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Rubella Fact Sheet

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Rubella: The Disease

Rubella, commonly known as German measles, is a contagious viral infection that typically causes a mild febrile illness with a distinctive rash. While rubella is generally mild or asymptomatic in children and adults, it poses a serious public health threat when contracted by pregnant women, particularly during the first trimester. Maternal infection during early pregnancy can result in miscarriage, fetal death, or congenital rubella syndrome (CRS), a condition associated with multiple severe birth defects. These may include cataracts, congenital heart disease, hearing impairment, and developmental delays. Each year, tens of thousands of CRS cases continue to occur globally, particularly in regions with suboptimal rubella vaccination coverage. Caring for children with CRS imposes a significant emotional and financial burden due to the permanent nature of the disabilities it causes. The rubella virus has only one serotype. This means that infection with the rubella virus or immunisation with the rubella vaccine generally provides lifelong immunity, as the immune response generated is protective against all circulating rubella strains. This characteristic greatly facilitates disease control and elimination efforts, unlike some other viruses (e.g., influenza or dengue), which have multiple serotypes or variants that complicate vaccine development and long-term immunity.

Epidemiology and Transmission

Rubella is caused by the rubella virus, an RNA virus belonging to the *Rubivirus* genus in the *Togaviridae* family. Humans are the only known host of the virus, which is transmitted from person to person via respiratory droplets. The virus is shed in nasopharyngeal secretions and can be transmitted even before the onset of symptoms. The incubation period ranges from 12 to 23 days, with an average of approximately 18 days. In pregnant women, the virus can cross the placenta and infect the developing foetus, leading to congenital infection and, in some cases, CRS.

The infectious period of rubella typically spans from about 7 days before to 7 days after the onset of rash. During this time, individuals can transmit the virus to others through respiratory droplets, even if they have mild or no symptoms. Children with congenital rubella syndrome (CRS), however, may shed the virus for several months, especially through urine and nasopharyngeal secretions, and can be a prolonged source of infection.

Clinical features

Rubella infection in children and young adults usually presents with mild symptoms such as low-grade fever, malaise, and a maculopapular rash that begins on the face and spreads to the trunk and extremities. This rash typically lasts about three days. Other features may include lymphadenopathy, especially of the postauricular and suboccipital nodes, conjunctivitis, and, in some cases, mild upper respiratory symptoms. Adolescents and adult women may experience arthralgia or arthritis. However, up to 50% of rubella infections are subclinical, making detection and control more challenging.

Complications

While rubella is often a mild disease, its most severe consequence is congenital rubella syndrome. When infection occurs during the first 10 weeks of pregnancy, the risk of foetal abnormalities is as high as 90%. These may include ocular defects such as cataracts and retinopathy, cardiac malformations like patent ductus arteriosus, sensorineural deafness, microcephaly, hepatosplenomegaly, thrombocytopenic purpura, and developmental delays. Surviving infants may also be at increased risk of long-term health issues, such as autism spectrum disorders, type 1 diabetes, and thyroiditis.

Diagnosis

Diagnosis of rubella in postnatal cases is primarily based on serology. A recent infection can be confirmed by detecting rubella-specific IgM antibodies or by demonstrating a significant rise in IgG titres using enzyme-linked immunosorbent assay (ELISA) or hemagglutination inhibition (HAI) tests. In some instances, viral RNA can be detected by RT-PCR. However, rubella IgM may be transiently detectable in reinfections or persist for several months post-vaccination, which can complicate interpretation. In suspected congenital infections, the detection of rubella-specific IgM in neonatal blood samples, persistence of rubella IgG beyond 6–9 months of age (when maternal antibodies should have waned), or isolation of the virus from infants during the first months of life are all considered confirmatory.

Surveillance

Rubella and CRS are notifiable diseases in Sri Lanka, and surveillance is conducted under the National Epidemiology Unit. Suspected cases are investigated using standardised case investigation forms. Confirmed and suspected rubella or CRS cases are entered into the national surveillance database. Active case finding and contact tracing are important tools in identifying transmission clusters and ensuring a rapid response to outbreaks.

The surveillance case definition for rubella is any person presenting with fever and a maculopapular rash. For congenital rubella syndrome (CRS), the case definition includes any infant with a maternal history of suspected or confirmed rubella infection during pregnancy and/or presenting with specific clinical signs suggestive of CRS. These signs may include one or more of the following: ophthalmologic abnormalities such as congenital cataract, congenital glaucoma, or pigmentary retinopathy; congenital heart defects such as patent ductus arteriosus (PDA), peripheral pulmonary artery stenosis, or ventricular septal defect (VSD); and other systemic manifestations including purpura, splenomegaly, microcephaly, developmental delay or intellectual disability, meningoencephalitis, radiolucent bone disease, or jaundice within the first 24 hours of life. Laboratory evidence supporting a diagnosis of CRS includes the presence of rubella-specific IgM antibodies or isolation of rubella virus from clinical specimens.

Vaccination and Prevention

Vaccination is the cornerstone of rubella prevention. A single dose of the live attenuated rubella vaccine induces protective immunity in more than 95% of recipients and usually confers lifelong protection. In Sri Lanka, the Mumps-Measles-Rubella (MMR) vaccine is administered as part of the National Immunisation Programme (NIP), with the first dose given at 9 months of age and a second dose at 3 years of age. In addition, the MMR vaccine is offered to women of childbearing age who do not have documented evidence of immunisation with a rubella-containing vaccine. Achieving and maintaining high vaccination coverage—above 95% with two doses of rubella-containing vaccine—is critical for preventing rubella virus circulation and CRS cases.

The rubella vaccine is a live attenuated virus, and while it's theoretically possible for it to cross the placenta, multiple studies and surveillance data have not shown any cases of congenital rubella syndrome (CRS) or birth defects linked to accidental vaccination during pregnancy. However, Rubella vaccination during pregnancy is not recommended as a precaution. Women are advised to avoid pregnancy for 1 month after receiving the rubella-containing vaccine. However, if a woman is inadvertently vaccinated while pregnant, termination of pregnancy is not indicated, as the risk is only theoretical and not supported by evidence.

Global and National Progress

Substantial progress has been made globally in reducing rubella incidence through vaccination. As of 2023, more than 80% of countries have introduced rubella vaccine into their routine immunisation schedules, and many have set targets for elimination. However, rubella remains endemic in several regions, and gaps in immunisation coverage can lead to outbreaks and continued transmission. In Sri Lanka, the introduction of the rubella-containing vaccine and

strong routine immunisation efforts have eliminated the disease burden. Sri Lanka was verified by the World Health Organisation as having eliminated rubella and congenital rubella syndrome (CRS) in 2020. Maintaining elimination requires continued vigilance, high coverage, and robust surveillance systems.

Conclusion

Rubella, though often mild in children, is a major cause of preventable congenital anomalies through CRS. Vaccination remains the most effective strategy to prevent rubella virus transmission and protect pregnant women from infection. Strong routine immunisation programs, supplemented by catch-up campaigns when indicated and effective CRS surveillance, are essential to sustain rubella elimination and prevent the devastating effects of congenital rubella syndrome.