

# Requests for red cells with rare blood types in the Netherlands

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In the Netherlands (16.9 million inhabitants), blood units are nationally provided by Sanquin Blood Supply, which includes a nationally organized rare donor program. Since the 1970s, donated red blood cell (RBC) units with rare blood types have been frozen and stored. This began as part of the European Bank of Frozen Blood of the Council of Europe, with contributions from several European countries. In 2006, this became the Sanquin Bank of Frozen Blood (SBFB). In early 2015, 1294 units of frozen blood with rare phenotypes were stored at the SBFB.

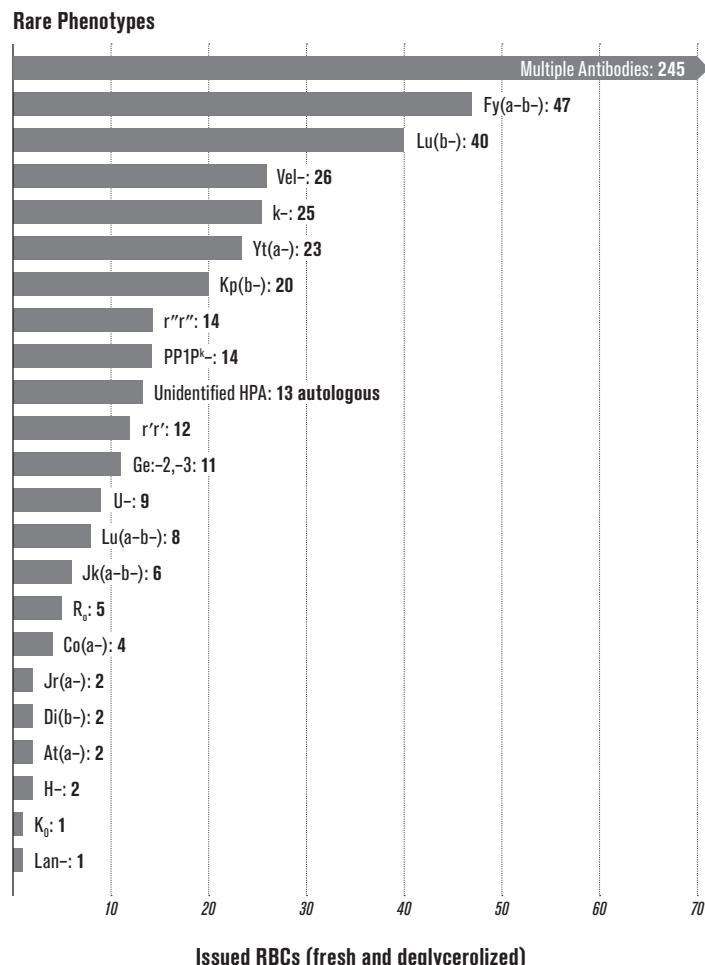
Sanquin Blood Bank uses a cohort of 380,000 regular, repeat blood donors and approximately 900 active rare donors, who are negative for a high-prevalence antigen. All donors donate on a voluntary basis and no incentives are given to rare donors.

We have different methods to enlarge the rare donor cohort. First, patients who have been identified with RBC alloantibodies and found to be negative for a high-prevalence antigen are asked to become rare donors. Second, family members of these patients are tested and asked to become donors if they are also negative for the antigen. Third, Sanquin Blood Bank types donors for different RBC antigens such as k, Lu<sup>b</sup>, and Kp<sup>b</sup> on a regular basis. In general, we add approximately 15 new rare donors to our database each year. When rare blood is needed, we prefer the use of a fresh unit from one of the rare donors rather than a deglycerolized unit.

Although the rare donor cohort consists of several rare blood types, and requests in general can be filled, there is a shortage of rare donors with non-Caucasian phenotypes such as U- or Js(b-). Currently, we are evaluating whether we should make more effort to find non-Caucasian donors to extend the rare donor population. Furthermore, extremely rare donors such as Rh<sub>null</sub> or K<sub>0</sub> donors are lacking in our cohort.

## Issued Units

Rare RBC units, either deglycerolized or fresh, issued between January 2008 and December 2014 for patients in the Netherlands are shown in Figure 1. All requests during this period were filled. The only incompatible units transfused



**Fig. 1.** Overview of the phenotypes of issued units of rare red blood cells (RBCs) in the Netherlands, both fresh and deglycerolized, between 2008 and 2014. HPA = antibody to high-prevalence antigen.

during this time period were for a few patients with weakly reactive (<2+) anti-Yt<sup>a</sup> because Rh-matched, Yt(a-) units were not available and no transfusion reactions were expected. In these cases, no additional measures were taken.

From 2008 to 2014, a total of 434 units of fresh RBCs were issued. Of these units, 429 (99%) originated from Dutch donors. In the same period, 98 units of RBCs with rare phenotypes were thawed and deglycerolized through the SBFB. Of these deglycerolized units, 63 (64%) originated from Dutch donors,

and the other 35 units (36%) were received from blood banks outside the Netherlands. The 434 units of fresh RBCs were issued for 137 patients and the 98 units of deglycerolized RBCs were issued for 40 patients. Of the patients who received fresh RBCs, 118 (86%) patients were female, of whom 57 were pregnant. A total of 100 (23%) units were issued during delivery. For the units of deglycerolized RBCs, 26 (70%) were for female patients of whom 10 were pregnant; 16 units (16%) were deglycerolized for use during delivery.

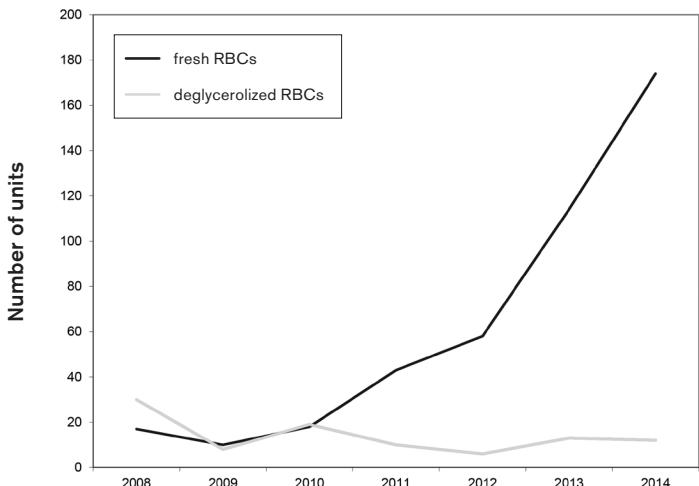
In the group of patients who received fresh RBCs, 28 patients (20%) received autologous units, as compared with 16 (40%) patients who received deglycerolized RBCs.

## Conclusions

Thanks to the national rare donor program, a steep increase in the issue of fresh RBC units and a decrease in the issue of deglycerolized RBC units have been observed in the last 7 years (Fig. 2). Of the fresh units of RBCs issued, 100 were ordered for female patients during delivery as compared with 10 units of deglycerolized RBCs. The relatively high proportion of units of fresh RBCs ordered for pregnant patients during delivery can be explained by the fact that it is easier and less costly to order units of fresh RBCs as a preventive measure than units of deglycerolized RBCs, ensuring a substantial contribution to optimize a patient's safety.

The overall contribution of autologous units is low, especially for fresh RBCs.

Because of the national rare donor program, almost all donors of fresh RBCs and a majority of the donors of the deglycerolized RBCs are of Dutch origin, thereby providing a self-sufficient blood supply. International collaboration, however, remains very important, especially when there is a need to find compatible blood for patients with non-Caucasian phenotypes.



**Fig. 2.** Overview of the total amount of fresh and deglycerolized red blood cell (RBC) units issued in the Netherlands between 2008 and 2014.

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