

Clinical Guideline

Rubella Infection in Pregnancy Clinical Guideline

Policy developed by: SA Maternal & Neonatal Clinical Network

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Summary Guideline for the management of the pregnant woman with Rubella

Keywords rubella, german measles, virus, fever, erythematous, rash, lymphadenopathy, rubella, mental, deafness, cardiac, microcephaly, intrauterine growth retardation, brain, liver, lungs, bone marrow, fetal, maternal, vaccination, IgG, IgM, seroconversion, termination, first trimester, amniocentesis, fetal blood sampling, EDTA, cord blood, pharyngeal swab, conjunctival swab, neurological, epilepsy, cataracts, retinopathy, tooth defects, growth retardation, clinical guideline

Policy history Is this a new policy? **N**
Does this policy amend or update an existing policy? **Y v3.0**
Does this policy replace an existing policy? **N**

Applies to All SA Health Portfolio
All Department for Health and Ageing Divisions
All Health Networks
CALHN, SALHN, NALHN, CHSALHN, WCHN, SAAS

Staff impact All Clinical, Medical, Nursing, Allied Health, Emergency, Dental, Mental Health, Pathology

PDS reference CG124

Version control and change history

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2.0	30 Nov 09	21 Sep 10	reviewed
3.0	20 May 13	7 Sept 15	reviewed
4.0	7 Sept 15	current	

rubella infection in pregnancy

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Note

This guideline provides advice of a general nature. This statewide guideline has been prepared to promote and facilitate standardisation and consistency of practice, using a multidisciplinary approach. The guideline is based on a review of published evidence and expert opinion.

Information in this statewide guideline is current at the time of publication.

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Health practitioners in the South Australian public health sector are expected to review specific details of each patient and professionally assess the applicability of the relevant guideline to that clinical situation.

If for good clinical reasons, a decision is made to depart from the guideline, the responsible clinician must document in the patient's medical record, the decision made, by whom, and detailed reasons for the departure from the guideline.

This statewide guideline does not address all the elements of clinical practice and assumes that the individual clinicians are responsible for discussing care with consumers in an environment that is culturally appropriate and which enables respectful confidential discussion. This includes:

- The use of interpreter services where necessary,
- Advising consumers of their choice and ensuring informed consent is obtained,
- Providing care within scope of practice, meeting all legislative requirements and maintaining standards of professional conduct, and
- Documenting all care in accordance with mandatory and local requirements

Explanation of the aboriginal artwork:

The aboriginal artwork used symbolises the connection to country and the circle shape shows the strong relationships amongst families and the aboriginal culture. The horse shoe shape design shown in front of the generic statement symbolises a woman and those enclosing a smaller horse shoe shape depicts a pregnant women. The smaller horse shoe shape in this instance represents the unborn child. The artwork shown before the specific statements within the document symbolises a footprint and demonstrates the need to move forward together in unison.



Australian Aboriginal Culture is the oldest living culture in the world yet Aboriginal people continue to experience the poorest health outcomes when compared to non-Aboriginal Australians. In South Australia, Aboriginal women are 2-5 times more likely to die in childbirth and their babies are 2-3 times more likely to be of low birth weight. The accumulative effects of stress, low socio economic status, exposure to violence, historical trauma, culturally unsafe and discriminatory health services and health systems are all major contributors to the disparities in Aboriginal maternal and birthing outcomes. Despite these unacceptable statistics the birth of an Aboriginal baby is a celebration of life and an important cultural event bringing family together in celebration, obligation and responsibility. The diversity between Aboriginal cultures, language and practices differ greatly and so it is imperative that perinatal services prepare to respectively manage Aboriginal protocol and provide a culturally positive health care experience for Aboriginal people to ensure the best maternal, neonatal and child health outcomes.

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Rubella

- > Rubella, also called German measles, is usually a mild infectious disease in children and adults that is clinically difficult to diagnose due to transient clinical features that are also common to a number of other virus infections

Clinical features

- > Rubella is asymptomatic in 25 to 50 % of cases. In some cases prodromal symptoms may be evident, such as:
 - > Low grade fever
 - > Transient erythematous rash
 - > Lymphadenopathy involving post-auricular and sub-occipital nodes
 - > Occasionally arthritis and arthralgia (commonly observed in women of child-bearing age)
 - > Rarely neurological disorders and thrombocytopenia¹
 - > The rash characteristically begins on the face and spreads to the trunk and extremities. It will usually resolve within three days in the same order in which it appeared (face first and then body)²
- > Maternal viraemia may occur 5 to 7 days after exposure with spread of the virus throughout the body as well as transplacental infection of the fetus⁴

Route of transmission

- > Droplet and contact with nasopharyngeal secretions

Incubation period

- > 14 to 23 days

Period of infectivity

- > One week before until 4 days after the onset of the rash¹

Infection precautions

- > Non-immune staff should not be assigned to care for the woman
- > Contact and droplet precautions (single room with own toilet facilities, surgical mask, dedicated equipment) should be used when caring for a woman / baby suspected of infection with rubella

Literature review

- > Maternal rubella infection in the first 8 to 10 weeks of pregnancy results in fetal damage in up to 90 % of affected pregnancies, usually with multiple defects¹
- > Following birth, if the baby survives, these infants have a persistent infection, shedding virus for 6-12 months⁵
- > Abnormalities associated with congenital rubella syndrome include:
 - > Central nervous system dysfunction (10-25%, intellectual impairment, developmental delay, microcephaly)
 - > Eye abnormalities (10-25%, cataracts, retinopathy, glaucoma, strabismus, microphthalmos)
 - > Sensorineural deafness (60-75%)
 - > Cardiac abnormalities (10-20%, PDA, PA stenosis)
 - > Intrauterine growth restriction, short stature
 - > Inflammatory lesions of the brain, liver, lungs and bone marrow³

- > The risk of fetal damage declines to 10 to 20 % by 16 weeks' gestation and has been rarely reported up to 20 weeks¹
- > The prominent abnormality in the second trimester is sensorineural deafness⁵
- > Maternal reinfection in immune women carries a risk of fetal damage of less than 5 %³
- > In recent years migrant and refugee communities especially from Asia and sub-Saharan Africa have been identified as having a much greater susceptibility to rubella than those born in Australia or developed countries due to disruption or absence of immunisation programs⁶

Maternal screening

- > Routine antenatal screening for rubella IgG is recommended for all pregnant women at their first visit
- > All pregnant women who have contact with rubella or clinical features consistent with rubella – like illness should be screened for the presence of rising antibody titre and / or rubella specific IgM
- > Serological confirmation is required before rubella can be diagnosed. Rubella is a notifiable disease
- > Download the appropriate notification form Report of Notifiable Condition or Related Death Form (PDF 72KB) from www.sahealth.sa.gov.au/NotifiableDiseaseReporting
- > This form is not to be sent by email for reasons of confidentiality
- > Notification should be made to the Communicable Disease Control Branch⁷ as soon as practicable and at least within 3 days of suspicion of diagnosis: Telephone 1300 232 272 or Facsimile (08) 8226 7187

Maternal diagnosis

Obtain maternal history

- > History of previous vaccination and results of any previous screening test for rubella immunity (IgG antibody level > 10 IU / mL) is usually protective against infection
- > Document stage of pregnancy when contact with rubella occurred
- > Identify duration / intensity of contact
 - > Living with a family member with rubella
 - > Workplace contact over how many hours / days
 - > Brief contact only
 - > Nature of contact – e.g. close personal contact as with kissing an infectious child
- > Any clinical / laboratory evidence for rubella in the contact
- > Stage of pregnancy when clinical rubella occurred / occurs in the mother
- > Features of clinical rubella in the mother

IgG positive and IgM positive

- > Indicates possible recent infection or reinfection
- > Repeat test to confirm (EIA or HAI on IgM fractions)
- > Positive IgM confirms rubella infection and/or a rise in IgG titre. As false IgM positives can occur, interpretation of serology by a medical virologist should be sought). Rubella IgG avidity testing may be indicated
- > Positive IgM and/or rise in IgG is consistent with maternal rubella infection
- > Offer appropriate counselling (see below)

IgG negative and IgM negative

- > Indicates susceptibility to rubella infection
- > Repeat serology if less than 3 weeks since contact or less than 7 days since onset of illness
- > If no seroconversion, rubella susceptible and immunise after delivery
- > If IgM or IgG seroconversion is confirmed, this is consistent with maternal rubella infection
- > Offer appropriate counselling as below

IgG negative and IgM positive

- > Indicates possible recent infection
- > Repeat serology
- > If no IgG seroconversion occurs it may be a false positive IgM. Immunise after delivery
- > If IgG seroconversion is confirmed, this is consistent with maternal rubella infection, counsel as below

IgG positive and IgM negative

- > Indicates past infection or immunisation
- > Manage as in positive antenatal screening

Counselling in case of seroconversion

- > Counsel woman regarding relevant risk to fetus in relation to timing of maternal infection and options for management (see in management of rubella below)
- > Termination of pregnancy should be offered if maternal infection occurs in the first trimester
- > Consider fetal testing if maternal infection occurs in the second trimester
- > Maternal infection after 20 weeks of gestation is rarely associated with congenital rubella syndrome

- > **NOTE:** Different laboratories use various cut-offs for reporting low IgG levels ranging from 7 to 50 IU/mL. Levels corresponding to protection from re-infection are imprecise, but only a small proportion of women are affected by re-infection
- > Re-infection can occur without detectable IgM. Previously stored serum should always be retrieved and tested in parallel with current serum (if available)

Maternal management of rubella

Primary infection

- > Risk of fetal infection and/or fetal damage or congenital rubella syndrome is related to the timing of maternal infection

Gestation (weeks)	1-12	13-16	17-22	23-30	31-36	>36
Rate of fetal infection %	80	54	36	30	60	100
Risk of congenital defects %	85	35	rare	rare	rare	rare

Re-infection

- > If asymptomatic re-infection with a good history of previous positive serology, then risk of fetal infection is < 10 percent
- > Risk of fetal injury is difficult to quantify and has been reported to be < 5 percent
- > Congenital rubella syndrome following maternal re-infection is considered rare particularly if re-infection occurs after 12 weeks
- > If the clinical picture is typically of rubella or previous immunity is inconclusive (based on serology), then risk must be assumed to be the same as for primary infection (see above)

Postpartum management

- > Vaccinate women found to be seronegative on antenatal screening before discharge with measles, mumps and rubella vaccine (i.e. rubella IgG < 10 IU / mL, or for women who were born in Australia or Western countries and whose antibody level is between 10 and 20 IU / mL)¹. For further information see URL:
<http://www.health.gov.au/internet/immunise/publishing.nsf/Content/Handbook-rubella>
- > They should have a second MMR 4 weeks after initial dose
- > Inform the woman to avoid pregnancy for 28 days after vaccination
- > Anti-D immunoglobulin does not interfere with the antibody response to vaccine. If anti-D immunoglobulin is also required, the two may be given at the same time in different sites with separate syringes, or at any time in relation to each other

Fetal diagnosis

- > Rubella PCR, rubella culture and fetal IgM can be performed following chorionic villus sampling (CVS) / amniocentesis or cordocentesis
- > Antenatal testing is recommended at least 6 weeks after known maternal infection and is best performed after the 20th week of gestation
- > PCR is not widely available and sensitivity is generally not well validated. However, a positive result will be helpful assuming that contamination can be excluded³
- > False negative fetal IgM is common until late in pregnancy

Amniocentesis

- > This is ideally performed 3 weeks after symptoms or estimated timing of a subclinical infection
- > Amniotic fluid is cultured for rubella virus. The cultures are maintained for 8 weeks before being considered negative. A negative culture does not completely exclude fetal infection. The likelihood of a positive culture falls rapidly after the first few weeks of culture
- > Samples will need to be sent to the Victorian Infectious Disease Reference Laboratory This should be arranged through SA pathology to ensure correct packaging and safe transport of specimens

Fetal blood sampling

- > Consult with a feto-maternal specialist for consideration of fetal blood sampling
- > If fetal blood sampling performed at 21-23 weeks serum is tested for rubella-specific IgM antibodies and ethylene diamine tetra acetate (EDTA) anticoagulated blood is cultured for virus isolation
- > Samples should be sent to IMVS for antibody studies and to VIDRL, Fairfield for viral culture
- > A negative IgM titre does not completely exclude fetal infection

Chorionic villus sampling

- > May be considered occasionally in the first trimester when couples are uncomfortable about termination of pregnancy based solely on the high risk of fetal infection and damage
- > Associated with risk of contamination with maternal tissue giving false positive PCR result
- > Possible uses of tissue obtained include culture for rubella virus, immunoblotting and probing of extracted RNA with a rubella specific gene probe. The former technique is available at VIDRL

Infant management

- > Ensure all clinicians caring for the newborn are rubella vaccinated and have specific antibodies detected
- > Paediatrician at delivery
- > Newborn assessment should include physical examination for evidence of congenital rubella syndrome (growth restricted, eye / cardiac abnormalities, rash, haematological abnormalities, pneumonitis, osteitis)³

Investigations

- > Cord blood IgM serology
- > Heel prick for IgM serology
- > Maternal blood for IgG, IgM serology
- > PCR for rubella (urine and pharyngeal swab)
- > Urine and pharyngeal and conjunctival (tears) swab for viral culture
- > Placenta for histopathology
- > Results can take several weeks

Clinical features of congenital rubella syndrome

Symptomatic Infected infant

- > Infant IgG greater than maternal IgG titre
- > IgM positive
- > PCR positive
- > Supportive management
- > Non-immune staff should not be assigned to care for infants with suspected or confirmed congenital rubella syndrome
- > Use contact and droplet precautions (single room with own toilet facilities, surgical mask, dedicated equipment)
- > Breastfeeding is not contraindicated
- > Ensure ophthalmology, cardiac and hearing assessment following birth
- > Serial follow up every 3 – 6 months for 12 months to detect any emerging abnormalities related to persisting infection (e.g. deafness, neurological deficiencies, epilepsy, cataracts, retinopathy, tooth defects and growth restriction)
- > Infants with congenital rubella syndrome should be presumed infectious at least through to 1 year of age unless nasopharyngeal and urine cultures are negative for rubella virus after 3 months of age. Contact between these infants and pregnant women should be avoided

No clinical features of congenital rubella syndrome

Asymptomatic infected infant (risk of late onset disease months or years after birth)

- > IgM positive
- > PCR positive
- > Management is as for 'Symptomatic infected infant' above

Infant probably not infected

- > Infant IgG less than maternal IgG
- > IgM negative
- > PCR negative
- > Reassure parents infection is unlikely
- > Encourage breastfeeding
- > Confirm absence of rubella infection with falling or absent IgG after 9 months of age

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Abbreviations

CVS	chorionic villus sampling
EDTA	ethylene diamine tetra acetate
e.g.	For example
EIA	Enzyme immunoassay
et al	And others
HAI	haemagglutination inhibition test
IgG	Immunoglobulin G
IgM	Immunoglobulin M
IMVS	Institute of Medical and Veterinary Science
IU	International units
mL	Millilitre(s)
NHMRC	National Health and Medical Research Council
PA	Pulmonary artery
PCR	Polymerase chain reaction
PDA	Patent Ductus Arteriosis
PDF	Portable document format
RNA	Ribonucleic acid
URL	Uniform resource locator
VIDRL	Victorian Infectious Diseases Reference Laboratory

Version control and change history

PDS reference: OCE use only

Version	Date from	Date to	Amendment
1.0	29 Mar 04	30 Nov 09	Original version
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