Supplementary Appendix 1: ACHI codes for cardiac condition related procedure

Procedure descriptions	**Procedure codes**
Insertion, removal and replacement of a cardiac pacemaker or electrode	38253, 38256, 38259, 38278, 38281, 38350, 38353
Procedure on the atrium, cardiac vessels and aorta	38456, 38457, 38458, 38460, 38464, 38466, 38470, 38473, 38475, 38477, 38480, 38481, 38483, 38485, 38487-38490, 38493, 38497, 38500, 38503-38505, 38507-38509, 38512, 38515, 38518, 38521, 38524, 38530, 38533, 38550, 28553, 38556, 38559, 38562, 38565, 38568, 38571
Procedures on the ventricle	38615, 38618, 38621, 38624, 38627-00
Procedures on the myocardium	22075, 38418, 38275, 38577, 38588, 38560, 38650, 90206
Closure of cardiac collateral vessels	38700.00-38700.03
Percutaneous interventions including angioplasty, atrial septostomy, balloon valvuloplasty, baffle and conduit procedures and procedures on the pulmonary and coronary arteries	38270, 38300, 38303, 38306, 38309, 38312, 38315, 38318, 38637, 38706, 38715, 38721, 38727, 38733, 38739, 38742, 38745, 38748, 38751, 38754, 38757, 38760, 38763, 38766
Cardiopulmonary bypass	38588.00, 38600.00, 38603.00, 90225.00, 38627.02, 38653

Supplementary Appendix 2: Severe cardiac-related outcomes and associated diagnosis codes recorded in admitted patient data collection

Description	**ICD10-AM Diagnosis code**
Cardiac arrest	I46
Intracerebral haemorrhage	I61
Other no traumatic intracranial haemorrhage	I62
Cerebral infarction	I63
Stroke	I64
Epileptic seizures	G40
Convulsions	R56

Supplementary Appendix 3: Medical record audit

Powerchart was used to review 200 randomly selected patient medical records to determine whether they had 'unfavourable' or 'favourable' outcomes. All cases were assessed in the context of the specific lesion, typical intervention and typical length of stay for that lesion. For example, a single ventricle pathway usually requires up to three staged procedures and consequently a longer ICU and hospital stay than a patient requiring an ASD closure.

The clinical variables reviewed included:

- Whether the patient was deceased or alive
- Any reported complications either during the operation or post-operatively
- Length of ICU stay
- Total hospital length of stay
- Any readmission to ICU within the same hospital admission
- Multiple admissions to hospital for cardiac interventions (atypical for the lesion type)
- Type of procedure completed (surgery vs cardiac catheterization)
- Presence of comorbidities

Various documents were reviewed to assess the above clinical variables. Discharge summaries provided details relating to the total length of stay, reason for visit, how many separate visits an individual has had and details of any major operative/post-operative complications. This information provided an overview and guided the more detailed review of operation reports, nursing notes, ICU discharge summaries and any other available documentation to identify additional information.

Criteria for a 'favourable' outcome classification included:

- A shorter than average ICU stay relative to the lesion
- Discharge from hospital in good condition and in a shorter time frame than average (for specific lesion)
- No or minor operative or post-operative complications
- No cardiac surgery re-interventions

Criteria for a 'unfavourable' outcome classification included:

- Patient deceased
- Major operative or post-operative complications (*as per list below)
- Longer than average ICU admission relative to lesion
- Longer than average total hospital stay relative to lesion

*Major operative and early post-operative complications:

- Excessive bleeding
- Re-intervention the same day as the operation
- CPR or unexpected initiation of cardiovascular support measures during ICU stay
- Extracorporeal membrane oxygenation (ECMO)
- Re-admission to ICU within the same hospital admissionArrhythmia disrupting cardiovascular stability
- Major organ damage (e.g brain, renal, hepatic) requirement targeted assessment and management
- Sepsis/infection

NOTE: Only patient medical records at The Children's Hospital at Westmead were reviewed, health data recorded elsewhere was not accessible. All criteria were assessed within the context of patient-specific lesions. Re-interventions included any additional treatments/interventions required as a result of a complication. When assessing length of stay, classification was determined based on the 'typical' length of stay of the other participants with the same lesion type.

Supplementary Appendix 4: Numbers in each 'unfavourable' and 'favourable' cardiovascular outcome category

Lesion Group	Age at surgery*	n	Unfav – cat 1 n (row %)	Unfav – cat 2 n (row %)	Unfav – cat 3 n (row %)	Total Un-favourable	Fav – cat 1 n (row %)	Fav – cat 2 n (row %)	Fav – cat 3 n (row %)	Total favourable
Group A	Neonatal	381	80 (21%)	27 (7%)	–	107 (28%)	11 (3%)	40 (10%)	49 (13%)	100 (26%)
	Infant	77	9 (12%)	7 (9%)	*	21 (27%)	*	*	13 (17%)	19 (25%)
	Child	34	*	*	*	8 (24%)	*	*	*	8 (24%)
Group B	Neonatal	188	33 (18%)	16 (8%)	12 (6%)	61 (32%)	6 (3%)	12 (6%)	33 (18%)	51 (27%)
	Infant	350	43 (12%)	30 (9%)	20 (6%)	93 (27%)	23 (7%)	30 (9%)	27 (8%)	80 (23%)
	Child	186	9 (5%)	17 (9%)	14 (7%)	40 (21%)	8 (4%)	32 (17%)	14 (7%)	54 (29%)
Group C	Neonatal	38	*	*	*	11 (29%)	*	7 (18%)	*	11 (29%)
	Infant	323	16 (12%)	37 (11%)	28 (9%)	81 (25%)	18 (6%)	34 (10%)	35 (11%)	87 (27%)
	Child	296	12 (11%)	32 (10%)	18 (6%)	62 (21%)	11 (4%)	50 (17%)	12 (4%)	73 (25%)
TOTAL		**1872**	**211**	**172**	**101**	**484**	**83**	**212**	**188**	**483**

*cell size = 5 or less.