

Rare Blood Program

Information Guide for Physicians



Introduction

Rare blood flows in the veins of just a few people. Consequently, demand remains an exception. But when the need does arise, finding a blood donor can be a global race against the clock.

If a person with rare blood receives a unit of regular blood, even O negative, an immediate or delayed hemolytic reaction may occur if the person is immunized against a high frequency erythrocyte antigen.

For some of these patients, depending on the rarity of their blood, compatible units may require national and international searches. Weeks are sometimes needed to find the appropriate units.

By optimizing its bank, Héma-Québec hopes to meet demands for rare blood units in a few days, most often from blood collected at its own donor centres.

Providing transfusion support to patients with rare blood is a real challenge! Multidisciplinary cooperation is essential between the medical directors and staff of blood banks, treating physicians, nurses, and Héma-Québec staff.

THIS GUIDE IS INTENDED PRIMARILY FOR PHYSICIANS.

It contains useful information to:

- Demystify what rare blood is;
- Make transfusion needs known;
- Explain the reality of using rare blood and searching for donors;
- Guide physicians in the vital role they play in recruiting and raising awareness among patients and their family.

As first-line interveners, your support is crucial to promoting access to an optimal rare blood reserve.



What is rare blood?

As you know, the antigens on the surface of red blood cells determine the blood group. In addition to the ABO blood group systems and Rh factor, there are **more than 600 known antigens**.

A person's blood group is considered rare when it is found in less than **0.1% of the population**.

In addition, some combinations are less frequent, such as **D+E-c-K-; Fy(a-b-); Jk(b-) and S-**.

Between 2019 and 2020, four units of rare blood per month were delivered on average to Québec hospitals. The rarest blood delivered was Bombay and PEL negative.

Who needs rare blood?

PRE-EXISTING CONDITIONS

Patients who present with one or other of these two conditions need rare blood:

1. Patients who have developed antibodies against antigens (through alloimmunization) and who, consequently, need broader compatibility than simply ABO/Rh to prevent hemolytic transfusion reactions (**absolute need based on the antibody present**).
2. Patients with rare blood who could develop antibodies against the known antigens in the donor's blood and, consequently, need rare blood (**preventative need**).

ALLOIMMUNIZATION

Alloimmunization can arise following a blood transfusion or pregnancy. Some groups of patients are at greater risk of developing antibodies. This is especially the case for persons with sickle cell anemia, thalassemia, myelodysplastic syndrome or autoimmune hemolytic anemia.

HEREDITARY FACTOR

The hereditary factor of a blood group is one of the issues to consider. For example, it is almost impossible to find a rare blood type needed for the transfusion of an Asian patient in a Caucasian donor and vice versa. Another example, the blood group S-s-U- is unique to the Black community.

BLOOD GROUP COMPATIBILITY

When blood is phenotypically matched, i.e., blood group compatibility is optimal, patients have less risk of developing antibodies.

However, the presence of different blood groups varies based on the genetic background. For this reason, it is extremely important to expand the number of donors from all communities.

Below are a few rare blood types based on ethnic origin:

ORIGIN	TYPES OF RARE BLOOD
Hispanic	Di(b-)
Caucasian	Kp(b-), Vel-, k-, Lan-, GE:-2,-3
Pacific Islands	Jk(a-b-)
Black	Hy-, Jo(a-), hr ^B -, hr ^S -, Js(b-), S-s-U+ ^{var}
Japanese, Asia	Jr(a-)
Quebecer	PEL-

Source: The Blood Group Antigen Facts Book, Third Edition, Marion E. Reid, Christine Lomas-Francis, 2012

When a person's blood presents with rare antigens, it is extremely important that the person be registered in Héma-Québec's Rare Blood Bank. To do this, we need your help!

How to find a rare blood donor?

The area of the world in which you live can have an impact on what is considered rare blood and on the available reserve. In Québec, we are most in need of donors other than Caucasian, especially donors from Black communities.

BELOW ARE THE WAYS HÉMA-QUÉBEC CAN FIND A RARE BLOOD DONOR:

1. By **genotyping** current donors.

Donors from Black communities or ethnic groups other than Caucasian are the subject of in-depth analyses at Héma-Québec to identify rare blood donors. They are from the O or A blood group.

2. By a **serological study of patients in our reference laboratory**.

At the request of hospitals, Héma-Québec can conduct a serological study, i.e., search and identify patients' antibodies. **The in-depth analyses done make it possible to identify patients with rare blood.**

3. By conducting a **family study** among the relatives of a patient or donor who has rare blood.

Starting with siblings, since brothers and sisters are most likely to have the same blood because of the hereditary transmission of blood groups.

Only our shared screening efforts, combined with the generosity of donors who are aware, will enable us to increase the diversity of rare blood groups.

What happens when a potential rare blood donor is discovered?

Scenario 1

The genotyping of a current donor reveals rare blood

Héma-Québec informs **the donor** and raises awareness about the importance of a family study and of donating blood regularly. Where appropriate, Héma-Québec guides the donor and family through every step of the process.

Scenario 2

Rare blood is discovered following the serological study of a patient

Following the serological study, the hospital blood bank is informed of the results. The blood bank staff will inform you, as the patient's treating physician. From there, you will be invited to meet with **your patient** to raise awareness about blood donation and the importance of the family study, and to obtain the patient's consent.

Scenario 3

Rare blood is discovered following the family study

Héma-Québec informs **the family member** that he or she has rare blood and raises awareness of the importance of donating blood regularly. Héma-Québec guides the patient and family through every step of the process.

What happens when a frozen (glycerolized) unit is needed?

When Héma-Québec receives a request from a hospital, it turns to its rare blood bank to retrieve units of fresh or frozen blood that are compatible with the patient's blood.

Frozen (glycerolized) units are kept at -80°C and must be thawed (deglycerolized) before being sent to the hospital. A frozen unit keeps for 10 years, but once thawed, it must be used within a short timeframe, failing which it expires. **It is necessary, therefore, to carefully plan its use based on the thawing (deglycerolization) time required and its subsequent preservation period.**

Thawing rare blood involves a complex technique performed exclusively in Héma-Québec's Montréal laboratory.

NORMAL THAWING TIME IS 2.5 HOURS, AND THE EXPIRY TIME OF THE PRODUCT VARIES BASED ON THE FREEZING METHOD:

Open system freezing

- Expiry post-thawing: 24 hours.

Closed system freezing

- Expiry post-thawing: 7 days.

NOTE: Transportation time must be added to the above. When orders are shipped outside of normal business hours (Monday to Friday, 7 a.m. to 11 p.m.), allowance must be made for a longer delay.

Use of rare blood: what is the impact on the supply?

As much as possible, Héma-Québec attempts to provide fresh blood to patients. The first step is to verify whether donors of compatible rare blood types can donate blood.

If not, Héma-Québec turns to its frozen rare blood bank to supply units for Québec patients. If the bank has no unit or compatible donor, an appeal is then launched to the Canadian Blood Services (CBS), and lastly to international blood banks. In this case, allowances must be made for delays of several days or even several weeks.

Since rare blood is a precious commodity with limited resources, the offering must be managed with care at all costs **to avoid unnecessarily thawing units**. The role of the hospital staff is crucial.

TO BE CONSIDERED, BASED ON THE URGENCY OF THE TRANSFUSION

Planned transfusion:

- Encourage allogeneic donation. Autologous, if possible;
- Check the availability of the blood based on its rarity.

Urgent transfusion:

- Establish the clinical significance of the antibody, i.e., the probability that the recipient's antibodies will provoke hemolysis of the transfused red blood cells:

Based on whether it is an antibody that rarely causes transfusion reactions or a life-threatening situation, analyze the possibility of transfusing with a positive unit for the rare antigen.

Examples:

- Rare antibody that has clinical significance: anti-Jr^a, anti-Vel and anti-Kp^b.
- Antibody that rarely causes transfusion reactions: anti-Yt^a.

A stylized illustration of a diverse group of people in various shades of blue and white, set against a dark blue background. The figures are simplified and overlapping, representing a multicultural and inclusive community. A vertical red line is positioned to the left of the main text.

Your role as a physician

Various elements contribute to the efficacy of a blood and transfusion management program. You have a leading role to play in this. More specifically, your support is invaluable to explaining to patients what rare blood is and what the implications are for them.



In that sense, you are the designated person to:

RAISE AWARENESS

Raise awareness about blood donation and the importance of a family study with your patient.

- Explain the importance of the rare blood reserve;
- Inform your patient that loved ones and other rare blood donors can help when blood transfusions are needed.

INFORM

Give your patient written information about rare blood.

- To support you, Héma-Québec has produced a document intended for patients and their family. It contains simple information meant to demystify rare blood, explain the importance of blood donation and consent to a family study.

COMMIT

Ask your patient to sign the consent form so that Héma-Québec can contact him or her to donate blood or encourage outreach to family members as part of the family study, and forward it to Héma-Québec.

- Héma-Québec will follow up with the patient and family members once it receives the signed consent form (*ENR-03751 - Rare blood program - consent form*).

Forward the signed consent form to Héma-Québec by:

Email: rareblood@hema-quebec.qc.ca

Fax: 514-527-5900

**Have questions regarding our
Rare Blood Program?**

rareblood@hema-quebec.qc.ca

