Answers About Rh Immune Globulin

What does it mean to be Rh or D negative?

If you are Rh negative, your red blood cells do not have a marker called Rh factor on them. If you are Rh positive, your blood cells do have this marker. If your blood is exposed to blood with this marker (D positive blood), your immune system will react to the Rh factor by making antibodies to destroy the blood cells carrying it. In Canada, about 85% of people are Rh positive and 15% are Rh negative.

What is Rh sensitization?

If your baby's father or the person who provided you with sperm for this pregnancy is Rh negative, your baby will also have Rh negative blood and there is no possibility of becoming Rh sensitized. But if the baby's father or the person who provided sperm to you is Rh positive, there is a possibility of having an Rh positive baby. If you are Rh negative and your baby is Rh positive you can become sensitized to Rh positive blood. This means that cells in your immune system make antibodies to fight Rh positive blood in the same way they can make antibodies to fight germs. Most of the time your blood and your baby's blood do not mix. But, sometimes your baby's cells can get into your blood stream and cause you to become Rh sensitized. There is about a 12-16% chance of becoming Rh sensitized during pregnancy. It can take as little as 0.01 mL of blood for sensitization to occur. Certain things put you at a higher risk of becoming sensitized, such as:

- Physical trauma (such as a car accident or other injury)
- Invasive genetic testing such as chorionic villus sampling (CVS) or amniocentesis
- Miscarriage
- Abortion
- Turning a breech baby (external cephalic version)
- Placental abruption (bleeding in the uterus)
- Giving birth

What are the risks to my baby if I become Rh sensitized?

Becoming Rh sensitized during your first pregnancy isn't usually a problem for the baby. But, if you get pregnant again with another Rh positive baby, your immune system can start attacking that baby's red blood cells. This can make your baby sick with something called Rh disease or Hemolytic Disease of the Fetus and Newborn. Rh disease can cause anemia, jaundice or, in some cases, very serious problems such as brain damage or even death. If you are at risk, Rh sensitization can almost always be prevented. If you are already Rh sensitized, treatment is available for Rh disease.

How do I know if I am Rh sensitized?

A blood test is the only way to check your blood type and find out if you are Rh sensitized. Your midwife will test your blood during one of your first appointments and then again at 28 weeks. If you are Rh negative you will also be offered a blood test after birth to check for Rh antibodies.

Can Rh sensitization be prevented?

Rh sensitization can be prevented with Rh Immune Globulin (sometimes called WinRho®). Rh Immune Globulin is a human blood product that has been used in Canada since 1968 to prevent Rh disease. It is a shot (injection) that contains Rh antibodies.

When your immune system makes its own antibodies to fight a germ, cells in your immune system 'remember' the germ. If you ever come in contact with that germ again, your immune system is ready to fight it. A similar immune response occurs if you are Rh negative and are exposed to Rh positive blood. But, if your midwife gives you shots with Rh antibodies in them, your immune system is "fooled" and it doesn't make antibodies of its own. The Rh antibodies your midwife gives you won't stay in your blood forever. So, the next time you have an Rh positive baby, your body won't recognize the Rh positive blood and won't attack the baby's red blood cells. Getting the shot of Rh Immune Globulin is 99.9% effective in preventing Rh sensitization. During every pregnancy your midwife will offer you a shot of Rh Immune Globulin:

- at 28 weeks of pregnancy
- within 72 hours after you give birth if your baby is Rh positive
- following miscarriage, therapeutic abortion, amniocentesis, chorionic villous sampling, and trauma (like a car accident or a bad fall while pregnant)

What are the Risks of Rh Immune Globulin?

Because Rh Immune Globulin is made from human blood, there is always a small risk of being exposed to viruses that the blood donor may have carried. However, in Canada all blood donors are screened for infection and all the Rh Immune Globulin is chemically treated and mechanically filtered to kill and remove viruses.

What are the possible side effects of getting the Rh Immune Globulin shot?

Most people who receive Rh Immune Globulin don't experience any side effects. Usually your midwife will stay with you for about a half hour after giving you the shot to make sure you don't experience any immediate problems. Some possible side effects include:

- Pain and swelling where you received the shot
- Slight fever
- Feeling unwell (malaise)

- Headache
- Mild allergic reaction (hives)
- With any blood product, there is a small risk of anaphylaxis (a severe allergic reaction that can make it difficult to breathe)

What happens if I choose not to get Rh Immune Globulin?

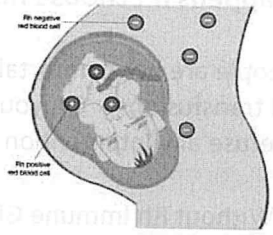
Some people are not comfortable receiving any human blood products (such as Rh Immune Globulin or blood transfusions). Or, you may have other concerns about receiving this shot. You are always free to refuse any intervention that your midwife offers to you. It is important to understand that:

- Without Rh Immune Globulin, there is a 12 to 16% chance that your body will form Rh antibodies. If you become Rh sensitized and become pregnant again, there is a risk that your next baby will become very sick or that the pregnancy will not be able to be carried to term.
- The problems related to Rh disease tend to get worse with each Rh positive pregnancy you have.
- There are no effective alternative treatments to prevent Rh disease. Rh Immune Globulin is the only way to prevent Rh disease in babies.

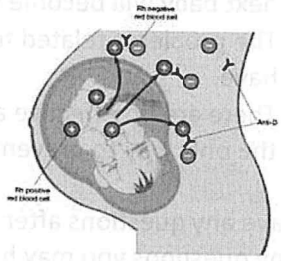
If you have any questions after reading this handout, talk to your midwife. If it helps, you can write down any questions you may have and bring this sheet with you to your next appointment.

Rh Sensitization

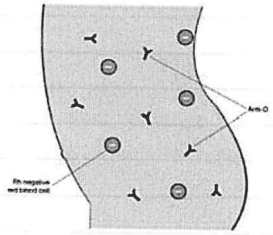
Rh negative (-) woman with Rh positive (+) baby.



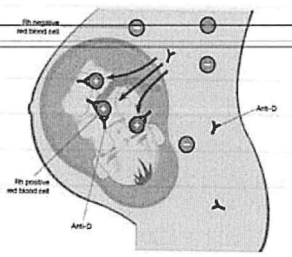
Baby's cells enter the woman's blood stream and she may become sensitized. This means the woman's body makes antibodies (**Y**) to fight the baby's Rh positive (+) red blood cells.



The woman's body will keep a memory of these antibodies (**Y**) in case Rh positive blood cells enter her bloodstream again in the future.



If the woman becomes pregnant again with an Rh positive (+) baby, her body may make large amounts of antibodies (**Y**) to attack the baby's blood cells. This can make the baby very sick with a disease called Rh disease or Hemolytic Disease of the Fetus and Newborn.



Hemolytic Disease of the Fetus and Newborn and its Prevention with Rh Immune Globulin- Information for Midwives

Hemolytic Disease of the Fetus and Newborn

Hemolytic Disease of the Fetus and Newborn (HDFN) is caused by maternal IgG antibodies directed against fetal red blood cell (RBC) antigens inherited from the father or sperm donor and absent from the mother's RBCs. Although most HDFN is caused by anti-D antibody formed by Rh(D) negative clients, RBC antibodies directed against other RBC antigens can cause HDFN, which means that Rh positive clients may also be at risk of HDFN. The most commonly implicated antibodies, other than anti-D, are anti-K, anti-c, and anti-E. Some RBC antibodies do NOT cause HDFN, such as anti-Le, anti-Lu, and others. HDFN may not be apparent in a first pregnancy due to low levels of maternal antibody, but may occur in a second or later pregnancy due to antibodies formed during the first pregnancy.

Prenatal Testing

At the first prenatal visit a Group/Type and Screen is performed on the client's blood. Her blood is grouped for ABO and Rh, and screened for unexpected antibodies to RBCs, such as anti-K, anti-c, anti-E, and others. Because antibodies other than anti-D can cause HDFN, the antibody screen is important. If a client is Rh negative, and has not previously formed anti-D, she will require Rh Immune Globulin (RhIG) to prevent HDFN in case her baby is Rh positive. The Group/Type and Screen is repeated at week 28 to determine if the client has formed any new RBC antibodies since the first group and screen. Clients who have already formed anti-D, and clients who have antibodies other than anti-D, will not benefit from RhIG. If RhIG is to be used, it is important to perform the first prenatal group/type and screen and the 28-week Group/Type and Screen before the first dose. This will avoid confusion in interpretation of a Group/Type and Screen post RhIG due to passive anti-D (see below).

Rh Immune Globulin

Rh Immune Globulin (RhIG) is a blood product derived from human plasma, and contains IgG antibody to the D antigen. It is used to prevent HDFN in Rh negative clients who have not formed anti-D. The mechanism of action is not fully understood. Given at 28 weeks of pregnancy, after potentially immunizing events such as abdominal trauma, abortion or vaginal bleeding, and again within 72 hours of delivery of an Rh positive baby, RhIG reduces the client's risk of immunization to the D antigen by 99.9%. If RhIG cannot be given within 72 hours of delivery it should be given as soon as possible, up to 28 days post-delivery. Without RhIG, the risk of immunization is 12-16%, and the risk increases with each pregnancy. RhIG does not prevent HDFN caused by RBC antibodies other than anti-D. There are no alternatives to RhIG for prevention of HDFN due to anti-D.

RhIG is effective for about 12 weeks. One 300µg dose of RhIG protects the client from a transplacental bleed of 30 mL of fetal blood (=15 mL of fetal RBCs). After delivery, a test is performed on the client's blood to determine if there was a bleed of greater than 30 mL, which would therefore require additional dose(s) of RhIG. This testing is done either by the Kleihauer-Betke method, or by flow cytometry, and is required for all Rh negative clients who deliver an Rh positive or weak D positive baby, or a baby whose Rh group is unknown.

Tips for Management of Rh(D) negative Clients and the Use of Rh Immune Globulin

1. RhIG is used in Rh(D) negative clients only, to prevent hemolytic disease of the fetus and newborn (HDFN) due to anti-D antibody. RhIG is not indicated or effective in an Rh negative client who has already formed immune anti-D.
2. Some clients will have an unusual Rh blood type called 'weak D positive' or 'weak D'. There are many genetically-determined types of weak D. Most of these clients will not form anti-D when exposed to Rh positive blood, and are managed the same way as Rh positive clients, while others may form anti-D and are managed the same way as Rh negative clients. The only way to determine whether a weak D positive client is a candidate for RhIG is to perform genotyping. This is done at a Canadian Blood Services reference laboratory, and can be arranged through consultation with your local Transfusion Medicine Laboratory (TML).
3. HDFN can be caused by red cell antibodies other than anti-D, in both Rh positive and Rh negative clients. The most common of these antibodies are anti-K, anti-c, and anti-E. RhIG does not prevent HDFN due to any antibody other than anti-D. Follow the CMO Standards regarding Consult and Transfer of Care for these clients, who should be referred to a high-risk obstetrical unit. On the other hand, some red cell antibodies such as anti-Le, anti-Lu, and others do NOT cause HDFN.
4. All clients should have a blood group (also known as blood type) and antibody screen done at the first prenatal visit, and again at 28 weeks gestation. **RhIG must not be given** before the first group and screen is done (see next tip). At 28 weeks gestation, a blood sample for a second group and screen should be taken **before** giving RhIG.
5. When requesting a Group and Screen, always indicate if RhIG has been given, and when. This helps to differentiate between passive anti-D (present in RhIG) and immune anti-D (formed by the client's own immune system and capable of causing HDFN). RhIG administration can cause a positive antibody screen, which persists for weeks to months. A TML may be able to help you determine whether your client's anti-D is passive or immune. When in doubt, give RhIG if the client is otherwise a candidate for it.
6. When an Rh negative client delivers, the baby's blood group should be determined from a sample of cord blood. If the baby is Rh negative, RhIG is not necessary. If the baby is Rh positive, weak D positive, or of unknown Rh group, a Kleihauer-Betke or flow cytometry test is done on the client's blood to estimate the volume of fetal maternal hemorrhage during parturition, and to determine if more than one 300µg vial of RhIG is needed.
7. RhIG must be stored according to the manufacturer's directions and in compliance with national standards. The product must be stored in a temperature-monitored fridge connected to emergency power, with an alarm that is continuously monitored. It is usually stored at the local TML, where these standards can be met.
8. National standards require that every dose of RhIG be traceable to the individual client, in case of a product recall. A log sheet helps to keep track of which clients received which lot number of RhIG.