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<http://www.odt.nhs.uk/transplantation/guidance-policies/tools/>

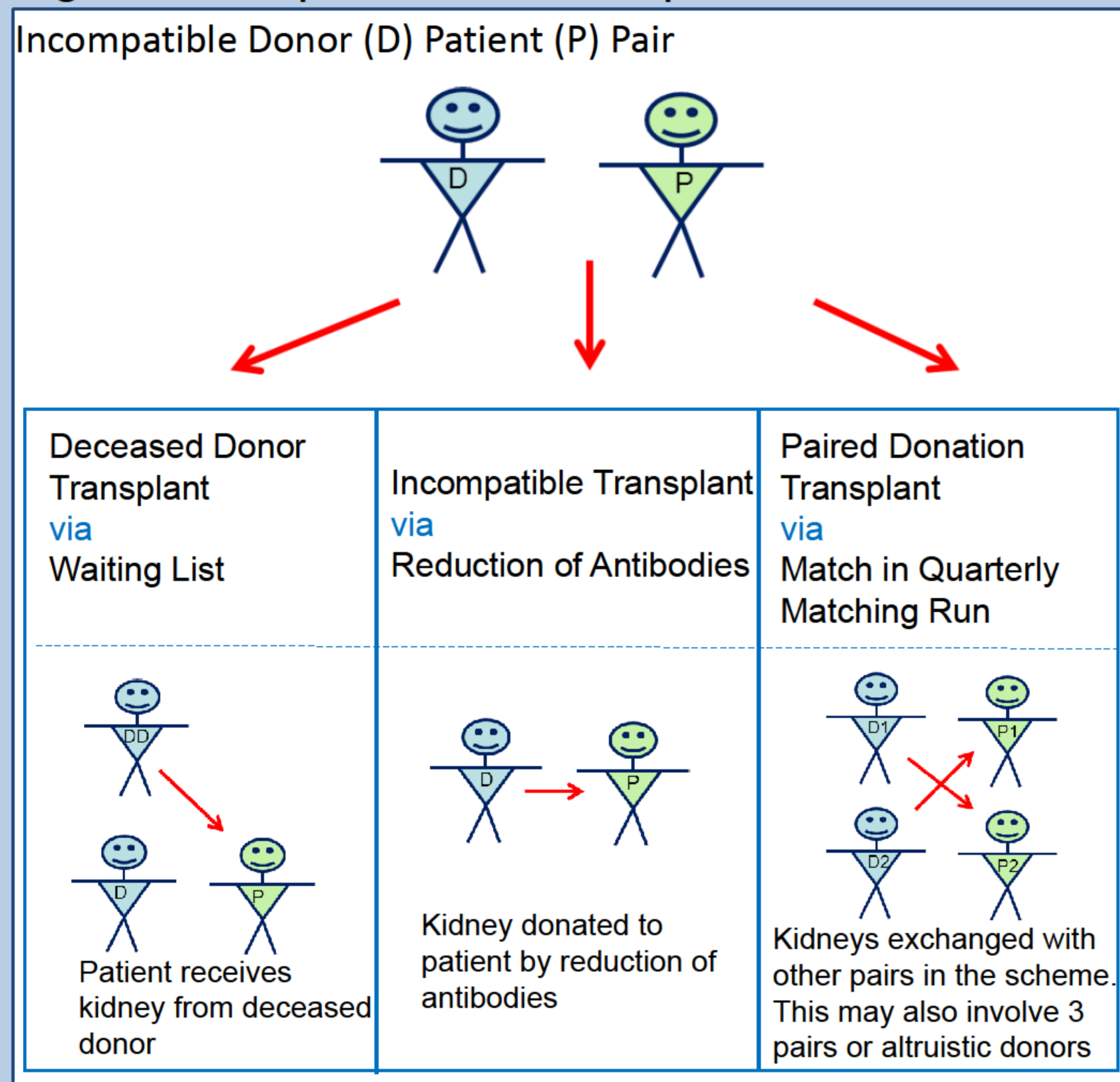
## Introduction

Patients in need of a kidney transplant typically have to wait for a deceased donor on the waiting list. In some cases the patient has a willing live donor who offers them a kidney which, dramatically reduces waiting time. However, due to blood type or tissue type incompatibility they may be unable to easily donate. The aim of this study was to collect and simulate data to inform incompatible pairs of their most likely route to transplant.

## Transplant Options

Patients have 3 routes to transplant: deceased donor transplant, paired donation or antibody incompatible transplant (Figure 1). The paired donation scheme allows a registered donor-patient pair to exchange kidneys with another pair given a match. Patients are matched with compatible donors and an algorithm is used to maximise the number of transplants from registered pairs. This is a national programme with matching performed quarterly. An antibody incompatible transplant requires reduction of antibodies and is not possible in all pairs.

Figure 1 – Options for Incompatible Pairs



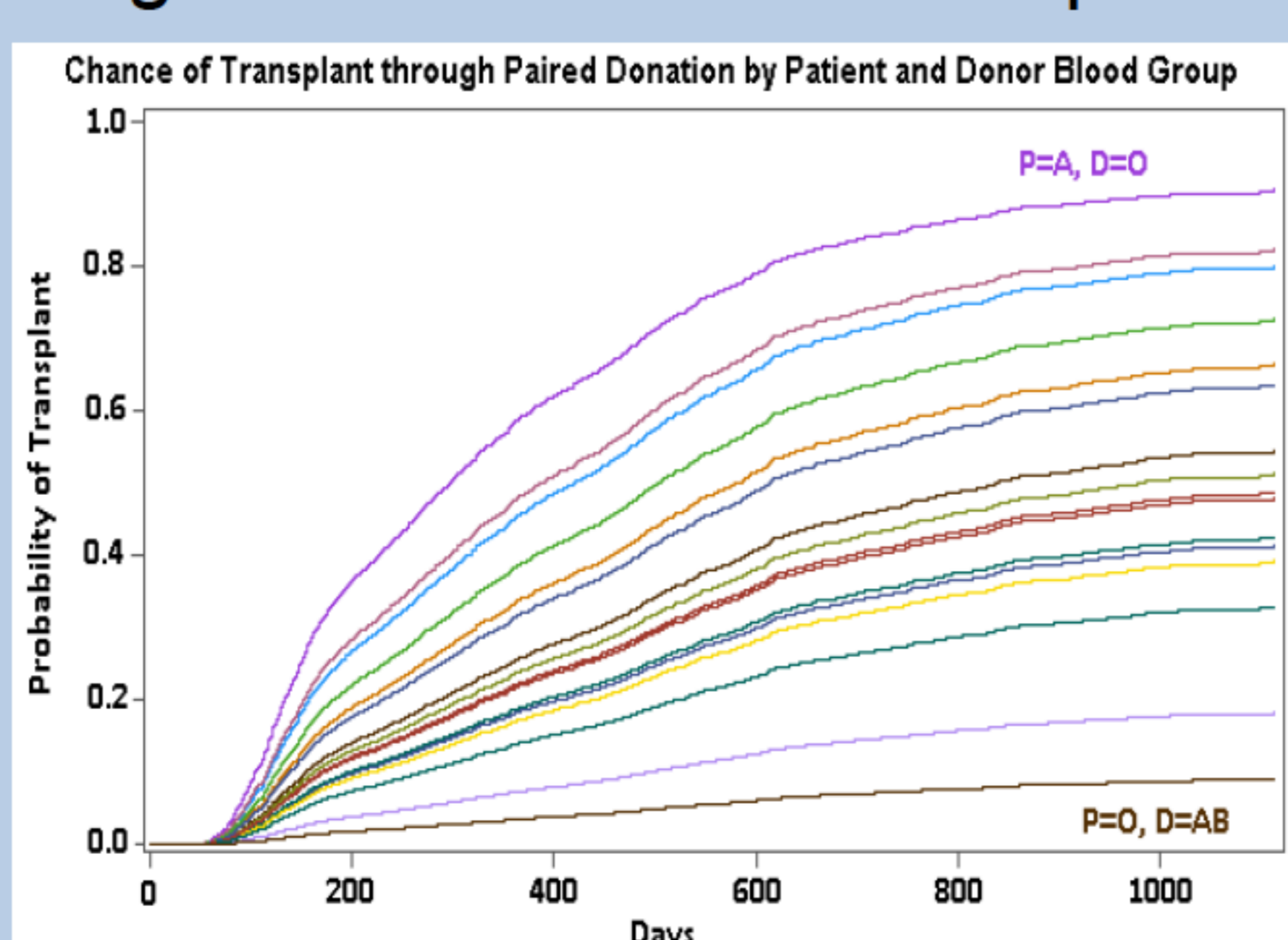
## Methods

We used Cox proportional hazards regression modelling to estimate waiting time for recipients based on actual patient data for time to transplant. While we have a large amount of data for deceased donor waiting time, we have less information on the paired pool due to its recent inception. We therefore simulate quarterly matching runs based on patients that have previously entered the scheme. Using this simulated data we get estimates of waiting time in the paired pool by using a Cox proportional hazards model.

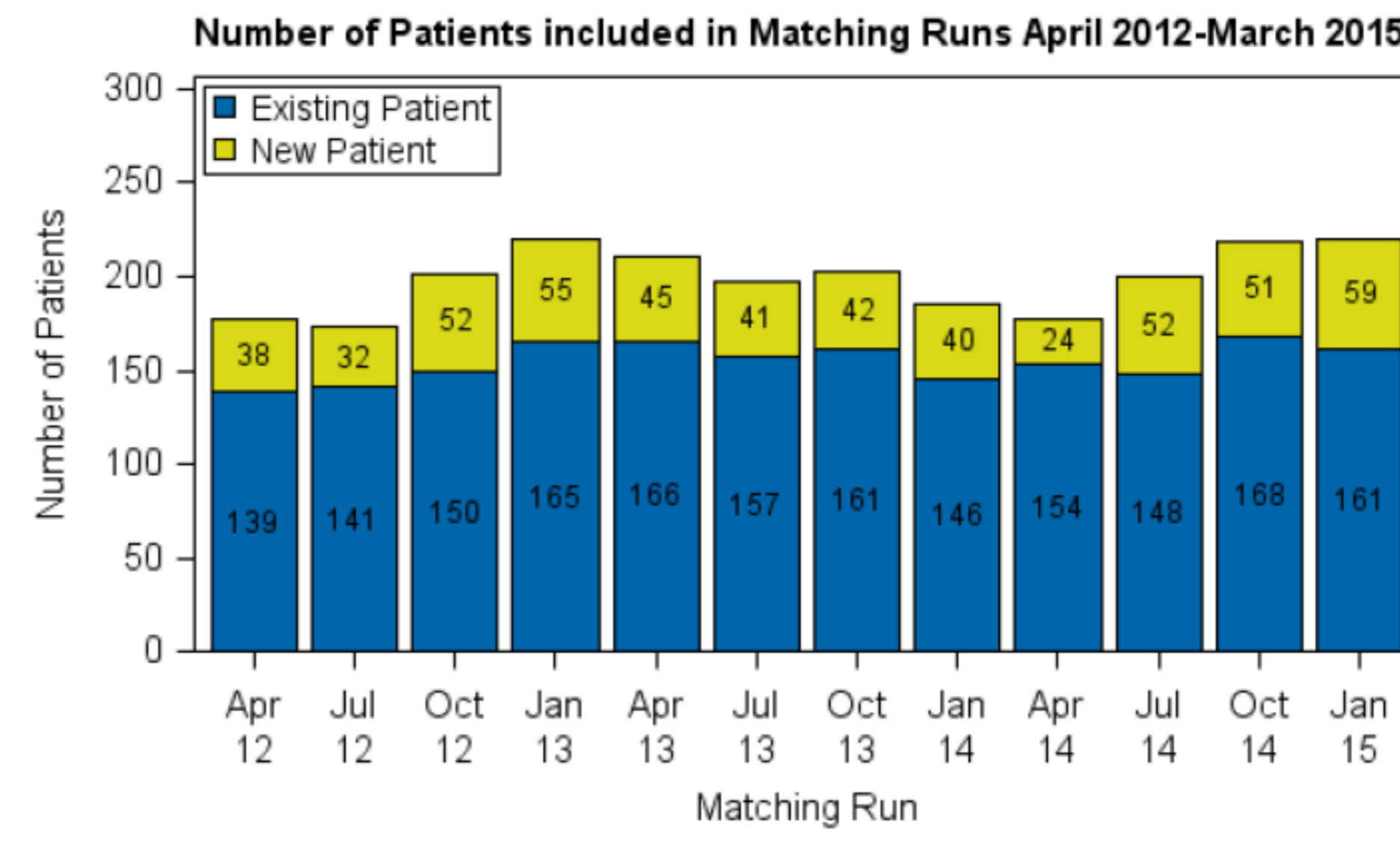
## Results

The data shows that waiting times for deceased donor transplant and paired donation vary greatly between donor and patient blood groups and also difficulty to match (Figures 2 & 3).

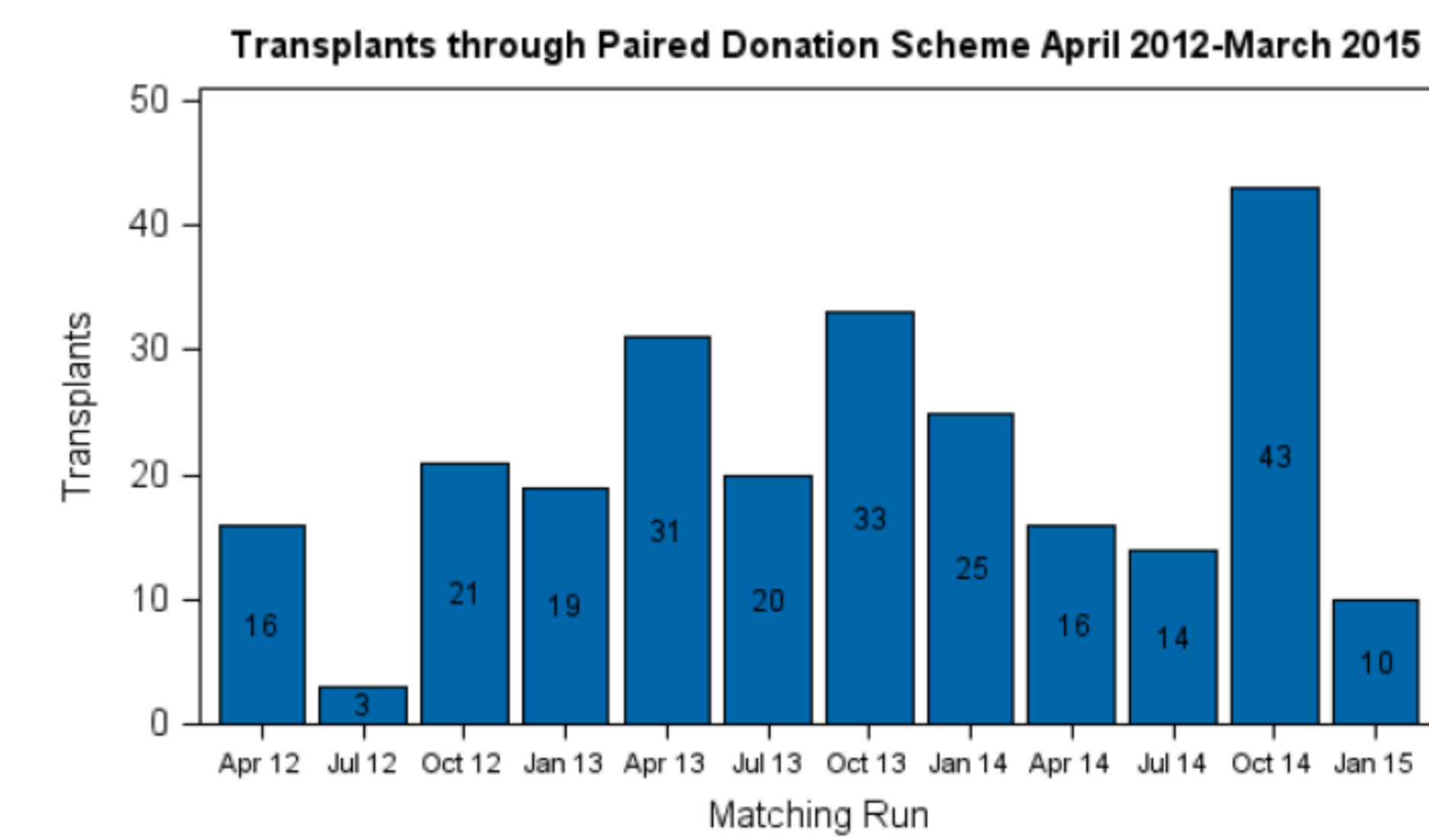
Figure 2- Chances of Transplant



## UK Paired Donation Scheme

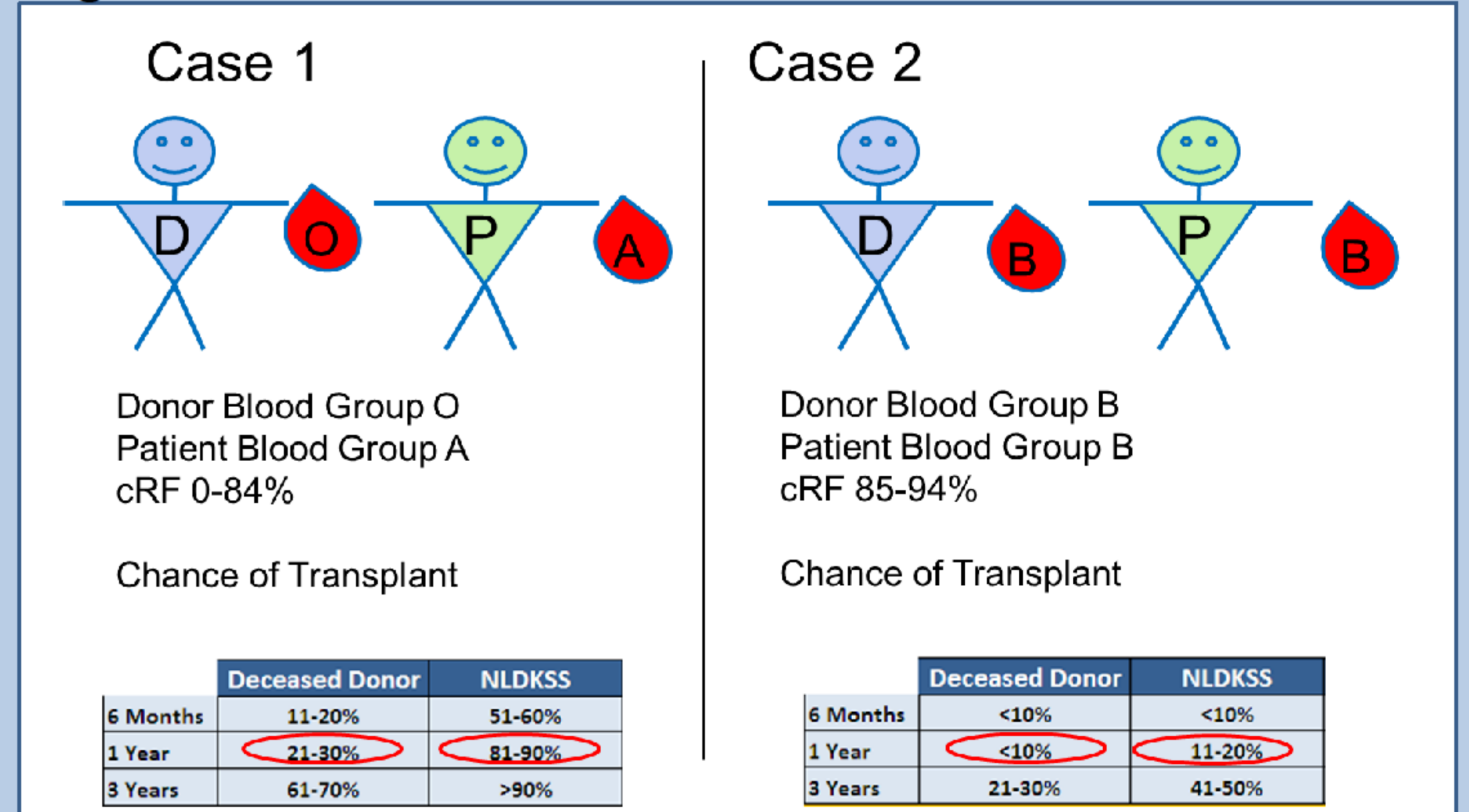


Over 1300 patients have registered for the paired donation scheme since it started in 2007. So far, 403 transplants have been facilitated through the scheme.



We currently expect around 200 patients to be included in every quarterly matching run. Short altruistic donor chains were added to the scheme in 2012 and see around 10 altruistic donors included per matching run. Longer altruistic donor chains were introduced to the scheme in April 2015.

Figure 3- HLAi Case Studies



We want to use this information to inform patients when making a decision about whether to join the paired pool or undergo an incompatible transplant. To do this we have created an application that is publicly available via the internet (Figure 4). By selecting the recipient blood group, donor blood group, difficulty to match and chances of incompatible transplant the pair and transplant coordinator will be informed of chances of transplant under each option. This will inform their decision making for their best route to transplant.

Figure 4- Living Donor Information Application

**Incompatible Pairs Living Donor Kidney Application**

Variable: Recipient Blood Group, Calculated Reaction Frequency, Donor Blood Group, ABOi TX with willing Donor?, HLAi TX with willing Donor?, Recipient Age

Estimated Chance of Transplant

	Deceased Donor	NLDKSS	ABOI	HLAI
6 Months	-	-	-	-
1 Year	-	-	-	-
3 Years	-	-	-	-

Transplant Survival Rates

	Deceased Donor	NLDKSS	ABOI	HLAI
6 Months	-	-	-	-
1 Year	-	-	-	-
3 Years	-	-	-	-

Disclaimer: The information is provided for guidance only. \*Low titre/Low DSA means acceptable for incompatible transplant. High titre/High DSA means unacceptable for incompatible transplant. Note: NLDKSS chance of transplant is based on paired donation including short altruistic donor chains. Chances of transplant through the NLDKSS could be increased by considering an antibody incompatible transplant within the scheme. For a more accurate estimate of waiting time for a deceased donor transplant based on more variables, please visit [http://www.odt.nhs.uk/goc/chance\\_of\\_transplant.xls](http://www.odt.nhs.uk/goc/chance_of_transplant.xls)

## Summary

This study has used statistical modelling to give incompatible donor-patient pairs in need of a kidney transplant the information to understand their best route to transplant. The application created to share this information is now available at: <http://www.odt.nhs.uk/transplantation/guidance-policies/tools/>