

Epidemiology of Measles & Rubella 19-11-2023

Assistant Pro. Mayasah A. Sadiq FIBMS-FM

Measles (Rubeola)

- ❑ An acute highly infectious disease of childhood caused by a specific virus of **the group myxoviruses**.
- ❑ It is clinically characterized by fever and catarrhal symptoms of the upper respiratory tract (coryza, cough), followed by a typical rash.

Secondary attack rate- > 80%

EPIDEMIOLOGY:-

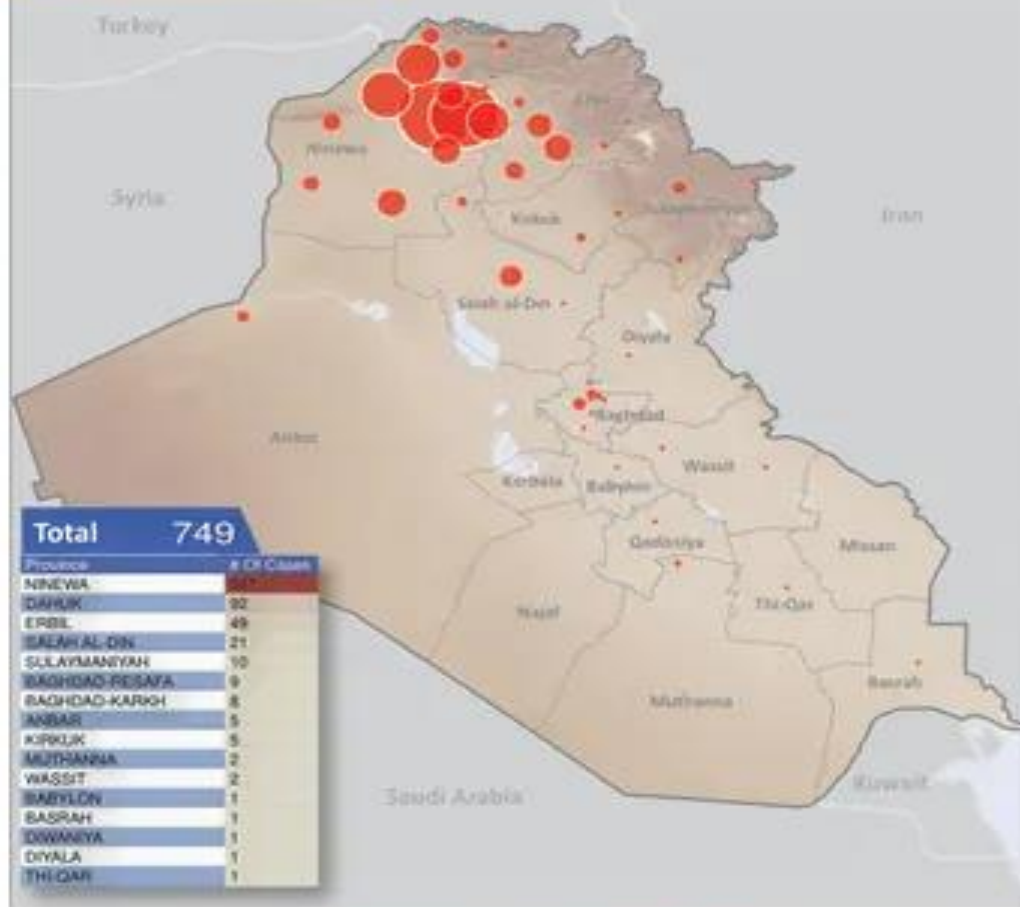
- ◉ Measles is endemic throughout the world.
- ◉ In the past, epidemics tended to occur irregularly .
- ◉ it is rarely subclinical.
- ◉ Prior to the use of measles vaccine, the peak incidence was among children 5-10 yr of age.

IRAQ MEASLES OUTBREAK

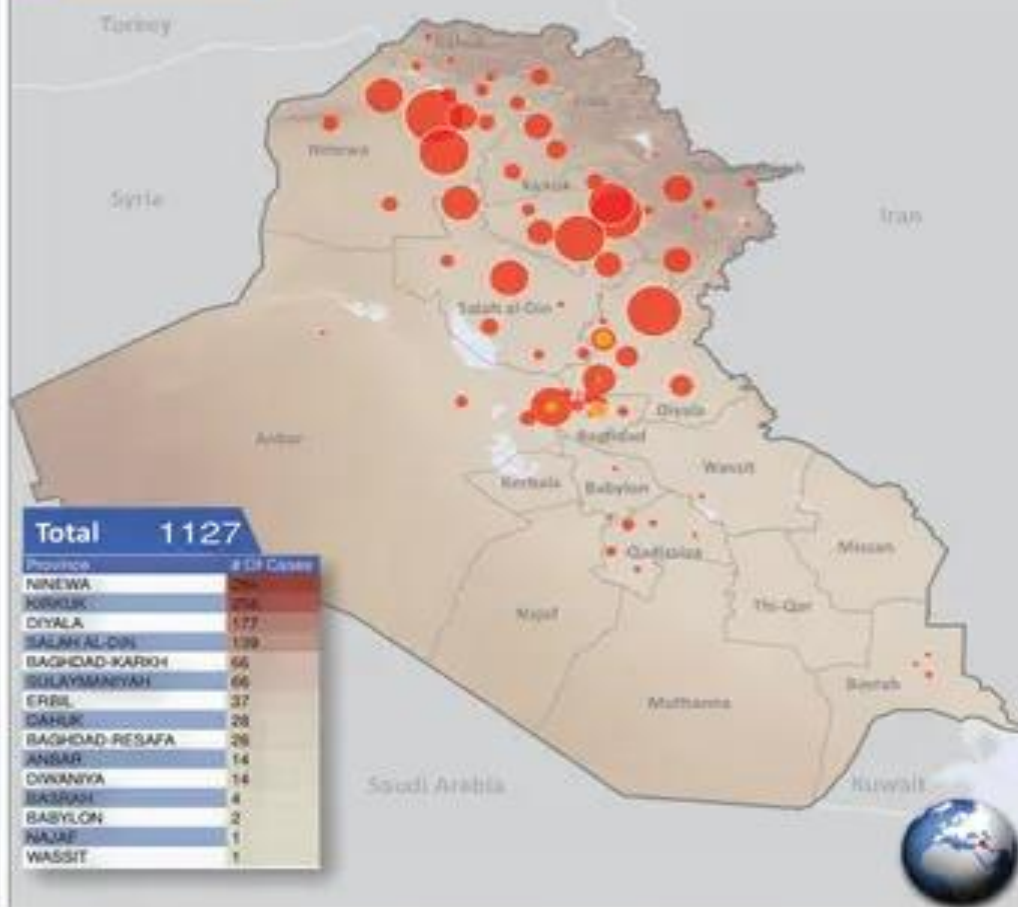
- In 2008–2009, Iraq experienced a major measles outbreak, with 30,321 reported cases in 2009 alone .
- During the outbreak, 11 of the 18 governorates reported their highest incidence of the time-series



2013 (Reporting Period 12 month)



2014 (as of week 45)



1- The total number of measles cases in 2013 was 749, while in 2014 (up to week 45) the number of cases reached 1127, 10 new cases were registered in week 45. 2- In 2013 the majority of the cases were distributed over Ninewa and Dahuk Governorates. In 2014 the cases are distributed over Ninewa, Salahaddin, Kirkuk, Diyala. 3- In 2014 the number of cases decreased by 50% in Ninewa and 80% in Dahuk compared with 2013, while the number of cases in Kirkuk increased from 5 to 258 Measles cases, and in Diyala the number of cases went from 1 to 178 Measles cases.

Further information:
World Health Organization
Iraq Country Office
Hussain@who.int
Data Source:
Ministry of Health/ WHO
District boundaries:
Health district boundaries, are not always match the administrative boundaries.

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Creation Date: 9 Nov 2014

Agent factors

- a. **Agent** - RNA paramyxovirus.
- b. **Source of infection** - Case of measles.
- c. **Infective material** - Secretions of the nose, throat and respiratory tract of a case of measles during the prodromal period and the early stages of the rash.
- d. **Communicability** - approximately 4 days before and 4 days after the appearance of the rash.

Measles is highly infectious during the prodromal period and at the time of eruption.

- e. **SECOND INFECTION** -. Infection confers life long immunity.

Host Factors

a. **Age** - 6 months to 3 years of age

b. **Sex** - Incidence equal

c. **Immunity** -

- No age is immune if there was no previous immunity.
- One attack of measles generally confers life-long immunity.
- Second attacks are rare.
- Infants are protected by maternal antibodies up to 6 months of age, in some, maternal immunity may persist beyond 9 months.
- Immunity after vaccination is quite solid and long-lasting.

d. Nutrition - very severe in the malnourished child, carrying a mortality upto 400 times higher than in well-nourished children having measles.

Environmental factors

- ❑ Virus can spread in any season.
- ❑ In tropical zones, most cases of measles occur during the dry season.
- ❑ In temperate climates, measles is a winter disease, probably because people crowd together indoors.

Mode of transmission

- ❑ Directly from person to person mainly by **droplet infection and droplet nuclei**, from 4 days before onset of rash until 4 days thereafter.
- ❑ **The portal of entry** - Respiratory tract.
- ❑ **Incubation period** - 10 -14 days

Clinical features

- **There are three stages in the natural history of measles. These are -**
 - 1. Prodromal or pre-eruptive stage**
 - 2. Eruptive stage**
 - 3. Post-measles stage**

1. Prodromal stage

- ❑ It begins 10 days after infection, and lasts until day 14.
- ❑ It is characterized by fever, coryza with sneezing and nasal discharge, cough, redness of the eyes, lacrimation and often photophobia.
- ❑ There may be vomiting or diarrhoea.
- ❑ **Koplik's spots** -
 - ✓ appears on a day or two before the appearance of the rash
 - ✓ Table salt like crystals appears on the buccal mucosa opposite the first and second lower molars.
 - ✓ They are small, bluish-white spots on a red base, smaller than the head of a pin .

Koplik's spots



Fig 1. Maculopapular rash



2. Eruptive phase

- ❑ Typical, dusky-red, macular or **maculo-papular rash**
- ❑ Rash begins behind the ears and spreads rapidly in a few hours over the face and neck, and extends down the body taking 2 to 3 days to progress to the lower extremities.
- ❑ The rash may remain discrete, but often it becomes confluent and blotchy.
- ❑ In the absence of complications, the lesions and fever disappear in another 3 or 4 days signalling the end of the disease.
- ❑ The rash fades in the same order of appearance leaving a brownish discoloration which may persist for 2 months or more.

- ❑ During the prodromal phase (2-4 days) and the first 2-5 days of rash, virus is present in tears, nasal and throat secretions, urine and blood.**



3. Post-measles stage

- ❑ The child will have lost weight and will remain weak for a number of days.**
- ❑ There may be failure to recover and a gradual deterioration into chronic illness due to increased susceptibility to other bacterial and viral infections, nutritional and metabolic effects and the tissue destructive effects of the virus.**
- ❑ There may be growth retardation and diarrhoea, cancrum oris, pyogenic infections, candidosis, reactivation of pulmonary tuberculosis etc.**

DIAGNOSIS

- **Diagnosis is based on the typical rash and koplik's spots seen in oral mucosa.**
- **Specific IgM antibodies are also being used for diagnosis.**

Complications

- Diarrhoea
- Pneumonia - most common life threatening
- Otitis media -5-15% cases
- Other respiratory complications
- Neurological complications - febrile convulsions, encephalitis and subacute sclerosing pan-encephalitis (SSPE).
- SSPE - It is a rare complication which develops many years after the initial measles infection
- Encephalitis - occurs in about 1 in 1000 cases.
- It is associated with spontaneous abortion and premature delivery

CASE MANAGEMENT

- ◉ Prophylactic Antibiotics can be given
- ◉ Attendants to use mask and gown
- ◉ Watch for complications
- ◉ Vitamin A for measles case management

Vitamin A supplementation is required in all cases of severe measles, A High dose of vitamin A is given after diagnosis and repeated next day .

Age	Day1	Following Day
0-6 months -	50000 IU -	50000 IU
6-11 months -	100000 IU-	100000 IU
≥ 12 months -	200000 IU	200000 IU

Prevention of measles

1. Measles vaccination
2. Immunoglobuline

1. Measles vaccine

- 1. Vaccine - live attenuated vaccine**
- 2. Age - at 9 months**
- 3. Administration - subcutaneous**
- 4. Immunity response - induces both humoral and cellular immune responses**
- 5. Reaction - induces a mild "measles" illness (fever and rash) 5 to 10 days after immunization, but in reduced frequency and severity.**
- 6. Immunity - develops on 11 to 12 days after vaccination and appears to be of long duration, probably for life.**
- 7. Contraindication - pregnant women , severely immunocompromised**
- 8. Adverse effects of vaccine - Toxic shock syndrome**

2. Immunoglobulin

- Measles may be prevented by administration of immunoglobulin (human) early in the incubation period.
- Dose - 0.25 ml per kg of body weight
- It should be given within 3-4 days of exposure.
- The person passively immunized should be given live measles vaccine 8-12 weeks later.

GUIDELINES FOR COMBATING MEASLES

- **1. Achieving an immunization rate over 95%.**
- **2. Ongoing immunization against measles through successive generations of children.**

Epidemiology of Rubella



Introduction

- **Rubella**, commonly known as **German measles**, is a disease caused by Rubella virus. The name is derived from the Latin, meaning ***little red***.
- Rubella is also known as German measles because the disease was first described by German physicians, Friedrich Hoffmann, in the mid-eighteenth century.

- **Rubella is accompanied by low grade fever, lymphadenopathy and a maculopapular rash.**
- **Infection in early pregnancy may result in serious congenital defects including death of the fetus.**

History - Rubella

The Teratogenic property of the infection was documented by an Australian **ophthalmologist Norman McAlister Gregg, in 1941**



AGENT

- Rubella is caused by an RNA virus of the **TOGAVIRUS** family. The virus can be propagated in cell culture.

SOURCE OF INFECTION

- Clinical or subclinical case of cases of rubella. (A large number of rubella infections are subclinical. **This is one of the major differences between measles and rubella)**)

PERIOD OF COMMUNICABILITY

- Rubella is much less communicable than measles (due to absence of coughing).

- **The period of communicability probably extends from a week before symptoms to about a week after rash appears.**
Infectivity is greatest when the rash is erupting.

HOST FACTOR

AGE

- Mainly a disease of childhood.
- Usually affects children between **3 & 10 Years.**

IMMUNITY

- **One attack results in lifelong immunity.**

ENVIRONMENTAL FACTORS

- **Disease usually occurs in a seasonal pattern.**
- **In temperate zones during the late winter and spring, with epidemics every 4-9 years.**

TRANSMISSION

- The virus is transmitted directly from person to person by droplets from nose and throat and **droplet nuclei (aerosols)** from one week before the onset of rashes to one week after it has faded.

- **The portal of entry is through respiratory tract.**
- **The virus can cross placenta (vertical transmission).**

INCUBATION PERIOD

2 To 3 weeks; average 18 days.

CLINICAL FEATURES

- **A large percentage of infections are asymptomatic.**
- **However in a typical case, the clinical features compromise the following.**

PRODROMAL

- The prodromal symptoms are coryza, sore throat, low-grade fever mark the of viraemia.

LYMPHADENOPATHY

- In susceptible individuals, the enlargement of the post auricular and posterior cervical lymph node **appears as early as 7 days before the appearance of the rash.**

- **The enlarged glands may be found 10-14 days after the rash.**

- It is a minute, discrete, pinkish, macular rash and not confluent as the rash of measles.
- **Conjunctivitis may occur.**

- **The rash spreads rapidly to the trunk and extremities, by which time it is often no longer apparent on the face.**
- **The rash spreads much faster and clears more rapidly than the rash of measles.**

COMPLICATIONS

- **In rare instances arthralgia may occur in several joints in adults.**
- **Thrombocytopenic purpura has also been observed as a complication.**

Diagnosis of Rubella in Adults

- ◆ Clinical Diagnosis is unreliable
- ◆ Many viral infections mimic Rubella
- ◆ Specific diagnosis of infection with
 - 1 Isolation of virus
 - 2 Evidence of seroconversion

CONGENITAL RUBELLA

- **Congenital Rubella Syndrome (CRS) refers to infants born with defects secondary to intrauterine infection or **who manifest symptoms or signs of intrauterine infection sometime after birth.****

- Rubella infection inhibits cell division and this is probably the reason for **congenital malformations and low birth weight.**

- **The classical triad of congenital defects are deafness, cardiac malformations and cataracts.**
- **Other resulting defects include glaucoma, retinopathy, microcephalus cerebral palsy, IUGR,hepato-splenomegaly, and mental and motor retardation.**

Rubella

Rubella Syndrome



Microcephaly



PDA



Cataracts



- **The first trimester of pregnancy is crucial and disastrous for the foetus as the organogenesis takes place. Maternal infection during this time is directly associated with congenital abnormalities.**

Rubella infection – At various trimesters

- ◆ 1st trimester infections lead to abnormalities in 85 % of cases. and greater damage to organs
- ◆ 2nd trimester infections lead to defects in 16 %
- ◆ > 20 weeks of pregnancy fetal defects are uncommon
- ◆ However Rubella infection can also lead to fetal deaths, and spontaneous abortion.
- ◆ The intrauterine infections lead to viral excretion in various secretion in new-born upto 12-18 months.

OUTBREAK OF RUBELLA IN IRAQ

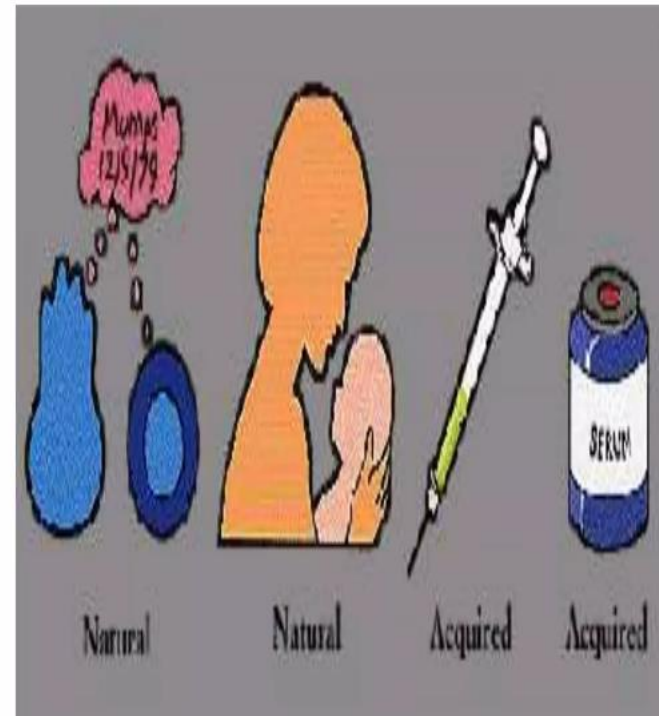
- Iraq had one outbreak of rubella in 2004. During this outbreak, Karbala, located southwest of Baghdad, reported the highest incidence of rubella (14.4 per 100,000 persons) and the largest number of cases (113 total)

Treatment and Prevention

- ◆ Rubella is a mild self limited illness.
- ◆ No specific treatment or Antiviral treatment is indicated.
- ◆ However Laboratory proved and clinically missed Rubella in the 1st 3-4 months of pregnancy is associated with fatal infections.

Immunity - Protects

- ◆ One attack of Rubella infection, protects for life
- ◆ Immune mothers transfer antibodies to off springs who are in turn are protected for 4 – 6 months.



Prevention and Treatment

- Rubella vaccine is given to children at 15 months of age as a part of the MMR (measles-mumps-rubella) immunization.
- The vaccine is live and attenuated and confers lifelong immunity.
- There is no specific treatment for Rubella; management is a matter of responding to symptoms to diminish discomfort.

QUESTION??

REFERENCE :MANUAL OF COMMUNICABLE DISEASES