1. PRINCIPLES OF HEART TWL MATCHING IN ORGANMATCH

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

There is one parent algorithm:

Heart (HAv1)

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

The use of the Heart Algorithm aims to:

- Enhance the process for selection of recipients and to facilitate a more efficient process for issuing VXM results.
- Provide an initial list of potential recipients generated from OrganMatch., reducing the need for the transplant unit to supply recipient names in the first instance.
- Exclude Potential Recipients with Unacceptable Antigens (UA) to the donor HLA mismatches
- Include the matching of Nationally Urgent patients.
- The matching algorithm will be run by the OM laboratory processing the donor once the heart has been accepted as suitable for transplant and the donor is ready to be matched.
- Prioritise Matching for Paediatric donors (=< 16 years old and <50kg) to paediatric recipients (=<16 years old) and listed for transplant at the Royal Children's Hospital Melbourne – Heart Unit or Children's Hospital Westmead- Heart 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.

Check	Process	!	✖	✔
Predictive Heart mass Ratio (PHM)	Compares predictive heart mass ratio	N/A	Does not proceed to matching.	PHM ratio falls between specified % range eg : +/- 30% as specified for each state# Proceeds to matching.

#Each transplant unit can specify a % range – this will be managed in a reference table so is easily changed on request.
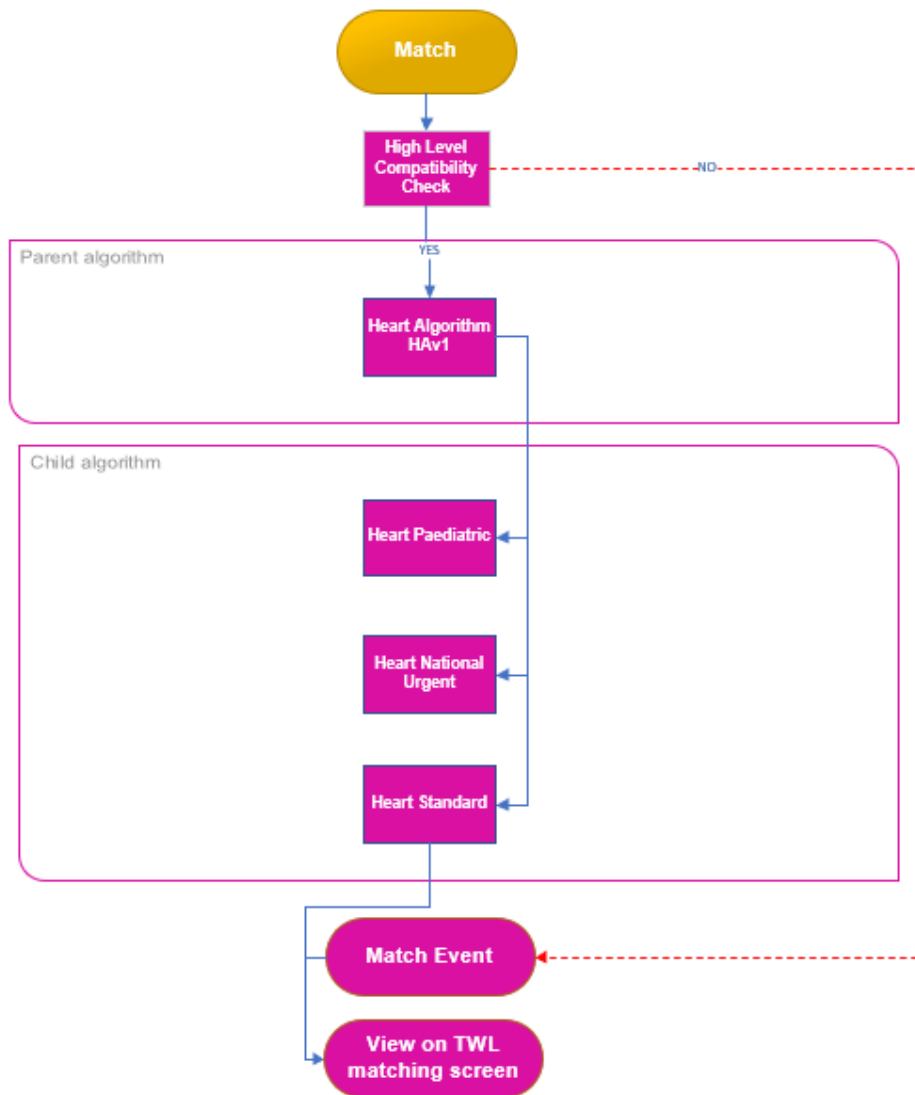
If a recipient passes the high-level compatibility check, they progress to matching.

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 Heart transplant unit. For further information refer to *OM-060 Donor Dashboard- Transplantation Portal*.

2. HEART ALGORITHM (HAV1)

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

1. Heart Paediatric
2. Heart National Urgent
3. Heart Standard

2.1 HEART PAEDIATRIC

If the donor is less than 16 years old and <50kg, this child algorithm matches with recipients 16 years or less, listed for transplant at The Royal Children's Hospital Melbourne- Heart unit or Children's Hospital Westmead- Heart unit transplant centres.

Note: For Donors and recipients <1 year old, the PHM ratio does not calculate and displays as infinity. Donors in this age bracket will not be matched in the algorithm and manual match comparison will be required.

Algorithm Name	Check	Process	!	✖	✔
Heart Paediatric	**Valid ABO for Heart**	Checks ABO compatibility.	N/A	Does not proceed to matching.	Recipient and donor compatible. Proceeds to matching.

2.1.1 HEART PAEDIATRIC ALGORITHM SCORE

The base score is calculated for each matched recipient.

Level	Description	Score
	All patients	5,000,000
	Paediatric patients with transplant unit = Royal Children's Hospital Melbourne –Heart Unit or Children's Hospital Westmead- Heart Unit	+ 5,000,000

2.2 NATIONAL URGENT

A recipient will be included if:

- Not already matched in the Heart Paediatric.
- Has a National Urgent flag and Urgent status has been accepted by the home state transplant unit.

Algorithm Name	Check	Process	!	✖	✔
Heart Urgent	**Valid National Flag**	Check National Urgent flag	N/A	Does not proceed to matching.	Recipient and donor compatible. Proceeds to matching.
Heart Urgent	**Valid ABO for National Priority** (see Section 3)	Checks ABO compatibility.	N/A	Does not proceed to matching.	Recipient and donor compatible. Proceeds to matching.

Note: Heart Urgent listing process not currently in OrganMatch

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 – Heart Unit Children's Hospital Westmead Heart Unit
	VIC (includes TAS)	The Alfred Hospital Heart Unit Royal Children's Hospital, Melbourne Heart Unit
	SA (includes NT)	**
	QLD	Prince Charles Hospital Heart Unit
	WA	Fiona Stanley Hospital Heart 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	!	✖	✔
Heart Standard	Valid ABO for Heart (see Section 3)	Checks ABO compatibility.	N/A	Does not proceed to matching.	Recipient and donor compatible. Proceeds to matching.

2.3.1 HEART STANDARD SCORE

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

Level	Description	Base Score
	All patients	5,000,000
	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
Heart	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.

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 Readiness Criteria in OrganMatch – Laboratory Portal, OM-070 for further information.

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

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

DEFINITIONS

Term/abbreviation	Definition
HAv1	Heart Matching Algorithms version 1
OM	OrganMatch
TWL	Transplant Waiting List
UA	Unacceptable Antigens

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
-	-	For previous change histories contact the National OrganMatch Office.
2	04/12/2023	• Update to new template. • Section 5 update to Heart readiness of 120 days for SAG.
3	Refer to footer	Update for OrganMatch Sprint 54: • Children's Hospital Westmead Heart Unit added to the paediatric algorithm and home state recipient transplant unit for NSW. • Update information for paediatric donors and patients <1 years old.
4	Refer to footer	Update for OrganMatch Sprint 55: • Reference to new Thoracic Exclusion Report and Donor Dashboard document.

ELECTRONIC SIGNATURE

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