Chapter 4

Kidney

(ETKAS and ESP)
## Change record

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The Eurotransplant Manual contains the rules and regulations for the implementation and specification of national legislation and national guidelines for waiting list management, organ procurement and allocation. It has been prepared with the best of knowledge and the utmost care. In case of discrepancies between the content of this manual and national binding provisions, the following applies:

- Insofar, as provisions about the acceptance of organ recipients to the waiting list are concerned, this manual has only an informative character. Only the national provisions which are applicable for the transplant centers are relevant and legally binding.
- For the allocation of organs only the national provisions are legally binding. The display of the allocation provisions in this Manual are based on these legally binding national provisions. As far as necessary, they have been specified by Eurotransplant in this Manual. Deviations from such specifying Eurotransplant provisions cannot be considered as a breach of the national provisions as long as the latter are not violated. Eurotransplant cannot be held liable for a potentially wrongful description in this Manual of procedures, in connection with the organ allocation, as long as the actual allocation follows national provisions.

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# Chapter 4 – Kidney (ETKAS en ESP)

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4.1 Introduction kidney allocation

4.1.1 General

In this chapter information about the allocation of kidneys can be found. In the introduction of this chapter a flowchart of the general kidney allocation can be found followed by kidney allocation related definitions. In the following paragraphs more information about the urgency codes, point score system and detailed information about the ETKAS and ESP allocation can be found. For general information about kidney recipient registration or donors please see the concerning chapters respectively 2 and 9.

4.1.2 Flowchart kidney allocation

In the flowcharts below the general scheme of the kidney allocation can be found
4.1.3 Definitions

Below the definitions that are related to the kidney allocation can be found. For the definitions about the urgency codes please see 4.2 Kidney – urgency codes.

4.1.3.1 Maintenance dialysis
The dialysis has not been interrupted for more than 90 days

4.1.3.2 PRA
Panel reactive allo-antibodies
It represents the proportion of the population to which the person being tested will react via pre-existing antibodies against HLA

4.1.3.3 Fully homozygous
Inheritance of two identical HLA antigens at each polymorphic locus

4.1.3.4 Fully heterozygous
Inheritance of two different HLA antigens at each polymorphic locus

4.1.3.5 Full house identical
The donor and recipient have both 6 different HLA antigens of which all antigens are the same, e.g.:
Donor typing A1 A2 B7 B8 DR1 DR13
Recipient typing A1 A2 B7 B8 DR1 DR13

4.1.3.6 Zero mismatch identical
The donor and recipient have the same amount of HLA antigens but less than 6, of which all antigens are the same, e.g.:
Donor typing A1 A2 B7 B8 DR1 -
Recipient typing A1 A2 B7 B8 DR1 -

4.1.3.7 Zero mismatch compatible
The donor has less HLA antigens than the recipient, but the recipient has all of the donor HLA antigens, e.g.:
Donor typing A1 - B7 B8 DR1 -
Recipient typing A1 A2 B7 B8 DR1 DR13

4.1.3.8 Outdated screening
Outdated screenings are those with a sample date older than 150 days (i.e. ≥5 months) at time of matching. Recipients with outdated screening are not selected in matching procedures.

4.1.3.9 Local(ly)
Recipients from the same center as the donor center.

4.1.3.10 Equivalent-local(ly)
Equivalent to a local status are recipients from collaborating transplant programs (regional or national).
4.1.3.11 Regional(ly)

One or more transplant centers in the same region of the donor center. Such a region can consist of one or more transplant programs. (e.g. In Germany the seven regions are consistent with the seven donor regions defined by the organ procurement organization Deutsche Stiftung Organtransplantation (DSO).

4.1.3.12 National(ly)

All transplant programs in the same country (but outside the region) of the donor center.

4.1.3.13 International

All transplant programs outside the country of the donor center.
4.2 Kidney - urgency codes

A recipient for kidney is someone who has an end-stage renal disease. The urgency codes are used to classify recipients on the waiting list and to prioritize them in the kidney match and allocation procedure. The urgency codes combine the aspects of transplantability, medical urgency and the most recent level of allo-sensitization in ENIS (see table 1).

<table>
<thead>
<tr>
<th>Urgency code</th>
<th>Transplantability</th>
<th>Medical urgency</th>
<th>allo-sensitization (%PRA)</th>
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<td>HU</td>
<td>High Urgency</td>
<td>yes</td>
<td>urgent</td>
</tr>
<tr>
<td>T</td>
<td>Transplantable</td>
<td>yes</td>
<td>normal</td>
</tr>
<tr>
<td>I</td>
<td>Immunized</td>
<td>yes</td>
<td>normal</td>
</tr>
<tr>
<td>HI</td>
<td>Highly Immunized</td>
<td>yes</td>
<td>normal</td>
</tr>
<tr>
<td>NT</td>
<td>Not Transplantable</td>
<td>no</td>
<td>no</td>
</tr>
</tbody>
</table>

Table 1, Urgency codes

4.2.1 High urgency (HU) Kidney status

In specific situations a high urgency status can be requested below the inclusion criteria can be found.

4.2.1.1 Non German countries; HU inclusion criteria

- Imminent lack of access for either hemodialysis or peritoneal dialysis;
- Severe (uremic) polyneuropathy,
- Inability to cope with dialysis with a high risk for suicide;
- Severe bladder problems (hematuria, cystitis etc.) due to kidney graft failure after simultaneous kidney + pancreas transplantation, provided that the pancreas graft is bladder-drained and functioning adequately.

4.2.1.2 Germany; HU inclusion criteria;

In Germany recipients are eligible for HU only if their life is either already in danger or that the underlying reason for requesting the HU status will inevitably lead to a life threatening situation:

- imminent lack of access for either hemodialysis or peritoneal dialysis;
- inability to cope with dialysis with a high risk for suicide;
- severe bladder problems (hematuria, cystitis etc.) due to kidney graft failure after simultaneous kidney + pancreas transplantation, provided that the pancreas graft is bladder-drained and functioning adequately.

4.2.1.3 Change clinical situation of recipient with HU status

If the clinical situation of a recipient improves, the transplant center should place the recipient in any lower urgency other than HU. Recipients in HU status who become (temporarily) not transplantable have to be reported as NT. If these recipients become transplantable again a new HU request has to be sent to Eurotransplant.
4.2.2 HU request

A remote center cannot assign urgency HU in ENIS, but send a request to ET. In order to request for HU kidney status the form “Kidney High Urgency form” (see Forms at [www.eurotransplant.org](http://www.eurotransplant.org)) should be used. Please be aware that only HU requests are taken in to account in case the recipient is placed on an active urgency status. Besides the form a transplant center must send a letter of motivation for the recipient’s high urgent request in English to ET. Depending on the criteria a report from one or two competent specialist(s) in the field of the indication concerned must be included (see form). Besides that often information whether living donor is considered is requested.

4.2.3 HU audit

A HU kidney request will only be taken in consideration if the recipient has a transplantable urgency status.

In case the indication for HU is “inability to cope with dialysis with a high risk for suicide”, the ET Medical Staff evaluates the request. All other requests and the requests that cannot be accepted by the ET medical staff will initially be evaluated by two members of the Eurotransplant Kidney Advisory committee. In case of a split decision, a third member of the Eurotransplant Kidney Advisory committee will be consulted for a final judgment. Only after approval the HU status will be granted and the urgency will be changed in ENIS.

The persons involved in the audit procedure should follow the “Kidney audit procedure” which is published on the ET member site.

4.2.3.1 Deviant national regulations; Germany

All HU requests will be evaluated by members of the Eurotransplant Kidney Advisory committee.

4.2.3.2 Objection

If the HU is declined by the audit and the requesting center does not agree with the auditors’ decision, the requesting center has only one opportunity of putting forward its objection. The center should indicate that the auditors overlooked some information or provide additional information that might be of importance for the final decision of the auditors. The objection has to be submitted to Eurotransplant within 5 working days after the initial decline of the request. The objection letter should be written in the English language and also summaries of other information (e.g. letters of specialists). The objection is send to all ETKAC members and the common decision in the second round is the final decision.

4.2.4 Transplantable (T)

Elective recipients who are transplantable and who have a PRA of <6%.

4.2.5 Highly Immunized (HI)

Recipients who are transplantable and who have a PRA of ≥ 85%.

4.2.6 Immunized (I)

Recipients who are transplantable and who have a PRA range 6% - 85%.
4.2.7  Not Transplantable (NT)

Recipients temporarily not transplantable should be placed in urgency NT. If a recipient deteriorates beyond transplantability, the transplant center should remove (Urgency R) the recipient from the waiting list.
4.3 General information on the allocation of kidneys

In 4.1.2 the flowchart can be found about the general allocation order. This figure shows that in the first place kidneys are offered to recipients that are in need for a combined organ transplant including kidney. These recipients will get the offer of the organs via the leading organ (For further information concerning this subject please see chapter 3 allocation). The kidney only allocation can be started as one or both kidneys are still available. If the donor is $< 65$ years the AM + ETKAS match is started; if the donor is $\geq 65$ years the ESP match will be started. In this chapter more information can be found on the allocation of the kidneys.

4.3.1 AB0 blood group rules

AB0-incompatible kidney transplants from post mortem donors are not allowed.

4.3.1.1 AM program

<table>
<thead>
<tr>
<th>Donor blood group</th>
<th>Eligible recipients</th>
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<tbody>
<tr>
<td>A</td>
<td>A and AB</td>
</tr>
<tr>
<td>B</td>
<td>B and AB</td>
</tr>
<tr>
<td>AB</td>
<td>AB</td>
</tr>
<tr>
<td>O</td>
<td>A, B, AB and O</td>
</tr>
</tbody>
</table>

4.3.1.2 ESP, ETKAS

<table>
<thead>
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<th>Donor blood group</th>
<th>Eligible recipients</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>AB</td>
<td>AB</td>
</tr>
<tr>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

4.3.2 Choice of allocation scheme Germany

In Germany recipients aged 65 years or older have to choose for either being included in the ESP or the (AM+) ETKAS program. These programs are mutually exclusive.

4.3.3 Acceptable Mismatch (AM) program

The Acceptable Mismatch (AM) program aims at allocating organs to recipients who are immunologically compromised because of current and/or historical HLA-sensitization.

The program identifies HLA mismatches not resulting in a positive cross match by checking against which HLA antigens the recipient has not yet reacted with allo-antibodies and might therefore be acceptable for the recipient.

Recipients selected by this program have priority over ETKAS-selected recipients. Within the AM program, recipients awaiting a combined kidney-non renal transplant have priority over kidney only candidate recipients.
4.3.3.1 Inclusion criteria

These criteria can be found in Chapter 10 Histocompatibility (§ 10.3).

4.3.3.2 Minimum requirements for organ offers

The AM program is run for every post-mortem kidney donor with a known HLA typing to select potentially cross-match negative AM recipients.

4.3.3.3 Contact with immunologist from the ETRL

All eligible AM-recipients are presented to and discussed with an ETRL immunologist prior to a kidney offer.

4.3.3.3.1 Effect of judgment by ETRL immunologist

In case a recipient is selected through:

- The AM program, then the judgment of the ETRL immunologist is binding. If the judgment is negative, then no offer is made for this recipient. If the judgment is positive, an offer is made for this recipient. No prospective cross match is performed.
- ETKAS, then the judgment of the ETRL immunologist is not binding. If the judgment is negative, then this will be communicated to the recipient center leaving the decision to accept or decline the offer to the responsible transplant physician.

4.3.4 Eurotransplant Kidney allocation system (ETKAS – donors < 65 years)

The selection of potential recipients is based on AB0 blood group rules. The ranking of recipients is based on age, medical urgency, %PRA level, HLA-A, -B, -DR matching between donor and recipient, waiting time and donor region.

Selected potential recipients are ranked with the help of a point score system. The point score is calculated for all recipients, including 000-mismatched recipients. The recipient with the highest point score is ranked on top and receives the first offer. All following offers, firm or back up, are made in descending order.

In case of a HLA fully homozygous donor, 000 HLA-A, B, DR mismatch recipients are ranked from fully homozygous to fully heterozygous. Within each group, recipients are ranked according to their point score.

For the determination of 000 MM recipients or the calculation of HLA points in the ETKAS system only HLA-A, -B and -DR are significant. In case of unacceptable antigens besides HLA-A, -B and –DR also HLA-C and -DQ antigens, as well as the public antigens of the HLA-B and -DR loci are taken into account.

For detailed information concerning the point score see 4.4

4.3.5 Eurotransplant Senior Program (ESP - donors ≥ 65 years)

The Eurotransplant Senior Program (ESP) allocates kidneys from post-mortem donors ≥65 years old to recipients ≥65 years without the use of a donor HLA typing. The ESP aims at a cold ischaemic period (CIP) that is as short as possible. Within the tiers the recipients are ranked based on the waiting time (dialysis time). In case donor HLA typing is known before the ESP match is generated unacceptable antigens are taken in to account.
4.3.5.1 **No allocation via ESP possible**

Kidneys from an ESP donor that cannot be allocated locally or regionally are allocated through the regular kidney allocation (ETKAS) after reporting of the HLA typing.

4.3.5.2 **National allocation rules**

4.3.5.2.1 Austria, Belgium/Luxembourg

In Austria and Belgium/Luxembourg, kidneys from ESP donors are allocated to ESP recipients from the reporting center’s local waiting list (=donor center).

4.3.5.2.2 Germany

In Germany, kidneys from ESP donors are allocated to ESP recipients from the corresponding region (see 4.7.4) as defined by the organ procurement organization Deutsche Stiftung Organtransplantation (DSO). Kidneys from ESP donors are first allocated to ESP recipients registered within the same sub-region as the donor and then to ESP recipients registered within the other sub-regions within that DSO region.

4.3.5.2.3 Hungary

In Hungary, kidneys from ESP donors are first allocated to local ESP recipients registered within the same region (= donor center) as the donor and then to ESP recipients registered nationally.

4.3.5.2.4 The Netherlands, Croatia, Slovenia

In the Netherlands, Croatia and Slovenia, kidneys from ESP donors are allocated to ESP recipients according to the national waiting list.

In the Netherlands, ESP donor kidneys are only allocated to never-immunized recipients awaiting a first kidney transplant.

4.3.6 **Donation after cardiocirculatory death (DCD) kidneys**

Kidneys from donation after cardiocirculatory death donors (DCD) are allocated according to the same algorithm as for donation after brain death (DBD) kidneys in those countries in which is legally and ethically allowed. For further information concerning this subject please see chapter 9 of the manual.

4.3.7 **Donors < 5 years and en-bloc procurement**

4.3.7.1 **Donors <2 years**

From donors under the age of 2 years the kidneys must be procured en-bloc.

4.3.7.2 **Donors between 2 and 5 years**

From donors between 2 and 5 years of age it is recommended to procure the kidneys en-bloc. For further information concerning the procurement of the kidneys please see chapter 9.

---

1 Discussed and confirmed by the ET Kidney Advisory Committee (ETKAC) in December 2004.
4.3.7.3  **Donors aged ≥75 years**

In case of rescue allocation for a donor ≥75 years of age, the transplant center is offered the opportunity to transplant both kidneys into one recipient. In all other cases, a single kidney transplant is preferred.

4.3.8  **Prospective cross-match**

4.3.8.1  **Prospective preliminary cross-match**

Donor tissue typing laboratories are obliged to perform cross-matches as ordered by either ET (non-German) countries or the DSO (Germany).

In case of a positive preliminary cross-match, no kidney offer will be made to a recipient or the conditional offer is withdrawn.

4.3.8.2  **No serum available for preliminary cross-match**

If a preliminary cross-match cannot be performed because no serum is available, no kidney offer will be made to a recipient, or the conditional offer is withdrawn, except in case of an immunized (4.2.5 or 4.2.6) HU recipient for whom unacceptable antigens are entered into the system.
4.4 ETKAS - Point score system

In this chapter detailed information can be found about the points kidney recipient can acquire for the different factors.

4.4.1 HLA-Typing

The HLA match program only concerns the HLA-A, -B and -DR loci.

4.4.1.1 The HLA-C and -DQ antigens, as well as the public antigens of the HLA-B and -DR loci are disregarded in HLA mismatch calculation program. Conversion of HLA-A and -B typing

The HLA-A and -B typing of the donor and the recipients is converted to a match HLA-typing by the HLA broad match phenotype reduction program (see table 4.6.1).

If present, split HLA-antigens are converted to their respective broad HLA antigen.

4.4.1.2 Conversion of HLA-DR typing

- If a donor with HLA-DR broad antigens is reported to ET without splits, recipients will be selected on broad antigen level;
- If a donor with HLA-DR split antigens is reported to ET, recipients will be selected on split antigen level. The only exclusion to this rule concerns split antigens DR17/DR18, because they are difficult to distinguish. Donors with HLA-DR 17 or 18 antigens will be matched on broad DR3 antigen level.

4.4.1.3 Calculation of HLA mismatches

The HLA mismatch program calculates HLA-antigen mismatches for HLA-A and -B based on broad antigens only. HLA-antigen mismatches for HLA-DR are calculated based on split HLA antigens.

Mismatches are defined as donor HLA-antigens that are different from the recipient's own HLA-antigens.

The converted HLA-typing is only accepted by the HLA-mismatch calculation program in the presence of at least 1 HLA-antigen on each of the three HLA-loci (HLA-A, HLA-B and HLA-DR).

In case only 1 HLA-antigen is identified, the donor or the recipient is assumed to be 'homozygous' for that locus (i.e. homologous chromosomes are presumed to code for identical antigens at that locus).

Calculation for homozygous locus of a donor:

Donor typing A1 -
Recipient typing A28 A2

In this case only only 1 mismatch is calculated.

The same counts in case there are 2 identical broad HLA-A or -B or split HLA-DR antigens on one locus.

Calculation for 2 identical antigens on 1 locus of a donor:

Donor typing A9 A9
Recipient typing A28 A2
Calculation: Only 1 mismatch is calculated.
4.4.1.4  **Point assignment**

The number of mismatches on the loci HLA-A, HLA-B and HLA-DR is added according to the following formula:

\[
= 400 \times [1 - \left( \sum \text{broad HLA-A, -B, split HLA-DR mismatches} / 6 \right)]
\]

<table>
<thead>
<tr>
<th>Number of HLA-A, -B, -DR mismatches</th>
<th>Number of points</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>400.00</td>
</tr>
<tr>
<td>1</td>
<td>333.33</td>
</tr>
<tr>
<td>2</td>
<td>266.67</td>
</tr>
<tr>
<td>3</td>
<td>200.00</td>
</tr>
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<td>4</td>
<td>133.33</td>
</tr>
<tr>
<td>5</td>
<td>66.67</td>
</tr>
<tr>
<td>6</td>
<td>0.00</td>
</tr>
</tbody>
</table>

4.4.1.5  **HLA-bonus for pediatric recipients**

For pediatric recipients (see § 4.4.4), the points for HLA-antigen mismatch are doubled.

4.4.2  **Mismatch Probability (MMP)**

Mismatch Probability is a calculation of the probability of receiving a kidney offer with 0 and 1 *broad* HLA-A, -B or *split* DR mismatch based on 1000 kidneys offered, taking into account AB0 blood group rules and PRA screening.

4.4.2.1  **MMP for 0 or 1 HLA mismatch**

The *broad/split* HLA-antigen frequencies, necessary for the calculation of the 0 and 1 HLA MMP, have been calculated on the ETRL Database (see table 4.7.2).

The MMP for 0 and 1 HLA is determined at the moment of listing on the kidney waiting list. The lower the calculated value for 0 + 1 HLA-MMP (MMP0 + MMP1), the higher the chance of finding a donor with 0 or 1 HLA-mismatches within the Eurotransplant pool.

4.4.2.2  **AB0 blood group**

AB0 blood group frequencies have been calculated on the CTS Database for a Caucasian donor population in the period 1988-1995 (see table 4.7.2).

4.4.2.3  **PRA screening**

The %PRA screening is the most recently entered in ENIS and must not be out-dated (see § 4.1.3.8). Screenings should be updated every 3 months. In the event of a possible sensitization between regular %PRA screening dates, additional %PRA screenings should be performed according to the ETRL guidelines.

A higher %PRA indicates a lower chance of finding a donor with a negative cross-match.
4.4.2.4 **MMP formulas**

All variables are equal to the **broad** HLA-A and –B and **split** HLA-DR frequencies in table 4.4.2.

\[
\text{MMP} = 100 \times (1 - \text{(AB0-match frequency)} \times (1 - (\%PRA / 100))) \times (\text{MMP0} + \text{MMP1}))^{1000}
\]

\[
\text{MMP0} = (a1 + a2)^2 \times (b1 + b2)^2 \times (dr1 + dr2)^2
\]

\[
\text{MMP1} = \text{MMP0} \times \left(\frac{((2*(a1+a2)*(1 - a1 - a2)) - a1^2 - a2^2 + \Sigma (\text{all HLA-A Ag frequencies}^2)) / ((a1+a2)^2)}{((b1+b2)^2)} + \frac{((2*(b1+b2)*(1 - b1 - b2)) - b1^2 - b2^2 + \Sigma (\text{all HLA-B Ag frequencies}^2)) / ((b1+b2)^2)}{((b1+b2)^2)} + \frac{((2*(dr1+dr2)*(1 - dr1 - dr2)) - dr1^2 - dr2^2 + \Sigma (\text{all HLA-DR Ag frequencies}^2)) / ((dr1+dr2)^2))}{((dr1+dr2)^2)}\right)
\]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Frequency of</th>
</tr>
</thead>
<tbody>
<tr>
<td>a1</td>
<td>1st HLA-A antigen</td>
</tr>
<tr>
<td>a2</td>
<td>2nd HLA-A antigen</td>
</tr>
<tr>
<td>b1</td>
<td>1st HLA-B antigen</td>
</tr>
<tr>
<td>b2</td>
<td>2nd HLA-B antigen</td>
</tr>
<tr>
<td>dr1</td>
<td>1st HLA-DR antigen</td>
</tr>
<tr>
<td>dr2</td>
<td>2nd HLA-DR antigen</td>
</tr>
</tbody>
</table>

Parameters a1 - dr2 are derived from the match HLA-typing used for the calculation of the HLA-mismatches.

4.4.3 **Waiting time**

Upon registration on the kidney waiting list, the recipient’s date of onset of maintenance dialysis or date of re-institution of maintenance dialysis after previous kidney transplantation is counted as the first day for the calculation of the waiting time.

In eligible cases, waiting time includes the return of waiting time according to the rules written in § 4.4.3.2 (see 4.4.3.2).

The points for waiting time equal 33.3 per year waiting time (i.e. 0.091 points per day waiting). Waiting time points can be accrued unrestrictedly.

4.4.3.1 **Pre-emptive recipients**

On the active Eurotransplant kidney waiting list it is possible to register pre-emptive recipients, but these recipients do not receive points for waiting time, as they have not yet started their dialysis. Please be aware that there might be different National rules concerning the registration of pre-emptive recipients on the waiting list.

4.4.3.2 **Return of waiting time**

A recipient who is re-registered for a kidney transplant with one or more immediate previous kidney transplantations having failed, requiring maintenance dialysis within 90 days after the transplantation is eligible for the return of waiting time.

This return of waiting time will automatically be calculated. The amount of waiting time returned equals the number of days accumulated from the date of:

- start of dialysis and **no** previous transplant, or
re-institution of dialysis after the last successful transplant, i.e. graft function >90 days.

4.4.3.2.1 Deviant national regulations

Austria, Croatia, Hungary, Luxembourg, The Netherlands, Slovenia

A recipient who is re-registered for a kidney transplant with one or more immediate previous living donor kidney transplantations having failed, requiring maintenance dialysis, is eligible for the return of waiting time.

The amount of waiting time returned equals the number of days accumulated from the date of
- start of dialysis and no previous transplant, or
- re-institution of dialysis after the last successful transplant, i.e. graft function >90 days. until the living donor transplant

The return of waiting time is done manually on a monthly basis.

4.4.4 Pediatric bonus

A transplant candidate is defined pediatric if:
1. dialysis started before the 16th birthday or
2. registration on the waiting list was before the 16th birthday and dialysis started before the 17th birthday or
3. Recipient is proven to be in maturation

Each pediatric transplant candidate is assigned a pediatric bonus of 100 points:

For pediatric recipients the points for HLA-antigen mismatch are doubled.

4.4.4.1 Delivering and auditing proof of maturation

A transplant center must send a completed Kidney recipient in maturation form (see Forms at www.eurotransplant.org) including a report from a competent radiologist or pediatric endocrinologist on an X-ray of the left hand.

This report must not be older than 3 months
• Calculated from date of onset of maintenance dialysis
• Pre-emptive listing calculated from date of registration on the waiting list).

The request will be evaluated by two members of the Eurotransplant Kidney Advisory committee. In case there is no unanimous decision, a third member of the Eurotransplant Kidney Advisory committee will be consulted for a final decision. Proof of maturation should be only delivered when the onset of maintenance dialysis is after the 17th birthday or the recipient is registered on the kidney waiting list after the 16th birthday while not being on dialysis yet.

After the proof of maturation has been accepted the pediatric status is granted:
1. Until the first successful transplant in case the recipient is on maintenance dialysis
2. Until the first successful transplant in case the maintenance dialysis starts within the first year after registration on the waiting list.
3. For 1 year calculated from date of registration on the waiting list in case the recipient is not on maintenance dialysis.

The pediatric status can be re-installed when the recipient is still proven to be in maturation at time of onset of maintenance dialysis. The pediatric status will then be granted until the first successful transplant.
4.4.5 Distance between donor center and transplant center.

<table>
<thead>
<tr>
<th></th>
<th>Austria</th>
<th>Belgium / Luxemburg</th>
<th>Croatia</th>
<th>Germany</th>
<th>Hungary</th>
<th>The Netherlands</th>
<th>Slovenia</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Local Equivalent</strong></td>
<td>200</td>
<td>200 (also eq)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td><strong>Regional</strong></td>
<td></td>
<td></td>
<td>200</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>National</strong></td>
<td>100</td>
<td>100</td>
<td>300</td>
<td>100</td>
<td>300</td>
<td>300</td>
<td>100</td>
</tr>
</tbody>
</table>

The total amount of points given to national recipients is composed from national points plus if applicable the local or regional points.

4.4.6 National Kidney Exchange Balance

Once every day, for the period of the immediate previous 365 days, the difference between the number of kidneys procured, exchanged between each ET country\(^2\) and transplanted, is calculated.

* Export, i.e. a negative balance, is defined as: kidneys procured in a country > kidneys transplanted in that country.
* Import, i.e. a positive balance, is defined as: kidneys procured in a country < kidneys transplanted in that country.

No immediate compensation exists for exchanging kidneys together with non-renal organ(s) from one donor for transplantation into one recipient; however the calculation of kidneys exchanged includes kidneys exchanged together with non-renal organs.

The point assignment depends on the range of national balance values and is assigned only to resident recipients.

National Balance Points = (highest import balance – recipient country balance) \(\times 10\)

4.4.7 Regional Kidney Exchange Balance (Austria only)

In addition to the National Kidney Exchange Balance, the difference between the number of kidneys procured and exchanged for transplantation between each Austrian center/region and all other (including Austrian) ET centers/regions over the preceding 365 days is calculated once every day.

In case of an Austrian donor, resident recipients from the Austrian centers/regions receive additional balance points according to the following formula:

Regional Balance Points\(^3\) = 0.25x(Austrian National Balance - Regional Balance)

4.4.8 High Urgency

Recipients with urgency code HU receive a bonus of 500 points.

\(^2\) Belgium and Luxemburg are considered as one country

\(^3\) Please note the Regional Balance Points can be negative, which means a deduction of the total pointscore
No further stratification is made with regard to the %PRA level. 
Please Note: the required HLA mismatch criteria is not taken into account when the recipient has the HU status

4.4.9 Kidney after liver transplant

In addition to the option of performing a simultaneous liver-kidney transplant the option of transplanting first the liver and the kidney at a later time (i.e. a kidney-after-liver transplant) is possible in selected cases. In particular this option is preferred in case of a hepatorenal syndrome.
In case of a kidney-after-liver transplant, the recipient gets 500 extra points in the kidney allocation system (ETKAS) during the period of 90 to 360 days after the liver-only transplant, provided that:
1. the recipient was registered (active or NT) on the kidney waiting list at time of the liver transplant
2. the creatinine clearance is <15ml/min (sample date between 87 and 360 days after the liver transplant)

This bonus will be automatically rewarded if the recipient is entered in a transplantable status and the above conditions are met. The bonus (i.e. 500 points) expires either at time of the kidney transplant or at the end of the bonus period (i.e. 360 days after the liver transplant).

4.4.10 Bonus for recipients having donated one of their own kidneys

Recipients suffering from end stage renal disease after having donated one of their own kidneys are eligible for pre-emptive listing on the kidney waiting list. Upon registration on the waiting list the recipient will be granted a once-only allocation bonus of 500 points.

In exceptional cases, upon request of the transplant center, this bonus can be granted a second time. Each request for a repeated bonus should be well motivated and will be evaluated by all ETKAC members.

4.4.10.1 Deviant national regulations; Germany

Granting this bonus has not yet been accepted by the German national authorities
4.5 ETKAS – allocation algorithms

4.5.1 Donors < 16 years of age

First, to AM program recipients (pediatric & adult) then, to zero (000) HLA-A, -B and -DR mismatch recipients (pediatric & adult), in case of a HLA fully homozygous donor recipients are ranked from fully homozygous to fully heterozygous. Within each group recipients are ranked according to their point score. then, to recipients having the pediatric status, ranked according to their point score. then, to all other HI, I, T and HU recipients ranked according to their point score.

4.5.2 Flowchart 1 – Donor < 16 years

```
Pediatric donor
Kidney only

AM recipient in
AM program

Yes
AB0 compatible

No

AB0 identical

000
MM

Recipients ranked from
fully homozygous to
heterozygous

Yes
Donor fully
homozygous

No
Ranked according
to point score

Status Pediatric
ranked according to point score

All other recipients
ranked according to point score
```
4.5.3 Donors ≥ 16 years and < 65 years of age

First, to AM program recipients

then, to zero (000) HLA-A, -B and -DR mismatch recipients in case of a HLA fully homozygous donor (see 4.2.2.1.3): recipients are ranked from fully homozygous to fully heterozygous. Within each group recipients are ranked according to their point score.

then, to HI, I, T and HU recipients ranked according to their point score.

4.5.4 Flowchart 2 – Donor ≥ 16 years and < 65 years
4.6 ESP allocation algorithms (Donor aged ≥ 65 years)

4.6.1 Eurotransplant Senior program (ESP)

First recipient oriented allocation to recipients aged ≥ 65 years within the area tiers first HU then elective ranked on waiting time (=dialysis time):

- Austria, Belgium/Luxembourg → Locally or equivalent
- Germany → Subregion (see § 4.7.4) before other subregions in that DSO region
- Hungary → Region of the donor before all other regions
- The Netherlands Croatia and Slovenia → Nationally

then, according to the ETKAS scheme (see § 4.5.2)

4.6.2 Flowchart 3 – Donor ≥ 65 years
### 4.7 Tables

#### 4.7.1 Conversion of *split* HLA-antigen to *broad* HLA-antigen

<table>
<thead>
<tr>
<th>A23</th>
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<th>A10</th>
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<th>A28</th>
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### 4.7.2 HLA antigen frequency

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<tr>
<th>HLA-A</th>
<th>HLA-B</th>
<th>DR1</th>
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<th>DR15</th>
<th>DR16</th>
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<tbody>
<tr>
<td>A1</td>
<td>0.1581</td>
<td>0.0089</td>
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<tr>
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<td>0.2992</td>
<td>0.0004</td>
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<td>0.1622</td>
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<td>0.1197</td>
<td>0.0029</td>
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<td>0.0001</td>
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<td>0.0001</td>
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### 4.7.3 AB0 blood group frequency

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<th>Recipient’s blood group</th>
<th>Frequency</th>
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<tr>
<td>AB0-A</td>
<td>0.423</td>
</tr>
<tr>
<td>AB0-B</td>
<td>0.102</td>
</tr>
<tr>
<td>AB0-AB</td>
<td>0.036</td>
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</table>
### German ESP (sub) regions

<table>
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<tr>
<th>DSO region</th>
<th>ESP sub region</th>
<th>Transplant centers</th>
<th>ET center code</th>
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<tbody>
<tr>
<td>GBWOR</td>
<td>OZ Stuttgart</td>
<td>Heidelberg</td>
<td>GHBTTP</td>
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<td></td>
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<td>GMATP</td>
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<td>GSTTP</td>
</tr>
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<td></td>
<td>München, Rechts der Isar</td>
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4.8 Forms

All forms can be found and downloaded from the section ‘Forms’ of the Library of the member site at www.eurotransplant.org.