# 1. PRINCIPLES OF LUNG TWL MATCHING IN ORGANMATCH

In OrganMatch, recipients listed on the Lung transplant waiting list (TWL) are matched with deceased organ donors using multi-tiered matching algorithm.

There is one parent algorithms:

- Lung (LAv1)

Matching using the above parent algorithm triggers a series of functions and child algorithms.

The first version of the Lung Matching Algorithm (LAv1) is effective from December 2022.

- Enhance the current process for selection of recipients to be crossmatched with deceased organ donors and to facilitate a more efficient process for issuing VXM results.
- Provide a list of potential recipients from OrganMatch. Previously, this was performed manually at a unit level.
- Potential Recipients with UA to the donor HLA mismatches will be excluded.
- Include the matching of Nationally Urgent patients (High acuity and Recipient <16 years old) to be matched across all jurisdictions.
- The matching algorithm will be run by the OM laboratory processing the donor once the lung has been accepted as suitable for transplant and the donor is ready to be matched.
- Prioritise Matching for Paediatric donors (=< 16 years old) to paediatric recipients (=<16 years old) and listed for transplant at The Alfred Hospital – Lung Unit.

Scoring is used to order the list, and not for ranking or allocation purposes.

## 1.1 HIGH-LEVEL COMPATIBILITY CHECK

The first step in matching is the high-level compatibility check, which determines if recipients will progress to being matched in the next stage of the algorithm.
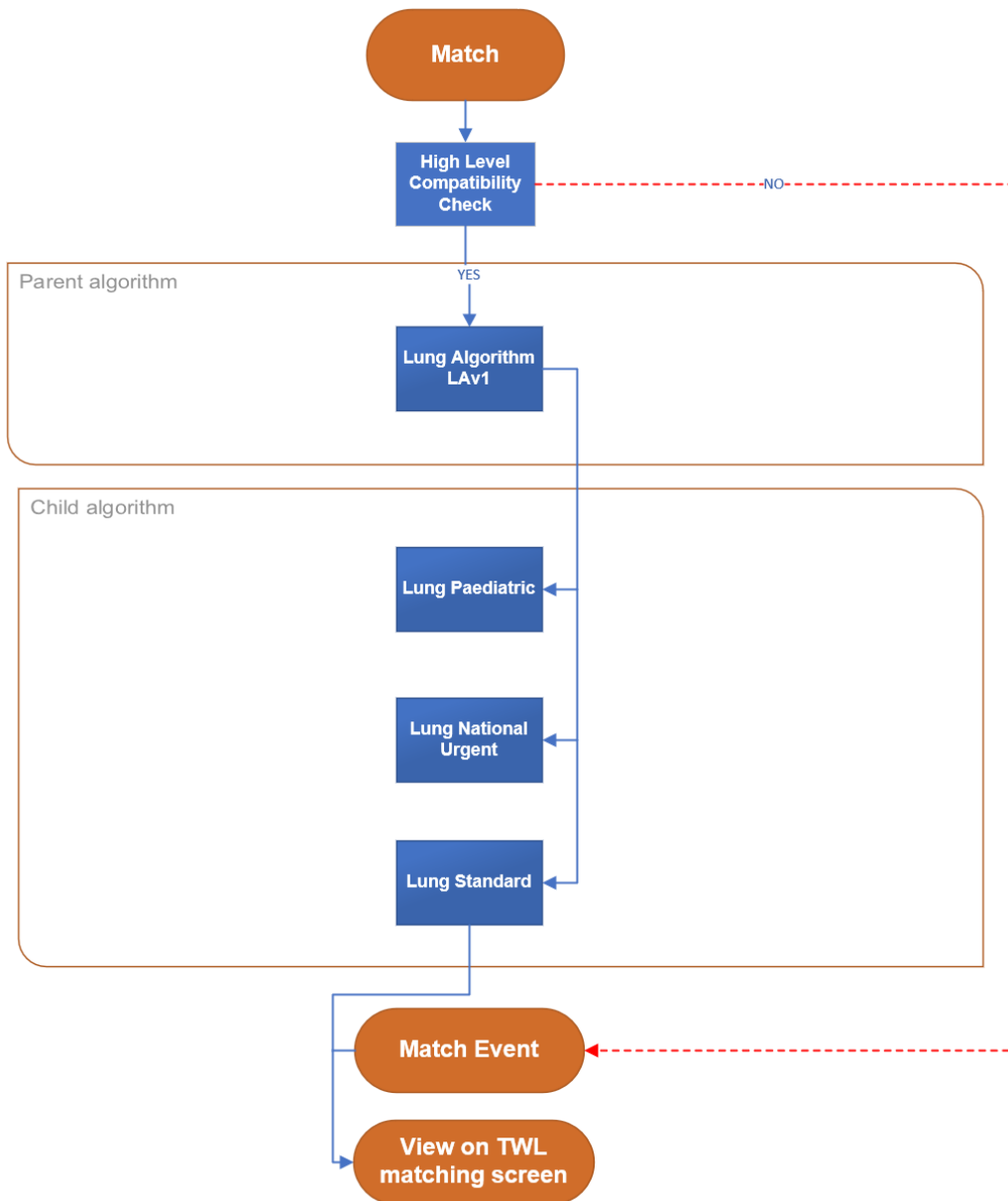
| Check | Process | ! | ✘ | ✔ |
|---|---|---|---|---|
| **No Unacceptable Antigens (UA) identified** | Compares donor HLA with recipient UA. Includes all HLA loci. | Potential UA for the donor are listed. Will proceed to matching | UA and donor HLA match. Does not proceed to matching. | Recipient and donor compatible. Proceeds to matching. |
| **Valid ABO for program** | Checks ABO compatibility. | N/A | Does not proceed to matching. | Recipient and donor compatible. Proceeds to matching. |
| **Acceptable height range** | Compares donor height to the Acceptable height range for recipient | N/A | Does not proceed to matching. | Recipient and donor compatible. Proceeds to matching. |

If a recipient passes the high-level compatibility check, they progress to matching, depending on which parent algorithm is selected.

Recipients that are excluded through the high-level compatibility check can be viewed in the Thoracic Exclusion Report which is available in the Transplantation Portal for users linked to a Lung transplant unit. For further information refer to *OM-060 Donor Dashboard- Transplantation Portal*.

## 2. LUNG ALGORITHM (LAV1)

The Lung algorithm consists of three child algorithms. The child algorithms are executed in a set order.

## 2.1 LUNG PAEDIATRIC

If the donor is less than 16 years old, this child algorithm matches with recipients 16 years or less, listed for transplant at The Alfred – Lung unit transplant centre.

| Algorithm Name | Check | Process | ! | ✖ | ✔ |
|---|---|---|---|---|---|
| Lung Paediatric | **Valid ABO for Lung**<br><br>(See Section 3) | Checks ABO compatibility. | N/A | Does not proceed to matching. | Recipient and donor compatible.<br><br>Proceeds to matching. |

### 2.1.1 LUNG PAEDIATRIC ALGORITHM SCORE

The base score is calculated for each matched recipient.

| Level | Description | Score |
|---|---|---|
| Paediatric | All patients | 5,000,000 |
| Paediatric | Paediatric patients with transplant unit = Alfred Lung Unit | + 5,000,000 |

## 2.2 NATIONAL URGENT

A recipient will be included if:

- Not already matched in the Lung Paediatric
- Has a National Urgent flag (High acuity and Recipient <16 years old)

| Algorithm Name | Check | Process | ! | ✖ | ✔ |
|---|---|---|---|---|---|
| Lung National Urgent | Valid National Flag | Check National Urgent flag with High acuity, and Recipient <16 years old | N/A | Does not proceed to matching. | Recipient and donor compatible. Proceeds to matching. |
| Lung National Urgent | Valid ABO for National Priority | Checks ABO compatibility. | N/A | Does not proceed to matching. | Recipient and donor compatible. Proceeds to matching. |

### 2.2.1 NATIONAL URGENT SCORE

The base score is calculated for each recipient that proceeds to matching.

| Level | Description | Score |
|---|---|---|
| National Urgent | Base Score | 5,000,000 |
| National Urgent | National Priority Flag | Add 2,000,000 |

## 2.3 STANDARD ALGORITHM

A recipient will be included if their ABO type is compatible with donor as determined by the ABO Type Selection Rules (Section 3).

The donor OM lab will determine which Unit the organ will be matched with first, subsequent matches will occur in OrganMatch but offered as per the current Rotation rules (Process not in OrganMatch currently).

| Algorithm | Donor OM Lab State* | Recipient Transplant Unit |
|---|---|---|
| Standard | NSW (includes ACT) | St Vincents, Sydney – Lung Unit |
| | VIC (includes TAS) | The Alfred Hospital Lung Unit |
| | SA (includes NT) | ** |
| | QLD | Prince Charles Hospital Lung Unit |
| | WA | Fiona Stanley Hospital lung unit |

*OrganMatch Lab refers to the Tissue Typing lab that performs the donor testing.

** SA OM lab to match as per directed by the Home state / rotation.

All patients will be included in the matching.

| Algorithm Name | Check | Process | ! | ✖ | ✔ |
|---|---|---|---|---|---|
| Lung Standard | Valid ABO for Lung (see Section 3) | Checks ABO compatibility. | N/A | Does not proceed to matching. | Recipient and donor compatible. Proceeds to matching. |

### 2.3.1 LUNG STANDARD SCORE

The base score is calculated for each recipient that proceeds to matching.

| Level | Description | Base Score |
|---|---|---|
| Standard | All patients | 5,000,000 |
| Standard | Home state | + 1,000,000 |

## 3. ABO COMPATIBILITY RULES

The following table show the compatible ABO groups. Additional points are added to the score for compatibility. This assists with the final sort order.

| Algorithm | Donor ABO Type | Patient ABO Type | Score |
|---|---|---|---|
| Lung | A | A | 100,000 |
| | A | AB | 70,000 |
| | B | B | 100,000 |
| | B | AB | 70,000 |
| | AB | AB | 100,000 |
| | O | O | 100,000 |
| | O | A | 70,000 |
| | O | B | 40,000 |
| | O | AB | 10,000 |

## 4. ORGAN OFFER LIST ORDER

Sorting will be by score descending –

Calculate and the following are additions to the scores above:

- Add score by blood group (see scores in table in point 5)
- Calculate score by Recipients' Acceptable height From: (300 – Acceptable Height From (cm)) x 100

Examples:

300 – 1 (acceptable height from) x 100 = 29,900 score

300-150 (acceptable height from) x100 = 15,000 score

300 – 170 (acceptable height from) x 100 = 13,000 score

300 – 299 (acceptable height from) x 100 = 10,000 score

## 5. RECIPIENT READINESS CRITERIA TO BE MATCHED

Recipients must be ready and active to be able to be matched via an algorithm in OrganMatch.

The readiness criteria must be met to be matched in the algorithm. Refer to *OM-070 Readiness Criteria in OrganMatch – Laboratory Portal* for further information.

The current readiness criteria for patients listed for Lung TWL is as follows:

| Criteria | Recipient Requirements |
|---|---|
| HLA typing | Authorised for:<br><br>HLA-A – 1 field<br><br>HLA-B – 1 field<br><br>HLA-C – 1 field<br><br>HLA-DRB1 – 1 field<br><br>HLA-DQB1 – 1 field<br><br>HLA-DQA1 – 1 field<br><br>HLA-DPB1 – 1 field<br><br>HLA-DPA1 – 1 field |
| Location | OM Laboratory Entered<br>Transplant Hospital entered |
| Luminex | Luminex Antibody screen (SAG1) Tested within 120 days<br>Luminex Antibody screen (SAG2) Tested within 120 days |
| Unacceptable antigen | Authorised |
| Samples | Final ABO Blood Group Confirmed |
| Enrolment Criteria | Acceptable Height Range (cm) |
| Height & Weight | Height (cm)<br>Weight (kg) |

## DEFINITIONS

| Term/abbreviation | Definition |
|---|---|
| LAv1 | Lung Matching Algorithms version 1 |
| OM | OrganMatch |
| TWL | Transplant Waiting List |

## REFERENCED INTERNAL DOCUMENTS

| Document number | Source |
|---|---|
| OM-060 | Donor Dashboard- Transplantation Portal |
| OM-070 | Readiness Criteria in OrganMatch – Laboratory Portal |

## CHANGE HISTORY

| Version number | Effective date | Summary of change |
|---|---|---|
| 1 | 1/09/2022 | First Version |
| 2 | 04/12/2023 | • Update to new template.<br>• Section 5 update to Lung readiness of 120 days for SAG. |
| 3 | Refer to footer | Sprint 55 updates:<br>• Reference to new Thoracic Exclusion Report and Donor Dashboard document. |

## ELECTRONIC SIGNATURE

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