**Outcomes in Infective Endocarditis among Adults with Congenital Heart Disease: A Comparative National Study**

**Supplemental Material**

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Supplemental Table 1. ICD-9-CM and ICD-10-CM Diagnosis and Procedure Codes for Congenital Heart Disease Diagnoses

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| **Congenital Heart Disease** | | | |
| **ICD-9-CM Diagnosis Code** | **ICD-9-CM Diagnosis Code Description** | **ICD-10-CM Diagnosis Code** | **ICD-10-CM Diagnosis Code Description** |
| 745.12 | Corrected transposition of great vessels | Q20.3 | Discordant ventriculoarterial connection |
| 745.19 | Other transposition of great vessels | Q20.4 | Double inlet ventricle |
| 745.2 | Tetralogy of Fallot | Q20.5 | Discordant atrioventricular connection |
| 745.3 | Common ventricle | Q20.8 | Other congenital malformations of cardiac chambers and connections |
| 745.4 | Ventricular septal defect | Q20.9 | Congenital malformation of cardiac chambers and connections, unspecified |
| 745.6 | Endocardial cushion defects | Q21.0 | Ventricular septal defect |
| 745.60 | Endocardial cushion defect, unspecified type | Q21.2 | Atrioventricular septal defect |
| 745.61 | Ostium primum defect | Q21.3 | Tetralogy of Fallot |
| 745.69 | Other endocardial cushion defects | Q21.8 | Other congenital malformations of cardiac septa |
| 745.7 | Cor biloculare | Q21.9 | Congenital malformation of cardiac septum, unspecified |
| 745.8 | Other bulbus cordis anomalies and anomalies of cardiac septal closure | Q22.0 | Pulmonary valve atresia |
| 745.9 | Unspecified defect of septal closure | Q22.1 | Congenital pulmonary valve stenosis |
| 746.0 | Anomalies of pulmonary valve congenital | Q22.2 | Congenital pulmonary valve insufficiency |
| 746.00 | Congenital pulmonary valve anomaly, unspecified | Q22.3 | Other congenital malformations of pulmonary valve |
| 746.01 | Atresia of pulmonary valve, congenital | Q22.5 | Ebstein's anomaly |
| 746.02 | Stenosis of pulmonary valve, congenital | Q22.9 | Congenital malformation of tricuspid valve, unspecified |
| 746.09 | Other congenital anomalies of pulmonary valve | Q23.0 | Congenital stenosis of aortic valve |
| 746.1 | Tricuspid atresia and stenosis, congenital | Q23.1 | Congenital insufficiency of aortic valve |
| 746.2 | Ebstein's anomaly | Q23.2 | Congenital mitral stenosis |
| 746.3 | Congenital stenosis of aortic valve | Q23.3 | Congenital mitral insufficiency |
| 746.4 | Congenital insufficiency of aortic valve | Q23.4 | Hypoplastic left heart syndrome |
| 746.5 | Congenital mitral stenosis | Q23.8 | Other congenital malformations of aortic and mitral valves |
| 746.6 | Congenital mitral insufficiency | Q24.0 | Dextrocardia |
| 746.7 | Hypoplastic left heart syndrome | Q24.2 | Cor triatriatum |
| 746.8 | Other specified congenital anomalies of heart | Q24.3 | Pulmonary infundibular stenosis |
| 746.81 | Subaortic stenosis | Q24.4 | Congenital subaortic stenosis |
| 746.82 | Cor triatriatum | Q24.5 | Malformation of coronary vessels |
| 746.83 | Infundibular pulmonic stenosis | Q24.6 | Congenital heart block |
| 746.84 | Obstructive anomalies of heart, not elsewhere classified | Q24.8 | Other specified congenital malformations of heart |
| 746.85 | Coronary artery anomaly | Q24.9 | Congenital malformation of heart, unspecified |
| 746.86 | Congenital heart block | Q25.0 | Patent ductus arteriosus |
| 746.87 | Malposition of heart and cardiac apex | Q25.1 | Coarctation of aorta |
| 746.89 | Other specified congenital anomalies of heart | Q25.21 | Interruption of aortic arch |
| 746.9 | Unspecified congenital anomaly of heart | Q25.29 | Other atresia of aorta |
| 747.0 | Patent ductus arteriosus | Q25.3 | Supravalvular aortic stenosis |
| 747.1 | Coarctation of aorta | Q25.40 | Congenital malformation of aorta unspecified |
| 747.10 | Coarctation of aorta (preductal) (post-ductal) | Q25.41 | Absence and aplasia of aorta |
| 747.11 | Interruption of aortic arch | Q25.42 | Hypoplasia of aorta |
| 747.2 | Other congenital anomalies of aorta | Q25.43 | Congenital aneurysm of aorta |
| 747.20 | Anomaly of aorta, unspecified | Q25.44 | Congenital dilation of aorta |
| 747.21 | Anomalies of aortic arch | Q25.45 | Double aortic arch |
| 747.22 | Atresia and stenosis of aorta | Q25.49 | Other congenital malformations of aorta |
| 747.29 | Other anomalies of aorta | Q26.0 | Congenital stenosis of vena cava |
| 747.3 | Congenital anomalies of pulmonary artery | Q26.1 | Persistent left superior vena cava |
| 747.4 | Congenital anomalies of great veins | Q26.2 | Total anomalous pulmonary venous connection |
| 747.40 | Anomaly of great veins, unspecified | Q26.3 | Partial anomalous pulmonary venous connection |
| 747.41 | Total anomalous pulmonary venous connection | Q26.8 | Other congenital malformations of great veins |
| 747.42 | Partial anomalous pulmonary venous connection | Q26.9 | Congenital malformation of great vein, unspecified |
| 747.49 | Other anomalies of great veins |  | |

Supplemental Table 2. ICD-9-CM and ICD-10-CM Diagnosis and Procedure Codes for Infective Endocarditis, Valve Surgery, and Microbiologic Etiology.

|  |  |  |
| --- | --- | --- |
| **Diagnosis/Procedure** | **ICD-9-CM Diagnosis and Procedure Codes** | **ICD-10-CM Diagnosis and Procedure Codes** |
| **Infective Endocarditis** | | |
| Endocarditis of native valve | 421.0, 421.1, 421.9, 112.81 | I33.0, I33.9, I39, B37.6 |
| Endocarditis of prosthetic material | 996.61 | T82.6XXA, T82.7XXA |
| **Surgery** | | |
| Valve Repair | 35.10, 35.11, 35.12, 35.13, 35.14, 35.33 | 02QF0ZZ, 02QG0ZZ, 02QH0ZZ, 02QJ0ZZ, 027F04Z, 027F0DZ, 027F0ZZ, 02NF0ZZ, 027G04Z, 027G0DZ, 027G0ZZ, 02NG0ZZ, 02QG0ZZ, 02VG0ZZ, 027H04Z, 027H0DZ, 027H0ZZ, 02NH0ZZ, 02QH0ZZ, 027J04Z, 027J0DZ, 027J0ZZ, 02NJ0ZZ, 02QJ0ZZ |
| Valve Replacement | 35.20, 35.21, 35.22, 35.23, 35.24, 35.25, 35.26, 35.27, 35.28 | 02RF07Z, 02RF08Z, 02RF0JZ, 02RF0KZ, 02RF07Z, 02RG08Z, 02RG0JZ, 02RG0KZ, 02RJ07Z, 02RH08Z, 02RH0JZ, 02RH0KZ, 02RJ07Z, 02RJ08Z, 02RJ0JZ, 02RJ0KZ, X2RF032, 02RG07Z, 02RH07Z |
| Conduit Creation | 35.92 | 021K08P, 021K08Q, 021K08R, 021K09P, 021K09Q, 021K09R, 021K0AP, 021K0AQ, 021K0AR, 021K0JP, 021K0JQ, 021K0JR, 021K0KP, 021K0KQ, 021K0KR, 021K0ZP, 021K0ZQ, 021K0ZR |
| ASD or VSD Repair | 35.51, 35.53, 35.60, 35.61, 35.62 | 02U507Z, 02U508Z, 02U50JZ, 02U50KZ, 02UM07Z, 02UM08Z, 02UM0JZ, 02UM0KZ |
| **Left vs. Right-Sided Surgery** | | |
| Left-Sided Valve Repair or Replacement | 35.11, 35.12, 35.21, 35.22, 35.23, 35.24 | 02QF0ZJ, 02QF0ZZ, 02QG0ZE, 02QG0ZZ, 02WF07Z, 02WF08Z, 02WF0JZ, 02WFOKZ, 02WG07Z, 02WG08Z, 02WG0JZ, 02WG0KZ, 02RF07Z, 02RF08Z, 02RF0JZ, 02RF0KZ, 02RG07Z, 02RG08Z, 02RG0JZ, 02RG0KZ, X2RF032 |
| Right-Sided Valve Repair or Replacement | 35.13, 35.14, 35.25, 35.36, 35.27, 35.28, 35.92 | 02QH0ZZ, 02QJ0ZG, 02QJ0ZZ, 02WH07Z, 02WH08Z, 02WH0JZ, 02WH0KZ, 02WJ072, 02WJ08Z, 02WJ0JZ, 02WJ0KZ, 02RH07Z, 02RH08Z, 02RH0JZ, 02RH0KZ, 02RJ07Z, 02RJ08Z, 02RJ0JZ, 02RJ0KZ, 021K08P, 021K08Q, 021K08R, 021K09P, 021K09Q, 021K09R, 021K0AP, 021K0AQ, 021K0AR, 021K0JP, 021K0JQ, 021K0JR, 021K0KP, 021K0KQ, 021K0KR, 021K0ZP, 021K0ZQ, 021K0ZR |
| Unspecified Side Valve Repair or Replacement | 35.10, 35.20, 35.33 |  |
| **Microbiologic Etiology** | | |
| Streptococcal species | 038.0, 038.2, 041.0, 041.00, 041.01, 041.02, 041.03, 041.04, 041.05, 041.09, 041.2 | A40.9, A40.3, B95.5, B95.0, B95.1, B95.4, B95.2, B95.4, B95.3 |
| Staphylococcal species | 038.11, 038.12, 041.11, 041.12, 038.1, 038.10 038.19, 041.1, 041.10, 041.19 | A41.01, A41.02, B95.61, B95.62, A41.2, A41.1, B95.8, B95.7 |
| Gram negative species | 041.85, 038.4, 038.40, 038.41, 038.42, 038.43, 038.44, 038.49, 041.3, 041.4, 041.5, 041.6, 041.7, 041.41, 041.42, 041.49, 041.82, 041.85 | A41.50, A41.3, A41.51, A41.52, A41.53, A41.59, B96.1, B96.21, B96.22, B96.3, B96.4, B96.5, B96.20, B96.29, B96.6 |
| Fungal species | 116.0, 112.81, 112.5, 115.04, 115.14, 115.94, 117.3 | B40.9, B37.6, B37.7, B39.4, B39.5, B39.9, I39, B44.9 |

Supplemental Table 3. Baseline Characteristics for Sub Analysis of ACHD IE Stratified by Disease Severity (2001-2014)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | **Disease Severity** | | |  |
|  | **Overall** | **Simple** | **Complex** | **Unclassified** | ***P*** |
|  | N=14,269 | N=8,810 (61.7%) | N=4,049 (28.4%) | N=1,410 (9.9%) |  |
| **Female** | 4,144 (29.0%) | 1,952 (22.2%) | 1,699 (42.0%) | 493 (35.0%) | ***<0.001*** |
| **Age** |  |  |  |  |  |
| 18-44y/o | 7,523 (52.7%) | 4,593 (52.1%) | 2,103 (51.9%) | 827 (58.7%) | ***<0.001*** |
| 45-64y/o | 4,732 (33.2%) | 3,320 (37.7%) | 1,014 (25.0%) | 398 (28.2%) |
| ≥65y/o | 2,014 (14.1%) | 898 (10.2%) | 932 (23.0%) | 184 (13.1%) |
| **Race** |  |  |  |  |  |
| Non-Hispanic White | 8,848 (62.0%) | 5,607 (63.7%) | 2,391 (59.1%) | 850 (60.3%) | ***<0.001*** |
| Non-Hispanic Black | 988 (6.9%) | 487 (5.5%) | 393 (9.7%) | 108 (7.7%) |
| Hispanic | 1,140 (8.0%) | 594 (6.7%) | 402 (9.9%) | 144 (10.2%) |
| Other or missing | 3,293 (23.1%) | 2,122 (24.1%) | 863 (21.3%) | 308 (21.8%) |
| **Insurance Type** |  |  |  |  |  |
| Governmental  insurance | 5,439 (38.1%) | 2,634 (29.9%) | 2,144 (53.0%) | 661 (46.9%) | ***<0.001*** |
| Private insurance | 6,745 (47.3%) | 4,743 (53.8%) | 1,435 (35.4%) | 567 (40.2%) |
| Other | 2,085 (14.6%) | 1,433 (16.3%) | 470 (11.6%) | 182 (12.9%) |