Rare donor program: Canadian Blood Services

M. Goldman and L. St. Croix

In Canada, two blood services are responsible for the provision of all blood components: Héma-Québec for the province of Québec and Canadian Blood Services (CBS) for the rest of Canada. There is close collaboration between the two organizations to ensure the provision of rare blood units; units are shipped between the two blood services when necessary. This article will focus on the rare donor program at CBS. CBS has approximately 425,000 active donors (donors who have donated in the past 18 months) who donate approximately 900,000 red blood cell (RBC) units per year. Of these, approximately 2,000 donors have a rare donor code, and 800 RBC units are found in the frozen rare inventory. The inventory is managed nationally, with units being sent throughout the country wherever they are needed.

Methods of Donor Screening, Recruitment, and Retention

Potential rare donors are found by several mechanisms. Close to 45,000 donors (approximately 10% of the active donor base), chosen based on ABO group, D type, and donation status, are phenotyped annually using an automated solid-phase platform, supplemented by manual testing. Implementation of the Immucor (Norcross, GA) NEO permits automated testing for the 11 common antigens (C, E, c, e, K, Fy^a, Fy^b, Jk^a, Jk^b, S, and s). When the typings have been performed on two separate donations, the phenotype will print on the donation label for all subsequent donations. Genotyping using an automated testing platform (Progenika-Grifols IDCore XT; San Marcos, TX) is done on samples with phenotypes of particular interest, such as group O, D– S– s–, or group O, D– Fy(a–b–), to identify rare donors. Genotyping is also being performed on samples from clinics with a high number of ethnically diverse donors and donors known to be missing a high-prevalence antigen originally typed using unlicensed serological reagents. Genotyping will be increasingly important to type donors of African origin, as there is an increasing need for RBC units to provide transfusion support for patients with sickle cell anemia. Identification of ethnically diverse donors for genotyping will be facilitated by the introduction of a voluntary question regarding donor ethnic origin in 2016. When an antibody to a high-prevalence antigen is identified in a prenatal patient, we attempt to recruit the individual to become a blood donor when she becomes eligible. We also attempt to obtain samples from family members of prenatal patients as well as patients with rare types identified by our diagnostic services laboratories. Testing of prenatal patients and family members of prenatal and diagnostic services patients has enabled us to find several rare donors whose phenotypes are not found on the automated genotyping platform, such as GE:–2,–3; Jr(a–); and Vel–.

We do not provide any incentives for rare donors. At the present time, these individuals are simply sent a letter explaining how rare their blood is. Often, they are contacted by phone to provide units for a given patient. We hope to develop more robust donor loyalty programs to retain these donors going forward.

Current Inventory, Imports, Exports, and Challenges

At the present time, we have 801 RBC units in our rare phenotype inventory (Table 1). On average, approximately 30 RBC units are deglycerolized every year. We currently have no Rh_{null} donors.

From 2011 through December 31, 2014, we imported 26 rare units from other countries and 9 rare units from Héma-Québec. Imported rare units included 7 K_0, 5 Jk(a–b–), 3 I–E–, 4 Co(a–), 2 Jr(a–), 2 Di(b–), 1 Rh_{null}, and 2 that were negative for multiple antigens. The American Rare Donor Program has graciously provided most of the international units imported, with the K_0 units coming from Japan and Finland, and the Rh_{null} unit coming from South Africa. Over the years, we have exported a small number of units including Bombay units to Australia and Kp(b–) Jk(b–) units to the United States.

We have had very few incompatible transfusion cases. In 2010, we were challenged by a patient who required AnWj– units.[1] We provided units that were truly AnWj– or expressed the In(Lu) phenotype. These units came from our own donors, as well as from Héma-Québec and international donors. We were unable to find crossmatch-compatible units for a pregnant female with sickle cell anemia with multiple alloantibodies and other unidentified reactivity; this may have contributed to fetal loss. We are currently challenged to provide adequate transfusion support for patients with sickle cell anemia with

Table 1. Frozen red cell inventory, Canadian Blood Services, March 2015 (*N* = 801)

Phenotype	Number of units
k–	147*
Fy(a–b–)	139†
Yt(a–)	137
Other‡	91
Vel–	46
Kp(b–)	38
Js(b–)	28
Co(a–)	26
O_h (Bombay)	24
I–	18
GE:–2,–3	17
U–	17
Jr(a–)	13
Lan–	11
Lu(a–b–)	9
SC:–1	8
Di(b–)	7
En(a–)	7
In(b–)	7
Jk(a–b–)	6
Gy(a–)	4
GE:–2,3	1

*Over 150 known donors; only units negative for several other antigens were frozen.

†Over 1500 known donors; only units negative for several other antigens were frozen.

‡Mainly rare phenotype combinations.

partial CE antigens and multiple antibodies requiring chronic transfusion support. We also have an inadequate number of Di(b–) donors; many Di(b–) individuals are part of the native Canadian population and live in remote areas.

References

1. Xu A, Duffett L, Tokessy M, et al. Anti-AnWj causing acute hemolytic transfusion reactions in a patient with aplastic anemia. Transfusion 2012;52:1476–1481.

Mindy Goldman, MD (corresponding author), Medical Director, Donor and Clinical Services, Canadian Blood Services, 1800 Alta Vista Drive, Ottawa, ON, Canada, K1G 4J5, mindy.goldman@blood.ca; Lisa St. Croix, BSc, MLT, Business Continuity Program Developer, Supply Chain Operations Planning, London, ON, Canada.