OBSTETRICS AND GYNAECOLOGY
CLINICAL PRACTICE GUIDELINE

Blood group and antibody screening in pregnancy

(previously titled 'Blood group management and clinically significant antibodies: RhD negative and RhD Positive women')

Scope (Staff):	WNHS Obstetrics and Gynaecology Directorate staff
Scope (Area):	Obstetrics and Gynaecology Directorate clinical areas

This document should be read in conjunction with this Disclaimer

Contents

Aims

- To determine the woman's ABO and rhesus D (RhD) blood and to detect the presence of red cell antibodies.
- Routine blood group and antibody testing in pregnancy will:
  - identify RhD negative women who may require RhD Ig

- detect and identify red cell antibodies
- identify pregnancies at risk of fetal and neonatal haemolytic disease resulting from clinically significant maternal antibodies crossing the placenta and entering the fetal circulation
- to identify antibodies which may be relevant to the safe provision of blood should it be required for transfusion

Background

It is important to understand that any woman can produce clinically significant antibodies in pregnancy that may cause Haemolytic Disease of the Fetus and Newborn (HDFN).

Blood group incompatibility between a pregnant woman and her baby can lead to maternal antibody sensitisation and transfer of clinically significant antibodies across the placenta which may cause HDFN.

RhD negative women

RhD negative women can develop anti-D antibodies if exposed to RhD positive fetal red cells. If this occurs, anti-D antibodies can cross the placenta, bind to and destroy RhD positive fetal red cells in subsequent pregnancies. Severe HDFN due to anti-D alloimmunisation can result in severe fetal anaemia, jaundice, hydrops and / or death.[1]

This can be prevented by the administration of RhD Immunoglobulin (RhD Ig) “Anti-D” to RhD negative women during pregnancy.

Prophylactic RhD immunoglobulin (RhD Ig) is a commercial preparation of human anti-D collected from Australian blood donors. Introduction of the postnatal administration of RhD Ig reduced the incidence of RhD alloimmunisation from about 13% to 2%, and the introduction of routine antenatal RhD Ig at 28 weeks and 34 weeks reduced the incidence of RhD alloimmunisation further to <0.2%.

Changes in 2023

RhD negative women will be offered non-invasive prenatal testing to predict the RhD status of their babies (RHD NIPT) to allow targeted antenatal RhD Ig prophylaxis from late 2023. WNHS will roll out RHD NIPT in a phased approach starting with women managed at KEMH followed by women managed at OPH in mid-2024.

The results of the RHD NIPT will guide healthcare providers to offer RhD Ig only to RhD negative women who are predicted to be carrying a RhD positive baby- see new guideline ‘WNHS Antenatal RHD NIPT for the Prediction of Fetal RhD Status’ [**NEW 2023**] (available to WA Health staff through HealthPoint).

If the RhD status of the baby is predicted to be RhD positive or is unknown (e.g. not tested, result inconclusive, RHD NIPT declined) the RhD negative women will continue to be offered prophylactic antenatal RhD Ig.

Antenatal blood group and antibody screening at WNHS

	Gestation			
	1st visit >20 weeks	**28 - 30 weeks**	**34 - 36 weeks**	**On admission**
RhD Positive	G&S (if not done in early pregnancy)	G&S		G&S if appropriate*
RhD Negative	G&S (if not done in early pregnancy) **Offer RHD NIPT**	Current* G&S	Current* G&S (if not done in this pregnancy)	G&S*

Notes:

* “Current” Group and Screen (G&S) is collected within two weeks of a request for RhD Ig.

Additionally, a pre-birth G&S should be collected on admission to the Labour and Birth Suite, Family Birth Centre, or the Pre-Admission Clinic if an elective Caesarean section birth is planned.

The request form accompanying blood samples to TMU must include:

- Previous history of transfusion
- Previous history of antibodies, especially if reported at an outside facility
- Previous number of pregnancies
- Gestation
- Dates of any prophylactic RhD Ig administered in the last 3 months, especially if administered outside of WNHS

Note: If the G&S is collected at an ‘external’ PathWest collection centre, the pathology request form must request the sample be sent to KEMH.

Antenatal visits

Initial visit

At the first antenatal visit a G&S is required for **ALL** pregnant women in order to:

- establish ABO and RhD blood group types
- test for the presence of red blood cell antibodies

If a copy of the pathology report does not accompany the woman to this visit, a blood sample should be taken for this purpose before she leaves the clinic.

Subsequent visits

Check results: Refer to section below Clinical Significance of Antibodies (in this guideline) if clinically significant antibodies are detected.

RhD negative women: For the management of RhD negative women, refer to:

- Transfusion Medicine Protocol: RhD Negative Women: RhD Immunoglobulin Products and Applications
- WNHS Antenatal RHD NIPT for the Prediction of Fetal RhD Status (available to WA Health staff through HealthPoint)

Clinical significance of antibodies

When clinically significant red cell antibodies are present during pregnancy, follow-up antibody testing is necessary to:

- identify a fetus at risk of HDFN
- predict which infants might require treatment, and should be monitored closely after birth due to their increased risk of jaundice and/or anaemia
- detect and identify new antibodies

If a red cell antibody is identified and deemed to be of clinical significance to the fetus, the antibody will be measured by “titre” or “quantification” and follow-up tests performed. Anti-D, anti-c and anti-K are frequently implicated with severe HDFN[2].

Red cell antibodies that cause HDFN are IgG and reactive by the Indirect Antiglobulin Test. The clinical significance of antibodies detected during routine prenatal testing should be discussed with a Maternal Fetal Medicine (MFM) Specialist and TMU. Refer to table 7.4 page 42 ‘Red Cell antibodies and the risk of haemolytic disease of the fetus and newborn’ within ANZSBT Guidelines for Transfusion and Immunohaematology Laboratory Practice (2020) (external website, PDF, 1.1MB).[2]

Monitoring women with red cell antibodies in pregnancy

1. If clinically significant antibodies are detected at the first antenatal visit, these antibodies will be identified, and a titration performed. Thereafter antibody investigation and titration should be repeated **every 4 weeks until 28 weeks** gestation and **then every 2 weeks thereafter** or as advised by TMU / Australian Red Cross Lifeblood (Lifeblood) Red Cell Reference laboratory. The TMU will refer anti-D and anti-c antibodies to Lifeblood for antibody quantitation.
2. A clinically significant rise in the antibody titre (or quantitation) will assist the clinician in determining when to initiate fetal monitoring, such as Doppler ultrasound and cordocentesis. Once fetal monitoring has been initiated the specialist will determine the frequency of further serological testing.
3. The MFM Specialists should perform an antepartum assessment of the severity of the HDFN.

   Indications for referral to an MFM Specialist include:

   - Any clinically significant antibody that may cause HDFN with the titre reaching or exceeding 1:32. The MFM Specialist and Haematologist/ TMU will advise on antibody significance.
   - Anti-K at any titre when the paternal phenotype is K positive.
   - All women who have had an infant previously affected by HDN should be referred to an MFM specialist as soon as possible and preferably before 20 weeks gestation irrespective of antibody level. The partner's blood group and phenotype should be obtained as early as possible in the pregnancy.

Cord blood sample

- A cord blood sample is collected from all babies born at WNHS and sent to TMU.
- A blood group and a Direct Antiglobulin Test (DAT) should be collected on all neonates born to a mother who:
  - is RhD Negative
  - is O positive (see CAHS Neonatology Jaundice guideline)
  - has known clinically significant antibodies
  - maternal blood group and antibody status unknown

  (any or multiple may apply)
- RhD negative women: Check the cord blood result. If RhD Positive neonate:
  - Collect a Kleihauer on all mothers who birth an RhD positive neonate (based on cord sample result) - see Transfusion Medicine Kleihauer guideline.
  - Baby's blood group must be confirmed as RhD positive prior to the administration of prophylactic RhD Ig (postnatal prescription needed) to a RhD negative mother.
- A neonatal blood group and DAT should be collected for all neonates with unexplained jaundice. If the DAT is positive, a bilirubin estimation and a haemoglobin level should be collected as a *peripheral blood sample taken from the neonate.

*Bilirubin may be performed on the cord sample ONLY if a cord sample is collected in a lithium heparin anticoagulant tube.

Administration of RhD Immunoglobulin (RhD Ig)

See:

- WNHS Antenatal RHD NIPT for the Prediction of Fetal RhD Status (available to WA Health staff through HealthPoint)
- Transfusion Medicine Protocol: 'RhD Negative Women: RhD Immunoglobulin Products and Applications' and
- Relevant WNHS Pharmacy SASAs for Rhesus D Immunoglobulin (RhD-Ig) (Anti-D):
  - Registered Midwives (general) on-site at KEMH / OPH
  - Registered Midwives in CMP

Abbreviations

ABO	Blood grouping ABO	MFM	Maternal Fetal Medicine
ARCBS	Australian Red Cross Blood Service	RhD	Rhesus D
DAT	Direct Antiglobulin Test	RhD Ig	Rhesus D Immunoglobulin
FAQ	Frequently asked questions	RHD NIPT	Rhesus D Non-invasive prenatal testing
FMH	Fetomaternal haemorrhage	SASA	Structured Administration and Supply Arrangement
G&S	Group and screen	TMU	Transfusion Medicine Unit
HDFN	Haemolytic Disease of the Fetus and Newborn	WNHS	Women and Newborn Health Service
IgG	Immunoglobulin G		

References

1. Royal College of Obstetricians and Gynaecologists. The management of women with red cell antibodies during pregnancy: Green-top guideline No. 65. **RCOG**. 2014. Available from: https://www.rcog.org.uk/media/oykp1rtg/rbc_gtg65.pdf
2. Australian and New Zealand Society of Blood Transfusion [ANZSBT]. Guidelines for transfusion and immunohaematology laboratory practice. **ANZSBT**. 2020. Available from: https://anzsbt.org.au

Related WNHS policies, procedures and guidelines

WNHS Clinical Guidelines:

- Transfusion Medicine Protocols:
  - RhD Negative Women: RhD Immunoglobulin Products and Applications
  - The Kleihauer Test and Feto-Maternal Haemorrhage
- Obstetrics and Gynaecology
  - Antenatal RHD NIPT for the Prediction of Fetal RhD Status (available to WA Health staff through HealthPoint)
  - Pathology and Ultrasound Ordering by Midwife/Nurse [moving to WNHS policy] (See Kleihauer: Requesting; Kleihauer, Postnatal: Requesting; Cord Blood Group: Requesting)
  - Blood Products and/or Components: Refusal of
- Pharmacy Medicines Management: **SASAs**:
  - **CMP**: Anti D (RhD) Immunoglobulin - CMP
  - **General** (**KEMH and OPH midwives**): Anti D (RhD) Immunoglobulin- General

Other related documents

- Australian Red Cross (Rhophylac information; Anti-D prophylaxis) Frequently Asked Questions About the Use of Rh D Immunoglobulin
- CSL Behring: RhD Immunoglobulin Product Information and Consumer Medicine Information

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Version history

Version number	Date	Summary
	Prior to Sept 2016	Archived individual guidelines dating from 2002- contact OGD Guideline Coordinator for previous versions.
1	Sept 2016	**History**: Titled as 'RhD Negative Blood Group: Management'. Amalgamated five individual O&G guidelines (A1.9.1-4 & B1.1.13) on blood product management dating from 2002: **Supersedes**: 1. (A1.9.1) Blood Group and Antibody Screening in Pregnancy 2. (A1.9.2) The Kleihauer Test 3. (A1.9.3) Rh (D) Immunoglobulin (formerly Anti- D) 4. (A1.9.4) Administration of Rh (D) Immunoglobulin 5. (B1.1.13) Rh (D) Immunoglobulin at 28 and 34 weeks in antenatal clinics: Prophylactic administration

		Changes: Checking procedure described with more detail- patient identity involves the woman stating her name, DOB and cross checked against ID band (if inpatient) as per blood checking procedure.
2	Aug 2018	• Title changed to 'Blood Group Management and Clinically Significant Antibodies: Rh D Negative & Rh D Positive Women' • Kleihauer not performed under 20 weeks gestation • 'Principles of Management of Isoimmunisation' section amended- further details added regarding quantification and titre sample timings- read section
3	Sept 2022	• Title changed to 'Blood Group and Antibody Screening in Pregnancy' • Content made more concise. Links added to administration content now moved to Transfusion Medicine Protocols and related SASAs. • Repeat G&S at 28-30 weeks (testing for antibodies in all women regardless of RhD positive or negative status)
4	Oct 2023	• New RHD NIPT testing offered at KEMH PathWest for RhD negative women. Link added to new Antenatal RHD NIPT guideline. • Content condensed with links to TM guidelines for RhD negative women. See TM protocols for Kleihauer information. • Request forms accompanying blood samples to TMU to include previous number of pregnancies • Cord blood sent for blood group and DAT if the mother is O positive (see CAHS Neonatology Jaundice guideline)