

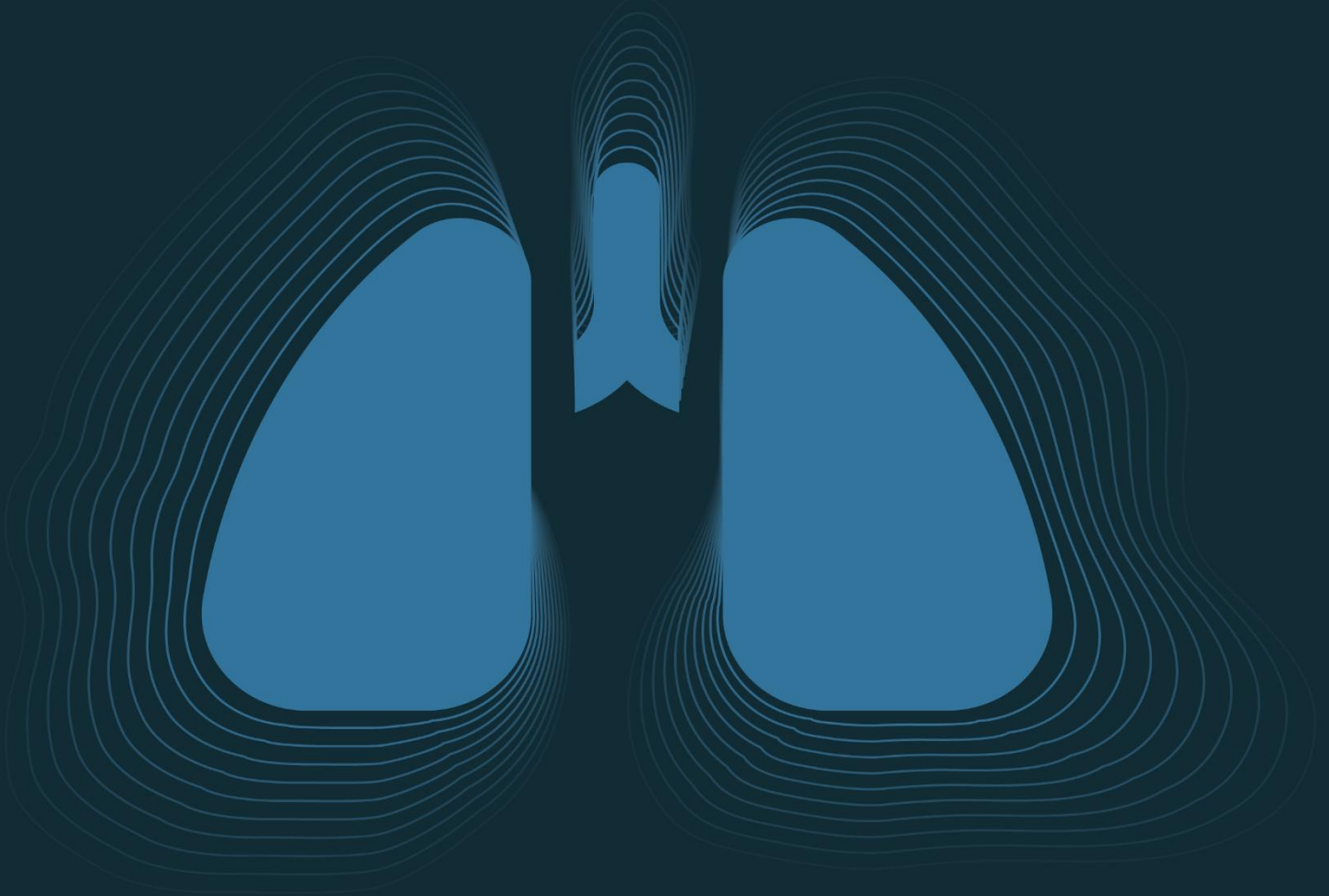


المركز السعودي لزراعة الأعضاء
Saudi Center for Organ Transplantation

Lung Allocation Policy

September 2024

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Lung Allocation Policy

1. PURPOSE

The purpose of this policy is to ensure equitable and efficient allocation of deceased lung donors to maximize transplant outcomes and benefit patients in need.

2. RELATED DOCUMENTS

- 2.1 General Organ Allocation policy.
- 2.2 Data sharing and privacy policy
- 2.3 Deceased donor Management Policy
- 2.4 Post Consent Donor Management Policy
- 2.5 Disposal of Discarded Human Organ/Tissue Policy

3. DEFINITION

- 2.1 **Allocation:** the process used to match donated organs with candidates/centers needing transplants.
- 2.2 **Recipient:** The patient to whom the donated human organ had been transplanted in his/her body.
- 2.3 **Donor:** Anyone who had permitted while alive to donate his/her organs after death, or his/her successors and relatives had agreed for the donation of any of his/her organs after his/her death according to the provisions of the regulations.
- 2.4 **Adult Patient:** Aged ≥ 14 years at the time of transplantation.
- 2.5 **Small Adult Patient:** Height ≤ 155 cm (only applies to the Urgent and Super Urgent schemes).
- 2.6 **Pediatric Patient:** Aged < 14 at the time of transplantation.
- 2.7 **HLA:** Human Leukocyte Antigen
- 2.8 **Interstitial Lung Diseases (ILD):** A group of lung disorders characterized by inflammation and fibrosis of lung parenchyma. These conditions typically result in a restrictive pattern on pulmonary function tests.
- 2.9 **Obstructive Lung Diseases:** These include conditions such as emphysema and chronic bronchitis, which impair airflow by causing airway narrowing or blockage. They are characterized by an obstructive pattern on pulmonary function tests.
- 2.10 **(CAS):** Composite Allocation Score
- 2.11 **(DSA):** Donor specific antibodies to HLA proteins.
- 2.12 **ICU:** Intensive Care Unit
- 2.13 **IPF:** Idiopathic pulmonary fibrosis is a type of ILD in which the lungs become scarred, and breathing becomes increasingly difficult.
- 2.14 **PAH:** A specific type of pulmonary hypertension where there is high blood pressure in the pulmonary arteries.
- 2.15 **CF:** Cystic fibrosis
- 2.16 **NCFBE:** Non-Cystic Fibrosis Bronchiectasis
- 2.17 **NIV:** Non invasive ventilation
- 2.18 **MV:** Mechanical Ventilator
- 2.19 **VV-ECMO:** Veno-venous extracorporeal membrane oxygenation
- 2.20 **VA ECMO:** Veno-arterial extracorporeal membrane oxygenation

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- 2.21 **Calculated panel reactive antibodies (CPRA):** A formula used to determine what proportion of deceased donors a potential candidate may be immunologically incompatible with and unable to accept organs from.
- 2.22 **SCOT coordinator:** Health professionals appointed by SCOT waiting list management and organ allocation section: Clinical and nursing staff.
- 2.23 **Lung transplantation sub-committee:** It is a committee that branches from the national committee for lung transplantation and consists of 2 to 3 members from the national committee assigned for the allocation of exceptional cases.
- 2.24 **Exceptional Cases:** Unique or urgent cases requiring a deviation from the standard allocation attributes.

4. POLICY

- 4.1 The responsibility of Lungs Allocation relies solely on SCOT waiting list management and organ allocation section.
- 4.2 SCOT Organ Allocation Framework is designed to ensure fairness, optimize transplantation outcomes, and maximize the benefits for candidates in need.
- 4.3 SCOT lungs allocation policy mandates that lungs allocation considers the attributes of medical urgency, compatibility, waiting time, and organ utilization.
- 4.4 **Medical Urgency:** SCOT policy requires that organ allocation considers the level of medical urgency of candidates, ensuring that those with the most critical medical conditions are prioritized for transplantation. [Refer to Lung Allocation Scheme](#)
- 4.4.1 **Super-urgent Lung Allocation Scheme (SULAS):** Priority for allocation is assigned first to patients supported with VA-ECMO, followed by those on VV-ECMO, and then those on mechanical ventilation (MV) as a bridge to transplant. If more than one patient is on the same type of support, the lung shall be allocated to the patient who has been on the waiting list the longest. The multidisciplinary team should conclude that the patient has a reasonable chance of intermediate survival; for example, there is a 50% probability of surviving 3-5 years post transplantation. SULAS patients shall be given priority during lung allocation – both ABO identical and compatible-, ordered by their waiting time.
- 4.4.2 **Urgent Lung Allocation Scheme (ULAS):** is assigned to **Disease-specific** patients for whom survival without transplantation is likely to be less than 90 days. The multidisciplinary team should conclude that the patient has a reasonable chance of intermediate survival; for example, there is a 50% probability of surviving 3-5 years post-transplantation.
- 4.4.2.1 **Disease-specific Urgent Criteria:**

Fibrotic ILD	PAH	CF and NCFBE	COPD
<ul style="list-style-type: none"> Increasing oxygen requirements with persistent hypoxia at rest (PaO₂ <8 kPa) despite continuous O₂ ≥ 5 L/min or unable to maintain SpO₂ ≥ 88% on a walk test despite supplemental oxygen of > 8 L/min 	<ul style="list-style-type: none"> Persistence in ERS high risk category status (> 3 relevant high-risk criteria on the ERS PAH risk calculator) despite optimal pulmonary vasodilator therapy. Current hospitalization for decompensated heart failure despite maximum tolerated medical therapy including IV prostaglandin therapy, diuretics +/- inotropes Recent within 3 months RHC RAP > 20mmHg and CI < 2.0 L/min/m² despite optimization of therapy. 	<ul style="list-style-type: none"> Worsening hypoxia at rest (PaO₂<7.5 kPa) and hypercapnia (PaCO₂>6.5 kPa) despite appropriate oxygen and maximal non-invasive ventilatory support (i.e. optimal NIV or High Flow Nasal Cannula) pH persistently <7.30 despite optimal continuous NIV Ongoing episodes of life-threatening massive hemoptysis (> 200 ml/ 24hr) despite bronchial embolization 	<ul style="list-style-type: none"> Worsening hypoxia at rest (PaO₂<7.5 kPa) and hypercapnia (PaCO₂>6.5 kPa) requiring increasing oxygen demand of >10 L/min despite continuous NIV pH persistently <7.30 despite optimal continuous NIV



4.4.2.2 Lung allocation for ULAS patients shall be in the following order:

- 4.4.2.2.1 **1st priority shall be assigned to** pediatric & small adult patients with identical blood group, ordered by their waiting time.
- 4.4.2.2.2 **2nd priority shall be assigned to** pediatric & small adult patients with compatible blood group, ordered by their waiting time.
- 4.4.2.2.3 **3rd priority shall be assigned to** adult patients with identical blood group, ordered by their waiting time.
- 4.4.2.2.4 **4th priority shall be assigned to** adult patients with compatible blood group, ordered by their waiting time.

4.4.3 Non-Urgent Lung Allocation Scheme (NULAS): will be assigned according to the Composite Lung Score (CAS), Certain variables will be adjusted:

- 4.4.3.1 Expected 1 year waiting list mortality (without a transplant)
- 4.4.3.2 Expected 5-year post-transplant survival.
- 4.4.3.3 Blood type
- 4.4.3.4 CPRA (measure of HLA antibody sensitization)
- 4.4.3.5 Height
- 4.4.3.6 Pediatric status (less than 14 years old at the time of registration).
- 4.4.3.7 Prior living donor status

4.5 Compatibility:

- 4.5.1 **The calculated panel reactive antibodies (CPRA):** which directly estimates the proportion of donor candidates that is HLA incompatible is used in the allocation process. For CPRA calculation, a mean fluorescence intensity (MFI) cutoff of **2000** is applied. Donor specific antibodies (DSA) should be avoided as possible, otherwise desensitization might be necessary to mitigate the negative impact of DSA on the transplant outcome.
- 4.5.2 **HLA crossmatching:** virtual crossmatch should be done followed by actual crossmatch. The CPRA is an integral component of the CAS. It is calculated based on the candidate's unacceptable HLA antigens to which the candidate has pre-existing antibodies.

4.6 Waiting Time:

- 4.6.1 SCOT lung allocation policy emphasizes the consideration of waiting time in lung allocation **within same the medical urgency**, ensuring that candidates who have been waiting for a longer duration are given priority to receive a lung.
- 4.6.2 It is the sole responsibility of transplant centers to continuously update and submit their waiting list data to SCOT.
- 4.6.3 Transplantation centers must update their waitlists on a weekly basis, and centers are required to notify SCOT immediately of any significant updates or changes in patient status to ensure timely and accurate information.
- 4.6.4 SCOT maintains authority over managing waiting lists, emphasizing the importance of accurate and timely data submissions to ensure fair organ allocation.
- 4.6.5 Transplant centers are required to submit their waiting lists including all requested information as specified by SCOT based on the organ type.
- 4.6.6 If a patient has been suspended from the SULAS/ULAS waiting list for more than 14 days, the center shall remove the patient from the list. If the patient needs to be reactivated on the list after 14 days, a new registration form must be submitted, and they will not retain any waiting time from their previous urgent registration.

4.7 Organ Utilization:

- 4.7.1 To maximize organ utilization, factors such as the organ's suitability for transplantation proximity and the likelihood of a successful outcome must be taken into consideration during lungs allocation.
- 4.7.2 If the initial allocation process for the kidney was unsuccessful for any reason, SCOT takes full responsibility for ensuring that the organ is utilized effectively following SCOT's General Organ Allocation Policy



- 4.8 Exceptional cases will be evaluated individually by the lung transplantation sub-committee, which will be convened as needed when an exceptional case arises prior to the allocation process.
- 4.9 Once the lung is allocated, SCOT will not permit any changes to the lung allocation. However, SCOT retains the authority to withdraw the offer if the allocation is found to be in violation of the rules established in this policy.
- 4.10 SCOT coordinator in charge shall ensure that all correspondence, including emails, letters, and other forms of communication are documented promptly and accurately with the dates & times.
- 4.11 All documentation shall be handled in accordance with applicable privacy and data protection laws and regulations.
- 4.12 Access to allocation documentation shall be limited to authorized personnel involved in the organ allocation process, maintaining confidentiality, and protecting sensitive information.
- 4.13 The allocation policy shall be reviewed periodically by the Operational Excellence Department at SCOT along with the national committees for organs transplantation, to ensure its effectiveness, relevance, and alignment with SCOT regulatory requirements. Any necessary revisions or updates shall be made in a timely manner.

5. PROCEDURE

- 5.1 SCOT commences the allocation process, within 1 hour after obtaining consent for organ donation.
- 5.2 SCOT coordinator shall request post consent donor workup from donor hospitals for the lung. (Refer to [Table 1: Routine Donor Workup](#) and [Table 2: Routine Donor Workup by each organ](#)).
- 5.3 SCOT coordinator shall promptly review the case details and ensure data completion.
- 5.4 Following the viability assessment, SCOT coordinator shall allocate the lung according to the allocation attributes outlined in this policy.
- 5.5 SCOT coordinator shall allocate the lung to the primary recipient and backup recipients simultaneously. The final allocation plan must receive approval from the head of the Waiting List Management and Organ Allocation section at SCOT
- 5.6 SCOT coordinator shall promptly contact the coordinator at the patient's transplant center to make the lung offer and provide all relevant donor information.
- 5.7 The transplant center has a maximum of 1 hour to initially accept the offer, during this period, the transplant center may request further investigations.
- 5.8 SCOT coordinator shall ensure that all necessary workups are done and submitted to the transplant center effectively.
- 5.9 Any new data obtained during the workup process shall be promptly submitted to the initially accepting center.
- 5.10 Once the transplant center receives all necessary/requested data about the donor results, they must provide a final acceptance or rejection within 1 hour using ([Organ and Tissue Acceptance/Rejection form](#))
- 5.11 Failure to respond within 1 hour will exclude the center from the allocation of that lung and will be considered as refusal.
- 5.12 In case of rejection, the transplant center must provide a valid reason for the rejection using ([Organ and Tissue Acceptance/Rejection form](#))
- 5.13 The reason for rejection by the initially accepted center must be shared with the backup centers, informing the next backup center that they have become the primary center for the lung.
- 5.14 During lungs recovery, the transplant center may reject the lung based on macroscopic examination.
- 5.14.1 The primary transplant center must complete the [Organ and Tissue Acceptance/Rejection form](#) and send it to SCOT. SCOT coordinator shall inform the backup transplant center of the rejection and the reason behind it.
- 5.15 If the lung is not accepted by any transplant center due to unsuitability for transplantation, the transplant center coordinator must fill the [Deceased Organ Discard Report](#) according to SCOT's (Disposal of Discarded Human Organ/Tissue Policy)
- 5.16 If the lung is transplanted, the transplant center shall complete the [Post Organ Transplantation Form](#) within 24 hours of the transplantation date.
- 5.17 The SCOT coordinator responsible for allocation shall document the entire allocation process using [Organ Allocation Form](#).
- 5.18 The lungs allocation process is considered concluded once the lungs have been successfully transplanted to the recipient or declined by all centers.



6. RESPONSIBILITIES

The responsibility of implementing and ensuring compliance with the developed Policy and Procedure lies with Donor Affairs & Organ Allocation Department at SCOT.

7. SYNOPSIS OF CHANGE

New

8. APPENDICES

- 8.1 [Table 1: Routine donor workup](#)
- 8.2 [Table 2: Routine donor workup by each organ](#)
- 8.3 [Organ and Tissue Acceptance/Rejection form](#)
- 8.4 [Organ Allocation Form.](#)
- 8.5 [Post Organ Transplantation Form](#)
- 8.6 [Deceased Organ Discard report](#)
- 8.7 [Lung Allocation Scheme](#)

9. REFERENCES

- 9.1 OPTN, “Organ Procurement and Transplantation Network (OPTN) Policies.” Aug. 01, 2023. [Online]. Available: https://optn.transplant.hrsa.gov/media/eavh5bf3/optn_policies.pdf
- 9.2 Eurotransplant, “ET Thoracic Allocation System (EThAS).” Aug. 17, 2023. [Online]. Available: <https://www.eurotransplant.org/wp-content/uploads/2023/08/H6-ETHAS-August-17-2023.pdf>
- 9.3 SCOT, “Directory of the Regulations of Organ Transplantation in the Kingdom of Saudi Arabia.” 2023. [Online]. Available: www.SCOT.gov.sa



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APPENDIXES





10. Lung Transplantation Scientific Committee
Dr. Saleh Aldammas (Chairman): Lung Transplant Consultant – Prince Sultan Military Medical City, Riyadh.
Dr. Waleed Saleh (Vice-Chairman): Lung Transplant Consultant Surgeon – King Faisal Specialist Hospital & Research Center, Riyadh
Dr. Maher Bazarbashi: Lung Transplant Consultant – King Abdulaziz Medical City and National Guard Hospital, Riyadh
Dr. Rayid Abdulqawi: Transplant Pulmonology Consultant– King Faisal Specialist Hospital & Research Center, Riyadh
Dr. Mohamed Hussain: Lung Transplant Consultant Surgeon – King Abdulaziz Medical City and National Guard Hospital, Riyadh
Dr. Abdullah Al-Harbi: Lung Transplant Consultant – King Saud University Medical City, Riyadh
Iskander Al-Githmi: Consultant cardiothoracic and lung transplant surgeon College of Medicine, King Abdulaziz University, Jeddah
Dr Samar Alshadly: Lung Transplant and Diseases Consultant – Private practice
Dr. Mohammed Albalwi: Pediatric pulmonologist and lung transplant consultant- King Faisal Specialist Hospital & Research Center, Riyadh



Table 1: Routine donor workup:

List of routine workups to all donors that should be done during case follow up
Blood culture
Urine culture
Surveillance MRSA: Groin, Axilla, Nasal
Serology : HIV 1 & 2, Hepatitis B (HBsAg, anti-HBc), Hepatitis C (anti-HCV), CMV (IgM & IgG), EBV (IgM & IgG), Syphilis (VDRL/RPR/TPHA), HTLV I & II (where available)
Additional Serology as needed: Toxoplasma (IgM & IgG, especially for heart donors), other viral panels (Varicella, Rubella, Measles for tissue donors), COVID-19 PCR/serology.
Blood type
Liver enzyme
Renal Profile
Electrolyte
CBC
Blood gases
HLA (Only to be done after the consent obtained)

Table 2: Routine donor workup for each organ

Organs	Routinely work up by each organ/tissue
Lung	<ul style="list-style-type: none"> ▪ Challenge test ✓ Ventilator settings for challenge gases: (PEEP) of 5-8 cmH₂O, (FiO₂) 100%, Tidal volume of 6-8 mL/kg ideal body weight) . ✓ Challenge gases obtained 2 hours prior to the initial offer every 12 hours between organ offer acceptance and the organ recovery ✓ Challenges gases must not be drawn within 30 minutes after any recruitment maneuver ▪ Chest x-ray(within 4 hrs. of the initial offer and every 24 hrs. until lung procurement) ▪ CT lung (within 72 hours prior to the initial offer and should provide images with lung windows) ▪ Bronchoscopy ▪ TB PCR from tracheal aspirate or Bronchoalveolar Lavage, if available ▪ Respiratory Rapid Multiplex Polymerase Chain Reaction PCR (Pneumonia panel) from Bronchoalveolar Lavage, if available ▪ Covid test and influenza ▪ Sputum gram stain and culture ▪ ECHO
Heart	<ul style="list-style-type: none"> ▪ Cardiac Cath ▪ Echo ▪ ECG
Liver	<ul style="list-style-type: none"> ▪ Liver function tests with bilirubin ▪ Coagulation profile ▪ GGT ▪ Albumin ▪ US/ CT abdomen

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Kidney	<ul style="list-style-type: none">▪ kidney function tests▪ electrolytes▪ US/CT Abdomen▪ Total intake/output
Pancreases	<ul style="list-style-type: none">▪ Amylase▪ Lipase▪ HbA1c▪ US/ CT Abdomen
Intestinal	<ul style="list-style-type: none">▪ Abd girth▪ Amylase▪ Lipase
Cornea	<ul style="list-style-type: none">▪ Serology specially, HBc antibodies.



Organ and Tissue Acceptance/ Rejection

Donor Demographics

Name:	<input type="text"/>	SCOT Case No.:	# <input type="text"/>
Hospital:	<input type="text"/>	Coordinator:	<input type="text"/>
Offer Date/Time:	# <input type="text"/>		

Organ:

<input type="checkbox"/> Kidney	<input type="checkbox"/> Liver	<input type="checkbox"/> Heart	<input type="checkbox"/> Lungs
<input type="checkbox"/> Pancreas	<input type="checkbox"/> Small Bowel	<input type="checkbox"/> Corneas	<input type="checkbox"/> Bones

Accepted

Date/Time:

Rejected

Kindly indicate the reason:

Date/Time:

The transplant center shall complete the organ transplantation form promptly after the organ transplantation within 24 hours of the transplantation date

Information Provider

Transplant Center:	<input type="text"/>	Signature:	<input type="text"/>
Consultant:	<input type="text"/>	Signature:	<input type="text"/>
Transplant Coordinator:	<input type="text"/>	Date/time:	<input type="text"/>



Post Lung Transplantation

Recipient Information

Hospital Code	Recipient MRN	SCOT MRN
<p>Name: Given: _____ Father: _____ Grandfather: _____ Surname: _____</p>		
<p>Date of Birth: _____</p>		<p>Age: _____ Years</p>
<p>Sex: <input type="checkbox"/> Male <input type="checkbox"/> Female</p>	<p>Saudi ID/Iqama No. _____</p>	<p>Nationality: _____</p>
<p>Address: P.O. Box: _____</p>	<p>City: _____</p>	<p>Tel/Mobile: # _____</p>
<p>Marital Status: <input type="checkbox"/> Single <input type="checkbox"/> Married <input type="checkbox"/> Widow <input type="checkbox"/> Divorced</p>		
<p>Hospital Admission Date: _____</p>		<p>Original Lung Disease: _____</p>
<p>Blood Group: <input type="checkbox"/> A+ <input type="checkbox"/> A- <input type="checkbox"/> B+ <input type="checkbox"/> B- <input type="checkbox"/> AB+ <input type="checkbox"/> AB- <input type="checkbox"/> O+ <input type="checkbox"/> O-</p>		
<p>Date of Transplantation: _____</p>		<p>Body Weight: _____</p>
<p>In case of graft loss: How many re-transplant has been performed to the patient? _____</p>		
<p>Type of Transplant: <input type="checkbox"/> Lung <input type="checkbox"/> Heart & Lung</p>		<p>Place of Transplantation: _____ Hrs. _____ Mins.</p>
<p>Total Lung Tx. <input type="checkbox"/> Single <input type="checkbox"/> Bilateral</p>		<p>Cold Ischemia: _____</p>
<p>Remarks: _____</p>		

Deceased Donor Information

Hospital Code	Donor MRN	SCOT MRN
<p>Name: Given: _____ Father: _____ Grandfather: _____ Surname: _____</p>		
<p>Sex: <input type="checkbox"/> Male <input type="checkbox"/> Female</p>		<p>Age: _____ Years</p>
<p>Blood Group: <input type="checkbox"/> A+ <input type="checkbox"/> A- <input type="checkbox"/> B+ <input type="checkbox"/> B- <input type="checkbox"/> AB+ <input type="checkbox"/> AB- <input type="checkbox"/> O+ <input type="checkbox"/> O-</p>		
<p>Nationality: _____</p>		
<p>Donor Hospital: _____</p>		
<p>Address: P.O. Box: _____</p>		<p>City: _____</p>
<p>Tel/Mobile: # _____</p>		
<p>Remarks: _____</p>		

The transplant center shall complete the organ transplantation form promptly after the organ transplantation within 24 hours of the transplantation date



Deceased Organ Discard Report

Donor Demographics

Hospital:			
Name:		SCOT Case No.:	#
Age:	#	Date/Time:	
Nationality:		Blood Group:	

Discarded Organ:

- | | | | |
|-----------------------------------|--------------------------------------|----------------------------------|--------------------------------|
| <input type="checkbox"/> Kidney | <input type="checkbox"/> Liver | <input type="checkbox"/> Heart | <input type="checkbox"/> Lungs |
| <input type="checkbox"/> Pancreas | <input type="checkbox"/> Small Bowel | <input type="checkbox"/> Corneas | <input type="checkbox"/> Bones |

*Use a different form if you would like to report more than one organ for disposal

Transplant Center:	
Received date & time:	

Reason of Disposal

Reason organ harvested not used for transplantation

<input type="checkbox"/> Result of Perfusion Pump	<input type="checkbox"/> Warm ischemic time too long	<input type="checkbox"/> Diseased organ
<input type="checkbox"/> Long Cold Ischemia Time	<input type="checkbox"/> Organ trauma	<input type="checkbox"/> Anatomical abnormalities
<input type="checkbox"/> Vascular damage	<input type="checkbox"/> Organ not as described	<input type="checkbox"/> No recipient located - listed exhausted
<input type="checkbox"/> Ureteral damage	<input type="checkbox"/> Biopsy findings	<input type="checkbox"/> Other, specify:
<input type="checkbox"/> Inadequate urine output	<input type="checkbox"/> Recipient determined to be unsuitable for transplant in Operating room	
<input type="checkbox"/> Positive CMV	<input type="checkbox"/> Poor organ function	
<input type="checkbox"/> Positive HIV	<input type="checkbox"/> Infection	
<input type="checkbox"/> Positive hepatitis		

Disposal Method: Pathology Research

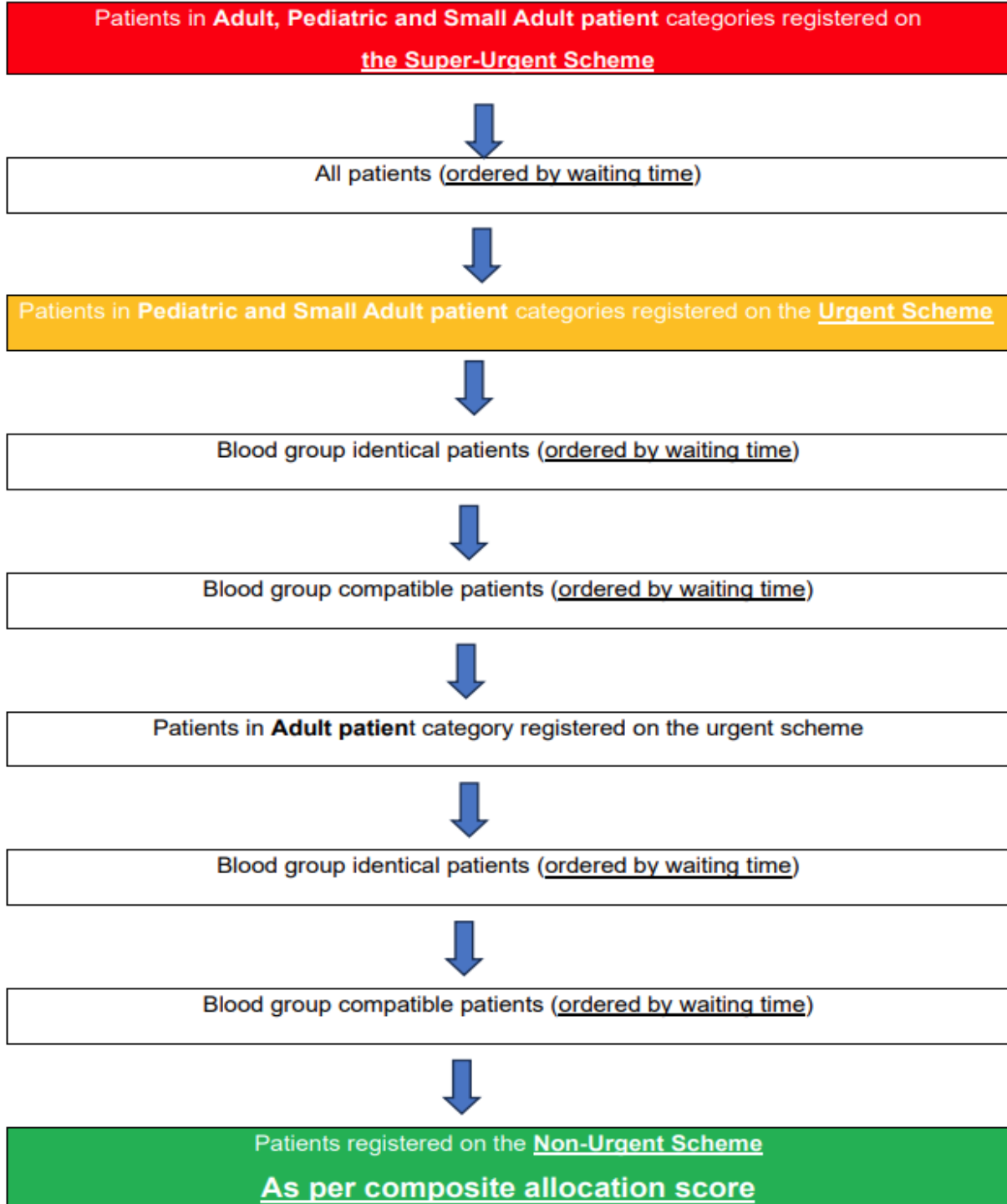
Information Provider

Coordinator Name:		Signature:	
Position:		Date/time:	
Transplant Center:			

In accordance with Articles 9 and 10 of the Human Organ Donation Regulation and Executive Bylaw, all medical examination and scientific research conducted on donated organs must adhere to Islamic principles and be done only with the informed consent of the donor. The dignity and confidentiality of the organ donor, whether living or deceased, shall be respected at all times during organ recovery and transplantation procedures. Any disclosure of medical information related to the donor's body is prohibited except when legally required or ordered by a judicial authority. All parties involved in organ donation, procurement, and transplantation procedures must uphold these principles outlined in Articles 9 and 10.



Lung Allocation Scheme:





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