

# Allo-immunisation and the implication for future blood requirements: Case Review

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## ► Abstract

Allo-immunisation is a risk of blood transfusion, around 2-6% of patients go on to develop allo-antibodies and can cause complications for blood provision. For most patients stock red cells from the hospital can be used and are easily ordered from the National Blood Service centre for the next routine delivery. Understanding antigen frequencies can be overlooked in the transfusion laboratory due to the ease of access to products. In this case a patient is admitted to hospital with a negative antibody screen and has 10 units issued via electronic issue. From the transfused 10 units the patient had created six allo-antibodies (Anti-f, Anti-M, Anti-S, Anti-K, Anti-Fya and Anti-Jka) in a month from admission and required further blood transfusion support.

## ► Aims

To identify the frequency of possible compatible units present within the donor population for a patient with complex antibody requirements.

## ► Methods

Identify the clinical significance of the antibodies detected and if antigen negative blood is required. Calculate the antigen frequencies present in the donor population to estimate the theoretical number of compatible red cell units available for transfusion.

**Table 1 Allo-antibodies detected and clinical significance (British Committee for Standards in Haematology, 2012)**

Antigen	Clinically Significant In Transfusion	Antigen Negative Cells Required
Anti-f	✓	✓
Anti-M	✓	✓
Anti-S	✓	✓
Anti-Fya	✓	✓
Anti-K	✓	✓
Anti-Jka	✓	✓

## ► Results

Determining antigen negative frequencies

$$\frac{\text{Multiply the compatible units in donor population}}{\text{The number of units required}}$$

**Table 2 Percentage of antigen frequency (Qureshi, 2015)**

Antigen	Compatible Units
C	32%
e	3%
K	91%
M	22%
S	45%
Fya	32%
Jka	24%
Group O	48%

$$\frac{0.32 \times 0.03 \times 0.91 \times 0.22 \times 0.45 \times 0.32 \times 0.24 \times 0.48}{1} = 0.00003188235$$

$$0.0032\% \text{ of } 1,376,000 = 44$$

$$44 / 1,376,000 = 31,272$$

The antigen frequency in the population is 0.0032% which corresponds to 1 out of 31,272 donations that would need to be tested to find a compatible unit for this patient. In this case 1 unit was found in the country that would be suitable for the patient.

## ► Conclusions

1) Blood is not an infinite resource and compatible blood may not be readily available for some patients depending on the donor demographic.

2) Other methods of compatibility may be needed in situations where antigen negative blood cannot be sourced.

3) Antigen frequencies in the donor population is important information for the laboratory to understand. It may cause a delay to blood provision and this should be communicated to the clinical teams.

## References

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