

# Rubella, Rotavirus & Coronavirus

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# Rubella

- Rubella is a contagious viral infection seen in children and young adults.
- It is the leading vaccine-preventable cause of birth defects.
- Rubella infection in pregnant women may cause fetal death or congenital defects known as congenital rubella syndrome.
- There is no specific treatment for rubella but the disease is preventable by vaccination.

# Symptoms

- In children, the disease is usually mild, with symptoms including a rash, low fever ( $<39^{\circ}\text{C}$ ), nausea and mild conjunctivitis.
- The rash, occurs in 50–80% of cases, usually starts on the face and neck before progressing down the body, and lasts 1–3 days.
- Swollen lymph glands behind the ears and in the neck are the most characteristic clinical feature.
- Women, may develop arthritis and painful joints that usually last from 3–10 days.
- Once a person is infected, the virus spreads throughout the body in about 5-7 days. Symptoms usually appear 2 to 3 weeks after exposure. The most infectious period is usually 1–5 days after the appearance of the rash.

- When a woman is infected with the rubella virus early in pregnancy, she has a 90% chance of passing the virus on to her fetus. This can cause the death of the fetus, or it may cause CRS. Infants with CRS may excrete the virus for a year or more.
- **Congenital rubella syndrome**
- Children with CRS can suffer hearing impairments, eye and heart defects and other lifelong disabilities, including autism, diabetes mellitus and thyroid dysfunction.
- The highest risk of CRS is in countries where women of childbearing age do not have immunity to the disease (either through vaccination or from having had rubella). Before the introduction of the vaccine, up to 4 babies in every 1000 live births were born with CRS.



**Image in a 4-year-old girl with a 4-day history of low-grade fever, symptoms of an upper respiratory tract infection, and rash.  
Courtesy of Pamela L. Dyne, MD.**

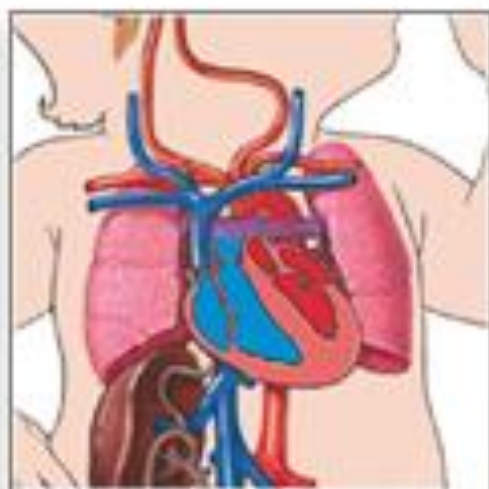


Photo source: U.S. Centers for Disease Control and Prevention

## Rubella syndrome



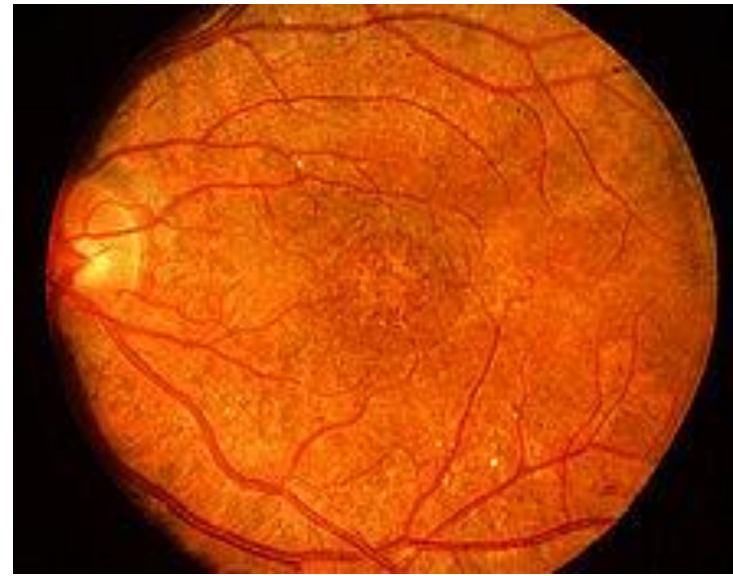
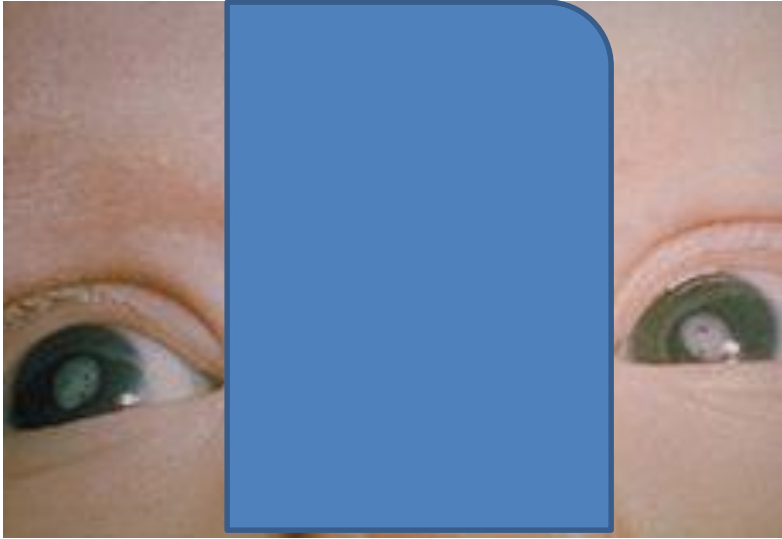
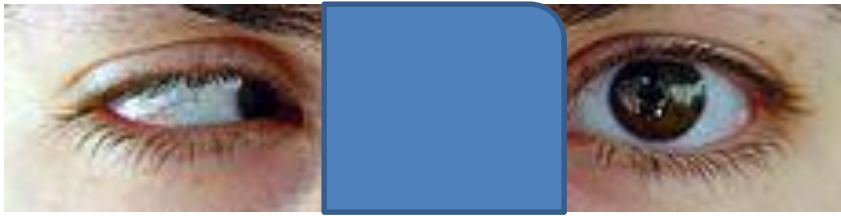
Microcephaly



PDA



Cataracts



### **Salt and pepper retinopathy**

<http://www.kellogg.umich.edu/theeyeshaveit/congenital/retinopathy.html>

Courtesy: Jonathan Trobe, M.D. - University of Michigan Kellogg Eye Center

Courtesy

[http://phil.cdc.gov/phil\\_images/20030724/28/PHIL\\_4284\\_lores.jpg](http://phil.cdc.gov/phil_images/20030724/28/PHIL_4284_lores.jpg)

Content Providers(s): CDC Creation

Date: 1976



## Vaccination

- The rubella vaccine is a live attenuated strain, and a single dose gives more than 95% long-lasting immunity, which is similar to that induced by natural infection.
- Rubella vaccines are available either in monovalent formulation (a vaccine directed at only one pathogen) or more commonly in combinations with other vaccines such as with vaccines against measles (MR), measles and mumps (MMR), or measles, mumps and varicella (MMRV).
- Adverse reactions following vaccination are generally mild. They may include pain and redness at the injection site, low-grade fever, rash and muscle aches.

## WHO response

- WHO recommends that all countries that have not yet introduced rubella vaccine should consider doing so using existing, well-established measles immunization programmes. To-date, four WHO regions have established goals to eliminate this preventable cause of birth defects.
- In 2015, the WHO Region of the Americas became the first in the world to be declared free of endemic transmission of rubella.
- As of December 2018, 168 out of 194 countries had introduced rubella vaccines and global coverage was estimated at 69%. Reported rubella cases declined 97%, from 670 894 cases in 102 countries in 2000 to 14 621 cases in 151 countries in 2018.
- Congenital Rubella Syndrome rates are highest in the WHO African and South-East Asian regions where vaccination coverage is lowest.
- In April 2012, the Measles Initiative – now known as the Measles & Rubella Initiative – launched a Global Measles and Rubella Strategic Plan which covers the period 2012-2020. The Plan includes a series of global goals for 2020.

## By the end of 2020

- Achieve measles and rubella elimination in at least 5 WHO regions.
- Based on the 2018 Global Vaccine Action Plan (GVAP) Assessment Report by the WHO Strategic Advisory Group of Experts (SAGE) on Immunization, rubella control is lagging, with 26 countries still do introduce the vaccine, while two regions (African and Eastern Mediterranean) have not yet set rubella elimination or control targets.
- SAGE recommends that rubella vaccination should be incorporated into immunization programmes, as quickly as possible, to ensure additional gains in controlling rubella .
- WHO provides technical support to governments and communities to improve routine immunization programmes and hold targeted vaccination campaigns.
- The WHO Global Measles and Rubella Laboratory Network supports the diagnosis of rubella and CRS cases and tracking of the spread of rubella viruses.

# Rotavirus

- **Cause**

Family - *Reoviridae*.

- **Transmission**

Transmission is primarily by the feco–oral route, directly from person to person, or indirectly via contaminated fomites.

A respiratory mode of transmission has also been proposed.

- **Nature of the disease**

- Rotavirus causes an acute gastroenteritis in infants and young children and is associated with profuse watery diarrhoea, projectile vomiting and fever.
- Rapid dehydration requiring rehydration therapy can occur, especially in very young infants.
- The virus replicates in the enterocytes of the small intestine, causing extensive damage to the microvilli and resulting in malabsorption and loss of fluids and electrolytes.

- **Geographical distribution**
- Rotaviruses are found worldwide. They are the leading cause of severe, dehydrating diarrhoea in children under 5 years globally
- Child deaths occurred due to rotavirus gastroenteritis worldwide. Fatal outcomes occur predominantly in low-income countries. In temperate climates, the incidence of rotavirus gastroenteritis typically peaks during the winter season, whereas in tropical settings this type of gastroenteritis occurs year round. Reinfection of older children and adults is common, although reinfections are usually sub-clinical.
- **Risk for travellers**
- The risk for adult travellers is negligible since most individuals will have good immunity through repeated exposures early in life. Children under the age of 5 years are at risk.

- Vaccination
- Four oral, live, attenuated rotavirus vaccines
  1. Rotarix™ (derived from a single common strain of human rotavirus)
  2. RotaTeq™ (a reassorted bovine-human rotavirus)
  3. Rotavac™ (naturally occurring bovine-human reassortant neonatal G9P, also called 116E)
  4. RotaSiil™ (bovine-human reassortant with human G1, G2, G3 and G4 bovine UK G6P[5] backbone) are available internationally and WHO prequalified.
- All four vaccines are considered highly effective in preventing severe gastrointestinal disease.
- In low income countries, vaccine efficacy can be lower than in industrialized settings, similar to other live oral vaccines. Even with this lower efficacy, a greater reduction in absolute numbers of severe gastroenteritis and death was seen, due to the higher background rotavirus disease incidence.

- WHO recommends that rotavirus vaccines should be included in all national immunization programmes and considered a priority particularly in countries in South and Southeast Asia and sub-Saharan Africa.
- First dose of rotavirus vaccine be administered as soon as possible after 6 weeks of age, along with DTP vaccination. Apart from a low risk of intussusception (up to 6 per 100 000 infants vaccinated)<sup>1</sup> the current rotavirus vaccines are considered safe and well tolerated.

# Coronavirus

- Coronaviruses cause zoonotic disease
- 2002 -SARS-CoV was transmitted from civet cats to humans
- 2012 - MERS-CoV from dromedary camels to humans
- 2019 – COVID 19
- Several known coronaviruses are circulating in animals that have not yet infected humans.



- Clinical presentation - symptoms may appear **2-14 days after exposure** (based on the incubation period of MERS-CoV viruses).
- Fever
- Cough
- Shortness of breath
- Breathing difficulties.
- In more severe cases, infection can cause pneumonia, severe acute respiratory syndrome, kidney failure and even death.

## Who should be tested

- Not everyone needs to be tested for COVID-19.
- Most people have mild illness and recover at home.
- There is no treatment specifically approved for this virus.
- Testing results may be helpful to inform decision-making about who you come in contact with.
- CDC has guidance for who should be tested, but **decisions about testing are at the discretion of state and local health departments and/or individual clinicians.**
- Clinicians should work with their state and local health departments to coordinate testing through public health laboratories, or work with clinical or commercial laboratories.

- **Molecular assays to diagnose 2019-nCoV**
- Several assays that detect the 2019-nCoV have been and are currently under development, both *in-house* and commercially. Some assays may detect only the novel virus and some may also detect other strains (e.g. SARS-CoV) that are genetically similar.
- **Summary table of available protocols**

Country	Institute	Gene Target
China	China CDC	ORF1ab and N
Germany	Charité	RdRP, E, N
Hong Kong SAR	HKU	ORF1b-nsp14, N
Japan	National Institute of Infectious Diseases, Department of Virology III	Pancorona and multiple targets, Spike protein
Thailand	National Institute of Health	N
US	US CDC	Three targets in N gene
France	Institut Pasteur, Paris	Two targets in RdRP

- Prevention-

Regular hand washing, covering mouth and nose when coughing and sneezing, thoroughly cooking meat and eggs.

Avoid close contact with anyone showing symptoms of respiratory illness such as coughing and sneezing.