

### CONCLUSION:

- All participants concluded that measles is no longer in endemic in united states -34 years after the first eradication target was set.
- This achievement is a credit to the efforts of millions of parent and children, hundreds of thousands of health workers and thousands of policy markers and legislators who provided the political and financial support.
- Not withstanding the tremendous progress that this is an inherently unstable situation and that we must maintain our effort to ensure that this is an inherently unstable situation &that we must maintain our effort to ensure that immunization levels remain very high & that survelliance is of high quality we also must strengthenour support for global measles control &work toward ultimate global eradication of measles.

- Measles mortality reduction is highly cost effective & substantial progress has been made.
- Estimated mortality in 2010 was <770 of that in the pre-vaccine era. Most of the estimated reduction was due to increase in routine coverage with at least one dose of measles vaccine.
- CRS is major preventable cause of severe disability & there should be low marginal costs to including rubella in measles elimination activities.
- The strategy has five components, including achieving & maintaining high coverage with two doses of measles & rubella containing vaccines, establishing effective surveillance & outbreak response, building public confidence in & demand for vaccination & conducting operational research.
- To date, however most funding has been allocated for complaints & GAVI funding appears to reinforce this tendency.
- Though measles is usually a mild or moderately severe illness, it can result in complications such as pneumonia, encephalitis & death.
- Post-infectious encephalitis may occur in approximately 2 or 3 death may occur for every 1000 reported measles cases.
- Majority of the measles cases were vaccinated with at least one dose of measles containing vaccine potency at lower level was noted as only about two fifth of cases visited health.

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