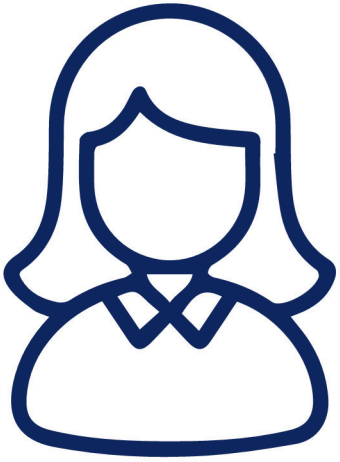
An tOspidéal Náisiúnta Máithreachais
The National Maternity Hospital

RhD-negative Blood Group: what it means for you and your pregnancy



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The information in this leaflet is not designed to replace the professional guidance provided by your clinician, hospital midwife or community midwife. Your clinician or midwife should explain your treatment plan (including alternatives) and associated risks, including risk of injury.

Please ask your doctor or midwife to explain any part of your treatment that you remain unsure of. There is a glossary of terms at the back of this booklet

This leaflet explains the standard of care given to pregnant women who have been identified as having an RhD-negative blood group. It explains the following:

- Why it is important to know your blood group
- Haemolytic Disease of the Fetus and Newborn
- Anti-D Prophylaxis
- Anti-D Immunoglobulin and Associated Risks
- Does every RhD-negative pregnant women need to get Anti-D?
- How will your unborn baby's RhD blood group type be determined?
- Test Results
- Receiving Anti-D Immunoglobulin (or not) is your choice
- What happens if you attend a different hospital in Ireland?
- Further information

If you have a recommendation to receive Anti-D Immunoglobulin, you need to remember:

If you have an ACCIDENT (e.g. minor car accident or fall) or experience BLEEDING (vaginal bleeding) while you are pregnant then you must call the Hospital 01 6373100

Anti-D Immunoglobulin needs to be given within 72 hours of the event.

Why it is important to know your blood group

When you attend Hospital for the first time during your pregnancy you will have several blood samples taken. One is used to test your blood group and check for Antibodies. Your blood will be typed for the most clinically important ones: the ABO blood groups (O, A, B or AB) and the RhD blood group (RhD-positive or RhD-negative).

If you are RhD-negative you can potentially develop Anti-D, an Antibody your body can make against RhD-positive red blood cells (RBCs). Anti-D is the most clinically significant red blood cell Antibody involved in the condition Haemolytic Disease of the Fetus and the Newborn (HDFN) which is explained in the next section. *Women who are RhD-positive will not develop Anti-D.*

Haemolytic Disease of the Fetus and Newborn

Haemolytic Disease of the Fetus and Newborn (HDFN), is a condition that can affect the blood of a fetus or a newborn baby. You may hear it being called Rhesus Disease (RhD).
HDFN can happen where there is a difference between the blood groups of a mother and her unborn baby. The mother can make substances called Antibodies that attack the baby's Red Blood Cells (RBCs).

This is important when an RhD-negative mother is carrying an RhD-positive baby. If any of the RhD-positive baby's RBCs get into the blood of an RhD-negative mother, her immune system may recognise the baby's RhD-positive RBCs as 'foreign' and produce Anti-D.

The Anti-D can cross from the mother's blood into the baby's blood (still in the womb), and destroy the baby's RBCs. This destruction causes anaemia, jaundice and in severe cases brain damage or even death. This can happen in the womb or after delivery.

Normally the first pregnancy is not affected. However, the Antibodies remain in the mother's blood and they may damage the RBCs of subsequent babies (with the same blood group as the first). HDFN is largely preventable with the administration of Anti-D injections in pregnancy as explained in the next section.

Anti-D Prophylaxis

The development of Anti-D in women who are RhD-negative can be prevented. This is done by injecting RhD-negative women with Anti-D Immunoglobulin (Rhophylac™). Anti-D Immunoglobulin stops women developing Anti-D, even though her baby's RhD-positive RBCs have entered her blood. This has been done in many countries since the 1960s. At The National Maternity Hospital, Anti-D Immunoglobulin is offered in three situations:

- **Antenatal Anti-D Prophylaxis Following Event:** Anti-D Immunoglobulin is given in response to a recognisable event (known as a Potential Sensitising Event; PSE) that could result in your baby's RBCs going into your blood. These situations include: bleeding in your pregnancy, unusual abdominal pain; following injury to your abdomen (tummy), such as a fall or blow, after miscarriage, ectopic pregnancy or termination of pregnancy, after an amniocentesis, chorionic villus sampling (CVS) and external cephalic version (ECV). *Anti-D Immunoglobulin must be given each time you have a PSE and within 72 hours of the PSE.*
- **Routine Antenatal Anti-D Prophylaxis:** A dose of Anti-D Immunoglobulin is given at 28-weeks gestation. This is called Routine, as it happens whether or not there is any recognisable PSE. It is designed to catch PSEs that you were not aware of.
- **Postnatal Anti-D Prophylaxis:** When your baby is born, and is confirmed RhD-positive you will be given more Anti-D Immunoglobulin. *Anti-D Immunoglobulin should be given within 72 hours of delivery.*

Anti-D Immunoglobulin and Associated Risks

Anti-D Immunoglobulin is made from human plasma, collected from carefully selected donors. The donors are screened for specific markers of infectious agents including HIV, HBV and HCV. However, as with all human-derived medicines, the possibility of transmitting infective agents cannot be totally excluded.

You may experience some soreness at the injection site. This is common and can last from a few hours to a day or two. Less commonly you may experience a mild fever, headache or rash. Very occasionally women can experience an allergic reaction to Anti-D injections.

Anti-D Immunoglobulin will not harm your baby in any way. If you have any concerns, please speak to your midwife or doctor.

Does every RhD-negative pregnant women need to get Anti-D?

The answer is no. Only pregnant RhD-negative women who are carrying an RhD-positive baby need to get Anti-D Immunoglobulin.

At the National Maternity Hospital approximately 40% of pregnant RhD-negative women carry an RhD-negative baby and therefore do not need Anti-D Immunoglobulin at any time during their pregnancy.

The National Maternity Hospital has introduced a system of targeted Anti-D Prophylaxis, where the RhD blood group of your baby will be determined at either your Booking Visit (if you are known to be RhD negative) or if of unknown group you will be invited to re-attend for the test. This allows Anti-D Immunoglobulin to be given only to those women who require it.

How will your unborn baby's RhD blood group type be determined?

When you are pregnant, a small amount of your baby's DNA can be found in your blood. This is known as cell-free fetal DNA (cffDNA). By testing this cffDNA from your blood, it is possible to determine the unborn baby's RhD blood group, in a very safe way. The test is called the Fetal RHD Screen.

Testing will be carried out by a special laboratory, at the Irish Blood Transfusion Service. Please note that the test only checks the baby's RhD type. It does NOT test for genetic disorders.

Twin or multiple pregnancy: You should have the Fetal RHD Screen, even if you carry more than one baby. If at least one of your babies is RhD-positive you will need Anti-D.

If your RhD type is already known to be RhD-negative, from a previous pregnancy, then a blood sample will be taken at your Booking Visit (provided you have reached at least 11 weeks of pregnancy). If it is your first pregnancy, then your blood group will be determined first; if you are RhD-negative, then you will be asked to return to another clinic, for a second sample to be taken to perform the Fetal RHD Screen.

Please note: The Fetal RHD result applies to the current pregnancy only. The test should be repeated in each pregnancy.

Test Results

Baby is RhD-positive: If the test identifies your baby as being RhD-positive, then it is recommended that you receive Anti-D Immunoglobulin. If an RhD-positive result is obtained for your baby, a report will be issued.

Due to the biology of RhD, approximately 2% of these babies will actually be RhD-negative. This is of no concern as Anti-D prophylaxis would have been offered in all cases if DNA testing had not taken place and the injection will not harm your baby.

Baby is RhD-negative: If the test identifies your baby as being RhD-negative, then it is recommended that you do not receive Anti-D Immunoglobulin. If an RhD-negative result is obtained for your baby, a report will be issued only when gestation is ≥11-weeks.

Inconclusive: Inconclusive results may occur for technical reasons (insufficient fetal DNA / sample was taken too early in the pregnancy) or where the mother has an unusual RhD blood group / maternal RHD gene is present.

If the test gives an inconclusive result due to technical reasons a repeat sample will be requested and you will remain eligible to receive Anti-D Immunoglobulin if required.

If the inconclusive result is due to the presence of a maternal RHD gene then it is not possible to determine Fetal RHD type and in these cases antenatal Anti-D immunoglobulin will always be offered/given and the post delivery Anti-D injection will be based on the blood group on a baby sample taken directly from the umbilical cord after delivery.

Test Accuracy

The Fetal RHD Screen is a very accurate test, capable of detecting very small amounts of your baby's DNA. If the unborn baby is predicted to be RhD negative there is a very small chance (0.1%, or 1:1000) that the baby might be found to be D positive after birth. In this case, you will be given an Anti-D injection at that time.

What is the risk when my baby was predicted to be RhD negative but tests RhD positive at birth?

There is a very low risk of making Anti-D if you do not get antenatal Anti-D Immunoglobulin, due to an incorrect RhD-negative test result. About 1% of RhD-negative women will develop Anti-D, if they miss their Anti-D Immunoglobulin at 28-weeks' gestation (but do receive it at delivery). When you get Anti-D Immunoglobulin at both 28-weeks' gestation and at birth, then this falls to 0.35%.

What is the risk when my baby was predicted to be RhD positive but tests RhD negative at birth?

Due to the biology of RHD blood group, approximately 2% of babies who were predicted to be RhD positive based on the Fetal RHD screen will actually be RhD-negative. These are called false positive Fetal RHD screen results. They occur for various reasons, baby has a variant RHD gene (cells do not express the RhD group protein), technical reasons or vanishing twin. This is of no concern as Anti-D prophylaxis would have been offered in all cases if DNA testing had not taken place and the injection will not harm your baby.

After Delivery

Following delivery of your baby, a sample will be taken from the umbilical cord to confirm the RhD blood group of the baby. This will determine the need for postnatal Anti-D immunoglobulin injection. In the event of a false positive result (fetal RHD screen predicted RhD positive but the cord or baby sample tests as RhD negative), a repeat sample will be taken from the baby to confirm / exclude incorrect sample labelling. The possible reasons for the different results will be explained by your doctor or midwife and Anti-D injection may still be offered if your baby is believed to have a variant RhD blood type.

Receiving Anti-D Immunoglobulin is your choice

You can ask to receive Anti-D Immunoglobulin, even if the Fetal RHD Screen result predicts that your baby is RhD-negative. Similarly you can ask not to receive Anti-D Immunoglobulin, even if the Fetal RHD Screen result predicts that your baby is RhD-positive. Your midwife or doctor will help you understand the implications of the result from the Fetal RHD Screen and will discuss your treatment options.

What happens if you attend a different hospital in Ireland?

All hospitals in Ireland will give Anti-D Immunoglobulin when appropriate for potentially sensitising events, routinely at 28-30 weeks and at birth. However, not all hospitals send samples for the Fetal RHD Screen test. They may not be familiar with the result and the implications of the result.

It is possible that if you attend a different hospital, they may want to give you Anti-D Immunoglobulin, even if your baby is predicted to be RhD-negative. Please let them know regarding the Fetal RHD Screen result and request them to ring and talk to your midwife or doctor at The National Maternity Hospital.

Data protection and sample retention

Both The National Maternity Hospital and the Irish Blood Transfusion Service keep records of all tests results and retains these for a period of 30 years (as required by EU Directive 2002/98/EC).

Both the National Maternity Hospital and the Irish Blood Transfusion Service are subject to, and comply with, Data Protection Acts 1988 and 2003.

The Irish Blood Transfusion Service will retain plasma from each sample, for the duration of the pregnancy and a period of up to 8 weeks after delivery. This is to allow investigation of any discrepant results identified at birth. If not required, all plasma will be discarded after this time.

Further information

If you have any questions about the information in the leaflet, or if you have any other concerns, please discuss these with your doctor or midwife.

For more information on technical aspects of the Fetal RHD Screen, visit: https://healthprofessionals.giveblood.ie/clinical-services/transfusion-transplantation/blood-group-genetics/fetal-rhd-screen-cffdna/

A - Z of useful terms

Amniocentesis: a test sometimes carried out in pregnancy to check on the baby's progress in the womb. A small sample of the fluid surrounding your baby is taken for laboratory tests.
Anaemia: levels of red cells in the blood which are below normal.
Antibodies: are produced by your immune system to fight against infections or anything foreign which enters your blood.
Anti-D: an Antibody which attacks red blood cells that are D positive. The main cause of HDFN.
Anti-D immunoglobulin: ready-made Anti-D which is given to stop you making your own Anti-D. The plasma used to make Anti-D injections undergoes effective infectious disease screening programmes. Please see the manufacturer's current Anti-D injection patient information leaflet for information on safety with regard to infections.
Blood group: ABO and D are blood groups, e.g. A, D positive or A, D negative. Your blood group is made up of natural substances on the surface of your red blood cells.
Haemolytic disease of the fetus and newborn (HDFN): anaemia and jaundice in newborn babies caused by Antibodies in the mother affecting the baby's red cells. This can cause anaemia, jaundice and in severe cases brain damage or death, either while the baby is in the womb or after delivery.
Jaundice: raised levels of waste products from the breakdown of red blood cells. It gives a yellow colour to a baby's skin and eyes.
Plasma: the liquid part of blood. Prophylactic Anti-D is made from the plasma of specially selected blood donors.
Prophylactic Anti-D: ready-made Anti-D given to D negative women to stop them making harmful Anti-D. (See also Anti-D immunoglobulin). Prophylaxis: medicines given to prevent a harmful condition developing.

Red Cell Antibodies: Antibodies are produced by your immune system to fight against infections or anything foreign which enters your blood. Red cell Antibodies are your body's natural defence against red blood cells which are different from your own. Antibodies can destroy red blood cells.
Rhesus disease: is now known as Haemolytic Disease of the Fetus and Newborn (HDFN) caused by the Anti-D Antibody.
Rhesus positive or Rhesus negative: other names for 'D positive' or 'D negative' blood groups.
Routine antenatal prophylaxis: injections of ready-made Anti-D offered to women who are D negative to stop them making Anti-D. This is given during late pregnancy and after incidents which may cause your baby's red cells to leak into your blood.

The National Maternity Hospital
Holles Street
Dublin 2
D02 YH21
Ireland

01 637 3100

www.nmh.ie

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