* 1. NHISSOT

### How to Order Tests

As per the EFI standard for sample acceptance, all samples received and accepted into the laboratory **must** have the patient’s name, date of birth and sample date. Samples that do not comply with this EFI standard will be rejected and repeat samples will be required.

* HLA Typing: The Histocompatibility Testing Request and Consent Form [H&I-Form-509] **must** be completed and must include the patient name, date of birth, requesting clinician/consultant, centre and sample date. This form should accompany the blood samples
* It is the responsibility of the requestor to ensure that the patient has read and understood the permission statement on the consent form. This must be signed by the consenting individual.
* HLA antibody screening: A HLA antibody screening request form must be completed [H&I-Form-236]. This form may be E-mailed to [crossmatch@beaumont.ie](mailto:crossmatch@beaumont.ie) or posted with the samples to the H&I Department.
* Forms for HLA typing and HLA antibody screening are available from the H&I department. Please phone or email [crossmatch@beaumont.ie](mailto:crossmatch@beaumont.ie) if a request form is required.

### Repertoire of Tests

| **Test** | | **Blood Container** | **Minimum**  **Volume** |
| --- | --- | --- | --- |
| HLA Typing of patients for solid organ transplant | | Sodium Citrate | 2.9ml |
| HLA Antibody Screening for solid organ transplant  Pre transplant / Post transplant / Antibody Mediated Rejection query | | Clotted | Paeds: 3ml  Adult: 5ml |
| ABO blood grouping of patients for solid organ transplant | | EDTA | 5ml |
| HLA Disease Association Testing [B\*27 / B\*57:01/ HLA-DQ] | | Sodium Citrate | 2.9ml |
| Potential deceased donor work-up | | Sodium Citrate  Clotted  EDTA | 60ml  5ml  5ml |
| Living donor work-up : Potential Donors | 1st Workup | Sodium Citrate  EDTA | 2.9ml  5ml |
| 2A Workup  2B Workup | Sodium Citrate  EDTA  Sodium Citrate  EDTA | 2.9ml  5ml  50ml  5ml |
| 3rd and Final Workup | Sodium Citrate  Clotted | 40ml  5ml |
| Living donor work-up : Potential Recipients | 2B Workup | Sodium Citrate  Clotted | 40ml  5ml |
| 3rd and FinalWorkup  Clotted blood should be within 7 days of the proposed transplant date | Sodium Citrate  Clotted | 40ml  5ml |
| Autocrossmatch | | Sodium Citrate  Clotted | 40ml  5ml |
| HLA typing for partners | | Sodium Citrate | 2.9ml |

### HLA Typing of Patients for Solid Organ Transplantation

Human Leucocyte Antigen (HLA) type is defined by the presence of different HLA antigens on the cell surface. These antigens enable the immune system to recognise foreign organisms and destroy them.

In solid organ transplantation the major HLA antigens involved are HLA-A, HLA-B, HLA-C, HLA-DR, HLA-DQαβ and HLA-DPαβ.

Mismatches between donor and recipient HLA type are a major stimulus of the development of donor specific HLA antibodies leading to rejection of the transplanted organ.

Potential recipients are HLA typed by low to medium resolution molecular techniques. These techniques use commercial probes and primer sets selected according to the EFI standards for HLA typing.

* Specimens received for HLA typing have DNA isolated and stored, serum stored and a sample sent for blood grouping.
* Prior to issuing a clinic appointment, the Transplant Co-Ordinator, HLA Typing and antibody screening will be carried out. A NHISSOT patient report will be issued prior to the patient’s appointment at the renal and pancreas transplant clinics.
* **Samples and tests required prior to a transplant clinic appointment**

1x 2.9ml Sodium Citrate sample for HLA typing  
1x 5ml Clotted sample for Antibody Screening  
1x 5ml EDTA sample for Blood Grouping  
Histocompatibility Testing Request and Consent Form

Molecular (DNA) Typing

Patient’s DNA is isolated from citrated blood and typed by molecular techniques:

1. PCR-SSP (sequence specific primers) – these SSP primers consist of allele and group specific primers that are designed to anneal to specific sequences characteristic of a given allele or group of alleles. Amplified products of DNA are visualised by gel electrophoresis.
2. PCR-SSO (sequence specific oligonucleotides) – After PCR amplification the amplicons are denatured to form single stranded DNA which are added to a microsphere or chip containing specific SSO probes. The amplicons then hybridise to those probes that contain a complementary target sequence. Assignment of a HLA type is based on the reaction patterns associated with published HLA gene sequences.

**Note:** Luminex® technology for SSO typing allows for multiplex, high throughput testing. This method is therefore particularly suited for the routine HLA typing of multiple DNA samples. SSO typing is not suitable for donor typing due to time constraints.

**Note:** DNA samples may be sent to the National Histocompatibility and Immunogenetics Reference Laboratory (NHIRL) for high resolution or sequencing for confirmation of rare HLA types

**Note:** Patients are HLA typed on two separate samples taken on two different occasions.

### Antibody Screening

Antibodies to HLA antigens can develop through pregnancy, transfusion, previous solid organ transplant or cardiac mechanical assist device placement. These antibodies can potentially react with a transplant organ causing graft rejection. All patients for solid organ transplantation are tested for HLA antibodies and these are recorded in the H&I database.

#### Screening Tests

**Luminex Single Antigen**Microbeads coated with purified HLA antigens are used to detect HLA antibodies. . The Luminex flow analyser detects the fluorescent emission from the beads and the amount of fluorescence can help to estimate the amount of antibody present.

#### Antibody Analysis and Identification

The HLA antibody screening results are analysed and any HLA antibody identified is recorded in the patient’s antibody profile as an unacceptable antigen.Therefore, if a donor is identified and a recipient list is generated, any potential recipient with an antibody to the potential donors’s HLA antigens, are excuded. This significantly reduces the liklihood of a positive crossmatch.

#### Pgen

Pgen - Generated or Calculated PRA

Using the H&I database of donor HLA types, we can calculate how many donors are unsuitable due to the presence of HLA antibody. This is referred to as generated PRA - Pgen. The Pgen value can be used as an indicator of how difficult it is to find a compatible graft.

**Pgen example**HLA-A2 is present in approx 25% of Irish donor population. If a recipient has an antibody to HLA-A2, the Pgen is calculated at 25%. This tells us that 25% of donors in the Irish population are unsuitable for this recipient. The more antibodies the patient has, the higher the Pgen.

#### Specimen Requirements for Antibody Screening

**Renal/pancreatic patients who are active on the transplant waiting list:**

* HLA antibody screening sample (clotted sample) every 90 days.
* CAPD and pre-emptive patients can have the samples taken by their local GP and posted to the department - see section 3 for transport requirements.
* Following a transfusion (blood products or platelets) a clotted sample is required 14 days post transfusion or as soon as possible thereafter. It is **vital** we receive these samples to monitor a patient for donor specific HLA antibodies.

**Note: Routine 3 monthly samples are essential for screening and crossmatching patients on the waiting list. If we do not have a sample less than 90 days old, the patient will not be listed for transplant.**

**Renal/pancreatic patients who are *not yet* on the transplant waiting list:**

* All patients transfused (blood products or platelets) require a clotted sample 14 days post transfusion or as soon as possible thereafter. It is **vital** we receive these samples.

**Cardiothoracic patients**

* Patients identified as positive for HLA antibody – **Sample every month.**
* Patients with no identified HLA antibody **– Sample every 3 months.**
* Patientswith cardiac mechanical assist device placement – Samples required every month unless otherwise notified.

Due to time constraints in cardiothoracic transplants the following schedule applies to ensure that a sample within an acceptable time frame is available for crossmatch: Following a blood transfusion (blood products or platelets), we require a sample at week 2, 3 and 4.

### Solid Organ Transplant Pools Work-Up

#### Renal/Pancreatic Patients

If a patient is approved for the transplant waiting list at the transplant clinic by the Consultant Transplant Surgeon, the Transplant Co-ordinator will contact the laboratory by email to confirm patient’s approval for activation.   
The patient will appear on the monthly transplant waiting list as ‘NHISSOT workup’.

A Patient is ‘activated’ on the transplant list when all the documentation and immunological work is completed.

A letter is then issued from the H&I Department to the patient, their Consultant Nephrologist and Transplant Co-ordinator to confirm activation on the transplant list.

#### Cardiothoracic Patients

On receipt of a request by email from the Cardiothoracic Transplant Co-ordinator, the patient is HLA typed and tested for HLA antibodies. The report issued will indicate if the patient will need a prospective crossmatch when listed for transplant.  
Additional samples are required on patients listed for lung transplant for auto crossmatch. These bloods will be requested by the Cardiothoracic Transplant Co-ordinators when the patient has been approved for the active lung transplant waiting list.

#### Liver Patients

On receipt of a request by email from the Liver Transplant Co-ordinator, a patient is HLA-B typed and ABO blood grouped. A Confirmatory HLA-B type is performed following transplantation

### Deceased Donor Work-up and Potential Recipient List Generation

The ODTI Transplant Co-ordinator (Organ Donation and Transplant Ireland) contacts the H&I Department when a potential donor is identified. Donor bloods are sent to the laboratory.

On receipt

* Potential donor is HLA typed.
* ABO blood group requested.
* Match programme to identify suitable recipients is generated.
* Potential recipient list is complied according to agreed criteria andcontains information on the following :
* Priority Patients/Paediatric Patients/Acceptable Mismatched Patients.
* Significantly Sensitised Patients (Highly Sensitised) PGen ≥ 50.
* Favourable Match / Reasonable Match Patients.
* Longest Waiting Patients.
* HLA incompatiable patients (HLAi).
* Simultaneaous Pancreas and Kidney (SPK) Patients.

The list of immunological suitable recipients is sent to the Consultant Transplant Surgeon and the Renal Transplant Co-ordinator.

### Matchability Scores

A database of HLA types of previous deceased donors from the Irish population is used to calculate the chance of a patient getting a good match from our donor population. This data is expressed as a percentage of the population and is made available to the referring clinicians on the monthly transplant waiting lists.The ODT (Organisation for donation and transplantation in the UK)) define a favourable match as:

* 000, 100, 200, 010, 110, 210 (HLA -A, -B, -DR) – Figures represent donor mismatched antigens
* These grafts show a definite survival advantage in most large studies. Additionally, for patients likely to require a further transplant the degree of sensitisation following a well matched graft is usually less than that following a poorly matched graft.

Defining Matchability

For patients of blood groups A and O:

|  |  |
| --- | --- |
| **Score** | **Reported** |
| 5% or under | Low |
| 5.1-7.9% | Medium |
| 8% and over | High |

### Living Donor Work-Up

#### What is living donation?

Living donation is where a living person donates an organ (or part of an organ) for transplantation to another person. Living Donation is only considered after thorough evaluation when the donor is healthy, where the loss of the organ or part of an organ is not deemed to place their longterm health at undue risk, and where the donor understands the process and freely consents to donation.

The following forms must accompany potential donor samples for work-up:

HLA Request form for 1st Living Donor Workup

Activation Request form for Living Donor Workup

Samples should be forwarded to the H&I Department, either directly from the transplant co-ordinator, or by post if from abroad. Only 2 potential donors per recipient will be processed by the laboratory at any one time. If either is deemed unsuitable, two further potential donors can be evaluated once a signed activation form has been received.

#### What makes a donor suitable?

* **Compatible blood group**

The living donor and recipient blood groups should be compatible

* **Compatible HLA type**

HLA antigens are inherited therefore blood relatives are more likely to have similar HLA type. A brother and sister have a one in four chance of having an identical type.

Those genetically unrelated can also be assessed for living donation. Any potential living donor is HLA typed to ensure that their HLA type is compatible with the potential recipient

HLA antigens assessed for matching are HLA-A, -B, -C, -DR, -DQ, -DP.

* **Compatible Antibody Profile**

A potential living donor can be eliminated at the first stage of living donor work-up, if the potential recipient has an antibody to the donor’s HLA antigens. This antibody can pose a risk to the graft.

#### Summary of stages for Living Donor work-up

Note: Families who wish to donate **must** initially contact the Transplant Co-ordinators. Any samples received into the laboratory **will not be processed** without prior contact with the Transplant Co-ordinators.

**Note:** Samples required are listed in the repertoire of tests.

**First living donor work-up – virtual crossmatch**

* Potential donor HLA type and blood group
* Risk assessment issued

**Second living donor work-up**

**2a Workup – virtual crossmatch**

* Confirmatory HLA type and blood group
* Risk assessment issued

**2b Workup – ‘wet’ crossmatch**

* Confirmatory HLA type and blood group
* Crossmatch using the potential donor cells and recipient sera
* Autocrossmatch of the potential recipient
* Risk assessment issued

**Final living donor work-up**

* This final stage of the work-up takes place no more than one week pre-transplant
* ‘Wet’ crossmatch
* Risk assessment issued

#### Risk Assesment

Using antibody screening data, sensitisation history and crossmatch results the immunological risk for a donor/recipient pair is assigned by the Consultant Immunologist

#### **Reporting**

Reports for the first and second work-up are issued to the Transplant Co-ordinator. The final work-up report is sent to the Consultant Surgeon and Transplant Co-ordinator.

**Note: Results cannot be transmitted directly to the potential recipient’s Nephrologist or dialysis centre**.

### Crossmatching for Solid Organ Transplantation

Transplanting an organ into a patient who has circulating HLA antibodies to donor HLA antigens could result in a hyperacute rejection and immediate organ loss.

The crossmatch prior to transplantation will detect any donor specific antibodies and thus prevent hyperacute rejection, greatly reduce acute rejection and the risk of graft loss.

A positive crossmatch is not necessarily a bar to transplant. A patient’s sensitisation history and antibody screening profile is also taken into account for the risk assessment.

The crossmatch uses a selection of both current and historic sera:

* Detection of historic antibody can be an indication of prior sensitisation (exposure) of the patient to donor antigen and the presence of memory T and B cells. This can lead to a rapid immunological response if challenged with the same antigen.
* Detection of current antibody, if directed against HLA antigens present on the graft, can cause hyperacute rejection of the organ or an acute rejection.
* A day of transplant (DoTx) sample is required for crossmatch where a patient has had a recent sensitising event, graft in situ, failed graft within 12 months or borderline donor specific reactivity against donor HLA antigen.

**Please note:**

**It must be stressed that all crossmatch interpretation should be done in consultation with the H&I staff and the Consultant Immunologist or designated Senior Medical Scientist**

#### Crossmatch tests

The crossmatch techniques used in the laboratory are flow cytometry and complement dependent cytotoxicity (CDC). They can detect both HLA class I and class II donor specific antibodies.

#### Virtual crossmatching

In limited circumstances a patient may be suitable for transplant without a prospective crossmatch due to theatre time constraints.  
Renal and Cardiothoracic patients who fulfil **certain** criteria are suitable for consideration for virtual crossmatch in discussion with the transplant team.  
**Note:** If the patient has had transfusion/pregnancies or has a failing transplant they may not be suitable for a virtual crossmatch.

**All patients transplanted using virtual crossmatching require a flow crossmatch retrospectively in accordance with EFI standards.**

#### Autocrossmatch

This assay involves a crossmatch of the recipient’s lymphocytes with autologous (own) serum. This can identify auto-reactive antibodies.

Knowledge of the presence and type of autoantibody can be helpful in interpreting positive crossmatches.

* + Samples for autocrossmatches should reach the laboratory within 24 hours
  + Please contact the H&I deparment to book in the samples for autocrossmatch

### Post-Transplant Monitoring

Antibody testing post transplant can detect the presence of donor specific antibodies (DSA) that may develop clinical and sub-clinical. Screening for DSA post transplant and early intervention could prevent graft rejection and improve graft outcomes.

#### Graft Rejection

Rejection of solid organ grafts is conventionally classified as hyperacute, acute and chronic.

* Hyperacute rejection causes rapid activation of complement, platelet aggregation, thrombosis and ischaemic necrosis. It is mediated by pre-formed antibodies that react with many different antigens expressed on the transplanted organ. The result of hyperacute rejection is rapid destruction of the transplanted organ which must be removed immediately to prevent a severe inflammatory response.
* Acute rejection usually occurs early following transplantation (typically within 4 weeks). It is a classical cell-mediated immune response involving presentation of foreign antigens to T cells by antigen presenting cells, proliferation and activation of T cell clones and destruction of the graft by cytoxic T cells.
* Chronic rejection occurs later (typically months or years after transplantation). It leads to a gradual deterioration of renal function with biopsy appearances of fibrous intimal thickening, interstitial fibrosis and tubular atrophy. The most consistent predisposing factor is that of previous episodes of acute rejection

#### Post Transplant: Renal/Pancreatic Patients

**Specimen Requirements**

* Clotted sample weekly for the first month.
* Clotted sample monthly for the next two months.
* Clotted sample should then be sent at 6, 9 and 12 months.
* Clotted sample should then be sent on each subsequent anniversary of the transplant
* Clotted sample should be sent when clinically indicated - at biopsy, when there are concerns regarding graft function or a change to immunosuppressive regimen.

**Note:** Samples are tested according to their post transplant testing schedule and a post transplant report sent to the requesting Clinican

**Note:** Please email [posttransplant@beaumont.ie](mailto:posttransplant@beaumont.ie) or phone the H&I department when screening is clinically indicated. Please include any clinical indicators such as creatinine levels and a contact number for urgent results. If antibody mediated rejection is suspected, this should be discussed with a Senior Medical Scientist who will contact the Consultant Immunologist with patient clinical details.

#### **Post Transplant: Cardiothoracic Patients**

* Clotted sample weekly for the first month
* Clotted sample monthly for the next two months
* Clotted sample should then be sent at 6, 9 and 12 months post transplant
* Clotted sample should then be sent on each subsequent anniversary of the transplant
* Clotted sample should be sent when clinically indicated - at biopsy, when there are concerns regarding graft function or a change to the immunosuppressive regimen

**Note:** Samples are tested according to their post transplant testing schedule and a post transplant report sent to the requesting Clinican

#### **Post Transplant: Liver Patients**

Graft versus Host Disease (GvHD) can pose significant risks to liver transplant patients. If GVHD is suspected, please contact the department with clinical details by phone or email posttransplantlab@beaumont.ie.

### Patients for Disease Association

There are many thousands of different HLA types as a result of the differences in our HLA genes.

Some of these tissue types are associated with disease including ankylosing spondylitis, Behcet’s disease, coeliac disease, narcolepsy, rheumatoid arthritis and selective IgA deficiency

Only Beaumont Hospital patients and GP patients in the catchment area are HLA typed for disease association. All disease association typing from other hospitals are carried out in the NHIRL, National Blood Centre, James’s Street, Dublin 8.

### Patients for HLA-B57 Typing

Patients who express a specific allele of HLA-B57 (HLA-B\*57:01) are at risk of a life-threatening reaction if exposed to abacavir, anantiretroviral drug. Patients who require treatment are HLA typed for HLA-B57. Patients found to be HLA-B57 positive by low resolution are typed by high resolution to define the B\*57allele.

### HLA Typing for Partners of Recipients

During pregnancy or birth the baby’s cells can cross the placenta and expose the mother to paternal’s HLA antigens.

Occasionally this can induce an immune response and the mother can subsequently develop HLA antibodies. These only become clinically relevant if the mother requires a transplant.

Paternal HLA typing is helpful to identify the antigens the mother may have been exposed to.This can aid antibody identification and help to build up an antibody profile on a patient.

### ABO blood group typing

Beaumont Hospital Blood Transfusion Department carries out all donor and recipient blood groups on request.

### Out of Hours services (On-Call)

The H&I department provides an out-of-hours service for solid organ transplantation.

The services available are:

* HLA typing and crossmatching all potential donors for solid organ transplantation.
* Urgent antibody screening for cardiothoracic patients.
* Urgent antibody screening for post transplant rejection episodes.

**Note**:

* All requests for urgent antibody screening **out of hours** **must be** done in consultation with the Medical Scientist on-call
* For clinical advice **out-of-hours**, the Consultant Immunologist on-call can be contacted through the switch board. During normal working hours urgent requests must be discussed with a Senior Medical Scientist or e-mailed to the following e-mail address detailing the reason for the urgent request:

[posttransplant@beaumont.ie](mailto:posttransplant@beaumont.ie)

[transplantlab@beaumont.ie](mailto:transplantlab@beaumont.ie)

### Data Protection Act and Freedom of Information

The H&I computer database is used to maintain patient data. A back-up paper copy is also retained. All data is stored in compliance with General Data Protection Regulation. Data can include the following:

* Name.
* Hospital chart numbers.
* Date of birth.
* Address.
* Phone number(s).
* Email address.
* Dates of dialysis.
* Type of dialysis.
* Dates of transfusions/transplants.
* Dates of sera samples received.
* Antibody screening information and results.
* HLA type.
* Molecular DNA typing information.
* Blood group
* Number of pregnancies.
* Related donor information, where patients have been transplanted.
* Related family information, where a family study has been performed.
* Partner’s HLA type where applicable.

### Reports issued/Expected Turn Around Times (TAT)

#### Turn Around Times

The following table lists the turn-around-times for H&I reports:

| **TESTS** | **TURN AROUND TIMES** |
| --- | --- |
| HLA typing for Solid Organ Transplant | 3 weeks – *Urgent service available* |
| HLA Antibody Screening | 2-4 weeks – *Urgent service available* |
| HLA Antibody Screening HLA typing requests for emergency transplantation | Same day service if requested |
| NHISSOT Patient report for the transplant clinic | 4 weeks from request to issuing a report |
| Transplant pool work-up | 2-6 weeks |
| Deceased donor work-up | 6 hours |
| Potential donor recipient list | 8 hours |
| Crossmatching for renal transplants | 6 hours |
| Crossmatching for pancreatic/cardiothoracic transplants. Time taken from receipt of bloods in H&I laboratory and potential names for crossmatch given to the on-call scientist | 6.5 hours for processing a single donor with a standard workup of a maximum 4 names. This time may change due to additional names or for technical issues. Users will be informed |
| Living donor work-up | 1st work-up 4 weeks  2nd work-up 3 weeks  Final work-up 48 hours |
| Autocrossmatch | 2-3 days |
| Post Transplant Monitoring  Non Urgent.  *If contacted by the referring clinician for a more timely report the sample can be set on the next screen*.  Further testing/ typing | 2 weeks.  3 weeks |
| Post Transplant monitoring - Urgent antibody screening request for possible graft rejection  *Requires discussion with Antibody Screening Senior. The level of urgency must be stated by the referring clinician*. | Same day service available if required, otherwise the sample is set on the next screen. |
| HLA typing for disease association | 4 weeks |
| HLA typing for BMT/HSCT | 2 weeks (unless awaiting further potential donors from overseas) |
| HLA typing for B57 | 4 weeks |
| HLA typing for partners | 3 weeks |
| ABO Blood Grouping | 2-3 hours |

#### Abbreviations on H&I Reports and Printouts

**Dialysis Centres**

AM Antrim Area Hospital

BE Beacon Clinic Sandyford, Dublin

BD Beacon Clinic Drogheda, Dublin

BT Beacon Clinic Tallaght, Dublin

BF Belfast City Hospital

BH Beaumont Hospital, Dublin

CA Cavan General Hospital

CB Mayo General Hospital, Castlebar

CO Cork University Hospital

CR Our Lady’s Hospital for Sick Children, Crumlin, Dublin

EU Patients dialysing in hospitals overseas within the EU

FR Fresensius Limerick

GA Galway University Hospital, Galway

GW Wellstone Clinic, Galway

JA St. James’s Hospital, Dublin

KK Wellstone Clinic, Kilkenny

LE Letterkenny General Hospital

LI Limerick University Hospital

MA Mater Misericordiae University Hospital, Dublin

MK Merlin Park Hospital, Galway

MW Midlands Wellstone Clinic

NC Northern Cross Clinic, Dublin

NE Daisy Hill Hospital, Newry

OM Omagh General Hospital

OS Patients dialysing overseas – outside the EU zone

SL Sligo General Hospital

SV St. Vincent’s University Hospital, Dublin

TA Tallaght Hospital (AMANCH), Dublin

TE Children’s University Hospital, Temple Street, Dublin

TR UniversityHospital Kerry

TU Tullamore General Hospital

WA University Hospital WaterfordWW Wexford Wellstone

#### Renal/Pancreatic Transplant Pool Printout Abbreviations

Age Age in years

Blood G Blood Group

BMI Body Mass Index

Compno H&I computer number

Cyto Due Date Date a sample for antibody screening isrequired

Days until sample Number of days sample is due. Minus number indicates the number of days the sample is outstanding

Dial Cen Dialysis centre

Dial Dialysis type:P = CAPD/CCPD H =Haemodialysis

KG Weight in kilos

Match % Matchability score

PGen Generated PRA PGen4: calculated on 4 HLA loci

PGen10: calculated on 10 HLA loci

Prev Tx Previous transplant(s): Number is printed

Ref Hosp Referring Hospital

Urgent Highest urgency - ABO compatible kidney

Wait Length of time on transplant pool in months

#### Crossmatch Codes – Potential donor offer list

DoTx Day of transplant sample required

Std Standard – sample(s) available in the laboratory and suitable for crossmatch

VXM Suitable for virtualcrossmatch