Supplementary Material

Supplementary information 1:

PRISMA 2020 Main Checklist

Topic	No.	Item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	Title (page 1)
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist	Abstract (page 2)
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	Background (pages 2-3)
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	Aims and objectives (page 3
METHODS			

Topic	No.	Item	Location where item is reported
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	Methods and eligibility criteria (pages 3-4)
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	Information Sources (page 4)
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	Search terms in methods and supplemental information (page 4)
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	Selection Process (page 4)

Topic	No.	Item	Location where item is reported
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	Data collection (page 5)
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	Data extraction (page 5)
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	NA

Topic	No.	Item	Location where item is reported
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	Study Risk of bias assessment (page 4)
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	Data synthesis (page 5)
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item 5)).	Data synthesis (page 5)
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	NA
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	Data synthesis (page 5)

Topic	No.	Item	Location where item is reported
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	Data synthesis (page 5)
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	Data synthesis (page 5)
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	Data synthesis (page 5)
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	Not used due to limited sample size (page 9)
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	Not used due to limited sample size (page 9)
RESULTS			

Topic	No.	Item	Location where item is reported
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	Study selection and consort diagram (page 5-6)
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	Consort diagram page 6
Study characteristics	17	Cite each included study and present its characteristics.	Table 2 (pages 7-8)
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	Risk of bias in studies (page 10)
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	Results of individual studies and Table 2 (pages 7-8; 10-11)
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	Results of synthesis (page 11-12)

Topic	No.	Item	Location where item is reported
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	Results of synthesis (page 11-12)
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	Results of synthesis (page 11-12)
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	Not performed
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	Funnel plot (page 13)
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	Not performed
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	Discussion (page 13)

Topic	No.	Item	Location where item is reported
	23b	Discuss any limitations of the evidence included in the review.	Disscussion / Limitation (Page 16)
	23c	Discuss any limitations of the review processes used.	Disscussion / Limitation (page 16)
	23d	Discuss implications of the results for practice, policy, and future research.	Discussion page 15-16
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	Abstract page 2
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	Abstract page 2
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	NA

Topic	No.	Item	Location where item is reported
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	Page 1
Competing interests	26	Declare any competing interests of review authors.	Other information Conflicts of interest (page 1)
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	Full data extraction/Supplementary information 4 (page 9; page 12)

PRIMSA Abstract Checklist

Topic	No.	Item	Reported?
TITLE			
Title	1	Identify the report as a systematic review.	Yes
BACKGROUND			

Topic	No.	Item	Reported?
Objectives	2	Provide an explicit statement of the main objective(s) or question(s) the review addresses.	Yes
METHODS			
Eligibility criteria	3	Specify the inclusion and exclusion criteria for the review.	Yes
Information sources	4	Specify the information sources (e.g. databases, registers) used to identify studies and the date when each was last searched.	Yes
Risk of bias	5	Specify the methods used to assess risk of bias in the included studies.	Yes
Synthesis of results	6	Specify the methods used to present and synthesize results.	Yes
RESULTS			
Included studies	7	Give the total number of included studies and participants and summarise relevant characteristics of studies.	Yes
Synthesis of results	8	Present results for main outcomes, preferably indicating the number of included studies and participants for each. If meta-analysis was done, report the summary estimate and confidence/credible interval. If comparing groups, indicate the direction of the effect (i.e. which group is favoured).	Yes
DISCUSSION			

Topic	No.	Item	Reported?
Limitations of evidence	9	Provide a brief summary of the limitations of the evidence included in the review (e.g. study risk of bias, inconsistency and imprecision).	Yes
Interpretation	10	Provide a general interpretation of the results and important implications.	Yes
OTHER			
Funding	11	Specify the primary source of funding for the review.	No
Registration	12	Provide the register name and registration number.	Yes

From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. MetaArXiv. 2020, September 14. DOI: 10.31222/osf.io/v7gm2. For more information, visit: www.prisma-statement.org

Supplementary Information 2:

PubMed
Search Terms and strategy:

Population
("Child"[MeSH] OR "children"[tiab] OR "pediatric"[tiab] OR "paediatric"[tiab] OR "under 18"[tiab] OR "infant"[tiab] OR "under 16"[tiab] OR "adolescent"[tiab] OR "teenagers"[tiab] OR "childhood"[tiab]
AND
("Heart Diseases"[MeSH] OR "heart disease"[tiab] OR "cardiac disease"[tiab] OR "congenital heart disease"[tiab] OR "congenital heart defect"[tiab] OR "cardiomyopathy"[tiab] OR “heart failure”[tiab] OR “congestive heart failure”[tiab] OR “chronic heart failure”[tiab])
AND
Exposure
("Iron"[MeSH Terms] OR "Iron, Dietary"[MeSH Terms] OR "Iron Metabolism Disorders"[MeSH Terms] OR "iron deficiency"[tiab] OR "iron deficiency anemia"[tiab] OR "low iron levels"[tiab] OR "iron metabolism disorders"[tiab] OR "iron supplementation"[tiab] OR "iron depletion"[tiab] OR "iron studies"[tiab] OR "iron status"[tiab] OR "ferritin levels"[tiab] OR "serum iron"[tiab] OR "hemoglobin levels"[tiab] OR "iron blood level"[tiab])
AND
Outcome
("Heart Transplantation"[MeSH] OR "Death"[MeSH] OR "Adverse Cardiovascular Outcomes"[tiab] OR "Cardiovascular Events"[tiab] OR "Cardiovascular Complications"[tiab] OR "Cardiovascular Morbidity"[tiab] OR "Cardiovascular Mortality"[tiab] OR "Major Adverse Cardiovascular Events (MACE)"[tiab] OR "Cardiovascular Risk"[tiab] OR "death"[tiab] OR "heart transplant"[tiab] OR "heart transplantation"[tiab] OR "heart-assist devices"[MeSH] OR "mechanical circulatory support"[tiab])

EMBASE Search Terms and Strategy
Database: Embase <1974 to 2024 December 31st>
Search Strategy:

ID	Terms	Number of articles
6	iron blood level/ or iron.mp. or iron deficiency/ or iron deficiency anemia/ or iron/ or iron metabolism disorder/ or iron depletion/ or iron metabolism/ or iron therapy/	(400581)
7	('heart diseases' or 'heart disease':ti,ab or 'cardiac disease':ti,ab or 'congenital heart disease':ti,ab or 'congenital heart defect':ti,ab or 'cardiomyopathy':ti,ab or 'heart failure':ti,ab or 'congestive heart failure':ti,ab or 'chronic heart failure':ti,ab).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]	(25617)
8	heart diseases.mp. or heart disease/	(153697)
9	heart disease.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]	(487388)
10	cardiac disease.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]	(28768)
11	congenital heart disease.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]	(75898)
12	congenital heart disease/ or congenital heart malformation/ or heart defects.mp.	(94654)
13	congenital heart defect.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]	(4680)
14	cardiomyopathy.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]	(205850)
15	heart failure/	(330118)
16	congestive heart failure.mp. or congestive heart failure/	(109446)
17	chronic heart failure.mp.	(34132)
19	7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17	(1028905)
20	dietary iron.mp.	(3040)
21	iron supplementation.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word] (7679)	(7679)

22	iron studies.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]	(1315)
23	iron therapy.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]	(12747)
24	iron status.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]	(9310)
25	ferritin levels.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]	(10154)
26	iron blood level.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]	(14544)
27	hemoglobin levels.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]	(17068)
28	6 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27	(417691)
29	child/ or child.mp.	(2816602)
30	children.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]	(1652714)
31	pediatric.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]	(654869)
32	paediatric.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]	(138601)

33	under 18.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]	(7646)
34	infant.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]	(875674)
35	under 16.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]	(2359)
36	adolescent.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]	(1905085)
37	teenager.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]	(5466)
38	childhood.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]	(526280)
39	29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38	(4540772)
40	heart transplant.mp. or heart graft/	(32600)
41	heart graft.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]	(21352)
42	death/ or death.mp.	(1673306)
43	adverse cardiovascular outcome.mp.	(427)
44	cardiovascular event.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]	(10921)
45	cardiovascular complication.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]	(1300)

46	cardiovascular morbidity.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]	(17991)
47	cardiovascular mortality.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]	(80570)
48	major adverse cardiovascular event*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]	(15783)
49	cardiovascular risk.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]	(302563)
50	heart transplantation.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]	(70348)
51	heart assist device.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]	(8471)
52	mechanical circulatory support.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]	(11907)
53	40 or 41 or 42 or 43 or 44 or 45 or 46 or 47 or 48 or 49 or 50 or 51 or 52	(2067700)
54	19 and 28 and 39 and 53	(422)
	*truncation	

Web of Science

(((ALL=(("heart diseases" OR "heart disease" OR "cardiac disease" OR "congenital heart disease" OR "congenital heart defect" OR "cardiomyopathy" OR "heart failure" OR "congestive heart failure" OR "chronic heart failure"))) AND ALL=(("iron" OR "dietary iron" OR "iron metabolism disorder" OR "iron deficiency" OR "iron deficiency anemia" OR "iron depletion" OR "iron studies" OR

"low iron levels" OR "iron metabolism disorders" OR "iron supplementation" OR "iron status" OR "ferritin levels" OR "serum iron" OR "hemoglobin levels")) AND ALL=("child" OR "children" OR "pediatric" OR "paediatric" OR "under 18" OR "infant" OR "under 16" OR "adolescent" OR "teenagers" OR "childhood"))) AND ALL=(("heart transplantation" OR "death" OR "adverse cardiovascular outcomes" OR "cardiovascular events" OR "cardiovascular complications" OR "cardiovascular morbidity" OR "cardiovascular mortality" OR "major adverse cardiovascular events (MACE)" OR "cardiovascular risk" OR "heart transplant" OR "heart-assist devices" OR "mechanical circulatory support"))

https://www.webofscience.com/wos/woscc/summary/b93ff2fc-5354-41e1-897b-9bf32f1becfe-fc974f61/relevant

Supplementary Information 3:

Complete data extraction from the included studies

First author and Year	Location	Inclusion Criteria	Exclusion criteria
Higgins, 2017	Seattle, Washington, USA	Age of <21 years old, the diagnosis of DCM, and at least one set of iron laboratories that included ferritin, serum iron, and iron saturation plus a same-day complete blood count.	Patients that were already receiving iron supplementation, post-cardiac transplantation, CHD, receiving chemotherapy or erythropoietin, received a transfusion within 2 weeks before obtaining iron laboratories, exposed to cardiopulmonary bypass 2 weeks before iron laboratories, or have renal dysfunction on renal replacement therapy.
Puri, 2020	Houston, Texas, USA	Patients between 1 and 21 years of age with a diagnosis of HF with laboratory assessment of iron status over a 5-year period.	Children <1 year of age, patients with a history of previous HTx and those with isolated diastolic dysfunction.
Phillips, 2023	New York, New York, USA	Age 1-21 years, with chronic HF seen between 2010 and 2020 in whom any iron testing was conducted. For our second specific aim, we only included patients with DCM as the etiology of systolic HF.	Patients were excluded if no evidence of systolic HF by either echocardiogram criterion or the presence of symptoms, (ii) a history was present of prior HT, isolated diastolic HF, or chronic kidney disease requiring dialysis, and (iii) age at baseline was less than 1 year of age. We also excluded patients without a measurement of TSAT or with an indeterminant iron status (TSAT 20%-30%)
Luxford, 2023	Sydney, Australia	Age < 18 years old, presenting with DCM and at least one one set of complete iron studies (ferritin, iron, transferrin, and TSAT) between January 2010 and January 2021	If the iron studies were incomplete, they were receiving erythropoietin-stimulating agents, had received a blood transfusion in the fortnight preceding their iron studies, or had already experienced the primary outcome before the first measurement of iron studies.

Newland, 2024	Seattle, Washington, USA	Pediatric HT recipients <21 years of age studied at the first annual post-HTx and laboratory assessment at Seattle Children's Hospital between July 2005 and July 2021	Patients who had undergone a previous HT (n = 13), had less than 1 year of follow-up since HT (n = 35), transferred post-HT care to another center before 1-year post-HT (n = 10), were transplanted before 2005 (n = 19), or did not have iron studies nor a CBC within 30 days of the annual biopsy (n = 1).

Notes: CHD, congenital heart disease DCM, dilated cardiomyopathy; HF, heart failure; HT, heart transplant; TSAT, transferrin saturation.

First author and Year	Study design	Sample Size	Age	Age for ID	Age for non-ID	Type of Heart Disease
Higgins, 2017	retrospective single center cohort study	28	10 (5.5) *			Dilated cardiomyopathy (N=28,100%)
Puri, 2020	retrospective single center cohort study	107	8 (3.6-13.9) &			Biventricular heart disease (N=77, 72%) and single ventricular CHD (N=30, 28%)
Phillips, 2023	retrospective single center cohort study	47		9 (2-14) &	12 (3-16) &	Dilated cardiomyopathy (N=47,100%)

Luxford, 2023	retrospective single center cohort study	47	3.83 (1.16-11.19) [&]	Idiopathic 14 (29.8) Familial 12 (25.5) Myocarditis 5 (10.6) Metabolic 3 (6.4) Rheumatic heart disease 3 (6.4) Anthracycline-induced 2 (4.3) Neuromuscular 2 (4.3) Tachyarrhythmia-induced 2 (4.3) Left ventricular noncompaction 2 (4.3) Ischemic 1 (2.1) Hypertensive 1 (2.1)
Newland, 2024	cross-sectional retrospective	115	4.1 (1.7-13.4) [&]	Heart transplant recipients

Notes: ID, iron deficiency.

* mean and standard deviation

[&] median and interquartile range

						ID		IS	
First author and Year	**Follow-up time (years)**	**ID definition**	**Outcome Definition**	**ID frequency**	**ID proportion**	**ACV frequency**	**ACV Proportion**	**ACV frequency**	**ACV Proportion**
Higgins, 2017	2.05 (2.11)	Ferritin <100 ng/mL alone or a ferritin 100 to 300 ng/ml and TSAT <20%.	Composite outcome defined as either mortality or need for MCS.	27	96.4	NA	NA	NA	NA
Puri, 2020	0.5	Presence of two of the four criteria: serum iron <50 mg/dL, serum ferritin <20 ng/mL, transferrin >300 ng/mL, and TSAT <15%.	ACV defined as the need for VAD implantation, HT, or death.	60	56.1	40	66.6	12	25.5

Phillips, 2023	0.5	TSAT <20%	ACV defined as the need for VAD implantation, HT, or death.	33	70.2	24	72.7	8	57.1
Luxford, 2023	4.5 (3.7-5.4)	Presence of two of the four criteria: ferritin < 20 µg/liter, iron < 9 µmol/liter, transferrin > 3 g/ liter, or TSat < 15%.	ACV defined as the need for MCS implantation, HT, or death.	29	61.7	10	34.5	1	5.5
Newland, 2024	1	Serum ferritin <30 ng/mL or serum ferritin < 30 ng/mL and TSAT < 20%.	Presence of ID defined as ferritin < 30 ng/mL or ferritin <30 ng/mL and TSAT < 20%)	53	46.1	NA	NA	NA	NA

ACV, adverse cardiovascular outcome, HT, heart transplant; ID, iron deficiency; IS, iron sufficiency; MCS, mechanical circulatory support; TSAT, transferrin saturation.

	ID		IS		
First author and Year	**Cummulative LOS at 3 months**	**Cummulative LOS at 6 months**	**Cummulative LOS at 3 months**	**Cummulative LOS at 6 months**	**Main Findings**
Higgins, 2017	NA	NA	NA	NA	Log transformed ferritin level was associated with mortality (0.29 (95%CI 0.12,0.70), P=0.006) and composite outcome (0.53 (95% CI 0.35,0.81), P=0.003), but was not associated with MCS, HF stage D, left ventricular dimensions and BNP levels.
Puri, 2020	88% (22-100) (BiV) 93% (10-100) (SV)	70% (18-100) (BiV) 65% (8-100) (SV)	18% (1-58) (BiV) 2% (0-11) (SV)	10% (3-45) (BiV) 2% (0-6) (SV)	ID was associated with a greater risk of ACV outcomes at six-months follow-up in patients with BiV physiology (OR 7, 95% CI 2-24) and SV physiology (OR 8, 95% CI 2-32).
Phillips, 2023	NA	NA	NA	NA	Patients with ID were not more likely to experience ACV outcomes when compared with IS patients (HR 1.365, 95% CI 0.612-3.043, P = .447). The lack of association between ID and ACV outcome was true for VAD implementation and HT listing too.

Luxford, 2023	29.4% (7.5-75.3)	14.7% (5.7-68.2)	2.2% (0-20)	1.1% (0-10.6)	Children with ID had significantly less freedom from the ACV at 1-year (54% ± 10%), 2-years (45 ± 10), and 5-years (37% ± 11%) than those without (p = 0.011). ID and anemia were the only significant predictors of the ACV (HR 3.84 (95% CI 1.27, 11.59) P=0.017 and (HR4.43 (1.46,13.38) P=0.008.
Newland, 2024	NA	NA	NA	NA	ID as defined by ferritin < 30 ng/mL (46%), and anemia per WHO diagnostic criteria (54%) were highly prevalent in the cohort of pediatric HT recipients at 1-year post-HT. Considering a more stringent criteria for ID such as including TSAT < 20% with ferritin < 30 ng/mL, the prevalence was 27%.

ACV, adverse cardiovascular outcome, BiV, biventricular heart failure; BNP, brain peptide natriuretic, HT, heart transplant; HR, hazard ratio, ID, iron deficiency; IS, iron sufficiency; MCS, mechanical circulatory support; OR, odds ratio; TSAT, transferrin saturation; SV, single ventricular heart failure.

Supplementary Information 4:

Complete data extraction from the included studies

First author and Year	Location	Inclusion Criteria	Exclusion criteria
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Puri, 2020	Houston, Texas, USA	Patients between 1 and 21 years of age with a diagnosis of HF with laboratory assessment of iron status over a 5-year period.	Children <1 year of age, patients with a history of previous HTx and those with isolated diastolic dysfunction.
Phillips, 2023	New York, New York, USA	Age 1-21 years, with chronic HF seen between 2010 and 2020 in whom any iron testing was conducted. For our second specific aim, we only included patients with DCM as the etiology of systolic HF.	Patients were excluded if no evidence of systolic HF by either echocardiogram criterion or the presence of symptoms, (ii) a history was present of prior HT, isolated diastolic HF, or chronic kidney disease requiring dialysis, and (iii) age at baseline was less than 1 year of age. We also excluded patients without a measurement of TSAT or with an indeterminant iron status (TSAT 20%-30%)
Luxford, 2023	Sydney, Australia	Age < 18 years old, presenting with DCM and at least one one set of complete iron studies (ferritin, iron, transferrin, and TSAT) between January 2010 and January 2021	If the iron studies were incomplete, they were receiving erythropoietin-stimulating agents, had received a blood transfusion in the fortnight preceding their iron studies, or had already experienced the primary outcome before the first measurement of iron studies.

Newland, 2024	Seattle, Washington, USA	Pediatric HT recipients <21 years of age studied at the first annual post-HTx and laboratory assessment at Seattle Children's Hospital between July 2005 and July 2021	Patients who had undergone a previous HT (n = 13), had less than 1 year of follow-up since HT (n = 35), transferred post-HT care to another center before 1-year post-HT (n = 10), were transplanted before 2005 (n = 19), or did not have iron studies nor a CBC within 30 days of the annual biopsy (n = 1).

Notes: CHD, congenital heart disease DCM, dilated cardiomyopathy; HF, heart failure; HT, heart transplant; TSAT, transferrin saturation.

First author and Year	Study design	Sample Size	Age	Age for ID	Age for non-ID	Type of Heart Disease
Higgins, 2017	retrospective single center cohort study	28	10 (5.5) *			Dilated cardiomyopathy (N=28,100%)
Puri, 2020	retrospective single center cohort study	107	8 (3.6-13.9) &			Biventricular heart disease (N=77, 72%) and single ventricular CHD (N=30, 28%)
Phillips, 2023	retrospective single center cohort study	47		9 (2-14) &	12 (3-16) &	Dilated cardiomyopathy (N=47,100%)

Luxford, 2023	retrospective single center cohort study	47	3.83 (1.16-11.19) [&]	Idiopathic 14 (29.8) Familial 12 (25.5) Myocarditis 5 (10.6) Metabolic 3 (6.4) Rheumatic heart disease 3 (6.4) Anthracycline-induced 2 (4.3) Neuromuscular 2 (4.3) Tachyarrhythmia-induced 2 (4.3) Left ventricular noncompaction 2 (4.3) Ischemic 1 (2.1) Hypertensive 1 (2.1)
Newland, 2024	cross-sectional retrospective	115	4.1 (1.7-13.4) [&]	Heart transplant recipients

Notes: ID, iron deficiency.

* mean and standard deviation

[&] median and interquartile range

						ID		IS	
First author and Year	**Follow-up time (years)**	**ID definition**	**Outcome Definition**	**ID frequency**	**ID proportion**	**ACV frequency**	**ACV Proportion**	**ACV frequency**	**ACV Proportion**
Higgins, 2017	2.05 (2.11)	Ferritin <100 ng/mL alone or a ferritin 100 to 300 ng/ml and TSAT <20%.	Composite outcome defined as either mortality or need for MCS.	27	96.4	NA	NA	NA	NA
Puri, 2020	0.5	Presence of two of the four criteria: serum iron <50 mg/dL, serum ferritin <20 ng/mL, transferrin >300 ng/mL, and TSAT <15%.	ACV defined as the need for VAD implantation, HT, or death.	60	56.1	40	66.6	12	25.5

Phillips, 2023	0.5	TSAT <20%	ACV defined as the need for VAD implantation, HT, or death.	33	70.2	24	72.7	8	57.1
Luxford, 2023	4.5 (3.7-5.4)	Presence of two of the four criteria: ferritin < 20 µg/liter, iron < 9 µmol/liter, transferrin > 3 g/ liter, or TSat < 15%.	ACV defined as the need for MCS implantation, HT, or death.	29	61.7	10	34.5	1	5.5
Newland, 2024	1	Serum ferritin <30 ng/mL or serum ferritin < 30 ng/mL and TSAT < 20%.	Presence of ID defined as ferritin < 30 ng/mL or ferritin <30 ng/mL and TSAT < 20%)	53	46.1	NA	NA	NA	NA

ACV, adverse cardiovascular outcome, HT, heart transplant; ID, iron deficiency; IS, iron sufficiency; MCS, mechanical circulatory support; TSAT, transferrin saturation.

	ID		IS		
First author and Year	**Cummulative LOS at 3 months**	**Cummulative LOS at 6 months**	**Cummulative LOS at 3 months**	**Cummulative LOS at 6 months**	**Main Findings**
Higgins, 2017	NA	NA	NA	NA	Log transformed ferritin level was associated with mortality (0.29 (95%CI 0.12,0.70), P=0.006) and composite outcome (0.53 (95% CI 0.35,0.81), P=0.003), but was not associated with MCS, HF stage D, left ventricular dimensions and BNP levels.
Puri, 2020	88% (22-100) (BiV) 93% (10-100) (SV)	70% (18-100) (BiV) 65% (8-100) (SV)	18% (1-58) (BiV) 2% (0-11) (SV)	10% (3-45) (BiV) 2% (0-6) (SV)	ID was associated with a greater risk of ACV outcomes at six-months follow-up in patients with BiV physiology (OR 7, 95% CI 2-24) and SV physiology (OR 8, 95% CI 2-32).
Phillips, 2023	NA	NA	NA	NA	Patients with ID were not more likely to experience ACV outcomes when compared with IS patients (HR 1.365, 95% CI 0.612-3.043, P = .447). The lack of association between ID and ACV outcome was true for VAD implementation and HT listing too.

Luxford, 2023	29.4% (7.5-75.3)	14.7% (5.7-68.2)	2.2% (0-20)	1.1% (0-10.6)	Children with ID had significantly less freedom from the ACV at 1-year (54% ± 10%), 2-years (45 ± 10), and 5-years (37% ± 11%) than those without (p = 0.011). ID and anemia were the only significant predictors of the ACV (HR 3.84 (95% CI 1.27, 11.59) P=0.017 and (HR4.43 (1.46,13.38) P=0.008.
Newland, 2024	NA	NA	NA	NA	ID as defined by ferritin < 30 ng/mL (46%), and anemia per WHO diagnostic criteria (54%) were highly prevalent in the cohort of pediatric HT recipients at 1-year post-HT. Considering a more stringent criteria for ID such as including TSAT < 20% with ferritin < 30 ng/mL, the prevalence was 27%.

ACV, adverse cardiovascular outcome, BiV, biventricular heart failure; BNP, brain peptide natriuretic, HT, heart transplant; HR, hazard ratio, ID, iron deficiency; IS, iron sufficiency; MCS, mechanical circulatory support; OR, odds ratio; TSAT, transferrin saturation; SV, single ventricular heart failure.