

Supplemental Table 1. International classification of diseases (ICD) 9 and 10 diagnosis and procedure codes used to define population and procedures.

Procedure and Diagnosis	ICD 9 and 10 Procedure Codes
Norwood Procedure (Diagnosis HLHS) ICD-9: 746.7 ICD-10: Q23.4	ICD-9: 35.92, 39.0 ICD-10: 021K08P, 021K08Q, 021K08R, 021K09P, 021K09Q, 021K09R, 021K0AP, 021K0AQ, 021K0AR, 021K0JP, 021K0JQ, 021K0JR, 021K0KP, 021K0KQ, 021K0KR, 021K0ZP, 021K0ZQ, 021K0ZR; 021P08A, 021P08B, 021P08D, 021P09A, 021P09B, 021P09D, 021P0AA, 021P0AB, 021P0AD, 021P0JA, 021P0JB, 021P0JD, 021P0KA, 021P0KB, 021P0KD, 021P0ZA, 021P0ZB, 021P0ZD, 021Q08A, 021Q08B, 021Q08D, 021Q09A, 021Q09B, 021Q09D, 021Q0AA, 021Q0AB, 021Q0AD, 021Q0JA, 021Q0JB, 021Q0JD, 021Q0KA, 021Q0KB, 021Q0KD, 021Q0ZA, 021Q0ZB, 021Q0ZD, 021R08A, 021R08B, 021R08D, 021R09A, 021R09B, 021R09D, 021R0AA, 021R0AB, 021R0AD, 021R0JA, 021R0JB, 021R0JD, 021R0KA, 021R0KB, 021R0KD, 021R0ZA, 021R0ZB, 021R0ZD, 021W08P, 021W08Q, 021W08R, 021W09P, 021W09Q, 021W09R, 021W0AP, 021W0AQ, 021W0AR, 021W0JP, 021W0JQ, 021W0JR, 021W0KP, 021W0KQ, 021W0KR, 021W0ZP, 021W0ZQ, 021W0ZR, 021X08P, 021X08Q, 021X08R, 021X09P, 021X09Q, 021X09R, 021X0AP, 021X0AQ, 021X0AR, 021X0JP, 021X0JQ, 021X0JR, 021X0KP, 021X0KQ, 021X0KR, 021X0ZP, 021X0ZQ, 021X0ZR, 031309M, 031309N, 03130AM, 03130AN, 03130JM, 03130JN, 03130KM, 03130KN, 03130ZM, 03130ZN, 031409M, 031409N, 03140AM, 03140AN, 03140JM, 03140JN, 03140KM, 03140KN, 03140ZM, 03140ZN
Glenn/Fontan (Diagnosis HLHS) ICD-9: 746.7 ICD-10: Q23.4	ICD-9: 35.94, 39.21 ICD-10: 021608P, 021608Q, 021608R, 021609P, 021609Q, 021609R, 02160AP, 02160AQ, 02160AR, 02160JP, 02160JQ, 02160JR, 02160KP, 02160KQ, 02160KR, 02160ZP, 02160ZQ, 02160ZR, 021708P, 021708Q, 021708R, 021709P, 021709Q, 021709R, 02170AP, 02170AQ, 02170AR, 02170JP, 02170JQ, 02170JR, 02170KP, 02170KQ, 02170KR, 02170ZP, 02170ZQ, 02170ZR; 021V08P, 021V08Q, 021V08R, 021V09P, 021V09Q, 021V09R, 021V0AP, 021V0AQ, 021V0AR, 021V0JP, 021V0JQ, 021V0JR, 021V0KP, 021V0KQ, 021V0KR, 021V0ZP, 021V0ZQ, 021V0ZR
Tetralogy of Fallot Repair (Diagnosis TOF) ICD-9: 745.2 ICD-10: Q21.3	ICD-9: 35.81 ICD-10: 02BK0ZZ, 02NH0ZZ, 02RM0JZ, 02RP0JZ, 02RQ0JZ, 02RR0JZ, 02NH0ZZ, 02BK0ZZ, 02RM0JZ, 02RM0JZ, 02RP0JZ, 02RQ0JZ, 02RR0JZ, 027H0ZZ, 02QH0ZZ, 02RP07Z, 02RP08Z, 02RP0KZ, 02RQ07Z, 02RQ08Z, 02RQ0KZ, 02RR07Z, 02RR08Z, 02RR0KZ
Arterial Switch Operation (Diagnosis TGA) ICD-9: 745.1 ICD-10: Q20.3	ICD-9: 35.84 ICD-10: 02S00ZZ, 02S10ZZ, 02SP0ZZ, 02SW0ZZ, 02SX0ZZ
VSD Repair (Diagnosis VSD) ICD-9: 745.4 ICD-10: Q21.0	ICD-9: 35.53, 35.62, 35.72 ICD-10: 02RM0JZ, 02UM0JZ, 02RM07Z, 02RM0KZ, 02UM07Z, 02UM0KZ, 02QM0ZZ
ASD Repair (Diagnosis ASD) ICD-9: 745.5 ICD-10: Q21.1	ICD-9: 35.51, 35.61, 35.71 ICD-10: 02U50JZ, 02U507Z, 02U508Z, 02U50KZ, 02Q50ZZ
AVSD Repair (Diagnosis AVSD) ICD-9: 745.6 ICD-10: Q21.2	ICD-9: 35.54, 35.63, 35.73 ICD-10: 024G0J2, 024J0J2, 02QG0ZZ, 02QJ0ZZ, 02U50JZ, 02UM0JZ, 024G072, 024G082, 024G0K2, 024J072, 024J082, 024J0K2, 02U50JZ, 02UM0JZ, 02U50JZ, 02UM0JZ, 02RM0JZ, 02RM0JZ, 02UG07E, 02UG07Z, 02UG08E, 02UG0JE, 02UG0KE, 02UG0KZ, 02UJ07G, 02UJ07Z, 02UJ08G, 02UJ08Z, 02UJ0JG, 02UJ0KG

TAPVR Repair (Diagnosis TAPVR) ICD-9: 747.41 ICD-10: Q26.2	ICD-9: 35.82 ICD-10: 021708S, 021708T, 021708U, 021709S, 021709T, 021709U, 02170AS, 02170AT, 02170AU, 02170JS, 02170JT, 02170JU, 02170KS, 02170KT, 02170KU, 02170ZS, 02170ZT, 02170ZU, 021V08S, 021V08T, 021V08U, 021V09S, 021V09T, 021V09U, 021V0AS, 021V0AT, 021V0AU, 021V0JS, 021V0JT, 021V0JU, 021V0KS, 021V0KT, 021V0KU, 021V0ZS, 021V0ZT, 021V0ZU, 02LS0ZZ, 02LT0ZZ, 02U70JZ
Truncus Repair (Diagnosis TA) ICD-9: 745.0 ICD-10: Q20.0	ICD-9: 35.83 ICD-10: 024F07J, 024F08J, 024F0JJ, 024F0KJ, 02LR0ZT, 02RM0JZ, 02RQ07Z, 02RQ0JZ, 02RR07Z, 02RR0JZ, 02RM0JZ, 02RQ0JZ, 02RR0JZ, 02RQ07Z, 02RQ0JZ, 02RR07Z, 02RR0JZ, 02RW07Z, 02RW08Z, 02RW0JZ, 02RW0KZ, 02RX07Z, 02RX08Z, 02RX0JZ, 02RX0KZ
Coarctation of the Aorta Repair (Diagnosis COA) ICD-9: 747.1 ICD-10: Q25.1	ICD-9: 38.34 ICD-10: 02BW0ZZ, 02BX0ZZ, 04B00ZZ, 04B04ZZ

Supplemental Table 2. Risk Adjustment for Congenital Heart Surgery Score Based on Diagnosis

Risk Adjustment for Congenital Heart Surgery-1 Score	Associated Diagnoses
1	Atrial Septal Defect
2	Coarctation of the aorta Tetralogy of Fallot Ventricular septal defect Glenn (superior cavopulmonary anastomosis)
3	Atrioventricular septal defect Fontan (total cavopulmonary anastomosis)
4	Transposition of the great arteries Total anomalous pulmonary venous return Truncus arteriosus
5	Truncus with interrupted aortic arch
6	Norwood

Supplemental Table 3. List of centers included in the analysis

Advocate Christ Medical Center
Ann & Robert H. Lurie Children's Hospital of Chicago
Arkansas Children's Hospital
Boston Children's Hospital
Children's Healthcare of Atlanta at Egleston
Children's Hospital & Medical Center Omaha
Children's Hospital Colorado
Children's Hospital Medical Center Cincinnati
Children's Hospital of Philadelphia
Children's Hospital of Pittsburgh of UPMC
Children's Hospital of the King's Daughters
Children's Hospital of Wisconsin
Children's Medical Center of Dallas
Children's Mercy Hospital
Children's Minnesota
Children's National Medical Center
Children's of Alabama
Children's Hospital Los Angeles
Children's Hospital Medical Center of Akron
CHOC Children's
Cook Children's Medical Center
Hartford Hospital
Johns Hopkins All Children's Hospital
Le Bonheur Children's Medical Center
Levine Children's Hospital
Loma Linda University Medical Center
Lucile Salter Packard Children's Hospital at Stanford
Memorial Hermann-Texas Medical Center
Miami Children's Hospital
Miller Children's & Women's Hospital Long Beach
MUSC Children's Hospital
Nationwide Children's Hospital
Norton Children's Hospital
Phoenix Children's Hospital
Primary Children's Hospital
Rady Children's Hospital and Health Center
Riley Hospital for Children
Seattle Children's Hospital
Seton Medical Center Austin
St. Louis Children's Hospital at Washington University
Medical Center
Texas Children's Hospital
University Hospitals of Cleveland
University of California San Francisco Medical Center
University of Chicago Medical Center
University of Michigan Medical Center
Valley Children's Healthcare
Vanderbilt University Medical Center and Nashville VA
Medical Center
Yale New Haven Hospital

Supplemental Table 4. Age of admission, pre- and post-operative lengths of stay, and post-operative echocardiograms for Risk Adjustment for Congenital Heart Surgery scores 1-6.

Risk Adjustment for Congenital Heart Surgery Score	1	2	3	4	5	6	p-value
Admission Age (days)	1500 (750-2548)	159 (94-294)	810 (169-1284)	1 (0-6)	1 (0-3)	0 (0-1)	<0.001
Pre-operative LOS (days)	0 (0-0)	0 (0-1)	0 (0-0)	3 (1-6)	5 (2-7)	5 (3-7)	<0.001
Post-operative LOS (days)	3 (3-4)	6 (4-10)	9 (6-15)	14 (9-25)	28 (18-46)	31 (20-51)	<0.001
Total Post-operative Echocardiograms	2 (2-2)	2 (2-3)	2 (2-3)	3 (2-4)	4 (3-7)	4 (3-7)	<0.001
Total Post-operative ICU Echocardiograms	1 (1-1)	1 (1-2)	1 (1-2)	2 (1-3)	3 (2-6)	3 (2-6)	<0.001

Data reported as median (25th – 75th percentile). p-values from the Kruskal-Wallis test for continuous variables. Abbreviations: ICU, intensive care unit; LOS, length of stay