

Chapter 6

ET Thoracic Allocation System (EThAS)

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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 6 – EThAS

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6.1. Heart

6.1.1. Overview Urgency Statuses

6.1.1.1. Urgency codes for heart transplant candidates

Urgency statuses are used to classify transplant candidates on the waiting list and to prioritize patients in the thoracic organ match and allocation procedure. The urgency statuses reflect transplantability and medical urgency.

6.1.1.2. Overview table of urgency statuses heart

Heart urgency codes in EThAS			
Urgency code		Transplantable	Medical Urgency
HU (national / international)	High Urgent	Yes	High Urgent
	High Urgent 1A (only the Netherlands)	Yes	High Urgent
	High Urgent 1B (only the Netherlands)	Yes	High Urgent
ACO	Approved Combined Organ	Yes	More priority in the match
T	Transplantable	Yes	Normal
NT	Not Transplantable	No	n.a*

* n.a. = not applicable

6.1.1.3. High Urgency Status: national vs. international

There are two HU statuses, respectively the national HU status and the international HU status.

The need for an upgrade of the medical urgency status is assessed by the treating physician.

The national HU status is granted according to national policies. These policies are different for each Eurotransplant member state, while in Germany no national HU status is defined.

The international HU status is assigned by an independent team of auditors, where their decision is guided by well defined criteria (see HU Inclusion Criteria, section [6.1.2.2](#)). All heart transplant centers within the Eurotransplant consortium can send in a request for the international HU status 24/7.

6.1.1.3.1. Deviant national/international regulations

6.1.1.3.1.1. The Netherlands, national HU

High urgent heart transplant candidates listed in the Netherlands can be classified, according to their disease severity into status 1A or 1B.

1. Status 1A

- unstable patient dependent on high dose inotropes and/or IABP with restored organ function;
- patient on medium or long-term VAD and restored organ function in whom support is no longer feasible;
- patient listed for an acute re-transplantation due to graft failure <7 days after a previous heart transplant;
- Patient with intractable, life-threatening arrhythmia.

2. Status 1B

- Stabilized patient still on high-dose of inotropes.

6.1.1.3.1.2. Germany, national HU status

Germany has no national HU status. All first requests for an HU status for patients listed in Germany are always submitted to the team of auditors.

6.1.1.4. *Approved Combined Organs (ACO)*

For patients in need of a multi-organ transplant - except the combination heart with kidney, and heart/ lung with kidney – the ACO status can be requested.

6.1.1.4.1. Applying for the ACO status

A complete documentation and appropriate justification in English of the request for ACO status must be sent to the Eurotransplant duty desk by use of the ACO forms ([website](#) → membersite → library → forms). This request is then forwarded to a member of the ET thoracic committee and, depending on the other organ(s), a member of the ET pancreas committee, or a member of the ET liver & intestine committee. The organ committee members who judge upon the ACO request are national representatives of countries different from the requesting country. The organ committee members will be given 24 hours to reach a decision. If no consensus is reached, a third organ committee member will decide on the ACO request. Upon granting of the ACO status, Eurotransplant duty officers will adapt the status accordingly.

6.1.1.5. *Transplantable (T)*

The urgency status Transplantable (T) is used for elective transplant candidates who are not eligible for the urgency statuses HU or ACO. Time spent in the T status is not limited.

6.1.1.6. *Not Transplantable (NT)*

Transplant candidates who are temporarily not transplantable should be placed in the urgency status NT. This adaptation of the urgency status is to be done in ENIS by the transplant center. Days spent in NT status, irrespective the previous urgency statuses are not taken into account in the calculation of the waiting time. Requesting an HU status is not possible if the patient is in a NT status.

6.1.1.6.1. Deviant Regulations

6.1.1.6.1.1. Germany

Elective transplant candidates, i.e. T status patients who are temporarily not transplantable can retain up to 30 days of NT waiting time. In the calculation of the waiting time up to a maximum of 30 days in NT status will be added to the T waiting time (see also [6.1.1.6.1.2.](#) and [6.1.5.1.4.](#)).

6.1.1.6.2. Return of HU waiting time after NT status

A transplant candidate with HU status, who is subsequently downgraded to T or NT status, but thereafter re-listed with an HU status within a time span of maximum 28 days, will not lose the previously accumulated HU waiting time

Pediatric transplant candidates who are registered as NT are automatically upgraded to the international HU status at the end of their NT period. The previously accumulated HU waiting time is re-assigned to the pediatric transplant but only if this NT period has not exceeded 28 days.

6.1.1.6.2.1. Reporting of the NT status

In order achieve a maximum efficiency of the allocation process all changes from active urgency statuses to NT status should immediately be recorded in ENIS. It is the responsibility of the transplant center to place the patient in the correct urgency status if the patient's condition improves or further deteriorates. Furthermore, if the patient's condition worsens beyond transplantability, the transplant center should remove the patient from the waiting list.

6.1.1.7. *Pediatric transplant candidates*

A pediatric transplant candidate is a patient under the age of 16 years or proven to be still in a growing phase or still in maturation. These patients receive a pediatric status. All patients with a pediatric status who are registered on the waiting list in an active urgency status receive the international HU status. When a patient reaches the age of 16 years and this patient does not have a proof of still being in maturation, the patient immediately loses the pediatric status, If in addition no request for an HU status had been approved, this patient also loses the international HU status.

6.1.1.7.1. Proof of in maturation

Proof of in maturation has to be delivered by the transplant center. This proof is made of by a report from a radiologist or a pediatric endocrinologist on an X-ray of the left hand, but should not be older than 3 months. The pediatric status which is then granted is for 1 year.

To request and submit this proof of in maturation Status, see also section [6.1.3.2](#).

6.1.1.7.2. Hospitalized status

All patients with a pediatric status receive the HU International Status. In order to further differentiate between these candidates, patients with a pediatric status who are hospitalized have priority over adult HU patients; while the pediatric status patients who are not hospitalized are sorted among the adult HU patients by HU waiting time. In order to receive a Hospitalized Status the transplant center must submit a request to Eurotransplant (see [6.1.3.2](#)). As soon as the recipient is no longer residing in a hospital, Eurotransplant should be informed via email and the patient will lose the Hospitalized Status.

6.1.2. Applying for the HU status

6.1.2.1. *Procedure: Applying for national and international HU status*

Notification of the national HU status is done by the transplant center in the ENIS system (see ENIS manual).

A request for the international HU status is done by submitting a request to Eurotransplant via the Thoracic Clinical Profile Application (selection option "HU"). A set of mandatory data needs to be sent along with the request (via email) (see Mandatory data, section [6.1.2.4](#)).

All first requests for international HU status are forwarded to the international audit group. If the international HU status is accepted by the international audit group, the international HU status is registered in ENIS by Eurotransplant employees.

The international HU status is granted for a period of 8 weeks, if thereafter this status is considered to be renewed, a re-evaluation of the transplant candidate's clinical status should be submitted to Eurotransplant. Similar as with the first request, original data supporting the current status must be sent. All requests for a re-evaluation are judged by the Eurotransplant Medical Staff according to the HU International Criteria (see section 6.1.2.4). If these criteria are not met, the request is then forwarded for evaluation to the international audit group (for further information on the audit team, see Audit Process section [6.1.3](#)).

Note: A transplant center cannot assign an international HU status in ENIS. This status can only be registered in ENIS by Eurotransplant employees.

6.1.2.2. *Inclusion Criteria for international HU status*

HU patients are patients admitted to an intensive care unit of the transplant center¹ and fulfill all criteria mentioned in a), b) or c)

a) Inotropic therapy:

- Swan Ganz catheter
 - CI < 2.2 l/min/m² AND
 - SVO₂ < 55 % AND
 - PC ≥ 10 mmHg
- while on inotropic therapy for at least 48h
 - Dobutamine > 7.5 µg/kg/min or equivalent inotropes OR
 - Milrinone > 0.5 µg/kg/min or equivalent PDE inhibitor
- And signs of beginning secondary organ failure:
 - sodium < 136 mmol/l OR
 - increase of creatinine during clinical course in spite of treatment OR
 - increase of transaminases OR
 - symptomatic of cerebral perfusion deficit (neurological report)

b) Complications while on assist device:

- life threatening assist device complications or failure of an implanted device that can only be treated by assist device exchange OR
- infection of assist device with positive blood cultures or other proof of infection of the device (sole infection of the driveline excluded) OR
- repeated assist-related cerebral events demonstrated with CT scan (without neurological sequel that represent a contraindication to heart transplantation)

c) Additional special cases:

- acute re-transplantation due to primary graft failure within 1 week after transplantation, this is not in itself an indication, see below.

6.1.2.3. *Relative contraindications*

- Multi-organ failure
- Emergency indication without preceding evaluation after:
 - heart surgery
 - large myocardial infarction
 - fulminant myocarditis
- Acute re-transplantation (except for acute re-transplantation due to primary graft failure within 1 week after transplantation, if implantation of VAD is not possible or has only limited chances for success)

¹ The HU status of a patient requires that the patient is hospitalized in the transplant center or in a hospital cooperating with the transplant center and using the same medical therapy guidelines as the transplant center. This hospital is to be situated at such a distance that a transplant center physician is able to visit the patient at least once a week. The visit is to be documented.

- Complications in the early phase (approx. 1-2 weeks) after implantation of an assist device without prior clinical stabilization of the patient
- Recipient older than 65 years

6.1.2.4. *Mandatory data*

Mandatory data (copies of original reports sent by email) that are relevant to the request:

- current treatment data
- current Swan-Ganz catheter data (not older than 5 days)
- blood gas analysis (arterial, mixed venous)
- current (day of request or previous day) laboratory values (hemogram, electrolytes, kidney, liver)
- echocardiography
- if applicable: respirator parameters

6.1.3. Audit process

All first requests for the international HU status are forwarded by Eurotransplant to the international HU audit group, who will judge upon the request. In addition, all re-evaluations for an international HU status that do not fulfill the HU International criteria are forwarded to this international HU audit group.

6.1.3.1. *International audit group*

From each accredited thoracic transplant center in Eurotransplant, 2 experienced transplant physicians can be nominated, by the program director, to become members of the international HU audit group.

The international HU audit group is operational 24/7 and consists of three members that rotate weekly. The audit members on call always include an internist and a surgeon. In case an audit member is not available, a reserve auditor will be consulted.

The final decision (approval or denial) of the request for an international HU status is based on a majority vote.

Auditors have to reply by email as soon as possible (as agreed upon in the payment contracts within 6 hours after receiving the request) after receiving the request. If an auditor needs additional information in order to come to a decision, the center that has submitted the request for an international HU status has to provide the specified information to the auditor as soon as possible.

6.1.3.1.1. *Objections*

In case a request for the international HU status is denied the requesting center is allowed to file an objection against the auditors decisions, but only if

the objection is accompanied with new information or if relevant information regarding the recipient was overlooked. This additional information is forwarded to the auditors who previously denied the request. The objection to the auditors' decision needs to be submitted to Eurotransplant with 24 hours, after the auditors' final decision. In case the objection to the auditor's decision is sent in too late and the transplant center decides to submit a new request for the international HU status, this latter request will be treated as a first request, this implies that in case the international HU status is granted, the HU waiting time counter is reset to zero days.

The transplant center is responsible for the delivery and the accuracy of all the data.

Any deviations from the procedure which could result in incorrect allocation of organs will be reported to the national authorities of the concerning Eurotransplant member state and the chairman of the Thoracic Advisory Committee.

6.1.3.2. *Audit process of patients with a pediatric status*

Proof of in maturation

If a patient is 16 years or older, but still growing, a center can apply for a Pediatric Status. A proof of in maturation has to be submitted to Eurotransplant, this can already be done before the patient becomes 16 years. This proof of in maturation consists out of a report from a radiologist or pediatric endocrinologist on an X-ray of the left hand, but should not be older than 3 months. This report has to be submitted to Eurotransplant by email (urgency@eurotransplant.org). Thereafter the request is judged by two independent auditors appointed by Eurotransplant. This is a 24/7 process. In the case of a split decision, a third auditor has to be consulted for a final decision. In order to keep the pediatric status, the proof of in maturation has to be updated yearly as long as the recipient is still on the waiting list. After acceptance Eurotransplant will send a confirmation letter with a re-evaluation date to the requesting center.

Hospitalized status

The Hospitalized Status can be applied for by submitting a request to Eurotransplant by email (urgency@eurotransplant.org). This request needs to contain evidence that the recipient has been admitted to a hospital, by way of a letter signed by the treating physician, upon which the patient will be admitted to the hospitalized status. Eurotransplant will confirm this status upgrading by sending the requesting center a confirmation letter.

6.1.4. Duration HU / pediatric status

The national HU status is valid till the patient is transplanted, has died or till the treating physician redraws the status.

The international HU status is valid for a period of 8 weeks.

The pediatric status and subsequent international HU status expires the day after the patient's 16th birthday, unless it has been proven that the patient is still growing (proof of in maturation) or the patient has been transplanted. This proof of in maturation is valid for a period of one year.

6.1.5. Allocation factors

For exact ranking see the Allocation Algorithms, section [6.4](#).

6.1.5.1. Rank Tier system

The ranking of transplant candidates is based on several characteristics. These characteristics include the following patient factors: the medical urgency status, the pediatric status, the resident status (only in Belgium), degree of immunization (only in Germany). Furthermore the donor-to-recipient ABO blood group relations as well as the donor-to-recipient country balance are considered.

6.1.5.1.1. Country balance

The balance between the donor and recipient countries is defined as the cumulative difference between the numbers of transplants performed in country X with donor hearts imported from country Y and the number of heart transplants performed in country Y with donor hearts from country X. The balance is calculated as of September 1, 2004.

The total balance takes all heart transplants into account, while the HU balance only counts heart transplants performed in HU transplant candidates.

A negative country balance for country X with country Y is reached if country X exported more hearts to country Y, and which are subsequently used for transplantation, than the number of donor hearts from country Y returned and used for transplantation in country X.

6.1.5.1.2. Medical Urgency status

The different medical urgency statuses that play a role in the allocation procedure are the HU status (both national and international) the pediatric status (both the hospitalized and the not hospitalized status), the ACO, and the T status. Patients who are registered as NT are not selected in the match.

6.1.5.1.2.1. Maximum age donor profile for HU status

If a transplant candidate has the HU status and is older than 50 years of age, the maximum donor age profile is ignored in the offering process. For HU transplant candidates under the age of 50 years, the donor age profile as denoted in ENIS is considered in the organ offering process.

6.1.5.1.2.2. Hospitalized pediatric transplant candidates

Within each tier of HU patients the hospitalized pediatric transplant candidates will have priority over all the other HU recipients.

6.1.5.1.3. Donor information requirements

The following donor characteristics are required in order to generate a heart match:

- donor size (min and max) specified by gender
- donor age (min and max)
- Acceptance of a heart from a donor who is/has:
 - HBsAG pos
 - HBcAb pos
 - HCV pos
 - CMV
 - Sepsis
 - Meningitis
 - Malignant tumor
 - Drug abuse
 - Domino donor

6.1.5.1.4. Waiting time

Waiting time is counted in days with a separate counter for each urgency status. The waiting time for an elective patient is the sum of previously accumulated HU and elective (T) days. The waiting time for an HU patient equals the number of days continuous waiting in this status. If a patient has turned NT for a maximum duration of 28 days then the previously accumulated HU waiting days are added. In the calculation of waiting time for an elective patient, the NT time is not taken into account, except for patients listed in Germany. German transplant candidates can accumulate a maximum of 30 days in the NT status, which are added to the T waiting days.

6.1.5.1.5. Non-resident transplant candidates

Non-resident transplant candidates registered in Belgium are offered a donor heart after all Eurotransplant residents.

6.1.5.2. Additional allocation factors

6.1.5.2.1. AB0 Blood group rules

Four different AB0 blood group schemes are defined. The applications of these schemes vary by country.

AB0 identical

			Recipient		
		A	AB	B	0
Donor	A	x			
	AB		x		

	B			x	
	0				x

AB0 modified

			Recipient		
		A	AB	B	0
Donor	A	x	x		
	AB		x		
	B			x	
	0			x	x

ET AB0 compatible

			Recipient		
		A	AB	B	0
Donor	A	x	x		
	AB		x		
	B		x	x	
	0			x	x

AB0 compatible

			Recipient		
		A	AB	B	0
Donor	A	x	x		
	AB		x		
	B		x	x	
	0	x	x	x	x

6.1.5.2.1.1. AB0-Incompatible heart transplantations

AB0-incompatible heart transplants are only allowed in patients under the age of 2 years provided that:

- A protocol approved by the local ethics committee has been submitted by the transplant center to Eurotransplant;
- Within Eurotransplant there are no suitable AB0 blood group compatible recipients available at the time of the organ allocation.

6.1.5.2.2. Higher ranking heart-lung transplant candidates

Heart-lung transplant candidates are ranked above heart-only transplant candidates within the same urgency tier.

6.1.5.2.3. High immunized transplant candidates

A high immunized transplant candidate is a patient who has a current PRA of at least 50%.

Highly immunized transplant candidates registered in Germany are prioritized in the allocation scheme, but only if the donor is procured in Germany. A cross match is required before transplantation, if no serum available in the donor center, the organ offer will not be made or the offer will be withdrawn.

6.1.5.2.4. 10% Extended donor height profile

In order to avoid the situation that a donor offer is missed because the donor height falls outside the donor height profile and to avoid the situation that transplant centers cope with this issue by extending the donor height profile to unrealistic extremes the 10% donor height rule is introduced in all Eurotransplant member states, except Germany. Donor hearts are only offered to those transplant candidates where the designated donor profile encompasses this specific donor height. According to the 10% rule, transplant candidates are selected whose designated donor profile 10% is extended. The 10% extended donor height profile is calculated as follows: minimum height in the donor profile minus 10% of this minimum value and maximum height in the donor profile plus 10% of this maximum value (see additional example).

For example:

Designated donor height profile range: 1.60 - 1.80m

If the donor height is between 1.60 to 1.80 meters, the recipient appears in the match. If not, the recipient does not appear in the match.

With the 10% extended height profile calculation:

→10% calculation: 10% of 1.60m is 0.16m (16cm)

→10% calculation: 10% of 1.80m is 0.18m (18cm)

So in the case of this recipient's donor profile for height:

$1.80\text{m} + 0.18\text{m} = 1.98\text{m}$ **extended maximum donor height**

$1.60\text{m} - 0.16 = 1.44\text{m}$ **extended minimum donor height**

→ New donor height profile: 1.44 – 1.98m

In the 10% rule, if the donor has a height between, 1.44 to 1.98 meters then the patient is included in the match, but will be ranked after the elective national transplant candidates.

6.1.5.2.5. Deviant national regulation

6.1.5.2.5.1. Germany

The 10 % donor height profile is not applied for donors from Germany or for candidates listed in Germany.

6.1.5.3. *Other*

6.1.5.3.1. Domino heart transplantation

If a post-mortem donor heart is transplanted in a patient whose primary disease allows the use of the patient's own heart, the patient's heart can be used for a consecutive, second transplant (domino heart).

The recipient of the first post-mortem heart allografts is then considered a "living donor" for the second consecutive heart transplantation.

A transplant candidate for this domino heart can be selected from the center's own waiting list, except in Germany. In Germany or in other countries where no local candidates are available, the domino heart will be allocated through the standard heart allocation scheme. If a center is willing to accept a domino heart for one of their patients, this should be indicated in the patient's donor profile in ENIS. Patients are selected according to their donor profile if acceptance of a domino donor heart is marked yes, and then the patient will be selected for the match.

6.1.5.3.1.1. Deviant national definitions, Germany

A domino heart is considered a difficult-to-allocate organ and is allocated through EThAS to those patients who have denoted in the donor profile a willingness to accept this type of donor hearts.

6.2. HEART- LUNG

6.2.1. Overview urgency statuses

6.2.1.1. *Urgency codes for heart –lung transplant candidates*

Urgency codes are used to classify transplant candidates on the waiting list and to prioritize the patients in the thoracic organ match and allocation procedure. The urgency codes reflect transplantability and medical urgency.

6.2.1.2. *Overview table urgency status heart - lung*

Heart - Lung urgency codes in EThAS			
Urgency code		Transplantable	Medical Urgency
HU (national / international)	High Urgency	Yes	High Urgent
ACO	Approved Combined Organ	Yes	More priority in the match.
T	Transplantable	Yes	Normal
NT	Not Transplantable	No	n.a.

* n.a. = not applicable

6.2.1.3. *High urgency status: national vs. international*

There are two HU statuses, respectively the national HU status and the international HU status.

The need for an upgrade of the medical urgency status is assessed by the treating physician.

The national HU status is granted according to national policies. These policies are different for each Eurotransplant member state, while in Germany no national HU status is defined.

The international HU status is assigned by an independent team of auditors, where their decision is guided by well defined criteria (see section 6.2.2.4) by an international audit group. All heart transplant centers within the Eurotransplant consortium can send in a request for the HU International Status.

6.2.1.3.1. Deviant national / international regulation

6.2.1.3.1.1. Germany, national HU status

Germany has no national HU status. All requests for an HU status for patients listed in Germany are always submitted to the team of auditors.

6.2.1.4. *Approved Combined Organs (ACO)*

For patients in need of a multi-organ transplant -except for the combination heart- lung and kidney – the ACO status can be requested.

6.2.1.4.1. Applying for the ACO Status

See procedure for HEART [6.1.1.4](#)

6.2.1.5. *Transplantable (T)*

See procedure for HEART [6.1.1.5](#).

6.2.1.6. *Not Transplantable (NT)*

See procedure for HEART [6.1.1.6](#).

6.2.1.6.1. Deviant Regulations

6.2.1.6.1.1. Germany

See procedure for HEART [6.1.1.6.1.1](#).

6.2.1.6.2. Return HU waiting time after NT status

See procedure for HEART [6.1.1.6.2](#).

6.2.1.6.3. Reporting of the NT status

See procedure for HEART [6.1.1.6.3](#).

6.2.1.7. *Pediatric recipients*

See procedure for HEART [6.1.1.7](#).

6.2.1.7.1. Proof of in maturation

See procedure for HEART [6.1.1.7.1](#).

6.2.1.7.2. Hospitalized status

See procedure for HEART [6.1.1.7.2](#).

6.2.2. Applying for HU status

6.2.2.1. *Procedure: Applying for national and international HU status*

See procedure for HEART [6.1.2](#).

6.2.2.2. *High urgency*

6.2.2.2.1. Inclusion criteria

Patients should be ventilator dependent or on ECMO (iLA) support. In case the patient further deteriorates despite these interventions, the HU status is no longer indicated.

6.2.3. Audit process

All first requests for the international HU International status are forwarded by Eurotransplant to the international HU audit group, who will judge upon the request.

6.2.3.1. *International HU audit group*

See procedure for the heart HU audit [6.1.3.1](#).

6.2.3.1.1. Objections

See procedure for the HEART [6.1.3.1.1](#).

6.2.3.1.2. Audit process pediatric recipients

6.2.3.1.2.1. Proof of in maturation

See procedure for the HEART [6.1.3.2](#).

6.2.3.1.2.2. Hospitalized status

See procedure for HEART [6.1.4](#).

6.2.4. Duration HU/pediatric status

See procedure for the HEART [6.1.5](#).

6.2.5. Allocation factors

See procedure for the HEART [6.1.5.1.1](#).

6.2.5.1. *Rank Tier System*

See procedure for HEART [6.1.5.1](#).

6.2.5.1.1. Country balance donor country

See procedure for HEART [6.1.5.1.1](#).

6.2.5.1.2. Medical urgency status

See procedure for HEART [6.1.5.1.2](#).

6.2.5.1.2.1. Hospitalized pediatric recipients

See procedure for HEART [6.1.5.1.2.2](#).

6.2.5.1.3. Donor information requirements

The following donor characteristics are required in order to generate a heart-lung match:

- donor total lung capacity (TLC) (min and max)
- donor age (min and max)

- Acceptance of heart-lung from a donor who is/has:

- HBsAG pos
- HBcAb pos
- HCV pos
- CMV
- Sepsis
- Meningitis
- Malignant tumor
- Drug abuse
- Domino donor

6.2.5.1.3.1. Formula for calculating Total Lung Capacity (TLC)²

Donor < 120 cm

- Male donor: $TLC = 1.37 \times [\text{height (m)}]^2.5698$ - Female donor: $TLC = 1.30 \times [\text{height (m)}]^2.5755$

Donor ≥ 120 cm

- Male donor: $TLC = 7.99 \times [\text{height (m)}] - 7.08$ - Female donor: $TLC = 6.60 \times [\text{height (m)}] - 5.79$

6.2.5.1.4. Waiting time

See procedure for HEART [6.1.5.1.4.](#)

6.2.5.1.5. Non-resident transplant candidates

See procedure for HEART [6.1.5.1.5.](#)6.2.5.2. *Additional allocation factors*

6.2.5.2.1. AB0 Blood group rules

See procedure for HEART [6.1.5.2.1.](#)

6.2.5.2.2. Highly immunized recipients Germany

See procedure HEART [6.1.5.2.3.](#)

6.2.5.2.3. 10% Extended donor height and TLC profile

In order to avoid the situation that a donor offer is missed because the donor TLC falls outside the donor profile and to avoid the situation that transplant centers cope with this issue by extending the donor TLC profile to unrealistic extremes, the 10% donor TLC rule is introduced in all Eurotransplant members states, except in Germany. Donor heart-lung blocks are only offered to those transplant candidates where the designated donor profile encompasses this specific donor TLC.

According to the 10% rule transplant candidates are selected whose designated donor profile 10% is extended. The 10% extended TLC donor profile is calculated as follows: minimum TLC in the donor minus 10% of this minimum value and maximum TLC in the donor profile plus 10% of this maximum value.

For example:

Designated donor TLC profile range 5.5 - 6.5 L

If the donor TLC is between 5.5 – 6.5 L, the recipient appears in the match. If not, the recipient does not appear in the match.

² Zapletal et al. Standardization of lung function tests in pediatrics. The European Respiratory Journal 1989; 2, Suppl 4. Ed. The Working Group Pediatrics SEPCR.

With the 10% extended TLC profile calculation:

→ 10% calculation: 10% of 5.5 L is 0.55 L

→ 10% calculation: 10% of 6.5 L is 0.65 L

So in the case of this recipient's donor profile for TLC:

$6.5 \text{ L} + 0.65 \text{ L} = 7.15 \text{ L}$ **extended maximum donor TLC**

$5.5 \text{ L} - 0.55 \text{ L} = 4.95 \text{ L}$ **extended minimum donor TLC**

→ New donor TLC range: 4.95 – 7.15L

In the 10% rule, if the donor has a TLC between, 4.95 to 7.16 L then the recipient is included in the match but will be ranked after the elective national transplant candidates.

6.2.5.2.4. Deviant national regulation

6.2.5.2.4.1. Germany

The 10 % donor TLC profile is not applied for German recipients or for donors from Germany.

6.3. Lung

6.3.1. Introduction

6.3.1.1. LAS

LAS is the acronym for the Lung Allocation Score. The LAS value reflects both the disease severity as well as the expected benefit after lung transplantation. and is used for allocation lung allografts such that the patient with the highest LAS value will be the first one to receive the lung offer. The score is constructed from estimates of each candidate's medical urgency prior to transplantation and the probability of success after transplantation. Since the system is based on a 'net benefit' concept it will give priority to candidates who are most urgently in need of a transplant *and* who are expected to receive the greatest benefit.

6.3.1.2. Calculation of LAS

See ET LAS Calculation Guide on the [Membersite](#).

6.3.1.3. To whom does LAS apply?

In case of a lung donor from Germany or the Netherlands, all lung transplant candidates listed in Germany or the Netherlands will be sorted on the lung match list according to LAS.

In case of a lung donor from a country X that has a positive balance with country Y, all patients from country Y will be sorted on the lung match from country X according to LAS.

The lung transplant candidates listed in Austria or Belgium will still be allocated according to the national law in case of a national donor.

6.3.1.4. Pediatric transplant candidates

Children under the age of 12 years, who are registered in Eurotransplant for lung transplant all receive a LAS of 100. It is not necessary to enter a request for these children until their 12th birthday as a LAS value of 100 is generated automatically upon registration on the waiting list.

6.3.2. LAS factors

The following factors are contained in the LAS.

1. Height (cm)
2. Weight (kg)
3. Date of Birth
4. Lung Diagnosis Code
5. Assistance level
6. Diabetes

7. Assisted Ventilation
8. Oxygen requirement
9. Supplemental Oxygen (FIO₂ in % or l /min)
10. FVC %predicted
11. Pulmonary Artery Systolic Pressure (mmHg)
12. Mean Pulmonary Artery Pressure (mmHg)
13. Pulmonary Capillary Wedge Mean (mmHg)
14. Current PCO₂ (mmHg)
15. Highest PCO₂ (mmHg)
16. Lowest PCO₂ (mmHg)
17. Six Minute Walk Distance (m)
18. Serum Creatinine (mg/dl)

6.3.3. Items required for LAS

The LAS is calculated based on the values indicated in the overview (section 6.3.2). If certain values are missing a default value is used to calculate the score. Information on height, weight and date of birth is absolute required to add a new candidate to the waiting list. Information on the patient's functional status and assisted ventilation needs to be submitted; otherwise the calculated LAS will be 0.

A calculated LAS which is based on default values will in general be lower compared to the LAS based on measured values.

6.3.3.1. Default values

#	Items LAS calculator	High LAS	Low LAS	Comment/Default Value
1	Height (cm)	Cannot be missing	Cannot be missing	Needed for registration
2	Weight (kg)	Cannot be missing	Cannot be missing	Needed for registration
3	Data of birth	Cannot be missing	Cannot be missing	Needed for registration
4	Lung Diagnosis Code	Cannot be missing	Cannot be missing	If missing or expired LAS=0
5	Assistance level (none, some, total)	Maximum 7 days old	Maximum 4 weeks old	If missing or expired LAS=0
6	Diabetes (no diabetes, insulin dependent, non insulin dependent, unknown)	At first registration	At first registration	Default: not diabetic
7	Assisted Ventilation (not needed, CPAP,	Maximum 7 days old	Maximum 4 weeks old	If missing or expired LAS=0

	BiPAP, continuous invasive, intermittent invasive)			
8	Oxygen requirement (not needed, with exercise only, at night, at rest)	Maximum 7 days old	Maximum 4 weeks old	Default: not required
9	Supplemental Oxygen (FIO2 in % or l/min)	Maximum 7 days old	Maximum 4 weeks old	Default: 0 ECMO*: value before start , but not older than 6 months
10	FVC %predicted	Maximum 7 days old	Maximum 4 weeks old	Default: 150 ECMO* and Ventilated patients: most recent value prior to start. For all other patients for whom a LFT cannot be performed (ICU admission, continuous BiPAP, pneumothorax), the same rule as for ECMO/MV pts may be applied, but in these cases a written and signed statement of the arguments should be submitted.
11	Pulmonary Artery Systolic Pressure (mmHg)	Maximum 1 year old	Maximum 1 year old	This only needs to be measured once, upon initial registration. No repeated measurement is needed. Default: 20
12	Mean Pulmonary Artery Pressure (mmHg)	Maximum 1 year old	Maximum 1 year old	This only needs to be measured once, upon initial registration Default: 15
13	Pulmonary Capillary Wedge Mean (mmHg)	Maximum 1 year old	Maximum 1 year old	This only needs to be measured once, upon initial registration Default: 5
14	Current PCO2 (mmHg)	Maximum 7 days old	Maximum 4 weeks old	Artery, capillary Default: 40 ECMO*: value before start treatment
15	Highest PCO2 (mmHg)	Maximum 6 months	Maximum 6 months	Artery, capillary Default: 40 ECMO*: value before start treatment

16	Lowest PCO ₂ (mmHg)	Maximum 6 months	Maximum 6 months	Artery, capillary Default: 40 ECMO*: value before start treatment
17	Increase in PCO ₂ % from lowest to highest	Calculated by ET	Calculated by ET	Default: 0
18	Six Minute Walk Distance (m)	Maximum 7 days old	Maximum 4 weeks old	Missing Default: 46 If on mechanical ventilation or ECMO* and fill out: 0
19	Serum Creatinine (mg/dl)	Maximum 7 days old	Maximum 4 weeks old	Default: 10
20	Bilirubine (mg/dl) “	Maximum 7 days old	Maximum 4 weeks old	Default: 0.7
21	SpO ₂ (%)”	Maximum 7 days old	Maximum 4 weeks old	Default: 50
22	Estimated RVSP (mmHG)“ (ultrasound)	Maximum 7 days old	Maximum 4 weeks old	Default: 25
23	Coagulopathy” (Thromb < 50/nl, INR > 2	Maximum 7 days old	Maximum 4 weeks old	Default: No
24	IV prostanoids”	Maximum 7 days old	Maximum 4 weeks old	Default: No
25	Pneumothorax with drainage” (yes , no)	Maximum 7 days old	Maximum 4 weeks old	Default: No
26	Extracorporeal support” (no, ILA, ECMO)	Maximum 7 days old	Maximum 4 weeks old	Default: No

“ LAS plus items

*the rule for ECMO patients holds true for ILA and ECLS patients

Following P-ThAC01.14 the following additional rules are to be followed:

- For low LAS patients: screening data can be up to 6 weeks old in order to allow a more flexible time scale in data collection
- For all intubated patients and for patients with a pneumothorax: the data fields FVC, PAPsys, PAPmean and PCWPmean can be used from dated measurements, no matter how old the measurement date.
- For Netherlands: the 6MWT does not need to be repeated

Full text of policy P-ThAC01.14 (enacted as of 9 December 2014)

- LAS data entered for a patient who is first listed for lung transplantation (screening data) can be up to 6 weeks old. Except in the case the calculated LAS

value is ≥ 50 , then the validity is 7 days.

- Allow any previous PFT upon request for intubated patients, no matter how old.
- PAH patients on awake ECMO can be accepted with LAS value equivalent to the 99th percentile.
- PAH patients with CI $< 2 \text{ l/m}^2$ and RA > 15 or bilirubin increase by 50%/abnormal or a creatinine increase by $> 50\%$ /abnormal, can be accepted with LAS value equivalent to the 95th percentile.
- For patients with pneumothorax and a drain, PFT are no contraindication but a reduced FVC is expected. For patients with pneumothorax without drain the last previous PFT are allowed, no matter how old. If no PFT are available, the least beneficial default values are used.
- The 6-MWT should only be entered once, at first listing. (only for the Netherlands)
- Allow short-cut eLAS decision yes/no for exceptional value requests (no formal letter) in those cases where the patient fulfilled the indications for eLAS request, but the initially proposed eLAS value was deemed too high by the review board members.

Full text of policy P-ThAC02.15 (enacted as of November 10, 2015)

- *Blood gases for evaluation by LAS must adhere to all of the following criteria*
 - Blood gases should be of arterial or capillary origin;
 - Blood gases at rest must be entered. Blood gases during or after exercise, or at night are not acceptable;
 - Blood gases should be performed after titration of oxygen flow and adjusted by pulse oximetry to a target oxygen saturation of 90-92%;
 - Blood gases with a $pO_2 > 100 \text{ mmHg}$ ($> 13.3 \text{ KPa}$) should be repeated with oxygen titration to a target oxygen saturation of 90-92%.
 - The last (in date and time) oxygen saturation measured by pulse oximetry after oxygen titration and the corresponding oxygen flow or fraction after titration should be recorded on the blood gas report.

- *High flow nasal cannula*

High flow (HF)- oxygen therapy (=HF nasal cannula (HFNC)) is defined as an oxygen flow $> 15 \text{ L/min}$;

In patients with HF-oxygen therapy, oxygen saturation (SpO_2) should be measured by pulse oximetry continuously including documentation of SpO_2 and oxygen fraction;

In case of a titrated oxygen flow of more than 15 L/min , the oxygen fraction should be entered. The maximum allowable value in the data form should be reset from 26 to 15 L/min ;

Oxygen titration also applies to ventilated patients.

- *Supplemental oxygen*

The most recent value in date and time of the amount of minimum oxygen needed to obtain an SpO_2 of 90-92% at rest must be entered.

- *Highest-lowest PCO_2 values*

Irrespective of the supplemental oxygen setting the highest and lowest pCO₂ value should be entered. For highest and lowest pCO₂ only blood gases at rest within the last three months should be used. Venous, transcutaneous blood gases and blood gases during exercise are not allowed to use for pCO₂ trend.

- *6-MWT*

The 6MWT should be performed with the flow rate needed during exercise.

- *Continuous mechanical ventilation*

Patient on continuous mechanical ventilation **with** sedation' will be replaced by 'Patient on continuous mechanical ventilation' thus including patients on continuous mechanical ventilation **without** sedation

The duration of the highest and lowest pCO₂ values of 3 months is only applicable for Germany, for the other countries the time interval of 6 months remains in place.

Testing and entering of blood gas samples is the responsibility of the transplant centers, Eurotransplant cannot check the circumstances.

For Germany: Standard definitions for measuring LAS parameters have been defined and were implemented on November 7, 2017. (see BAEK Guidelines). The adherence to these definitions is the responsibility of the transplant centers.

6.3.3.2. *Additional items*

In order to further study a future adaptation of the LAS system, the Eurotransplant Thoracic Advisory Committee (EThAC) has decided that the following data must also be submitted to Eurotransplant

- end saturation after six minute walk test
- estimated right ventricular systolic pressure
- presence of pneumothorax with drain
- need for a combined lung transplant
- need for extracorporeal support
- IV-prostanoids
- Bilirubine
- Coagulopathy

6.3.4. Types of LAS

- Low LAS
- High LAS
- Exceptional LAS

6.3.4.1. *Low and high LAS*

Transplant candidates with a LAS value below 50 are labeled Low LAS candidates; those with a LAS of 50 or higher are the High LAS candidates.

The exchange of donor lungs between countries is determined by the country balances and the value of the LAS

Patients from country Y with a High LAS will appear on top of the match list of country X, in case country Y has a negative total balance with country X.

Patients from country Y with a Low LAS will appear among the elective/low LAS patients from country X, in case country Y has a negative total balance with country X.

6.3.4.2. Exceptional LAS

In rare cases it might occur that the calculated LAS does not reflect the perceived idea of transplant benefit for a particular transplant candidate. In these cases it is possible to apply for an exceptional LAS. This can be done by proposing an alternative LAS value accompanied with a detailed description of the underlying reasoning. Every proposal for an exceptional LAS value will be evaluated by a the LAS review board (RB). In case the RB members agree with the suggested exceptional LAS value, the value will then be assigned to the patient. The decision of the RB members is binding. In case the RB members decline the request for an exceptional LAS, the calculated LAS will be used. Only in case new clinical information is available, the centers can submit another request for an exceptional LAS.

If the patient meets at least one of the following criteria, a request for an Exceptional LAS can be submitted:

1. Primary Pulmonary Hypertension types 1 and 4 ³;
2. Combined lung and non-renal transplant candidates;
3. Rare diseases not specified in LAS Diagnosis List;
4. Specific situations in which the LAS does not reflect the expected urgency and benefit

In addition, a request for an exceptional LAS for patients listed in Austria or Belgium can only be submitted if the patient has a national HU status.

6.3.5. Applying for LAS

For patients already registered on the lung transplant waiting list a calculated LAS can be obtained by submitting a request to Eurotransplant via the Thoracic Clinical Profile Application (go to the “library” on the [member site](#)).

If a new patient is registered on the lung transplant waiting list, the Thoracic Clinical Profile Application is an integral part of the registration process in ENIS.

The LAS request consists of the above mentioned LAS values (see section 6.3.2), a clinical letter and original data (additional laboratory values and

³ Guidelines for the diagnosis and treatment of pulmonary hypertension. European Heart Journal 2009; 30: 2493-2537.

functional test results) that support the values and data entered in the Thoracic Clinical Profile Application.

6.3.5.1. *Low or high LAS*

6.3.5.1.1. Certification low and high LAS

A random number of LAS entries are audited (random audit) by the Eurotransplant Staff. Every High LAS case is audited. The auditing process consists out of checking the submitted data with the original lab data. A notification will appear if your patient was selected for this audit.

6.3.5.1.2. Recertification low LAS

The LAS status for a patient listed in Germany is valid for 90 days, for patients listed in Austria, Belgium or the Netherlands the LAS status is valid for 180 days. Patients whose validation date has expired receive a LAS of 0. In order to retain the LAS value, updated information is to be delivered.

6.3.5.1.3. Recertification high LAS

A high LAS status is valid for 14 days, this holds true for all patients registered in Eurotransplant. After this period of 14 days, new data need to be submitted to Eurotransplant, if the calculated LAS based on these renewed data is at least 50, the submitted original data will be checked.

6.3.5.2. *Exceptional LAS*

Applying for Exceptional LAS status is done by submitting a request to Eurotransplant via the Thoracic Clinical Profile Application. This request consists of 2 parts: a request for Exceptional LAS and a request for a calculated LAS value. Furthermore when applying for the Exceptional LAS, a requesting center needs to motivate why a patient is to be considered for an exceptional LAS. This request is sent to the LAS Review Board members (see section [6.3.6](#)).

6.3.5.2.1. Reconfirmation exceptional LAS

The exceptional LAS status is valid for 56 days. If a patient is still on the waiting list after that period, and the center considers the patient still to be eligible for an exceptional LAS status a renewed request can be submitted in the same way as a first request for an exceptional LAS status (see section [6.3.6.1](#)).

6.3.6. Audit / Review Board

6.3.6.1. *Exceptional LAS*

Exceptional LAS requests are sent the LAS Review Board. Three LAS review boards are established, a German LAS review board that judges upon request from German transplant programs, a Dutch LAS review board that judges upon request from Dutch transplant programs and an international LAS review

board that judges upon requests from transplant programs in Austria and Belgium.

The LAS RB members are expected to concur on their decision and one un-split decision is submitted to Eurotransplant within 7 days.

6.3.6.2. *Other: Estimated value*

6.3.6.2.1. *Six minute walk test [6-MWT]*

If a patient cannot perform a 6MWT which is not related to the underlying lung disease, the transplant center can suggest an estimated value for this test. The audit group will evaluate these cases in a similar way as described for the exceptional LAS values. This estimated value can then be used for the calculated LAS.

6.3.6.2.2. Reconfirmation estimated value Six Minute Walk Test:

This estimated value is valid for 8 weeks, after which a new request needs to be done.

6.3.7. Lung allocation in Austria, Belgium, Croatia, Hungary, Slovenia

National allocation is based on the urgency tier system. The international exchange of all donor lungs is based on the LAS system. For all patients a calculated LAS can be requested, see section [6.3.5](#). All active adult patients receive a LAS 0 if no calculated LAS is requested, all active pediatric patients receive a LAS 100.

Croatia, Hungary and Slovenia do not have a national lung transplant programs. Patients from these countries are listed in Vienna, Austria; all donor lungs from these countries are considered by the ET twinning policy as local donors from Vienna.

6.3.7.1. *Overview urgency statuses*

6.3.7.2. *Urgency codes for lung transplant candidates*

Urgency statuses are used to classify transplant candidates on the waiting list and to prioritize the recipients in the thoracic organ match and allocation procedure. The urgency statuses reflect transplantability and medical urgency.

6.3.7.3. *Overview table urgency status lung*

Lung urgency codes in EThAS			
Urgency code		Transplantable	Medical Urgency
HU[^]	High Urgency	Yes	High Urgent
ACO[^]	Approved Combined Organ	Yes	More priority in match
T	Transplantable	Yes	Normal
NT	Not Transplantable	No	n.a.*

[^] only national status

* n.a. = not applicable

6.3.7.4. *High urgency status: national*

Due to the implementation of LAS the HU International Status has been abolished. There is only the HU National Status.

The national HU Status is granted according to national policies. These vary per Eurotransplant member state. The national HU Status does not apply to Germany and the Netherlands.

6.3.7.5. *Approved combined organs (ACO)*

For patients in need of a multi-organ transplant -except the combination lung with kidney- the ACO status can be requested.

6.3.7.5.1. *Applying for the ACO status*

A complete documentation and appropriate justification in English of the request for ACO status must be sent to the Eurotransplant duty desk by use of the ACO forms ([website](#)). This request is then forwarded to a member of the ET thoracic committee and, depending on the other organ(s), a member of the ET pancreas committee, or a member of the ET liver & intestine committee. The organ committee members who judge upon the ACO request are national representatives of countries different from the requesting country. The organ committee members will be given 24 hours to reach a decision. If no consensus is reached, a third organ committee member will decide on the ACO request. Upon granting of the ACO status, the Eurotransplant duty officers will adapt the status accordingly.

6.3.7.5.2. *Transplantable (T)*

The urgency status, transplantable (T) is used for elective transplant candidates who are not eligible for urgency statuses HU or ACO. Time spent in the T status is not limited.

6.3.7.6. *Not Transplantable (NT)*

Recipients who are temporarily not transplantable should be placed in urgency NT in ENIS by the transplant center. Days spent in NT (no matter the previous urgency status, HU or T) on the waiting list are not taken into account in the calculation of waiting time. It is not possible to request a LAS value if the patient is in an NT status. The LAS values become invalid upon NT status, hence after each NT status a new LAS request has to be submitted.

6.3.7.6.1. *Deviant regulations*

6.3.7.6.2. *Return HU waiting time after NT status*

A transplant candidate with HU status, who is subsequently downgraded to T or NT status, but is thereafter re-listed with an HU status within a time span of maximum 28 days, will not lose the previously accumulated HU waiting time.

6.3.7.6.3. Reporting the NT status

In order to achieve a maximum efficiency of the allocation process all changes from active urgency statuses to NT status should immediately be recorded in ENIS. It is the responsibility of the transplant center to place the patient in the correct urgency status if the patient's condition improves or further deteriorates. Furthermore, if the patient's condition worsens beyond transplantability, the transplant center should remove the patient from the waiting list.

6.3.7.6.4. Pediatric transplant candidates

A pediatric transplant candidate is a patient under the age of 12 years. All pediatric patients who are registered on the waiting list in an active urgency status receive a LAS of 100.

6.3.7.7. Applying for the HU National Status

6.3.7.7.1. Overview table ET countries and their HU status possibilities

Country	HU National
Belgium	+
Croatia	*via Vienna
Slovenia	*via Vienna
Hungary	*via Vienna
Austria	+

6.3.7.7.1.1. Deviant regulations

6.3.7.7.1.1.1. Croatia, Hungary and Slovenia

Croatia, Hungary and Slovenia do not have a lung transplant program. Their lung recipients are registered on the waiting list in Vienna, Austria.

6.3.7.7.2. Procedure: Applying for HU national status

Notification of the national HU status is done by the center in ENIS.

6.3.7.8. Duration HU status

The HU National Status has an unlimited time frame.

6.3.7.9. Allocation factors

For exact ranking see the Allocation Algorithms, see section [6.4](#).

6.3.7.9.1. Rank Tier system

The ranking of potential recipients is based on several characteristics. These characteristics include the following patient factors: the LAS score, the medical urgency status, the type of organ (heart beating or non-heart beating (except for Germany), the resident status (only in Belgium). Furthermore the donor- to-recipient ABO blood group relation as well as the donor-to-recipient country balance are considered.

The ranking scheme is dependent on the donor's age and blood group. (see section [6.4.2](#)).

6.3.7.9.1.1. Country balance donor country

The balance between the donor and recipient countries is defined as the cumulative difference between the numbers of transplants performed in country X with donor lungs imported from country Y and the number of lung transplants performed in country Y with donor lungs from country X. The balance is calculated as of September 1, 2004.

The total balance takes all lung transplants into account.

A negative country balance for country X with country Y is reached if country X exported more lungs to country Y, and which are subsequently used for transplantation, than the number of donor lungs from country Y returned and used for transplantation in country X.

Note: as the number of transplants is counted, a double lung transplant is counted as one event.

6.3.7.9.1.2. Medical Urgency status:

The following medical urgency statuses are used (except for Germany and the Netherlands): national high urgent status, approved combined organ status, elective status and not transplantable status see also 6.3.7.3. Patients who are registered as not transplantable are not selected in the match.

6.3.7.9.1.3. Lung match

6.3.7.9.1.3.1. Donor information requirements

Donor characteristics required in order to generate a lung match:

- donor total lung capacity (TLC) (min and max)
- donor age (min and max)
- Acceptance of a heart from a donor who is/has:
 - o HBsAG pos

- HBcAb pos
- HCV pos
- CMV
- Sepsis
- Meningitis
- Malignant tumor
- Drug abuse
- Domino donor

Additional donor filtering rule in Germany

The donor's allowed TLC range can be maximum 10% lower and 20% higher to the recipient's TLC. This rule has two exceptions: patients who have a special anatomical situation and patients with a TLC < 5L where a size reduction was planned. In case of a special anatomical situation, the recipient's TLC should be adapted in the ENIS system; and based on this new recipient TLC, the new maximum (+20%) and new minimum (-10%) donor ranges are calculated and used for donor selection. In case of a recipient TLC < 5L **and** if a planned size reduction is recorded in the ENIS system, the donor profile has no maximum TLC value.

6.3.7.9.1.3.2. Formula for calculating Total Lung Capacity (TLC)⁴

See section [6.2.5.1.3.1.](#)

6.3.7.9.1.4. Donation after Cardiac Death (DCD) transplantation

In the Netherlands, Belgium, Austria, Luxemburg and Slovenia donation after cardiac death (DCD) donations are considered legal procedures and are ethically accepted. Lungs from a DCD donors are allocated according to the same allocation algorithm as for donation after brain death (DBD) donors. The above mentioned member states have different regulations regarding the DCD.

In Germany, Croatia and Hungary DCD donations do not take place.

6.3.7.9.1.4.1. The Netherlands

In case of a non-renal DCD donor category III, there is no maximum allocation time, but only if the planned ventilator switch-off time (i.e. cessation of treatment) is known. The allocation process of this potential donor can be started once this planned switch-off time is reported.

6.3.7.9.1.4.2. Deviant national regulations

Belgium

⁴ Zapletal et al. Standardization of lung function tests in pediatrics. The European Respiratory Journal 1989; 2, Suppl 4. Ed. The Working Group Pediatrics SEPCR.

Non- resident transplant candidates registered in Belgium are offered a donor lung after all Eurotransplant residents.

Germany and Hungary

Organs from DCD donors cannot be procured and/or allocated in Germany and Hungary. DCD donor organs from outside Germany and Hungary cannot be allocated and/or transplanted in Germany and Hungary.

Croatia

Croatia has ethical objections to DCD procedures, therefore no DCD donations or transplants are carried out.

6.3.7.9.1.5. AB0 Blood Group Rules

Two different AB0 blood group schemes are defined. The applications of these schemes vary by country.

AB0 modified

			Recipient		
		A	AB	B	0
Donor	A	x	x		
	AB		x		
	B			x	
	0			x	x

AB0 compatible

			Recipient		
		A	AB	B	0
Donor	A	x	x		
	AB		x		
	B		x	x	
	0	x	x	x	x

In all countries lungs are allocated:

- first according to the modified AB0 compatible rule (AB0-0 to AB0-0 and -B; AB0-A to AB0-A and -AB; AB0-B to AB0-B; AB0-AB to AB0-AB);
- then according to the AB0 compatible rule (AB0-0 to AB0-0, -B, -A, -AB; AB0-A to AB0-A and -AB; AB0-B to AB0-B and -AB; AB0-AB to AB0-AB).

6.3.7.9.1.6. Waiting time national

Waiting time is counted in days in the urgencies HU and T. The HU and T days are added up. NT time is not taken into account.

6.3.7.9.2. Rank Sub Tier system

6.3.7.9.2.1. Pediatric donor allocation

For all countries lungs from donors

- aged <12 years go first to recipients <12 years, then to recipients aged 12 - 17 years, and then to recipients ≥ 18 years;
 - aged 12 – ≤ 17 years go first to recipients 12 - 17 years, then to recipients <12 years, then to recipients ≥ 18 years.
- aged ≥ 18 y go first to recipients ≥ 12 years then to recipients < 12 y

Except in Germany all lungs from donor ≥ 18 years are allocated to all recipients irrespective of their age.

6.3.7.9.2.2. 10% Extended donor TLC profile

In order to avoid the situation that a donor offer is missed because the donor's TLC falls outside the donor profile and to avoid the situation that transplant centers cope with this issue by extending the donor profile to unrealistic extremes the 10% donor TLC rule is introduced in all Eurotransplant member states, except Germany and the Netherlands.

Donor lungs are only offered to those transplant candidates where the designated donor profile encompasses this specific donor TLC. According to the 10% rule transplant candidates are selected whose designated donor profile 10% is extended.

The 10% extended donor TLC profile is calculated as follows: minimum TLC in the donor profile minus 10% of this minimum value and maximum TLC in the donor profile plus 10% of this maximum value.

6.3.7.9.2.3. Deviant national regulation

6.3.7.9.2.3.1. Germany and The Netherlands

The 10 % donor height profile does not exist for German and Dutch donors and recipients.

6.4. Allocation Algorithms

6.4.1. Introduction

All match lists are determined by the donor country. National transplant candidates are those patients who are listed in the same country as from where the donor originated.

As an example of how to read the allocation algorithms, the first few tiers of the Austrian heart and heart-lung algorithm are described below:

First

the organs are offered to hospitalized children with an international HU status and who are listed in a country with a negative HU balance with Austria international hospitalized and who are AB0 blood group compatible according to the ET compatible scheme and who are listed for a combined heart-lung block,

then to

hospitalized children with an international HU status and who are listed in a country with a negative HU balance with Austria international hospitalized and who are AB0 blood group compatible according to the ET compatible scheme and who are listed for a heart,

then to

hospitalized children with an international HU status and who are listed in a country with a negative HU balance with Austria international hospitalized and who are AB0 blood group compatible according to the AB0 compatible scheme and who are listed for a heart-lung block,

then to

hospitalized children with an international HU status and who are listed in a country with a negative HU balance with Austria international hospitalized and who are AB0 blood group compatible according to the AB0 compatible scheme and who are listed for a heart,

then to

patients with an international HU status and who are listed in a country with a negative HU balance with Austria and who are AB0 blood group compatible according to the ET compatible scheme and who are listed for a heart-lung block,

6.4.2. Heart and heart lung schemes

6.4.2.1. Austria

Main rank tiers	1st sub rank tier	2nd sub rank tier
Int'l HU (neg. HU balance) and hospitalized child	ET comp	Heart-Lung
Int'l HU (neg. HU balance) and hospitalized child	ET comp	Heart only
Int'l HU (neg. HU balance) and hospitalized child	ABO comp	Heart-Lung
Int'l HU (neg. HU balance) and hospitalized child	ABO comp	Heart only
Int'l HU (neg. HU balance)	ET comp	Heart-Lung
Int'l HU (neg. HU balance)	ET comp	Heart only
Int'l HU (neg. HU balance)	ABO comp	Heart-Lung
Int'l HU (neg. HU balance)	ABO comp	Heart only
Local HU and hospitalized child	ET comp	Heart-Lung
Local HU and hospitalized child	ET comp	Heart only
Local HU and hospitalized child	ABO comp	Heart-Lung
Local HU and hospitalized child	ABO comp	Heart only
Local HU	ET comp	Heart-Lung
Local HU	ET comp	Heart only
Local HU	ABO comp	Heart-Lung
Local HU	ABO comp	Heart only
Regional HU and hospitalized child	ET comp	Heart-Lung
Regional HU and hospitalized child	ET comp	Heart only
Regional HU and hospitalized child	ABO comp	Heart-Lung
Regional HU and hospitalized child	ABO comp	Heart only
Regional HU	ET comp	Heart-Lung
Regional HU	ET comp	Heart only
Regional HU	ABO comp	Heart-Lung
Regional HU	ABO comp	Heart only
[Nat. HU or Int'l HU (neg. total balance)] and hospitalized child	ET comp	Heart-Lung
[Nat. HU or Int'l HU (neg. total balance)] and hospitalized child	ET comp	Heart only
[Nat. HU or Int'l HU (neg. total balance)] and hospitalized child	ABO comp	Heart-Lung
[Nat. HU or Int'l HU (neg. total balance)] and hospitalized child	ABO comp	Heart only
Nat. HU or Int'l HU (neg. total balance)	ET comp	Heart-Lung
Nat. HU or Int'l HU (neg. total balance)	ET comp	Heart only
Nat. HU or Int'l HU (neg. total balance)	ABO comp	Heart-Lung
Nat. HU or Int'l HU (neg. total balance)	ABO comp	Heart only
Nat. ACO	ET comp	Heart-Lung
Nat. ACO	ET comp	Heart only
Nat. ACO	ABO comp	Heart-Lung
Nat. ACO	ABO comp	Heart only
Local Elective	ET comp	Heart-Lung
Local Elective	ET comp	Heart only
Local Elective	ABO comp	Heart-Lung

Local Elective	ABO comp	Heart only
National Elective	ET comp	Heart-Lung
National Elective	ET comp	Heart only
National Elective	ABO comp	Heart-Lung
National Elective	ABO comp	Heart only
Repeat the above for the 10% rule		
Int'l HU and hospitalized child	ET comp	Heart-Lung
Int'l HU and hospitalized child	ET comp	Heart only
Int'l HU and hospitalized child	ABO comp	Heart-Lung
Int'l HU and hospitalized child	ABO comp	Heart only
Int'l HU	ET comp	Heart-Lung
Int'l HU	ET comp	Heart only
Int'l HU	ABO comp	Heart-Lung
Int'l HU	ABO comp	Heart only
Int'l ACO	ET comp	Heart-Lung
Int'l ACO	ET comp	Heart only
Int'l ACO	ABO comp	Heart-Lung
Int'l ACO	ABO comp	Heart only
Int'l Elective	ET comp	Heart-Lung
Int'l Elective	ET comp	Heart only
Int'l Elective	ABO comp	Heart-Lung
Int'l Elective	ABO comp	Heart only
Repeat the above for the 10% rule		
Children aged < 2 years with incompatible ABO and centre has protocol		
Belgian non-residents		

6.4.2.2. Belgium and Luxemburg

Main rank tiers	1st sub rank tier	2nd sub rank tier
Int'l HU (neg. HU balance) and hospitalized child	ET comp	Heart-Lung
Int'l HU (neg. HU balance) and hospitalized child	ET comp	Heart only
Int'l HU (neg. HU balance) and hospitalized child	ABO comp	Heart-Lung
Int'l HU (neg. HU balance) and hospitalized child	ABO comp	Heart only
Int'l HU (neg. HU balance)	ET comp	Heart-Lung
Int'l HU (neg. HU balance)	ET comp	Heart only
Int'l HU (neg. HU balance)	ABO comp	Heart-Lung
Int'l HU (neg. HU balance)	ABO comp	Heart only
[Nat. HU or Int'l HU (neg. total balance)] and hospitalized child	Heart-Lung	ET comp
[Nat. HU or Int'l HU (neg. total balance)] and hospitalized child	Heart-Lung	ABO comp
Nat. HU or Int'l HU (neg. total balance)	Heart-Lung	ET comp
Nat. HU or Int'l HU (neg. total balance)	Heart-Lung	ABO comp
Regional HU hospitalized child	Heart only	ET comp
Regional HU hospitalized child	Heart only	ABO comp
Regional HU	Heart only	ET comp
Regional HU	Heart only	ABO comp

[Nat. HU or Int'l HU (neg. total balance)] and hospitalized child	Heart only	ET comp
[Nat. HU or Int'l HU (neg. total balance)] and hospitalized child	Heart only	ABO comp
Nat. HU or Int'l HU (neg. total balance)	Heart only	ET comp
Nat. HU or Int'l HU (neg. total balance)	Heart only	ABO comp
Nat. ACO	Heart-Lung	ET comp
Nat. ACO	Heart-Lung	ABO comp
Nat. ACO	Heart only	ET comp
Nat. ACO	Heart only	ABO comp
National elective	Heart-Lung	ET comp
National elective	Heart-Lung	ABO comp
Regional Elective	Heart only	ET comp
Regional Elective	Heart only	ABO comp
National Elective	Heart only	ET comp
National Elective	Heart only	ABO comp
Repeat the above for the 10% rule		
Int'l HU and hospitalized child	ET comp	Heart-Lung
Int'l HU and hospitalized child	ET comp	Heart only
Int'l HU and hospitalized child	ABO comp	Heart-Lung
Int'l HU and hospitalized child	ABO comp	Heart only
Int'l HU	ET comp	Heart-Lung
Int'l HU	ET comp	Heart only
Int'l HU	ABO comp	Heart-Lung
Int'l HU	ABO comp	Heart only
Int'l ACO	ET comp	Heart-Lung
Int'l ACO	ET comp	Heart only
Int'l ACO	ABO comp	Heart-Lung
Int'l ACO	ABO comp	Heart only
Int'l Elective	ET comp	Heart-Lung
Int'l Elective	ET comp	Heart only
Int'l Elective	ABO comp	Heart-Lung
Int'l Elective	ABO comp	Heart only
Repeat the above for the 10% rule		
Children aged < 2 years with incompatible ABO and centre has protocol		
Belgian non-residents		

6.4.2.3. Croatia, Hungary and Slovenia

Main rank tiers	1st sub rank tier	2nd sub rank tier
Int'l HU (neg. HU balance) and hospitalized child	ET comp	Heart-Lung
Int'l HU (neg. HU balance) and hospitalized child	ET comp	Heart only
Int'l HU (neg. HU balance) and hospitalized child	ABO comp	Heart-Lung
Int'l HU (neg. HU balance) and hospitalized child	ABO comp	Heart only
Int'l HU (neg. HU balance)	ET comp	Heart-Lung
Int'l HU (neg. HU balance)	ET comp	Heart only
Int'l HU (neg. HU balance)	ABO comp	Heart-Lung

Int'l HU (neg. HU balance)	ABO comp	Heart only
[Nat. HU or Int'l HU (neg. total balance)] and hospitalized child	ET comp	Heart-Lung
[Nat. HU or Int'l HU (neg. total balance)] and hospitalized child	ET comp	Heart only
[Nat. HU or Int'l HU (neg. total balance)] and hospitalized child	ABO comp	Heart-Lung
[Nat. HU or Int'l HU (neg. total balance)] and hospitalized child	ABO comp	Heart only
Nat. HU or Int'l HU (neg. total balance)	ET comp	Heart-Lung
Nat. HU or Int'l HU (neg. total balance)	ET comp	Heart only
Nat. HU or Int'l HU (neg. total balance)	ABO comp	Heart-Lung
Nat. HU or Int'l HU (neg. total balance)	ABO comp	Heart only
Nat. ACO	ET comp	Heart-Lung
Nat. ACO	ET comp	Heart only
Nat. ACO	ABO comp	Heart-Lung
Nat. ACO	ABO comp	Heart only
National Elective	ET comp	Heart-Lung
National Elective	ET comp	Heart only
National Elective	ABO comp	Heart-Lung
National Elective	ABO comp	Heart only
Repeat the above for the 10% rule		
Int'l HU and hospitalized child	ET comp	Heart-Lung
Int'l HU and hospitalized child	ET comp	Heart only
Int'l HU and hospitalized child	ABO comp	Heart-Lung
Int'l HU and hospitalized child	ABO comp	Heart only
Int'l HU	ET comp	Heart-Lung
Int'l HU	ET comp	Heart only
Int'l HU	ABO comp	Heart-Lung
Int'l HU	ABO comp	Heart only
Int'l ACO	ET comp	Heart-Lung
Int'l ACO	ET comp	Heart only
Int'l ACO	ABO comp	Heart-Lung
Int'l ACO	ABO comp	Heart only
Int'l Elective	ET comp	Heart-Lung
Int'l Elective	ET comp	Heart only
Int'l Elective	ABO comp	Heart-Lung
Int'l Elective	ABO comp	Heart only
Repeat the above for the 10% rule		
Children aged < 2 years with incompatible ABO and centre has protocol		
Belgian non-residents		

6.4.2.4. Germany

Main rank tiers	1st sub rank tier	2nd sub rank tier	3rd sub rank tier
Int'l HU (neg. HU balance) and hospitalized child	ET comp	Heart-Lung	

Int'l HU (neg. HU balance) and hospitalized child	ET comp	Heart only	
Int'l HU (neg. HU balance) and hospitalized child	ABO comp	Heart-Lung	
Int'l HU (neg. HU balance) and hospitalized child	ABO comp	Heart only	
Int'l HU (neg. HU balance)	ET comp	Heart-Lung	
Int'l HU (neg. HU balance)	ET comp	Heart only	
Int'l HU (neg. HU balance)	ABO comp	Heart-Lung	
Int'l HU (neg. HU balance)	ABO comp	Heart only	
[Nat. HU or Int'l HU (neg. total balance)] and hospitalized child	Heart-Lung	Highly Immunized	ABO identical
[Nat. HU or Int'l HU (neg. total balance)] and hospitalized child	Heart-Lung	Highly Immunized	mod. ABO comp
[Nat. HU or Int'l HU (neg. total balance)] and hospitalized child	Heart-Lung	Highly Immunized	ABO comp
[Nat. HU or Int'l HU (neg. total balance)] and hospitalized child	Heart-Lung	Not Immunized	ABO identical
[Nat. HU or Int'l HU (neg. total balance)] and hospitalized child	Heart-Lung	Not Immunized	mod. ABO comp
[Nat. HU or Int'l HU (neg. total balance)] and hospitalized child	Heart-Lung	Not Immunized	ABO comp
[Nat. HU or Int'l HU (neg. total balance)] and hospitalized child	Heart only	Highly Immunized	ABO identical
[Nat. HU or Int'l HU (neg. total balance)] and hospitalized child	Heart only	Highly Immunized	mod. ABO comp
[Nat. HU or Int'l HU (neg. total balance)] and hospitalized child	Heart only	Highly Immunized	ABO comp
[Nat. HU or Int'l HU (neg. total balance)] and hospitalized child	Heart only	Not Immunized	ABO identical
[Nat. HU or Int'l HU (neg. total balance)] and hospitalized child	Heart only	Not Immunized	mod. ABO comp
[Nat. HU or Int'l HU (neg. total balance)] and hospitalized child	Heart only	Not Immunized	ABO comp
Nat. HU or Int'l HU (neg. total balance)	Heart-Lung	Highly Immunized	ABO identical
Nat. HU or Int'l HU (neg. total balance)	Heart-Lung	Highly Immunized	mod. ABO comp
Nat. HU or Int'l HU (neg. total balance)	Heart-Lung	Highly Immunized	ABO comp
Nat. HU or Int'l HU (neg. total balance)	Heart-Lung	Not Immunized	ABO identical
Nat. HU or Int'l HU (neg. total balance)	Heart-Lung	Not Immunized	mod. ABO comp
Nat. HU or Int'l HU (neg. total balance)	Heart-Lung	Not Immunized	ABO comp
Nat. HU or Int'l HU (neg. total balance)	Heart only	Highly Immunized	ABO identical
Nat. HU or Int'l HU (neg. total balance)	Heart only	Highly Immunized	mod. ABO comp
Nat. HU or Int'l HU (neg. total balance)	Heart only	Highly Immunized	ABO comp

Nat. HU or Int'l HU (neg. total balance)	Heart only	Not Immunized	ABO identical
Nat. HU or Int'l HU (neg. total balance)	Heart only	Not Immunized	mod. ABO comp
Nat. HU or Int'l HU (neg. total balance)	Heart only	Not Immunized	ABO comp
Nat. ACO	Heart-Lung	Highly Immunized	ABO identical
Nat. ACO	Heart-Lung	Highly Immunized	mod. ABO comp
Nat. ACO	Heart-Lung	Highly Immunized	ABO comp
Nat. ACO	Heart-Lung	Not Immunized	ABO identical
Nat. ACO	Heart-Lung	Not Immunized	mod. ABO comp
Nat. ACO	Heart-Lung	Not Immunized	ABO comp
Nat. ACO	Heart only	Highly Immunized	ABO identical
Nat. ACO	Heart only	Highly Immunized	mod. ABO comp
Nat. ACO	Heart only	Highly Immunized	ABO comp
Nat. ACO	Heart only	Not Immunized	ABO identical
Nat. ACO	Heart only	Not Immunized	mod. ABO comp
Nat. ACO	Heart only	Not Immunized	ABO comp
Nat. Elective	Heart-Lung	Highly Immunized	ABO identical
Nat. Elective	Heart-Lung	Highly Immunized	mod. ABO comp
Nat. Elective	Heart-Lung	Highly Immunized	ABO comp
Nat. Elective	Heart-Lung	Not Immunized	ABO identical
Nat. Elective	Heart-Lung	Not Immunized	mod. ABO comp
Nat. Elective	Heart-Lung	Not Immunized	ABO comp
Nat. Elective	Heart only	Highly Immunized	ABO identical
Nat. Elective	Heart only	Highly Immunized	mod. ABO comp
Nat. Elective	Heart only	Highly Immunized	ABO comp
Nat. Elective	Heart only	Not	ABO

		Immunized	identical
Nat. Elective	Heart only	Not Immunized	mod. ABO comp
Nat. Elective	Heart only	Not Immunized	ABO comp
Int'l HU and hospitalized child	ET comp	Heart-Lung	
Int'l HU and hospitalized child	ET comp	Heart only	
Int'l HU and hospitalized child	ABO comp	Heart-Lung	
Int'l HU and hospitalized child	ABO comp	Heart only	
Int'l HU	ET comp	Heart-Lung	
Int'l HU	ET comp	Heart only	
Int'l HU	ABO comp	Heart-Lung	
Int'l HU	ABO comp	Heart only	
Int'l ACO	ET comp	Heart-Lung	
Int'l ACO	ET comp	Heart only	
Int'l ACO	ABO comp	Heart-Lung	
Int'l ACO	ABO comp	Heart only	
Int'l Elective	ET comp	Heart-Lung	
Int'l Elective	ET comp	Heart only	
Int'l Elective	ABO comp	Heart-Lung	
Int'l Elective	ABO comp	Heart only	
Children aged < 2 years with incompatible ABO and centre has protocol			
Belgian non-residents			

6.4.2.5. The Netherlands

Main rank tiers	1st sub rank tier	2nd sub rank tier
Int'l HU (neg. HU balance) and hospitalized child	ET comp	Heart-Lung
Int'l HU (neg. HU balance) and hospitalized child	ET comp	Heart only
Int'l HU (neg. HU balance) and hospitalized child	ABO comp	Heart-Lung
Int'l HU (neg. HU balance) and hospitalized child	ABO comp	Heart only
Int'l HU (neg. HU balance)	ET comp	Heart-Lung
Int'l HU (neg. HU balance)	ET comp	Heart only
Int'l HU (neg. HU balance)	ABO comp	Heart-Lung
Int'l HU (neg. HU balance)	ABO comp	Heart only
[Nat. 1A HU or Int'l HU (neg. total balance)] and hospitalized child	ET comp	Heart-Lung
[Nat. 1A HU or Int'l HU (neg. total balance)] and hospitalized child	ET comp	Heart only
[Nat. 1A HU or Int'l HU (neg. total balance)] and hospitalized child	ABO comp	Heart-Lung
[Nat. 1A HU or Int'l HU (neg. total balance)] and hospitalized child	ABO comp	Heart only
[Nat. 1A HU or Int'l HU (neg. total balance)]	ET comp	Heart-Lung
[Nat. 1A HU or Int'l HU (neg. total balance)]	ET comp	Heart only
[Nat. 1A HU or Int'l HU (neg. total balance)]	ABO comp	Heart-Lung

[Nat. 1A HU or Int'l HU (neg. total balance)]	ABO comp	Heart only
[Nat. 1B HU	ET comp	Heart-Lung
[Nat. 1B HU	ET comp	Heart only
[Nat. 1B HU	ABO comp	Heart-Lung
[Nat. 1B HU	ABO comp	Heart only
Nat. ACO	ET comp	Heart-Lung
Nat. ACO	ET comp	Heart only
Nat. ACO	ABO comp	Heart-Lung
Nat. ACO	ABO comp	Heart only
National Elective	ET comp	Heart-Lung
National Elective	ET comp	Heart only
National Elective	ABO comp	Heart-Lung
National Elective	ABO comp	Heart only
Repeat the above for the 10% rule		
Int'l HU and hospitalized child	ET comp	Heart-Lung
Int'l HU and hospitalized child	ET comp	Heart only
Int'l HU and hospitalized child	ABO comp	Heart-Lung
Int'l HU and hospitalized child	ABO comp	Heart only
Int'l HU	ET comp	Heart-Lung
Int'l HU	ET comp	Heart only
Int'l HU	ABO comp	Heart-Lung
Int'l HU	ABO comp	Heart only
Int'l ACO	ET comp	Heart-Lung
Int'l ACO	ET comp	Heart only
Int'l ACO	ABO comp	Heart-Lung
Int'l ACO	ABO comp	Heart only
Int'l Elective	ET comp	Heart-Lung
Int'l Elective	ET comp	Heart only
Int'l Elective	ABO comp	Heart-Lung
Int'l Elective	ABO comp	Heart only
Repeat the above for the 10% rule		
Children aged < 2 years with incompatible ABO and centre has protocol		
Belgian non-residents		

6.4.3. Lung Allocation Algorithms

6.4.3.1. General

For all Eurotransplant countries the international allocation rules are similar while the national allocation rules can differ.

In general the scheme is as follows, a donor lung is

First offered to

International patients with a high LAS (≥ 50) from countries with a negative total balance with the donor country, where all patients are sorted by LAS,

then to

the national transplant candidates according to the national rules, including the international patients with a low LAS (<50) from countries with a negative total balance with the donor country, where all patients are sorted by LAS (German or Dutch donor) or waiting time (Austrian or Belgian donor),

then to

the international patients from countries without a negative balance with the donor country, where all patients are sorted by LAS.

In general the national allocation schemes are as follows.

For instance for a lung donor from Belgium, the offer is first made to the patients with a national HU status, then to the national ACO patients, then to the local or regional elective patients and finally to the national elective patients and the international low LAS patients.

Germany and Netherlands	Belgium	Austria	Slovenia/Croatia/Hungary
		Local HU	Vienna HU
National high LAS	National HU	National HU	National HU (Austria)
	ACO	ACO	ACO
	Local/regional elective	Local elective	Local (Vienna) elective
National low LAS + International low LAS	National elective + International low LAS	National elective + International low LAS	National Elective (Austria) + International low LAS

6.4.3.2. Details

In order to understand and be able to read the allocation charts as listed below, some explanation is first warranted.

The charts below read as followed: from left to right, from top to bottom.

The match list is built as followed:

- Recipient category (recipient ranking on the match)
- Columns per donor age (Donor age < 12, Donor age donor >= 12 and <= 17, Donor age >= 18 years)
- 2 subtiers
 - Age
 - Blood group rules

Thereafter the patients are sorted by the LAS value or the waiting time.

Symbols and abbreviations in the match table

Symbol	Definition
< > Germany	not Germany
= Austria	is Austria
White fields	not applicable
LAS	Lung Allocation Score
WT	Waiting time
WL	Waiting list
Comp	compatible

6.4.3.2.1. Germany and Netherlands

In case of a German or Dutch donor the scheme is as follows:

Recipient category	Donor age < 12				Donor age >= 12 and <= 17			Donor age >= 18 years		
	Subtier 1	Subtier 2	Subtier 3		Subtier 1	Subtier 2	Subtier 3	Subtier 1	Subtier 2	Subtier 3
International high LAS and negative total balance	Age < 12 before age 12 - 17 before age >= 18	Modified ABO comp before ABO comp	LAS		Age 12 - 17 before age < 12 before age >= 18	Modified ABO comp before ABO comp	LAS		Modified ABO comp before ABO comp	LAS
National (high and low LAS) and International low LAS and negative total balance	Age < 12 before age 12 - 17 before age >= 18	Modified ABO comp before ABO comp	LAS		Age 12 - 17 before age < 12 before age >= 18	Modified ABO comp before ABO comp	LAS		Modified ABO comp before ABO comp	LAS
International high LAS and zero or positive total balance International low LAS and zero or positive total balance	Age < 12 before age 12 - 17 before age >= 18	Modified ABO comp before ABO comp	LAS		Age 12 - 17 before age < 12 before age >= 18	Modified ABO comp before ABO comp	LAS		Modified ABO comp before ABO comp	LAS

As an example of how to read this table a few rows from the scheme for lungs from a donor aged less than 12 years from Germany or the Netherlands are described below:

These lungs are first offered to

The international high LAS patients from countries with a negative total balance with Germany or the Netherlands, and aged under 12 years, and ABO blood group compatible according to the modified ABO scheme, all sorted by descending LAS

then to:

The international high LAS patients from countries with a negative total balance with Germany or the Netherlands, and aged between 12 and 17 years, and ABO blood group compatible according to the modified ABO scheme, all sorted by descending LAS

then to

The international high LAS patients from countries with a negative total balance with Germany or the Netherlands, and aged 18 or older, and AB0 blood group compatible according to the modified AB0 scheme, all sorted by descending LAS

then to

The international high LAS patients from countries with a negative total balance with Germany or the Netherlands, and aged under 12 years, and AB0 blood group compatible according to the AB0 compatible scheme, all sorted by descending LAS

then to:

The international high LAS patients from countries with a negative total balance with Germany or the Netherlands, and aged between 12 and 17 years, and AB0 blood group compatible according to the AB0 compatible scheme, all sorted by descending LAS

then to

The international high LAS patients from countries with a negative total balance with Germany or the Netherlands, and aged 18 or older, and AB0 blood group compatible according to the AB0 compatible scheme, all sorted by descending LAS

then to

National patients and international low LAS patients from countries with a negative total balance, and aged under 12 years and AB0 compatible according to the modified AB0 scheme, all sorted by LAS.

Etc.

6.4.3.2.2. Austria, Belgium Croatia, Hungary, Slovenia

The lung allocation scheme for donor lungs from Austria, Belgium, Croatia, Hungary, and Slovenia are as follows:

As an example of how to read this table a few rows from the scheme for lungs from a donor aged less than 12 years from Belgium are described below:

These lungs are first offered to

The international high LAS patients from countries with a negative total balance with Belgium, and aged under 12 years, and AB0 blood group compatible according to the modified AB0 scheme, all sorted by descending LAS,

then to:

The international high LAS patients from countries with a negative total balance with Belgium, and aged between 12 and 17 years, and AB0 blood group compatible according to the modified AB0 scheme, all sorted by descending LAS,

then to

The international high LAS patients from countries with a negative total balance with Belgium, and aged 18 or older, and ABO blood group compatible according to the modified ABO scheme, all sorted by descending LAS,

then to

The international high LAS patients from countries with a negative total balance with Belgium, and aged under 12 years, and ABO blood group compatible according to the ABO compatible scheme, all sorted by descending LAS,

then to:

The international high LAS patients from countries with a negative total balance with Belgium, and aged between 12 and 17 years, and ABO blood group compatible according to the ABO compatible scheme, all sorted by descending LAS,

then to

The international high LAS patients from countries with a negative total balance with Belgium, and aged 18 or older, and ABO blood group compatible according to the ABO compatible scheme, all sorted by descending LAS,

Etc.

Scheme for Austria, Belgium, Croatia, Hungary, Luxembourg and Slovenia

Case	Recipient category	Donor age donor < 12				Donor age donor >= 12				Donor age donor >= 18						
		Subster 1	Subster 2	Subster 3	Subster 4	The break	Subster 1	Subster 2	Subster 3	Subster 4	The break	Subster 1	Subster 2	Subster 3	Subster 4	The break
A	International high LAS and negative tba balance	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Modified ABO comp before ABO comp age < 12 age >= 18	Active WT	Date put on WL Etr	Date put on WL Etr	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Modified ABO comp before ABO comp age < 12 age >= 18	LAS	Active WT	Date put on WL Etr	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Modified ABO comp before ABO comp age < 12 age >= 18	LAS	Active WT	Date put on WL Etr
B	Donor country = Germany National high and low LAS) and international low LAS and negative tba balance	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18			Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18					Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18			
C	Donor country = Austria, Local HU Donor country = Hungary; Local HU in AVIGTP Training donor = Local HU in AVIGTP	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	HU WT	Date put on HU Etr	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	HU WT	Date put on HU Etr	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	HU WT	Date put on HU Etr	
D	Donor country = Austria, Belgium, Luxembourg, Netherlands, National HU Donor country = Slovenia, Croatia or Hungary; National HU in Austria Training donor = National HU in Austria	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	HU WT	Date put on HU Etr	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	HU WT	Date put on HU Etr	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	HU WT	Date put on HU Etr	
E	Donor country = Austria, Belgium, Luxembourg, Netherlands, National ACO Donor country = Hungary; National ACO Austria Training donor = National ACO Austria	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Active WT	Date put on WL Etr	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Active WT	Date put on WL Etr	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Active WT	Date put on WL Etr	
F	Donor country = Austria, donor center = AVIGTP, ABTP (not free region), default center offer - no recipients req Donor country = Belgium, Luxembourg, default center offer - no recipients req Donor country = Slovenia, Croatia or Hungary; default center offer AVIGTP - no recipients req Training donor = default center offer AVIGTP - no recipients req	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Active WT	Date put on WL Etr	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Active WT	Date put on WL Etr	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Active WT	Date put on WL Etr	
G	Donor country = Austria, Local Elective donor center = AOLT, ACETP, ACWTP, AKTTP (free region) - center offer to assigned center	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Active WT	Date put on WL Etr	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Active WT	Date put on WL Etr	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Active WT	Date put on WL Etr	
H	Donor country = Austria, National Elective Center offer Donor country = Slovenia, Croatia or Hungary; National Elective Austria (Center offer) Donor country = Belgium, Luxembourg, Netherlands, National Elective Austria (Center offer) Training donor = National Elective Austria (Center offer) International low LAS and negative tba balance	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Active WT	Date put on WL Etr	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Active WT	Date put on WL Etr	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Active WT	Date put on WL Etr	
AN	Donor country = Germany International high LAS and negative tba balance	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Active WT	Date put on WL Etr	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	LAS	Active WT	Date put on WL Etr	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	Age < 12 Modified ABO comp before ABO comp age >= 12-17 age >= 18	LAS	Active WT	Date put on WL Etr	

Scheme for Germany and the Netherlands

Cell	Recipient category	Donor country is Germany																	
		Donor age < 12					Donor age >= 12 and <= 17					Donor age >= 18 years							
		Subder 1	Subder 2	Subder 3	Subder 4	The break	Subder 1	Subder 2	Subder 3	Subder 4	The break	Subder 1	Subder 2	Subder 3	Subder 4	The break			
A	International high LAS and negative total balance	Age < 12 age 12 - 17 before before age >= 18	Modified ABO comp before ABO comp	LAS	Active WT	Date put on WL, Estr	Age 12 - 17 before age < 12 before age >= 19	Modified ABO comp before ABO comp	LAS	Active WT	Date put on WL, Estr	Modified ABO comp before ABO comp	LAS	Modified ABO comp before ABO comp	Active WT	Date put on WL, Estr	Modified ABO comp before ABO comp	Active WT	Date put on WL, Estr
B	Donor country = Germany: National (high and low LAS) and International (low LAS and negative total balance)	Age < 12 age 12 - 17 before before age >= 18	Modified ABO comp before ABO comp	LAS	Active WT	Date put on WL, Estr	Age 12 - 17 before age < 12 before age >= 19	Modified ABO comp before ABO comp	LAS	Active WT	Date put on WL, Estr	Modified ABO comp before ABO comp	LAS	Modified ABO comp before ABO comp	Active WT	Date put on WL, Estr	Modified ABO comp before ABO comp	Active WT	Date put on WL, Estr