PVS Network Registry Study

For the Retrospective study:

The PVS Network will concentrate the first data analysis on contemporary treatment practices and outcomes.

We ask that data collection be prioritized to:

1. **Children with PVS between 2010-2016**
2. **All children with two or more vein involved with PVS (common confluence=2veins)**
3. **Single vessel disease:**
    a. **children who have had an intervention (surgical/ cath) for single vessel PVS or**
    b. **an echo diagnosis of PVS in 1 vein with a mean gradient > 4mmHg.**

Our goal is to provide a general overview of the scope of PVS disease burden; therefore, we ask institutions to search across many different databases, as these patients cross many different disciplines.

Cardiology- palliative patients, routine follow up
Cardiac Surgery
Interventional Cardiology
Respirology/ lung transplant
Neonatology

*Helpful ways to identify children is through diagnostic code searches set up through the local IT department.

REDCap Forms

PVS Registry overview

1. There is data that only requires one time entry - ie. Clinical or demographic data
2. There is data that requires repeating entry ie. Cardiac surgery; echos; CT or MRIs; catheter interventions

At the end of many of the forms, there is an opportunity to upload the de-identified report. This is very important because:

1. It helps with data verification
2. Data can be abstracted at Sickkids for the current study if there is not a dedicated coordinator at the institution
3. These reports can be used to get more data for future studies if new variables are added

To become familiar with how to use the repeating events format of the PVS Network study, please look at the link provided

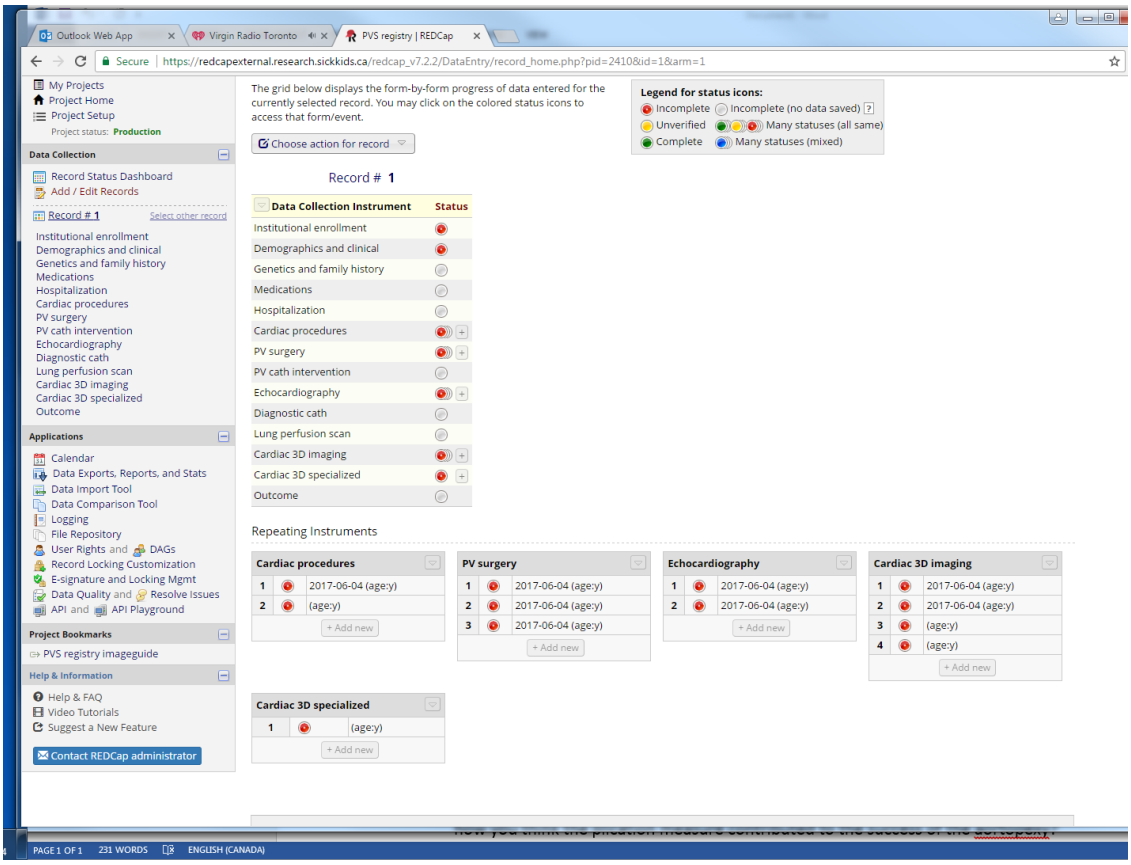
REDCap Links:

https://projectredcap.org/resources/videos/

-specific to this project: • Repeating Instruments and Events (33 min)

This function allows a patient to have a record that may have 2 cardiac surgery entries; 3 pulmonary vein interventions and 4 CT imaging entries. These can be added in a seamless and straightforward manner.

Example:



Pulmonary Vein Stenosis:

General information about the disease and common tests can be found on the website.

www.pvsnetwork.org

Institutional enrollment

Record # This will autopopulate with the institutional id code and study number registered with REDCap.

Record the study ID/record id in your master list log that corresponds to patient name/mrn that is for your institutional log _____

INSTITUTIONAL ENROLLMENT

SECTION: ENROLLMENT

Enrollment date _____

Participating centre

- ◯ Boston Children's Hospital (BCH)
- ◯ C.S Mott Children's Hospital (CSM)
- ◯ Cardinal Glennon Children's Hospital (CGC)
- ◯ Children's Clinics and Centers of Minnesota (CHM)
- ◯ Children's Hospital Colorado, Uptown Denver (DEN)
- ◯ Children's Hospital of Philadelphia (COP)
- ◯ Children's Hospital of Pittsburgh (CHP)
- ◯ Cincinnati Children's Hospital Medical Center (CCH)
- ◯ Emory Children's Hospital (EM)
- ◯ John Hopkins Children's Hospital (JH)
- ◯ Monroe Carell Jr. Children's Hospital at Vanderbilt (VDB)
- ◯ Nemours Cardiac Center, Wilmington (NEM)
- ◯ New York-Presbyterian Morgan Stanley Children's Hospital (COL)
- ◯ Primary Children' Hospital, Utah (UT)
- ◯ Standford Children's Hospital (ST)
- ◯ Stollery Children's Hospital (SCH)
- ◯ Texas Children's Hospital (TE)
- ◯ The Hospital for Sick Children (SK)
- ◯ University of Iowa Children's Hospital (IOW)
- ◯ Washington University at St.Louis (WAS)

Type of data collection — Indicate what type of IRB protocol you are entering data under. The majority will be under the retrospective protocol only

- ◯ Retrospective protocol only
- ◯ Prospective/ retrospective protocol

SECTION: GENETICS

Genetic specimens are only collected under the prospective study. Clinical genetic information can be collected under both protocols.

Genetic study consent (DNA or biospecimens)

- ◯ Yes
- ◯ No

Source of child's DNA

- ◯ Prospective study consent
- ◯ Existing Biobank
- ◯ Clinical genetics with research consent

Parental DNA available / collected

- ◯ Maternal DNA
- ◯ Paternal DNA
- ◯ Both
- ◯ None/not available/not collected

(Please assign DNA IDs accordingly (see below))

ID for mother's DNA: [recid]M

ID for father's DNA: [recid]F

Other biological specimens available

- ◯ Biobank- pulmonary vein tissue
- ◯ Biobank/pathology- parafin blocks/slides
- ◯ Both available

Comments on enrollment

Any additional information or clarification regarding enrollment or DNA samples (ex. paternal/maternal DNA sample pending, etc.)

Demographics and clinical

DEMOGRAPHICS AND CLINICAL INFORMATION

This data can be found in general clinic notes; NICU, cardiology, respirology follow up clinic letters

SECTION: DEMOGRAPHICS

Gender
- ◯ Male
- ◯ Female

Date of birth (year) _____

Date of birth (month)
- ◯ January
- ◯ February
- ◯ March
- ◯ April
- ◯ May
- ◯ June
- ◯ July
- ◯ August
- ◯ September
- ◯ October
- ◯ November
- ◯ December

Birth weight (kg) _____

Birth height (cm) _____

Twin
- ◯ Yes
- ◯ No

Type of twin
- ◯ Monozygotic
- ◯ Dizygotic
- ◯ Unknown

Comments on Twin type

Any additional information or clarification regarding circumstances of birth and twin type (ex. delivery at 34+6 weeks, dichorionic diamniotic twin pregnancy, etc.)

_____

Premature infant
- ◯ Yes
- ◯ No

If premature, weeks of gestation born _____
(if 35+1 (week+day), please enter '35')

Surfactant required
- ◯ No
- ◯ Yes
- ◯ Unknown

Intrauterine growth restriction
- ◯ No
- ◯ Yes
- ◯ Unknown

PDA treatment
- ◯ No
- ◯ Medical
- ◯ Surgical
- ◯ Unknown

Abdominal pathology
- ◯ No
- ◯ Pneumotosis Intestinalis
- ◯ Necrotizing Enterocolitis
- ◯ Unknown

Total number of days intubated in NICU since birth _____

History of treatment with systemic corticosteroids for chronic lung disease
- ◯ No
- ◯ Yes
- ◯ Unknown

SECTION: DIAGNOSIS

The cardiac diagnosis is from the STS database and is a pull down menu. Typing in the beginning letters of the diagnosis should put you in the appropriate diagnosis categories.

Many kids will have different cardiac diagnoses. ie. VSD, ASD, PDA and PVS -> these can all be recorded as fundamental and secondary diagnosis.

There are **notes for the child's diagnosis** that may not be found in the cardiac diagnosis pull down menu.
-This can be used to clarify the cardiac diagnosis if it does not fit the pull down menu
-or it can be used if there are additional non-cardiac diagnosis such as asplenia, spina bifida etc

Fundamental diagnosis

- ◯ PFO
- ◯ ASD, Secundum
- ◯ ASD, Sinus venosus
- ◯ ASD, Coronary sinus
- ◯ ASD, Common atrium (single atrium)
- ◯ ASD, Postoperative interatrial communication
- ◯ VSD, Type 1 (Subarterial) (Supracristal) (Conal septal defect) (Infundibular)
- ◯ VSD, Type 2 (Perimembranous) (Paramembranous) (Conoventricular)
- ◯ VSD, Type 3 (Inlet) (AV canal type)
- ◯ VSD, Type 4 (Muscular)
- ◯ VSD, Type: Gerbode type (LV-RA communication)
- ◯ VSD, Multiple
- ◯ AVC (AVSD), Complete (CAVSD)
- ◯ AVC (AVSD), Intermediate (transitional)
- ◯ AVC (AVSD), Partial (incomplete) (PAVSD) (ASD, primum)
- ◯ AP window (aortopulmonary window)
- ◯ Pulmonary artery origin from ascending aorta (hemitruncus)
- ◯ Truncus arteriosus
- ◯ Truncal valve insufficiency
- ◯ Truncal valve stenosis
- ◯ Truncus arteriosus + Interrupted aortic arch
- ◯ Partial anomalous pulmonary venous connection (PAPVC)
- ◯ Partial anomalous pulmonary venous connection (PAPVC), scimitar
- ◯ Total anomalous pulmonary venous connection (TAPVC), Type1 (supracardiac)
- ◯ Total anomalous pulmonary venous connection (TAPVC), Type 2 (cardiac)
- ◯ Total anomalous pulmonary venous connection (TAPVC), Type 3 (infracardiac)
- ◯ Total anomalous pulmonary venous connection (TAPVC), Type 4 (mixed)
- ◯ Cor triatriatum
- ◯ Pulmonary venous stenosis
- ◯ Systemic venous anomaly
- ◯ Systemic venous obstruction
- ◯ TOF
- ◯ TOF, Pulmonary stenosis
- ◯ TOF, AVC (AVSD)
- ◯ TOF, Absent pulmonary valve
- ◯ Pulmonary atresia
- ◯ Pulmonary atresia, IVS
- ◯ Pulmonary atresia, VSD (Including TOF, PA)
- ◯ Pulmonary atresia, VSD-MAPCA
- ◯ MAPCA(s) (major aortopulmonary collateral[s]) (without PA-VSD)
- ◯ Ebstein's anomaly
- ◯ Tricuspid regurgitation, non-Ebstein's related
- ◯ Tricuspid stenosis
- ◯ Tricuspid regurgitation and tricuspid stenosis
- ◯ Tricuspid valve, Other
- ◯ Pulmonary stenosis, Valvar
- ◯ Pulmonary artery stenosis (hypoplasia), Main (trunk)
- ◯ Pulmonary artery stenosis, Branch, Central (within the hilar bifurcation)
- ◯ Pulmonary artery stenosis, Branch, Peripheral (at or beyond the hilar bifurcation)
- ◯ Pulmonary artery, Discontinuous
- ◯ Pulmonary stenosis, Subvalvar
- ◯ DCRV
- ◯ Pulmonary valve, Other
- ◯ Pulmonary insufficiency
- ◯ Pulmonary insufficiency and pulmonary stenosis
- ◯ Shunt Failure

◯ Conduit failure
◯ Aortic stenosis, Subvalvar
◯ Aortic stenosis, Valvar
◯ Aortic stenosis, Supravalvar
◯ Aortic valve atresia
◯ Aortic insufficiency
◯ Aortic insufficiency and aortic stenosis
◯ Aortic valve, Other
◯ Sinus of Valsalva aneurysm
◯ LV to aorta tunnel
◯ Mitral stenosis, Supravalvar mitral ring
◯ Mitral stenosis, Valvar
◯ Mitral stenosis, Subvalvar
◯ Mitral stenosis, Subvalvar, Parachute
◯ Mitral stenosis
◯ Mitral regurgitation and mitral stenosis
◯ Mitral regurgitation
◯ Mitral valve, Other
◯ Hypoplastic left heart syndrome (HLHS)
◯ Shone's syndrome
◯ Cardiomyopathy (including dilated, restrictive, and hypertrophic)
◯ Cardiomyopathy, End-stage congenital heart disease
◯ Pericardial effusion
◯ Pericarditis
◯ Pericardial disease, Other
◯ Single ventricle, DILV
◯ Single ventricle, DIRV
◯ Single ventricle, Mitral atresia
◯ Single ventricle, Tricuspid atresia
◯ Single ventricle, Unbalanced AV canal
◯ Single ventricle, Heterotaxia syndrome
◯ Single ventricle, Other
◯ Single ventricle + Total anomalous pulmonary venous connection (TAPVC)
◯ Congenitally corrected TGA
◯ Congenitally corrected TGA, IVS
◯ Congenitally corrected TGA, IVS-LVOTO
◯ Congenitally corrected TGA, VSD
◯ Congenitally corrected TGA, VSD-LVOTO
◯ TGA, IVS
◯ TGA, IVS-LVOTO
◯ TGA, VSD
◯ TGA, VSD-LVOTO
◯ DORV, VSD type
◯ DORV, TOF type
◯ DORV, TGA type
◯ DORV, Remote VSD (uncommitted VSD)
◯ DORV + AVSD (AV Canal)
◯ DORV, IVS
◯ DOLV
◯ Coarctation of aorta
◯ Aortic arch hypoplasia
◯ VSD + Aortic arch hypoplasia
◯ VSD + Coarctation of aorta
◯ Coronary artery anomaly, Anomalous aortic origin of coronary artery (AAOCA)
◯ Coronary artery anomaly, Anomalous pulmonary origin (includes ALCAPA)
◯ Coronary artery anomaly, Fistula
◯ Coronary artery anomaly, Aneurysm
◯ Coronary artery anomaly, Ostial atresia
◯ Coronary artery anomaly, Other
◯ Interrupted aortic arch
◯ Interrupted aortic arch + VSD
◯ Interrupted aortic arch + AP window (aortopulmonary window)
◯ Patent ductus arteriosus
◯ Vascular ring
◯ Pulmonary artery sling
◯ Aortic aneurysm (including pseudoaneurysm)

◯ Aortic dissection
◯ Lung disease, Benign
◯ Lung disease, Malignant
◯ Tracheal stenosis
◯ Tracheomalacia
◯ Airway disease
◯ Pleural disease, Benign
◯ Pleural disease, Malignant
◯ Pneumothorax
◯ Pleural effusion
◯ Chylothorax
◯ Empyema
◯ Esophageal disease, Benign
◯ Esophageal disease, Malignant
◯ Mediastinal disease
◯ Mediastinal disease, Benign
◯ Mediastinal disease, Malignant
◯ Diaphragm paralysis
◯ Diaphragm disease, Other
◯ Rib tumor, Benign
◯ Rib tumor, Malignant
◯ Rib tumor, Metastatic
◯ Sternal tumor, Benign
◯ Sternal tumor, Malignant
◯ Sternal tumor, Metastatic
◯ Pectus carinatum
◯ Pectus excavatum
◯ Thoracic outlet syndrome
◯ Arrhythmia
◯ Arrhythmia, Atrial, Atrial fibrillation
◯ Arrhythmia, Atrial, Atrial flutter
◯ Arrhythmia, Atrial, Other
◯ Arrhythmia, Junctional
◯ Arrhythmia, Ventricular
◯ Arrhythmia, Heart block
◯ Arrhythmia, Heart block, Acquired
◯ Arrhythmia, Heart block, Congenital
◯ Arrhythmia, Pacemaker, Indication for replacement
◯ Atrial Isomerism, Left
◯ Atrial Isomerism, Right
◯ Dextrocardia
◯ Levocardia
◯ Mesocardia
◯ Situs inversus
◯ Aneurysm, Ventricular, Right (including pseudoaneurysm)
◯ Aneurysm, Ventricular, Left (including pseudoaneurysm)
◯ Aneurysm, Pulmonary artery
◯ Aneurysm, Other
◯ Hypoplastic RV
◯ Hypoplastic LV
◯ Postoperative bleeding
◯ Mediastinitis
◯ Endocarditis
◯ Rheumatic heart disease
◯ Prosthetic valve failure
◯ Myocardial infarction
◯ Cardiac tumor
◯ Pulmonary AV fistula
◯ Pulmonary embolism
◯ Pulmonary vascular obstructive disease
◯ Pulmonary vascular obstructive disease (Eisenmenger's)
◯ Primary pulmonary hypertension
◯ Persistent fetal circulation
◯ Meconium aspiration
◯ Kawasaki Disease
◯ Cardiac, Other
◯ Thoracic and/or mediastinal, Other
◯ Peripheral vascular, Other

- ◯ Complication of cardiovascular catheterization procedure
- ◯ Complication of cardiovascular catheterization procedure, Device embolization
- ◯ Complication of cardiovascular catheterization procedure, Device malfunction
- ◯ Complication of cardiovascular catheterization procedure, Perforation
- ◯ Complication of interventional radiology procedure
- ◯ Complication of interventional radiology procedure, Device embolization
- ◯ Complication of interventional radiology procedure, Device malfunction
- ◯ Complication of interventional radiology procedure, Perforation
- ◯ Foreign body, Intracardiac foreign body
- ◯ Foreign body, Intravascular foreign body
- ◯ Open sternum with closed skin
- ◯ Open sternum with open skin (includes membrane placed to close skin)
- ◯ Retained sternal wire causing irritation
- ◯ Syncope
- ◯ Trauma, Blunt
- ◯ Trauma, Penetrating
- ◯ Normal heart
- ◯ Miscellaneous, Other

Secondary diagnosis 1

- ◯ None
- ◯ PFO
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- ◯ ASD, Sinus venosus
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- ◯ Total anomalous pulmonary venous connection (TAPVC), Type 4 (mixed)
- ◯ Cor triatriatum
- ◯ Pulmonary venous stenosis
- ◯ Systemic venous anomaly
- ◯ Systemic venous obstruction
- ◯ TOF
- ◯ TOF, Pulmonary stenosis
- ◯ TOF, AVC (AVSD)
- ◯ TOF, Absent pulmonary valve
- ◯ Pulmonary atresia
- ◯ Pulmonary atresia, IVS
- ◯ Pulmonary atresia, VSD (Including TOF, PA)
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- ◯ Pulmonary stenosis, Subvalvar
- ◯ DCRV
- ◯ Pulmonary valve, Other
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- ◯ Shunt Failure
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◯ Retained sternal wire causing irritation
◯ Syncope
◯ Trauma, Blunt
◯ Trauma, Penetrating
◯ Normal heart
◯ Miscellaneous, Other

Secondary diagnosis 2

- ◯ None
- ◯ PFO
- ◯ ASD, Secundum
- ◯ ASD, Sinus venosus
- ◯ ASD, Coronary sinus
- ◯ ASD, Common atrium (single atrium)
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- ◯ Pulmonary venous stenosis
- ◯ Systemic venous anomaly
- ◯ Systemic venous obstruction
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- ◯ TOF, Pulmonary stenosis
- ◯ TOF, AVC (AVSD)
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- ◯ Pulmonary insufficiency
- ◯ Pulmonary insufficiency and pulmonary stenosis

- ◯ Shunt Failure
- ◯ Conduit failure
- ◯ Aortic stenosis, Subvalvar
- ◯ Aortic stenosis, Valvar
- ◯ Aortic stenosis, Supravalvar
- ◯ Aortic valve atresia
- ◯ Aortic insufficiency
- ◯ Aortic insufficiency and aortic stenosis
- ◯ Aortic valve, Other
- ◯ Sinus of Valsalva aneurysm
- ◯ LV to aorta tunnel
- ◯ Mitral stenosis, Supravalvar mitral ring
- ◯ Mitral stenosis, Valvar
- ◯ Mitral stenosis, Subvalvar
- ◯ Mitral stenosis, Subvalvar, Parachute
- ◯ Mitral stenosis
- ◯ Mitral regurgitation and mitral stenosis
- ◯ Mitral regurgitation
- ◯ Mitral valve, Other
- ◯ Hypoplastic left heart syndrome (HLHS)
- ◯ Shone's syndrome
- ◯ Cardiomyopathy (including dilated, restrictive, and hypertrophic)
- ◯ Cardiomyopathy, End-stage congenital heart disease
- ◯ Pericardial effusion
- ◯ Pericarditis
- ◯ Pericardial disease, Other
- ◯ Single ventricle, DILV
- ◯ Single ventricle, DIRV
- ◯ Single ventricle, Mitral atresia
- ◯ Single ventricle, Tricuspid atresia
- ◯ Single ventricle, Unbalanced AV canal
- ◯ Single ventricle, Heterotaxia syndrome
- ◯ Single ventricle, Other
- ◯ Single ventricle + Total anomalous pulmonary venous connection (TAPVC)
- ◯ Congenitally corrected TGA
- ◯ Congenitally corrected TGA, IVS
- ◯ Congenitally corrected TGA, IVS-LVOTO
- ◯ Congenitally corrected TGA, VSD
- ◯ Congenitally corrected TGA, VSD-LVOTO
- ◯ TGA, IVS
- ◯ TGA, IVS-LVOTO
- ◯ TGA, VSD
- ◯ TGA, VSD-LVOTO
- ◯ DORV, VSD type
- ◯ DORV, TOF type
- ◯ DORV, TGA type
- ◯ DORV, Remote VSD (uncommitted VSD)
- ◯ DORV + AVSD (AV Canal)
- ◯ DORV, IVS
- ◯ DOLV
- ◯ Coarctation of aorta
- ◯ Aortic arch hypoplasia
- ◯ VSD + Aortic arch hypoplasia
- ◯ VSD + Coarctation of aorta
- ◯ Coronary artery anomaly, Anomalous aortic origin of coronary artery (AAOCA)
- ◯ Coronary artery anomaly, Anomalous pulmonary origin (includes ALCAPA)
- ◯ Coronary artery anomaly, Fistula
- ◯ Coronary artery anomaly, Aneurysm
- ◯ Coronary artery anomaly, Ostial atresia
- ◯ Coronary artery anomaly, Other
- ◯ Interrupted aortic arch
- ◯ Interrupted aortic arch + VSD
- ◯ Interrupted aortic arch + AP window (aortopulmonary window)
- ◯ Patent ductus arteriosus
- ◯ Vascular ring
- ◯ Pulmonary artery sling

◯ Aortic aneurysm (including pseudoaneurysm)
◯ Aortic dissection
◯ Lung disease, Benign
◯ Lung disease, Malignant
◯ Tracheal stenosis
◯ Tracheomalacia
◯ Airway disease
◯ Pleural disease, Benign
◯ Pleural disease, Malignant
◯ Pneumothorax
◯ Pleural effusion
◯ Chylothorax
◯ Empyema
◯ Esophageal disease, Benign
◯ Esophageal disease, Malignant
◯ Mediastinal disease
◯ Mediastinal disease, Benign
◯ Mediastinal disease, Malignant
◯ Diaphragm paralysis
◯ Diaphragm disease, Other
◯ Rib tumor, Benign
◯ Rib tumor, Malignant
◯ Rib tumor, Metastatic
◯ Sternal tumor, Benign
◯ Sternal tumor, Malignant
◯ Sternal tumor, Metastatic
◯ Pectus carinatum
◯ Pectus excavatum
◯ Thoracic outlet syndrome
◯ Arrhythmia
◯ Arrhythmia, Atrial, Atrial fibrillation
◯ Arrhythmia, Atrial, Atrial flutter
◯ Arrhythmia, Atrial, Other
◯ Arrhythmia, Junctional
◯ Arrhythmia, Ventricular
◯ Arrhythmia, Heart block
◯ Arrhythmia, Heart block, Acquired
◯ Arrhythmia, Heart block, Congenital
◯ Arrhythmia, Pacemaker, Indication for replacement
◯ Atrial Isomerism, Left
◯ Atrial Isomerism, Right
◯ Dextrocardia
◯ Levocardia
◯ Mesocardia
◯ Situs inversus
◯ Aneurysm, Ventricular, Right (including pseudoaneurysm)
◯ Aneurysm, Ventricular, Left (including pseudoaneurysm)
◯ Aneurysm, Pulmonary artery
◯ Aneurysm, Other
◯ Hypoplastic RV
◯ Hypoplastic LV
◯ Postoperative bleeding
◯ Mediastinitis
◯ Endocarditis
◯ Rheumatic heart disease
◯ Prosthetic valve failure
◯ Myocardial infarction
◯ Cardiac tumor
◯ Pulmonary AV fistula
◯ Pulmonary embolism
◯ Pulmonary vascular obstructive disease
◯ Pulmonary vascular obstructive disease (Eisenmenger's)
◯ Primary pulmonary hypertension
◯ Persistent fetal circulation
◯ Meconium aspiration
◯ Kawasaki Disease
◯ Cardiac, Other
◯ Thoracic and/or mediastinal, Other

◯ Peripheral vascular, Other
◯ Complication of cardiovascular catheterization procedure
◯ Complication of cardiovascular catheterization procedure, Device embolization
◯ Complication of cardiovascular catheterization procedure, Device malfunction
◯ Complication of cardiovascular catheterization procedure, Perforation
◯ Complication of interventional radiology procedure
◯ Complication of interventional radiology procedure, Device embolization
◯ Complication of interventional radiology procedure, Device malfunction
◯ Complication of interventional radiology procedure, Perforation
◯ Foreign body, Intracardiac foreign body
◯ Foreign body, Intravascular foreign body
◯ Open sternum with closed skin
◯ Open sternum with open skin (includes membrane placed to close skin)
◯ Retained sternal wire causing irritation
◯ Syncope
◯ Trauma, Blunt
◯ Trauma, Penetrating
◯ Normal heart
◯ Miscellaneous, Other

Secondary diagnosis 3

- ◯ None
- ◯ PFO
- ◯ ASD, Secundum
- ◯ ASD, Sinus venosus
- ◯ ASD, Coronary sinus
- ◯ ASD, Common atrium (single atrium)
- ◯ ASD, Postoperative interatrial communication
- ◯ VSD, Type 1 (Subarterial) (Supracristal) (Conal septal defect) (Infundibular)
- ◯ VSD, Type 2 (Perimembranous) (Paramembranous) (Conoventricular)
- ◯ VSD, Type 3 (Inlet) (AV canal type)
- ◯ VSD, Type 4 (Muscular)
- ◯ VSD, Type: Gerbode type (LV-RA communication)
- ◯ VSD, Multiple
- ◯ AVC (AVSD), Complete (CAVSD)
- ◯ AVC (AVSD), Intermediate (transitional)
- ◯ AVC (AVSD), Partial (incomplete) (PAVSD) (ASD, primum)
- ◯ AP window (aortopulmonary window)
- ◯ Pulmonary artery origin from ascending aorta (hemitruncus)
- ◯ Truncus arteriosus
- ◯ Truncal valve insufficiency
- ◯ Truncal valve stenosis
- ◯ Truncus arteriosus + Interrupted aortic arch
- ◯ Partial anomalous pulmonary venous connection (PAPVC)
- ◯ Partial anomalous pulmonary venous connection (PAPVC), scimitar
- ◯ Total anomalous pulmonary venous connection (TAPVC), Type1 (supracardiac)
- ◯ Total anomalous pulmonary venous connection (TAPVC), Type 2 (cardiac)
- ◯ Total anomalous pulmonary venous connection (TAPVC), Type 3 (infracardiac)
- ◯ Total anomalous pulmonary venous connection (TAPVC), Type 4 (mixed)
- ◯ Cor triatriatum
- ◯ Pulmonary venous stenosis
- ◯ Systemic venous anomaly
- ◯ Systemic venous obstruction
- ◯ TOF
- ◯ TOF, Pulmonary stenosis
- ◯ TOF, AVC (AVSD)
- ◯ TOF, Absent pulmonary valve
- ◯ Pulmonary atresia
- ◯ Pulmonary atresia, IVS
- ◯ Pulmonary atresia, VSD (Including TOF, PA)
- ◯ Pulmonary atresia, VSD-MAPCA
- ◯ MAPCA(s) (major aortopulmonary collateral[s]) (without PA-VSD)
- ◯ Ebstein's anomaly
- ◯ Tricuspid regurgitation, non-Ebstein's related
- ◯ Tricuspid stenosis
- ◯ Tricuspid regurgitation and tricuspid stenosis
- ◯ Tricuspid valve, Other
- ◯ Pulmonary stenosis, Valvar
- ◯ Pulmonary artery stenosis (hypoplasia), Main (trunk)
- ◯ Pulmonary artery stenosis, Branch, Central (within the hilar bifurcation)
- ◯ Pulmonary artery stenosis, Branch, Peripheral (at or beyond the hilar bifurcation)
- ◯ Pulmonary artery, Discontinuous
- ◯ Pulmonary stenosis, Subvalvar
- ◯ DCRV
- ◯ Pulmonary valve, Other
- ◯ Pulmonary insufficiency
- ◯ Pulmonary insufficiency and pulmonary stenosis

- ◯ Shunt Failure
- ◯ Conduit failure
- ◯ Aortic stenosis, Subvalvar
- ◯ Aortic stenosis, Valvar
- ◯ Aortic stenosis, Supravalvar
- ◯ Aortic valve atresia
- ◯ Aortic insufficiency
- ◯ Aortic insufficiency and aortic stenosis
- ◯ Aortic valve, Other
- ◯ Sinus of Valsalva aneurysm
- ◯ LV to aorta tunnel
- ◯ Mitral stenosis, Supravalvar mitral ring
- ◯ Mitral stenosis, Valvar
- ◯ Mitral stenosis, Subvalvar
- ◯ Mitral stenosis, Subvalvar, Parachute
- ◯ Mitral stenosis
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- ◯ Mitral valve, Other
- ◯ Hypoplastic left heart syndrome (HLHS)
- ◯ Shone's syndrome
- ◯ Cardiomyopathy (including dilated, restrictive, and hypertrophic)
- ◯ Cardiomyopathy, End-stage congenital heart disease
- ◯ Pericardial effusion
- ◯ Pericarditis
- ◯ Pericardial disease, Other
- ◯ Single ventricle, DILV
- ◯ Single ventricle, DIRV
- ◯ Single ventricle, Mitral atresia
- ◯ Single ventricle, Tricuspid atresia
- ◯ Single ventricle, Unbalanced AV canal
- ◯ Single ventricle, Heterotaxia syndrome
- ◯ Single ventricle, Other
- ◯ Single ventricle + Total anomalous pulmonary venous connection (TAPVC)
- ◯ Congenitally corrected TGA
- ◯ Congenitally corrected TGA, IVS
- ◯ Congenitally corrected TGA, IVS-LVOTO
- ◯ Congenitally corrected TGA, VSD
- ◯ Congenitally corrected TGA, VSD-LVOTO
- ◯ TGA, IVS
- ◯ TGA, IVS-LVOTO
- ◯ TGA, VSD
- ◯ TGA, VSD-LVOTO
- ◯ DORV, VSD type
- ◯ DORV, TOF type
- ◯ DORV, TGA type
- ◯ DORV, Remote VSD (uncommitted VSD)
- ◯ DORV + AVSD (AV Canal)
- ◯ DORV, IVS
- ◯ DOLV
- ◯ Coarctation of aorta
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- ◯ Coronary artery anomaly, Aneurysm
- ◯ Coronary artery anomaly, Ostial atresia
- ◯ Coronary artery anomaly, Other
- ◯ Interrupted aortic arch
- ◯ Interrupted aortic arch + VSD
- ◯ Interrupted aortic arch + AP window (aortopulmonary window)
- ◯ Patent ductus arteriosus
- ◯ Vascular ring
- ◯ Pulmonary artery sling

◯ Aortic aneurysm (including pseudoaneurysm)
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◯ Lung disease, Benign
◯ Lung disease, Malignant
◯ Tracheal stenosis
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◯ Pleural disease, Benign
◯ Pleural disease, Malignant
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◯ Empyema
◯ Esophageal disease, Benign
◯ Esophageal disease, Malignant
◯ Mediastinal disease
◯ Mediastinal disease, Benign
◯ Mediastinal disease, Malignant
◯ Diaphragm paralysis
◯ Diaphragm disease, Other
◯ Rib tumor, Benign
◯ Rib tumor, Malignant
◯ Rib tumor, Metastatic
◯ Sternal tumor, Benign
◯ Sternal tumor, Malignant
◯ Sternal tumor, Metastatic
◯ Pectus carinatum
◯ Pectus excavatum
◯ Thoracic outlet syndrome
◯ Arrhythmia
◯ Arrhythmia, Atrial, Atrial fibrillation
◯ Arrhythmia, Atrial, Atrial flutter
◯ Arrhythmia, Atrial, Other
◯ Arrhythmia, Junctional
◯ Arrhythmia, Ventricular
◯ Arrhythmia, Heart block
◯ Arrhythmia, Heart block, Acquired
◯ Arrhythmia, Heart block, Congenital
◯ Arrhythmia, Pacemaker, Indication for replacement
◯ Atrial Isomerism, Left
◯ Atrial Isomerism, Right
◯ Dextrocardia
◯ Levocardia
◯ Mesocardia
◯ Situs inversus
◯ Aneurysm, Ventricular, Right (including pseudoaneurysm)
◯ Aneurysm, Ventricular, Left (including pseudoaneurysm)
◯ Aneurysm, Pulmonary artery
◯ Aneurysm, Other
◯ Hypoplastic RV
◯ Hypoplastic LV
◯ Postoperative bleeding
◯ Mediastinitis
◯ Endocarditis
◯ Rheumatic heart disease
◯ Prosthetic valve failure
◯ Myocardial infarction
◯ Cardiac tumor
◯ Pulmonary AV fistula
◯ Pulmonary embolism
◯ Pulmonary vascular obstructive disease
◯ Pulmonary vascular obstructive disease (Eisenmenger's)
◯ Primary pulmonary hypertension
◯ Persistent fetal circulation
◯ Meconium aspiration
◯ Kawasaki Disease
◯ Cardiac, Other
◯ Thoracic and/or mediastinal, Other

◯ Peripheral vascular, Other
◯ Complication of cardiovascular catheterization procedure
◯ Complication of cardiovascular catheterization procedure, Device embolization
◯ Complication of cardiovascular catheterization procedure, Device malfunction
◯ Complication of cardiovascular catheterization procedure, Perforation
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◯ Complication of interventional radiology procedure, Device embolization
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◯ Complication of interventional radiology procedure, Perforation
◯ Foreign body, Intracardiac foreign body
◯ Foreign body, Intravascular foreign body
◯ Open sternum with closed skin
◯ Open sternum with open skin (includes membrane placed to close skin)
◯ Retained sternal wire causing irritation
◯ Syncope
◯ Trauma, Blunt
◯ Trauma, Penetrating
◯ Normal heart
◯ Miscellaneous, Other

Secondary diagnosis 4

- ◯ None
- ◯ PFO
- ◯ ASD, Secundum
- ◯ ASD, Sinus venosus
- ◯ ASD, Coronary sinus
- ◯ ASD, Common atrium (single atrium)
- ◯ ASD, Postoperative interatrial communication
- ◯ VSD, Type 1 (Subarterial) (Supracristal) (Conal septal defect) (Infundibular)
- ◯ VSD, Type 2 (Perimembranous) (Paramembranous) (Conoventricular)
- ◯ VSD, Type 3 (Inlet) (AV canal type)
- ◯ VSD, Type 4 (Muscular)
- ◯ VSD, Type: Gerbode type (LV-RA communication)
- ◯ VSD, Multiple
- ◯ AVC (AVSD), Complete (CAVSD)
- ◯ AVC (AVSD), Intermediate (transitional)
- ◯ AVC (AVSD), Partial (incomplete) (PAVSD) (ASD, primum)
- ◯ AP window (aortopulmonary window)
- ◯ Pulmonary artery origin from ascending aorta (hemitruncus)
- ◯ Truncus arteriosus
- ◯ Truncal valve insufficiency
- ◯ Truncal valve stenosis
- ◯ Truncus arteriosus + Interrupted aortic arch
- ◯ Partial anomalous pulmonary venous connection (PAPVC)
- ◯ Partial anomalous pulmonary venous connection (PAPVC), scimitar
- ◯ Total anomalous pulmonary venous connection (TAPVC), Type1 (supracardiac)
- ◯ Total anomalous pulmonary venous connection (TAPVC), Type 2 (cardiac)
- ◯ Total anomalous pulmonary venous connection (TAPVC), Type 3 (infracardiac)
- ◯ Total anomalous pulmonary venous connection (TAPVC), Type 4 (mixed)
- ◯ Cor triatriatum
- ◯ Pulmonary venous stenosis
- ◯ Systemic venous anomaly
- ◯ Systemic venous obstruction
- ◯ TOF
- ◯ TOF, Pulmonary stenosis
- ◯ TOF, AVC (AVSD)
- ◯ TOF, Absent pulmonary valve
- ◯ Pulmonary atresia
- ◯ Pulmonary atresia, IVS
- ◯ Pulmonary atresia, VSD (Including TOF, PA)
- ◯ Pulmonary atresia, VSD-MAPCA
- ◯ MAPCA(s) (major aortopulmonary collateral[s]) (without PA-VSD)
- ◯ Ebstein's anomaly
- ◯ Tricuspid regurgitation, non-Ebstein's related
- ◯ Tricuspid stenosis
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- ◯ Tricuspid valve, Other
- ◯ Pulmonary stenosis, Valvar
- ◯ Pulmonary artery stenosis (hypoplasia), Main (trunk)
- ◯ Pulmonary artery stenosis, Branch, Central (within the hilar bifurcation)
- ◯ Pulmonary artery stenosis, Branch, Peripheral (at or beyond the hilar bifurcation)
- ◯ Pulmonary artery, Discontinuous
- ◯ Pulmonary stenosis, Subvalvar
- ◯ DCRV
- ◯ Pulmonary valve, Other
- ◯ Pulmonary insufficiency
- ◯ Pulmonary insufficiency and pulmonary stenosis

- ◯ Shunt Failure
- ◯ Conduit failure
- ◯ Aortic stenosis, Subvalvar
- ◯ Aortic stenosis, Valvar
- ◯ Aortic stenosis, Supravalvar
- ◯ Aortic valve atresia
- ◯ Aortic insufficiency
- ◯ Aortic insufficiency and aortic stenosis
- ◯ Aortic valve, Other
- ◯ Sinus of Valsalva aneurysm
- ◯ LV to aorta tunnel
- ◯ Mitral stenosis, Supravalvar mitral ring
- ◯ Mitral stenosis, Valvar
- ◯ Mitral stenosis, Subvalvar
- ◯ Mitral stenosis, Subvalvar, Parachute
- ◯ Mitral stenosis
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- ◯ Mitral valve, Other
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- ◯ Pericardial disease, Other
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- ◯ Single ventricle, DIRV
- ◯ Single ventricle, Mitral atresia
- ◯ Single ventricle, Tricuspid atresia
- ◯ Single ventricle, Unbalanced AV canal
- ◯ Single ventricle, Heterotaxia syndrome
- ◯ Single ventricle, Other
- ◯ Single ventricle + Total anomalous pulmonary venous connection (TAPVC)
- ◯ Congenitally corrected TGA
- ◯ Congenitally corrected TGA, IVS
- ◯ Congenitally corrected TGA, IVS-LVOTO
- ◯ Congenitally corrected TGA, VSD
- ◯ Congenitally corrected TGA, VSD-LVOTO
- ◯ TGA, IVS
- ◯ TGA, IVS-LVOTO
- ◯ TGA, VSD
- ◯ TGA, VSD-LVOTO
- ◯ DORV, VSD type
- ◯ DORV, TOF type
- ◯ DORV, TGA type
- ◯ DORV, Remote VSD (uncommitted VSD)
- ◯ DORV + AVSD (AV Canal)
- ◯ DORV, IVS
- ◯ DOLV
- ◯ Coarctation of aorta
- ◯ Aortic arch hypoplasia
- ◯ VSD + Aortic arch hypoplasia
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- ◯ Coronary artery anomaly, Anomalous aortic origin of coronary artery (AAOCA)
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- ◯ Coronary artery anomaly, Fistula
- ◯ Coronary artery anomaly, Aneurysm
- ◯ Coronary artery anomaly, Ostial atresia
- ◯ Coronary artery anomaly, Other
- ◯ Interrupted aortic arch
- ◯ Interrupted aortic arch + VSD
- ◯ Interrupted aortic arch + AP window (aortopulmonary window)
- ◯ Patent ductus arteriosus
- ◯ Vascular ring
- ◯ Pulmonary artery sling

◯ Aortic aneurysm (including pseudoaneurysm)
◯ Aortic dissection
◯ Lung disease, Benign
◯ Lung disease, Malignant
◯ Tracheal stenosis
◯ Tracheomalacia
◯ Airway disease
◯ Pleural disease, Benign
◯ Pleural disease, Malignant
◯ Pneumothorax
◯ Pleural effusion
◯ Chylothorax
◯ Empyema
◯ Esophageal disease, Benign
◯ Esophageal disease, Malignant
◯ Mediastinal disease
◯ Mediastinal disease, Benign
◯ Mediastinal disease, Malignant
◯ Diaphragm paralysis
◯ Diaphragm disease, Other
◯ Rib tumor, Benign
◯ Rib tumor, Malignant
◯ Rib tumor, Metastatic
◯ Sternal tumor, Benign
◯ Sternal tumor, Malignant
◯ Sternal tumor, Metastatic
◯ Pectus carinatum
◯ Pectus excavatum
◯ Thoracic outlet syndrome
◯ Arrhythmia
◯ Arrhythmia, Atrial, Atrial fibrillation
◯ Arrhythmia, Atrial, Atrial flutter
◯ Arrhythmia, Atrial, Other
◯ Arrhythmia, Junctional
◯ Arrhythmia, Ventricular
◯ Arrhythmia, Heart block
◯ Arrhythmia, Heart block, Acquired
◯ Arrhythmia, Heart block, Congenital
◯ Arrhythmia, Pacemaker, Indication for replacement
◯ Atrial Isomerism, Left
◯ Atrial Isomerism, Right
◯ Dextrocardia
◯ Levocardia
◯ Mesocardia
◯ Situs inversus
◯ Aneurysm, Ventricular, Right (including pseudoaneurysm)
◯ Aneurysm, Ventricular, Left (including pseudoaneurysm)
◯ Aneurysm, Pulmonary artery
◯ Aneurysm, Other
◯ Hypoplastic RV
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◯ Postoperative bleeding
◯ Mediastinitis
◯ Endocarditis
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◯ Myocardial infarction
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◯ Kawasaki Disease
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◯ Thoracic and/or mediastinal, Other

◯ Peripheral vascular, Other
◯ Complication of cardiovascular catheterization procedure
◯ Complication of cardiovascular catheterization procedure, Device embolization
◯ Complication of cardiovascular catheterization procedure, Device malfunction
◯ Complication of cardiovascular catheterization procedure, Perforation
◯ Complication of interventional radiology procedure
◯ Complication of interventional radiology procedure, Device embolization
◯ Complication of interventional radiology procedure, Device malfunction
◯ Complication of interventional radiology procedure, Perforation
◯ Foreign body, Intracardiac foreign body
◯ Foreign body, Intravascular foreign body
◯ Open sternum with closed skin
◯ Open sternum with open skin (includes membrane placed to close skin)
◯ Retained sternal wire causing irritation
◯ Syncope
◯ Trauma, Blunt
◯ Trauma, Penetrating
◯ Normal heart
◯ Miscellaneous, Other

Secondary diagnosis 5

- ◯ None
- ◯ PFO
- ◯ ASD, Secundum
- ◯ ASD, Sinus venosus
- ◯ ASD, Coronary sinus
- ◯ ASD, Common atrium (single atrium)
- ◯ ASD, Postoperative interatrial communication
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- ◯ VSD, Type 3 (Inlet) (AV canal type)
- ◯ VSD, Type 4 (Muscular)
- ◯ VSD, Type: Gerbode type (LV-RA communication)
- ◯ VSD, Multiple
- ◯ AVC (AVSD), Complete (CAVSD)
- ◯ AVC (AVSD), Intermediate (transitional)
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- ◯ AP window (aortopulmonary window)
- ◯ Pulmonary artery origin from ascending aorta (hemitruncus)
- ◯ Truncus arteriosus
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- ◯ Total anomalous pulmonary venous connection (TAPVC), Type 3 (infracardiac)
- ◯ Total anomalous pulmonary venous connection (TAPVC), Type 4 (mixed)
- ◯ Cor triatriatum
- ◯ Pulmonary venous stenosis
- ◯ Systemic venous anomaly
- ◯ Systemic venous obstruction
- ◯ TOF
- ◯ TOF, Pulmonary stenosis
- ◯ TOF, AVC (AVSD)
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- ◯ Pulmonary atresia, VSD (Including TOF, PA)
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- ◯ Aortic valve, Other
- ◯ Sinus of Valsalva aneurysm
- ◯ LV to aorta tunnel
- ◯ Mitral stenosis, Supravalvar mitral ring
- ◯ Mitral stenosis, Valvar
- ◯ Mitral stenosis, Subvalvar
- ◯ Mitral stenosis, Subvalvar, Parachute
- ◯ Mitral stenosis
- ◯ Mitral regurgitation and mitral stenosis
- ◯ Mitral regurgitation
- ◯ Mitral valve, Other
- ◯ Hypoplastic left heart syndrome (HLHS)
- ◯ Shone's syndrome
- ◯ Cardiomyopathy (including dilated, restrictive, and hypertrophic)
- ◯ Cardiomyopathy, End-stage congenital heart disease
- ◯ Pericardial effusion
- ◯ Pericarditis
- ◯ Pericardial disease, Other
- ◯ Single ventricle, DILV
- ◯ Single ventricle, DIRV
- ◯ Single ventricle, Mitral atresia
- ◯ Single ventricle, Tricuspid atresia
- ◯ Single ventricle, Unbalanced AV canal
- ◯ Single ventricle, Heterotaxia syndrome
- ◯ Single ventricle, Other
- ◯ Single ventricle + Total anomalous pulmonary venous connection (TAPVC)
- ◯ Congenitally corrected TGA
- ◯ Congenitally corrected TGA, IVS
- ◯ Congenitally corrected TGA, IVS-LVOTO
- ◯ Congenitally corrected TGA, VSD
- ◯ Congenitally corrected TGA, VSD-LVOTO
- ◯ TGA, IVS
- ◯ TGA, IVS-LVOTO
- ◯ TGA, VSD
- ◯ TGA, VSD-LVOTO
- ◯ DORV, VSD type
- ◯ DORV, TOF type
- ◯ DORV, TGA type
- ◯ DORV, Remote VSD (uncommitted VSD)
- ◯ DORV + AVSD (AV Canal)
- ◯ DORV, IVS
- ◯ DOLV
- ◯ Coarctation of aorta
- ◯ Aortic arch hypoplasia
- ◯ VSD + Aortic arch hypoplasia
- ◯ VSD + Coarctation of aorta
- ◯ Coronary artery anomaly, Anomalous aortic origin of coronary artery (AAOCA)
- ◯ Coronary artery anomaly, Anomalous pulmonary origin (includes ALCAPA)
- ◯ Coronary artery anomaly, Fistula
- ◯ Coronary artery anomaly, Aneurysm
- ◯ Coronary artery anomaly, Ostial atresia
- ◯ Coronary artery anomaly, Other
- ◯ Interrupted aortic arch
- ◯ Interrupted aortic arch + VSD
- ◯ Interrupted aortic arch + AP window (aortopulmonary window)
- ◯ Patent ductus arteriosus
- ◯ Vascular ring
- ◯ Pulmonary artery sling

◯ Aortic aneurysm (including pseudoaneurysm)
◯ Aortic dissection
◯ Lung disease, Benign
◯ Lung disease, Malignant
◯ Tracheal stenosis
◯ Tracheomalacia
◯ Airway disease
◯ Pleural disease, Benign
◯ Pleural disease, Malignant
◯ Pneumothorax
◯ Pleural effusion
◯ Chylothorax
◯ Empyema
◯ Esophageal disease, Benign
◯ Esophageal disease, Malignant
◯ Mediastinal disease
◯ Mediastinal disease, Benign
◯ Mediastinal disease, Malignant
◯ Diaphragm paralysis
◯ Diaphragm disease, Other
◯ Rib tumor, Benign
◯ Rib tumor, Malignant
◯ Rib tumor, Metastatic
◯ Sternal tumor, Benign
◯ Sternal tumor, Malignant
◯ Sternal tumor, Metastatic
◯ Pectus carinatum
◯ Pectus excavatum
◯ Thoracic outlet syndrome
◯ Arrhythmia
◯ Arrhythmia, Atrial, Atrial fibrillation
◯ Arrhythmia, Atrial, Atrial flutter
◯ Arrhythmia, Atrial, Other
◯ Arrhythmia, Junctional
◯ Arrhythmia, Ventricular
◯ Arrhythmia, Heart block
◯ Arrhythmia, Heart block, Acquired
◯ Arrhythmia, Heart block, Congenital
◯ Arrhythmia, Pacemaker, Indication for replacement
◯ Atrial Isomerism, Left
◯ Atrial Isomerism, Right
◯ Dextrocardia
◯ Levocardia
◯ Mesocardia
◯ Situs inversus
◯ Aneurysm, Ventricular, Right (including pseudoaneurysm)
◯ Aneurysm, Ventricular, Left (including pseudoaneurysm)
◯ Aneurysm, Pulmonary artery
◯ Aneurysm, Other
◯ Hypoplastic RV
◯ Hypoplastic LV
◯ Postoperative bleeding
◯ Mediastinitis
◯ Endocarditis
◯ Rheumatic heart disease
◯ Prosthetic valve failure
◯ Myocardial infarction
◯ Cardiac tumor
◯ Pulmonary AV fistula
◯ Pulmonary embolism
◯ Pulmonary vascular obstructive disease
◯ Pulmonary vascular obstructive disease (Eisenmenger's)
◯ Primary pulmonary hypertension
◯ Persistent fetal circulation
◯ Meconium aspiration
◯ Kawasaki Disease
◯ Cardiac, Other
◯ Thoracic and/or mediastinal, Other

◯ Peripheral vascular, Other
◯ Complication of cardiovascular catheterization procedure
◯ Complication of cardiovascular catheterization procedure, Device embolization
◯ Complication of cardiovascular catheterization procedure, Device malfunction
◯ Complication of cardiovascular catheterization procedure, Perforation
◯ Complication of interventional radiology procedure
◯ Complication of interventional radiology procedure, Device embolization
◯ Complication of interventional radiology procedure, Device malfunction
◯ Complication of interventional radiology procedure, Perforation
◯ Foreign body, Intracardiac foreign body
◯ Foreign body, Intravascular foreign body
◯ Open sternum with closed skin
◯ Open sternum with open skin (includes membrane placed to close skin)
◯ Retained sternal wire causing irritation
◯ Syncope
◯ Trauma, Blunt
◯ Trauma, Penetrating
◯ Normal heart
◯ Miscellaneous, Other

Secondary diagnosis 6

- ◯ None
- ◯ PFO
- ◯ ASD, Secundum
- ◯ ASD, Sinus venosus
- ◯ ASD, Coronary sinus
- ◯ ASD, Common atrium (single atrium)
- ◯ ASD, Postoperative interatrial communication
- ◯ VSD, Type 1 (Subarterial) (Supracristal) (Conal septal defect) (Infundibular)
- ◯ VSD, Type 2 (Perimembranous) (Paramembranous) (Conoventricular)
- ◯ VSD, Type 3 (Inlet) (AV canal type)
- ◯ VSD, Type 4 (Muscular)
- ◯ VSD, Type: Gerbode type (LV-RA communication)
- ◯ VSD, Multiple
- ◯ AVC (AVSD), Complete (CAVSD)
- ◯ AVC (AVSD), Intermediate (transitional)
- ◯ AVC (AVSD), Partial (incomplete) (PAVSD) (ASD, primum)
- ◯ AP window (aortopulmonary window)
- ◯ Pulmonary artery origin from ascending aorta (hemitruncus)
- ◯ Truncus arteriosus
- ◯ Truncal valve insufficiency
- ◯ Truncal valve stenosis
- ◯ Truncus arteriosus + Interrupted aortic arch
- ◯ Partial anomalous pulmonary venous connection (PAPVC)
- ◯ Partial anomalous pulmonary venous connection (PAPVC), scimitar
- ◯ Total anomalous pulmonary venous connection (TAPVC), Type1 (supracardiac)
- ◯ Total anomalous pulmonary venous connection (TAPVC), Type 2 (cardiac)
- ◯ Total anomalous pulmonary venous connection (TAPVC), Type 3 (infracardiac)
- ◯ Total anomalous pulmonary venous connection (TAPVC), Type 4 (mixed)
- ◯ Cor triatriatum
- ◯ Pulmonary venous stenosis
- ◯ Systemic venous anomaly
- ◯ Systemic venous obstruction
- ◯ TOF
- ◯ TOF, Pulmonary stenosis
- ◯ TOF, AVC (AVSD)
- ◯ TOF, Absent pulmonary valve
- ◯ Pulmonary atresia
- ◯ Pulmonary atresia, IVS
- ◯ Pulmonary atresia, VSD (Including TOF, PA)
- ◯ Pulmonary atresia, VSD-MAPCA
- ◯ MAPCA(s) (major aortopulmonary collateral[s]) (without PA-VSD)
- ◯ Ebstein's anomaly
- ◯ Tricuspid regurgitation, non-Ebstein's related
- ◯ Tricuspid stenosis
- ◯ Tricuspid regurgitation and tricuspid stenosis
- ◯ Tricuspid valve, Other
- ◯ Pulmonary stenosis, Valvar
- ◯ Pulmonary artery stenosis (hypoplasia), Main (trunk)
- ◯ Pulmonary artery stenosis, Branch, Central (within the hilar bifurcation)
- ◯ Pulmonary artery stenosis, Branch, Peripheral (at or beyond the hilar bifurcation)
- ◯ Pulmonary artery, Discontinuous
- ◯ Pulmonary stenosis, Subvalvar
- ◯ DCRV
- ◯ Pulmonary valve, Other
- ◯ Pulmonary insufficiency
- ◯ Pulmonary insufficiency and pulmonary stenosis

- ◯ Shunt Failure
- ◯ Conduit failure
- ◯ Aortic stenosis, Subvalvar
- ◯ Aortic stenosis, Valvar
- ◯ Aortic stenosis, Supravalvar
- ◯ Aortic valve atresia
- ◯ Aortic insufficiency
- ◯ Aortic insufficiency and aortic stenosis
- ◯ Aortic valve, Other
- ◯ Sinus of Valsalva aneurysm
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- ◯ Congenitally corrected TGA
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- ◯ Congenitally corrected TGA, IVS-LVOTO
- ◯ Congenitally corrected TGA, VSD
- ◯ Congenitally corrected TGA, VSD-LVOTO
- ◯ TGA, IVS
- ◯ TGA, IVS-LVOTO
- ◯ TGA, VSD
- ◯ TGA, VSD-LVOTO
- ◯ DORV, VSD type
- ◯ DORV, TOF type
- ◯ DORV, TGA type
- ◯ DORV, Remote VSD (uncommitted VSD)
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◯ Arrhythmia, Atrial, Atrial fibrillation
◯ Arrhythmia, Atrial, Atrial flutter
◯ Arrhythmia, Atrial, Other
◯ Arrhythmia, Junctional
◯ Arrhythmia, Ventricular
◯ Arrhythmia, Heart block
◯ Arrhythmia, Heart block, Acquired
◯ Arrhythmia, Heart block, Congenital
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◯ Mediastinitis
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◯ Rheumatic heart disease
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◯ Pulmonary vascular obstructive disease
◯ Pulmonary vascular obstructive disease (Eisenmenger's)
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◯ Persistent fetal circulation
◯ Meconium aspiration
◯ Kawasaki Disease
◯ Cardiac, Other
◯ Thoracic and/or mediastinal, Other

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◯ Complication of cardiovascular catheterization procedure, Device embolization
◯ Complication of cardiovascular catheterization procedure, Device malfunction
◯ Complication of cardiovascular catheterization procedure, Perforation
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◯ Open sternum with open skin (includes membrane placed to close skin)
◯ Retained sternal wire causing irritation
◯ Syncope
◯ Trauma, Blunt
◯ Trauma, Penetrating
◯ Normal heart
◯ Miscellaneous, Other

Secondary diagnosis 7

- ◯ None
- ◯ PFO
- ◯ ASD, Secundum
- ◯ ASD, Sinus venosus
- ◯ ASD, Coronary sinus
- ◯ ASD, Common atrium (single atrium)
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- ◯ VSD, Type 3 (Inlet) (AV canal type)
- ◯ VSD, Type 4 (Muscular)
- ◯ VSD, Type: Gerbode type (LV-RA communication)
- ◯ VSD, Multiple
- ◯ AVC (AVSD), Complete (CAVSD)
- ◯ AVC (AVSD), Intermediate (transitional)
- ◯ AVC (AVSD), Partial (incomplete) (PAVSD) (ASD, primum)
- ◯ AP window (aortopulmonary window)
- ◯ Pulmonary artery origin from ascending aorta (hemitruncus)
- ◯ Truncus arteriosus
- ◯ Truncal valve insufficiency
- ◯ Truncal valve stenosis
- ◯ Truncus arteriosus + Interrupted aortic arch
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- ◯ Partial anomalous pulmonary venous connection (PAPVC), scimitar
- ◯ Total anomalous pulmonary venous connection (TAPVC), Type1 (supracardiac)
- ◯ Total anomalous pulmonary venous connection (TAPVC), Type 2 (cardiac)
- ◯ Total anomalous pulmonary venous connection (TAPVC), Type 3 (infracardiac)
- ◯ Total anomalous pulmonary venous connection (TAPVC), Type 4 (mixed)
- ◯ Cor triatriatum
- ◯ Pulmonary venous stenosis
- ◯ Systemic venous anomaly
- ◯ Systemic venous obstruction
- ◯ TOF
- ◯ TOF, Pulmonary stenosis
- ◯ TOF, AVC (AVSD)
- ◯ TOF, Absent pulmonary valve
- ◯ Pulmonary atresia
- ◯ Pulmonary atresia, IVS
- ◯ Pulmonary atresia, VSD (Including TOF, PA)
- ◯ Pulmonary atresia, VSD-MAPCA
- ◯ MAPCA(s) (major aortopulmonary collateral[s]) (without PA-VSD)
- ◯ Ebstein's anomaly
- ◯ Tricuspid regurgitation, non-Ebstein's related
- ◯ Tricuspid stenosis
- ◯ Tricuspid regurgitation and tricuspid stenosis
- ◯ Tricuspid valve, Other
- ◯ Pulmonary stenosis, Valvar
- ◯ Pulmonary artery stenosis (hypoplasia), Main (trunk)
- ◯ Pulmonary artery stenosis, Branch, Central (within the hilar bifurcation)
- ◯ Pulmonary artery stenosis, Branch, Peripheral (at or beyond the hilar bifurcation)
- ◯ Pulmonary artery, Discontinuous
- ◯ Pulmonary stenosis, Subvalvar
- ◯ DCRV
- ◯ Pulmonary valve, Other
- ◯ Pulmonary insufficiency
- ◯ Pulmonary insufficiency and pulmonary stenosis

- ◯ Shunt Failure
- ◯ Conduit failure
- ◯ Aortic stenosis, Subvalvar
- ◯ Aortic stenosis, Valvar
- ◯ Aortic stenosis, Supravalvar
- ◯ Aortic valve atresia
- ◯ Aortic insufficiency
- ◯ Aortic insufficiency and aortic stenosis
- ◯ Aortic valve, Other
- ◯ Sinus of Valsalva aneurysm
- ◯ LV to aorta tunnel
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- ◯ Mitral stenosis, Valvar
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- ◯ Single ventricle, Tricuspid atresia
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- ◯ Single ventricle, Heterotaxia syndrome
- ◯ Single ventricle, Other
- ◯ Single ventricle + Total anomalous pulmonary venous connection (TAPVC)
- ◯ Congenitally corrected TGA
- ◯ Congenitally corrected TGA, IVS
- ◯ Congenitally corrected TGA, IVS-LVOTO
- ◯ Congenitally corrected TGA, VSD
- ◯ Congenitally corrected TGA, VSD-LVOTO
- ◯ TGA, IVS
- ◯ TGA, IVS-LVOTO
- ◯ TGA, VSD
- ◯ TGA, VSD-LVOTO
- ◯ DORV, VSD type
- ◯ DORV, TOF type
- ◯ DORV, TGA type
- ◯ DORV, Remote VSD (uncommitted VSD)
- ◯ DORV + AVSD (AV Canal)
- ◯ DORV, IVS
- ◯ DOLV
- ◯ Coarctation of aorta
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- ◯ Coronary artery anomaly, Ostial atresia
- ◯ Coronary artery anomaly, Other
- ◯ Interrupted aortic arch
- ◯ Interrupted aortic arch + VSD
- ◯ Interrupted aortic arch + AP window (aortopulmonary window)
- ◯ Patent ductus arteriosus
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◯ Mediastinal disease, Benign
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Secondary diagnosis 8

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- ◯ Mitral regurgitation
- ◯ Mitral valve, Other
- ◯ Hypoplastic left heart syndrome (HLHS)
- ◯ Shone's syndrome
- ◯ Cardiomyopathy (including dilated, restrictive, and hypertrophic)
- ◯ Cardiomyopathy, End-stage congenital heart disease
- ◯ Pericardial effusion
- ◯ Pericarditis
- ◯ Pericardial disease, Other
- ◯ Single ventricle, DILV
- ◯ Single ventricle, DIRV
- ◯ Single ventricle, Mitral atresia
- ◯ Single ventricle, Tricuspid atresia
- ◯ Single ventricle, Unbalanced AV canal
- ◯ Single ventricle, Heterotaxia syndrome
- ◯ Single ventricle, Other
- ◯ Single ventricle + Total anomalous pulmonary venous connection (TAPVC)
- ◯ Congenitally corrected TGA
- ◯ Congenitally corrected TGA, IVS
- ◯ Congenitally corrected TGA, IVS-LVOTO
- ◯ Congenitally corrected TGA, VSD
- ◯ Congenitally corrected TGA, VSD-LVOTO
- ◯ TGA, IVS
- ◯ TGA, IVS-LVOTO
- ◯ TGA, VSD
- ◯ TGA, VSD-LVOTO
- ◯ DORV, VSD type
- ◯ DORV, TOF type
- ◯ DORV, TGA type
- ◯ DORV, Remote VSD (uncommitted VSD)
- ◯ DORV + AVSD (AV Canal)
- ◯ DORV, IVS
- ◯ DOLV
- ◯ Coarctation of aorta
- ◯ Aortic arch hypoplasia
- ◯ VSD + Aortic arch hypoplasia
- ◯ VSD + Coarctation of aorta
- ◯ Coronary artery anomaly, Anomalous aortic origin of coronary artery (AAOCA)
- ◯ Coronary artery anomaly, Anomalous pulmonary origin (includes ALCAPA)
- ◯ Coronary artery anomaly, Fistula
- ◯ Coronary artery anomaly, Aneurysm
- ◯ Coronary artery anomaly, Ostial atresia
- ◯ Coronary artery anomaly, Other
- ◯ Interrupted aortic arch
- ◯ Interrupted aortic arch + VSD
- ◯ Interrupted aortic arch + AP window (aortopulmonary window)
- ◯ Patent ductus arteriosus
- ◯ Vascular ring
- ◯ Pulmonary artery sling

◯ Aortic aneurysm (including pseudoaneurysm)
◯ Aortic dissection
◯ Lung disease, Benign
◯ Lung disease, Malignant
◯ Tracheal stenosis
◯ Tracheomalacia
◯ Airway disease
◯ Pleural disease, Benign
◯ Pleural disease, Malignant
◯ Pneumothorax
◯ Pleural effusion
◯ Chylothorax
◯ Empyema
◯ Esophageal disease, Benign
◯ Esophageal disease, Malignant
◯ Mediastinal disease
◯ Mediastinal disease, Benign
◯ Mediastinal disease, Malignant
◯ Diaphragm paralysis
◯ Diaphragm disease, Other
◯ Rib tumor, Benign
◯ Rib tumor, Malignant
◯ Rib tumor, Metastatic
◯ Sternal tumor, Benign
◯ Sternal tumor, Malignant
◯ Sternal tumor, Metastatic
◯ Pectus carinatum
◯ Pectus excavatum
◯ Thoracic outlet syndrome
◯ Arrhythmia
◯ Arrhythmia, Atrial, Atrial fibrillation
◯ Arrhythmia, Atrial, Atrial flutter
◯ Arrhythmia, Atrial, Other
◯ Arrhythmia, Junctional
◯ Arrhythmia, Ventricular
◯ Arrhythmia, Heart block
◯ Arrhythmia, Heart block, Acquired
◯ Arrhythmia, Heart block, Congenital
◯ Arrhythmia, Pacemaker, Indication for replacement
◯ Atrial Isomerism, Left
◯ Atrial Isomerism, Right
◯ Dextrocardia
◯ Levocardia
◯ Mesocardia
◯ Situs inversus
◯ Aneurysm, Ventricular, Right (including pseudoaneurysm)
◯ Aneurysm, Ventricular, Left (including pseudoaneurysm)
◯ Aneurysm, Pulmonary artery
◯ Aneurysm, Other
◯ Hypoplastic RV
◯ Hypoplastic LV
◯ Postoperative bleeding
◯ Mediastinitis
◯ Endocarditis
◯ Rheumatic heart disease
◯ Prosthetic valve failure
◯ Myocardial infarction
◯ Cardiac tumor
◯ Pulmonary AV fistula
◯ Pulmonary embolism
◯ Pulmonary vascular obstructive disease
◯ Pulmonary vascular obstructive disease (Eisenmenger's)
◯ Primary pulmonary hypertension
◯ Persistent fetal circulation
◯ Meconium aspiration
◯ Kawasaki Disease
◯ Cardiac, Other
◯ Thoracic and/or mediastinal, Other

◯ Peripheral vascular, Other
◯ Complication of cardiovascular catheterization procedure
◯ Complication of cardiovascular catheterization procedure, Device embolization
◯ Complication of cardiovascular catheterization procedure, Device malfunction
◯ Complication of cardiovascular catheterization procedure, Perforation
◯ Complication of interventional radiology procedure
◯ Complication of interventional radiology procedure, Device embolization
◯ Complication of interventional radiology procedure, Device malfunction
◯ Complication of interventional radiology procedure, Perforation
◯ Foreign body, Intracardiac foreign body
◯ Foreign body, Intravascular foreign body
◯ Open sternum with closed skin
◯ Open sternum with open skin (includes membrane placed to close skin)
◯ Retained sternal wire causing irritation
◯ Syncope
◯ Trauma, Blunt
◯ Trauma, Penetrating
◯ Normal heart
◯ Miscellaneous, Other

Secondary diagnosis 9

- ◯ None
- ◯ PFO
- ◯ ASD, Secundum
- ◯ ASD, Sinus venosus
- ◯ ASD, Coronary sinus
- ◯ ASD, Common atrium (single atrium)
- ◯ ASD, Postoperative interatrial communication
- ◯ VSD, Type 1 (Subarterial) (Supracristal) (Conal septal defect) (Infundibular)
- ◯ VSD, Type 2 (Perimembranous) (Paramembranous) (Conoventricular)
- ◯ VSD, Type 3 (Inlet) (AV canal type)
- ◯ VSD, Type 4 (Muscular)
- ◯ VSD, Type: Gerbode type (LV-RA communication)
- ◯ VSD, Multiple
- ◯ AVC (AVSD), Complete (CAVSD)
- ◯ AVC (AVSD), Intermediate (transitional)
- ◯ AVC (AVSD), Partial (incomplete) (PAVSD) (ASD, primum)
- ◯ AP window (aortopulmonary window)
- ◯ Pulmonary artery origin from ascending aorta (hemitruncus)
- ◯ Truncus arteriosus
- ◯ Truncal valve insufficiency
- ◯ Truncal valve stenosis
- ◯ Truncus arteriosus + Interrupted aortic arch
- ◯ Partial anomalous pulmonary venous connection (PAPVC)
- ◯ Partial anomalous pulmonary venous connection (PAPVC), scimitar
- ◯ Total anomalous pulmonary venous connection (TAPVC), Type1 (supracardiac)
- ◯ Total anomalous pulmonary venous connection (TAPVC), Type 2 (cardiac)
- ◯ Total anomalous pulmonary venous connection (TAPVC), Type 3 (infracardiac)
- ◯ Total anomalous pulmonary venous connection (TAPVC), Type 4 (mixed)
- ◯ Cor triatriatum
- ◯ Pulmonary venous stenosis
- ◯ Systemic venous anomaly
- ◯ Systemic venous obstruction
- ◯ TOF
- ◯ TOF, Pulmonary stenosis
- ◯ TOF, AVC (AVSD)
- ◯ TOF, Absent pulmonary valve
- ◯ Pulmonary atresia
- ◯ Pulmonary atresia, IVS
- ◯ Pulmonary atresia, VSD (Including TOF, PA)
- ◯ Pulmonary atresia, VSD-MAPCA
- ◯ MAPCA(s) (major aortopulmonary collateral[s]) (without PA-VSD)
- ◯ Ebstein's anomaly
- ◯ Tricuspid regurgitation, non-Ebstein's related
- ◯ Tricuspid stenosis
- ◯ Tricuspid regurgitation and tricuspid stenosis
- ◯ Tricuspid valve, Other
- ◯ Pulmonary stenosis, Valvar
- ◯ Pulmonary artery stenosis (hypoplasia), Main (trunk)
- ◯ Pulmonary artery stenosis, Branch, Central (within the hilar bifurcation)
- ◯ Pulmonary artery stenosis, Branch, Peripheral (at or beyond the hilar bifurcation)
- ◯ Pulmonary artery, Discontinuous
- ◯ Pulmonary stenosis, Subvalvar
- ◯ DCRV
- ◯ Pulmonary valve, Other
- ◯ Pulmonary insufficiency
- ◯ Pulmonary insufficiency and pulmonary stenosis

- ◯ Shunt Failure
- ◯ Conduit failure
- ◯ Aortic stenosis, Subvalvar
- ◯ Aortic stenosis, Valvar
- ◯ Aortic stenosis, Supravalvar
- ◯ Aortic valve atresia
- ◯ Aortic insufficiency
- ◯ Aortic insufficiency and aortic stenosis
- ◯ Aortic valve, Other
- ◯ Sinus of Valsalva aneurysm
- ◯ LV to aorta tunnel
- ◯ Mitral stenosis, Supravalvar mitral ring
- ◯ Mitral stenosis, Valvar
- ◯ Mitral stenosis, Subvalvar
- ◯ Mitral stenosis, Subvalvar, Parachute
- ◯ Mitral stenosis
- ◯ Mitral regurgitation and mitral stenosis
- ◯ Mitral regurgitation
- ◯ Mitral valve, Other
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◯ Pleural disease, Malignant
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◯ Pleural effusion
◯ Chylothorax
◯ Empyema
◯ Esophageal disease, Benign
◯ Esophageal disease, Malignant
◯ Mediastinal disease
◯ Mediastinal disease, Benign
◯ Mediastinal disease, Malignant
◯ Diaphragm paralysis
◯ Diaphragm disease, Other
◯ Rib tumor, Benign
◯ Rib tumor, Malignant
◯ Rib tumor, Metastatic
◯ Sternal tumor, Benign
◯ Sternal tumor, Malignant
◯ Sternal tumor, Metastatic
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◯ Pectus excavatum
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◯ Arrhythmia, Junctional
◯ Arrhythmia, Ventricular
◯ Arrhythmia, Heart block
◯ Arrhythmia, Heart block, Acquired
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◯ Endocarditis
◯ Rheumatic heart disease
◯ Prosthetic valve failure
◯ Myocardial infarction
◯ Cardiac tumor
◯ Pulmonary AV fistula
◯ Pulmonary embolism
◯ Pulmonary vascular obstructive disease
◯ Pulmonary vascular obstructive disease (Eisenmenger's)
◯ Primary pulmonary hypertension
◯ Persistent fetal circulation
◯ Meconium aspiration
◯ Kawasaki Disease
◯ Cardiac, Other
◯ Thoracic and/or mediastinal, Other

- ◯ Peripheral vascular, Other
- ◯ Complication of cardiovascular catheterization procedure
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- ◯ Complication of cardiovascular catheterization procedure, Device malfunction
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- ◯ Complication of interventional radiology procedure, Device malfunction
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- ◯ Foreign body, Intracardiac foreign body
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- ◯ Open sternum with open skin (includes membrane placed to close skin)
- ◯ Retained sternal wire causing irritation
- ◯ Syncope
- ◯ Trauma, Blunt
- ◯ Trauma, Penetrating
- ◯ Normal heart
- ◯ Miscellaneous, Other

Notes on diagnosis

This can be used to clarify the cardiac diagnosis if it does not fit the pull down menu
or it can be used if there are additional non-cardiac diagnosis such as asplenia, spina bifida etc

(ex. pulmonary hypertension, hypoplastic right lung, atrioventricular valve regurgitation, left pulmonary vein stenosis, etc.)

Pulmonary vein connections

- ◯ TAPVD
- ◯ PAPVD
- ◯ Normal anatomical connections

TAPVD type specified

This information will be in clinic letters, CT imaging or cath reports.

- ◯ Supracardiac
- ◯ Cardiac
- ◯ Infracardiac
- ◯ Mixed type
- ◯ Other

TAPVD specified

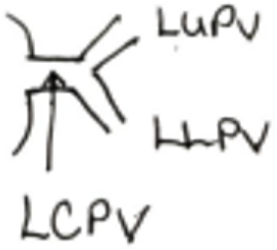
- ◯ Obstructed- Vertical Vein
- ◯ Small or obstructed pulmonary vein confluence
- ◯ Not obstructed
- ◯ Unknown

SECTION: PULMONARY VEIN CONNECTIONS AT FIRST PRESENTATION/DIAGNOSIS OF PVS

This information may best be captured from imaging at diagnosis - ie. CT,MRI, Echo or a summary clinic letter/ surgical conference note. This can be verified at HSC if imaging reports are uploaded in the imaging sections.

Typically 4 pulmonary veins draining into left atrium (LA)

RUPV, right upper pulmonary vein
RMPV, right middle pulmonary vein
RLPV, right lower pulmonary vein
LUPV, left upper pulmonary vein
LLPV, left lower pulmonary vein



Variation:
Common pulmonary vein drains into the LA

Ie. Left common pulmonary vein (LCPV) or right common pulmonary vein (RCPV)

Pulmonary vein anatomy (check all that apply)
- ☐ Right common
- ☐ Right upper
- ☐ Right middle
- ☐ Right lower
- ☐ Left common
- ☐ Left upper
- ☐ Left lingula
- ☐ Left lower

Pulmonary vein connection to right atrium
- ◯ Yes
- ◯ No

Pulmonary vein connections to right atrium (check all that apply)
- ☐ RUPV
- ☐ RMPV
- ☐ RLPV
- ☐ RCPV
- ☐ LUPV
- ☐ LLPV
- ☐ LCPV

Pulmonary vein connection to left atrium
- ◯ Yes
- ◯ No

Pulmonary vein connections to left atrium (check all that apply)
- ☐ RUPV
- ☐ RMPV
- ☐ RLPV
- ☐ RCPV
- ☐ LUPV
- ☐ LLPV
- ☐ LCPV

Pulmonary vein connection to systemic venous system
- ◯ Yes
- ◯ No

Pulmonary vein connections to systemic venous system (check all that apply)

- ☐ RUPV
- ☐ RMPV
- ☐ RLPV
- ☐ RCPV
- ☐ LUPV
- ☐ LLPV
- ☐ LCPV

Reference Pre-Op or Post Repair CT, Echo, or MRI to clarify and comment on pulmonary veins (ex. focal narrowing of LLPV, mild/moderate/severe stenosis of RUPV, low velocity flow, drainage into right atrium, etc.)

Comment on pulmonary vein anatomy and connections at time of first presentation/ diagnosis of PVS

can explain anything not captured adequately above

Modalities used to diagnosis/ at first presentation (check all that apply)

- ☐ Echocardiography
- ☐ MRI
- ☐ CT scan
- ☐ Heart catheterization
- ☐ Lung perfusion scan

(Specific modality data to be entered in the follow-up database)

Comments on specific cardiac diagnosis

Any additional information or clarification regarding cardiac diagnosis or abnormalities of heart anatomy (ex. stenosis distal to vertical vein from RUPV, L-looped ventricles, etc.)

SECTION: OTHER CLINICAL COMORBIDITIES

Diagnosis of GERD

- ◯ Yes
- ◯ No
- ◯ Unknown

Treatment of GERD

- ◯ No treatment
- ◯ Medical
- ◯ Nissen
- ◯ G/J tube
- ◯ Unknown

Diagnosis of bronchopulmonary dysplasia

- ◯ Yes
- ◯ No
- ◯ Unknown

Evidence of pulmonary lymphangectasia

- ◯ Yes, suspected diagnosis (imaging suggestive)
- ◯ Yes, confirmed diagnosis
- ◯ No
- ◯ Unknown

Comments on demographics and clinical

any additional information or clarifications

Any comments regarding diagnosis, or prenatal and postnatal period (ex. stay at NICU, emergency C-section birth, past infections, non-cardiac disorders, etc.)

Genetics and family history

Some children will have had a formal genetics work up and this can be filled out indepth or the deidentified pedigree can be uploaded at end of form

For those without a formal genetics consult- the basic information for the child and immediate family might be known and found in the clinic notes.

SECTION: GENETICS

Diagnosis confirmation
- ◯ Yes, confirmed
- ◯ Suspected or being investigated
- ◯ No
- ◯ Unknown

Genetic diagnosis
- ◯ VACTERL association
- ◯ CHARGE
- ◯ Trisomy 21
- ◯ Adams-Oliver Syndrome
- ◯ Other

Other confirmed genetic diagnosis (ex. chromosome deletion, gene mutation, karyotype, etc.) _____

Other suspected or investigated genetic diagnosis _____

Specific syndrome components described ie. limb defects; developmental delay (ex. global developmental delay, dysmorphic features, delayed motor skills, etc.)

this can be used to also put any extracardiac diagnosis that may be noted ie. tracheo-esophageal fistula, solitary kidney etc

SECTION: FAMILY HISTORY: PARENTS AND SIBLINGS

Consanguinity in parents of affected child
- ◯ Yes
- ◯ No
- ◯ Unknown

MOTHER

	Yes	No	Unknown
Congenital heart disease (excluding pulmonary veins)	◯	◯	◯
Pulmonary vein stenosis	◯	◯	◯
Abnormally connected PV (TAPVD/PAPVD)	◯	◯	◯
Confirmed genetic syndrome (any)	◯	◯	◯

FATHER

	Yes	No	Unknown
Congenital heart disease (excluding pulmonary veins)	◯	◯	◯
Pulmonary vein stenosis	◯	◯	◯
Abnormally connected PV (TAPVD/PAPVD)	◯	◯	◯
Confirmed genetic syndrome (any)	◯	◯	◯

BROTHER

	Yes	No	Unknown
Congenital heart disease (excluding pulmonary veins)	◯	◯	◯
Pulmonary vein stenosis	◯	◯	◯
Abnormally connected PV (TAPVD/PAPVD)	◯	◯	◯
Confirmed genetic syndrome (any)	◯	◯	◯

SISTER

	Yes	No	Unknown
Congenital heart disease (excluding pulmonary veins)	◯	◯	◯
Pulmonary vein stenosis	◯	◯	◯
Abnormally connected PV (TAPVD/PAPVD)	◯	◯	◯
Confirmed genetic syndrome (any)	◯	◯	◯

Comments on family history (parents and siblings)

Any additional information or specifications regarding metabolic or genetic conditions in family history (ex. heart attacks, stroke, diabetes, consanguinity, etc.)

SECTION: FAMILY HISTORY: MATERNAL GRANDPARENTS

Consanguinity in maternal grandparents

◯ Yes
◯ No
◯ Unknown

Remote consanguinity in maternal side

◯ Yes
◯ No
◯ Unknown

This data may not be known if there is no formal genetics consult

MATERNAL GRANDMOTHER

	Yes	No	Unknown
Congenital heart disease (excluding pulmonary veins)	◯	◯	◯
Pulmonary vein stenosis	◯	◯	◯
Abnormally connected PV (TAPVD/PAPVD)	◯	◯	◯
Confirmed genetic syndrome (any)	◯	◯	◯

MATERNAL GRANDFATHER

	Yes	No	Unknown
Congenital heart disease (excluding pulmonary veins)	◯	◯	◯
Pulmonary vein stenosis	◯	◯	◯
Abnormally connected PV (TAPVD/PAPVD)	◯	◯	◯
Confirmed genetic syndrome (any)	◯	◯	◯

MATERNAL SIBLINGS

	Yes	No	Unknown
Congenital heart disease (excluding pulmonary veins)	◯	◯	◯
Pulmonary vein stenosis	◯	◯	◯
Abnormally connected PV (TAPVD/PAPVD)	◯	◯	◯
Confirmed genetic syndrome (any)	◯	◯	◯

Comments on family history (maternal grandparents/siblings)

Any additional information or specifications regarding maternal family history (ex. maternal grandfather required cardiac surgeries for valvar issue, etc.)

SECTION: FAMILY HISTORY: PATERNAL GRANDPARENTS

Consanguinity in paternal grandparents

◯ Yes
◯ No
◯ Unknown

Remote consanguinity in paternal side

◯ Yes
◯ No
◯ Unknown

PATERNAL GRANDMOTHER

	Yes	No	Unknown
Congenital heart disease (excluding pulmonary veins)	○	○	○
Pulmonary vein stenosis	○	○	○
Abnormally connected PV (TAPVD/PAPVD)	○	○	○
Confirmed genetic syndrome (any)	○	○	○

PATERNAL GRANDFATHER

	Yes	No	Unknown
Congenital heart disease (excluding pulmonary veins)	○	○	○
Pulmonary vein stenosis	○	○	○
Abnormally connected PV (TAPVD/PAPVD)	○	○	○
Confirmed genetic syndrome (any)	○	○	○

PATERNAL SIBLINGS

	Yes	No	Unknown
Congenital heart disease (excluding pulmonary veins)	○	○	○
Pulmonary vein stenosis	○	○	○
Abnormally connected PV (TAPVD/PAPVD)	○	○	○
Confirmed genetic syndrome (any)	○	○	○

Comments on family history (paternal grandparents/siblings)

Any additional information or specifications regarding paternal family history (ex. heart attacks, stroke, diabetes, consanguinity, etc.)

Upload pedigree (deidentified)

Comments on genetics and family history

(ex. family history of arrhythmia, sudden deaths, sudden cardiac arrests, etc.)

Medications

This is to document the use of experimental therapies to treat PVS or Pulmonary hypertension

The start and end dates may be found in clinic notes. The highest dose given at any time during the treatment is sufficient for this record

MEDICATIONS

SECTION: EXPERIMENTAL THERAPY

Use of experimental therapies for PVS
◯ Yes
◯ No

Imatinib (e.g., Gleevec) ◯ Yes ◯ No

Imatinib: start date _____

Imatinib: end date _____

Imatinib: highest dose (mg/m2/day) _____
(Please enter dose per m2of body surface area per day)

Bevacizumab (e.g., Avastin) ◯ Yes ◯ No

Bevacizumab: start date _____

Bevacizumab: end date _____

Bevacizumab: highest dose (mg/kg/week) _____
(Please enter dose per kg per week)

Losartan ◯ Yes ◯ No

Losartan: start date _____

Losartan: end date _____

Losrtan: highest dose (mg/kg/day) _____
(Please enter dose per kg per day)

Any other experimental therapy for PVS ◯ Yes ◯ No

this may be sirolimus or other antiprolifative drugs that were started to try to treat PVS

Specify the other experimental therapy _____

[expmedothtx]: start date _____

[expmedothtx]: end date _____

[expmedothtx]: highest dose _____

[expmedothtx]: highest dose (unit) _____
(Please specify the unit of the dose)

Comments on experimental therapy

Any additional information or clarifications regarding experimental therapies and doses (ex. 11.25mg orally twice a day, etc.)
_____

SECTION: PULMONARY HYPERTENSION MEDICATIONS

children may be put on pulmonary hypertension medications. this may be noted in clinic notes or in the discharge summary.

Pulmonary hypertension medications ◯ Yes ◯ No

Nitric oxide ◯ Yes ◯ No

Nitric oxide: start date (if known) _____

Nitric oxide: end date (if known) _____

Nitric oxide: highest dose (ppm) (if known) _____ (Please enter dose in ppm)

Sildenafil ◯ Yes ◯ No

Sildenfil: start date (if known) _____

Sildenfil: end date (if known) _____

Sildenfil: highest dose (mg/kg) (if known) _____ (Please enter dose per kg per day)

Tadalafil ◯ Yes ◯ No

Tadalfil: start date (if known) _____

Tadalfil: end date (if known) _____

Tadalfil: highest dose (mg/kg) (if known) _____ (Please enter dose per kg per day)

Bosentan ◯ Yes ◯ No

Bosentan: start date (if known) _____

Bosentan: end date (if known) _____

Bosentan: highest dose (mg/kg) (if known) _____ (Please enter dose per kg per day)

Epoprostenol ◯ Yes ◯ No

Epoprostenol: start date (if known) _____

Epoprostenol: end date (if known) _____

Epoprostenol: highest dose (ng/kg/min) (if known) _____ (Please enter dose per kg per minute)

Nifedipine ◯ Yes ◯ No

Nifedipine: start date (if known) _____

Nifedipine: end date (if known) _____

Nifedipine: highest dose (mg/kg) (if known) _____ (Please enter dose per kg per day)

Other ◯ Yes ◯ No

Specify the other PHTN medication _____

[phtnmedothtx]: start date _____

[phtnmedothtx]: end date _____

[phtnmedothtx]: highest dose _____

[phtnmedothtx]: highest dose (unit) _____
(Please specify the unit of the dose)

Comments on PHTN medications

Specifications regarding PHTN medications and doses (ex. nitric oxide for pulmonary hypertension, Clonidine 20mcg, etc.)
_____

Hospitalization

The purpose of this form is to capture all the admissions for morbidity associated with PVS- ie recurrent chest infections , hemoptysis or work of breathing etc

If the hospitalization for infection/hemoptysis resulted in an intervention during the hospitalization (ie. consequence of symptoms)- both hospitalization and PV intervention/ surgery forms can be filled out.

if the child was admitted for an elective specific cardiac procedure or PV procedure- this form does not need to be filled out.

HOSPITALIZATION

Exclude hospitalization events for pulmonary vein surgery/intervention/cardiac surgery/lung transplant

Was the hospitalization solely for any of the reason(s):
PV surgeryPV interventionCardiac procedure/surgeryLung transplant

◯ Yes
◯ No

Please complete the relevant form(s).
Hospitalization form is not required to fill out.

Date of hospitalization _____

Age (years) _____
(e.g., for age 2 years and 9 months > put "2")

Age (months) _____
(e.g., for age 2 years and 11 months > put "11")

Addition: Age (days)

Age in years (calculated filed) _____
(e.g., for age 2 years & 11 months > this field displays "2.92")

SECTION: HOSPITALIZATION DATA

Reason for hospitalization: infection

◯ Yes
◯ No

Date of infection _____

Type of infection

◯ Pneumonia (radiographic or change in O2 requirements)
◯ Influenza
◯ Parainfluenza virus
◯ Respiratory syncytial virus (RSV)
◯ Necrotizing enterocolitis
◯ Rhinovirus
◯ Other

Specify the other infection (ex. wound infection, etc.) _____

Reason for hospitalization: cardiorespiratory reason reasons may include hospital admissions to treat cardiac symptoms e.g., heart failure or increased work of breathing

◯ Yes
◯ No

Specify the cardiac reason(s) for hospitalization (ex. respiratory distress, congestive heart failure, fever, etc.) _____

Any other reason for hospitalization

◯ Yes
◯ No

Specify the other reason(s) for hospitalization — (ex. hemoptysis, case viral illness, etc.)

Intubated during hospitalization
- ◯ Yes
- ◯ No

Total number for days intubated

Highest level of oxygen support for those not requiring intubation/ mechanical ventilation
- ◯ Supplemental oxygen by nasal prongs
- ◯ High flow nasal canula > 2LPM
- ◯ Non invasive ventilator support (CPAP/BiPAP)

Inotropic support
- ◯ Yes
- ◯ No

Extracorporeal life support during hospitalization
- ◯ Yes
- ◯ No

Type of ECLS
- ◯ VV ECMO
- ◯ VA ECMO
- ◯ Novalung/PLAD

Any non-cardiac procedure in hospital — ie. g tube/ chest tube
- ◯ Yes
- ◯ No

Date of procedure during hospitalization

Specify the non-cardiac procedure during hospitalization — (ex. G-tube insertion, etc.)

Date of discharge from hospital

Duration of hospital stay (days)

Comments on hospitalization — (ex. respiration failure requiring intubation, etc.)

Cardiac procedures

This is only for cardiac surgery that was done at a time other than the PV surgery date

CARDIAC PROCEDURE

Exclude cardiac procedures involving pulmonary veins

Does this cardiac procedure involve pulmonary vein(s)?

◯ Yes
◯ No

Please complete the PV surgery or cath. interventions form. "Cardiac procedures" form is not required to fill out.

Cardiac procedure date

_____

Age (years)

_____
(e.g., for age 2 years and 9 months > put "2")

Age (months)

_____
(e.g., for age 2 years and 11 months > put "11")

Addition: Age (days)

Age in years (calculated filed)

_____
(e.g., for age 2 years & 11 months > this field displays "2.92")

SECTION: CARDIAC PROCEDURE SPECIFICATION

This is a drop down menu from the STS database. Typing in the first few letters of the procedure should allow you to then select the procedure. There is a place to record all the procedures that may have been done at one time. ie. ASD closure, TAPVD repair.

For each unique operation date, a new event is to be entered.

There is a place at the end of the form to upload the Operative report (deidentified).

There is a place to write text comments if you are unable to find the operation performed. Data at HSC can verify and enter the operation if the de-identified report is uploaded.

Specify the primary cardiac procedure

- ◯ PFO, Primary closure
- ◯ ASD repair, Primary closure
- ◯ ASD repair, Patch
- ◯ ASD repair, Device
- ◯ ASD repair, Patch + PAPVC repair
- ◯ ASD, Common atrium (single atrium), Septation
- ◯ ASD creation/enlargement
- ◯ ASD partial closure
- ◯ Atrial septal fenestration
- ◯ Atrial fenestration closure
- ◯ VSD repair, Primary closure
- ◯ VSD repair, Patch
- ◯ VSD repair, Device
- ◯ VSD, Multiple, Repair
- ◯ VSD creation/enlargement
- ◯ Ventricular septal fenestration
- ◯ AVC (AVSD) repair, Complete (CAVSD)
- ◯ AVC (AVSD) repair, Intermediate (Transitional)
- ◯ AVC (AVSD) repair, Partial (Incomplete) (PAVSD)
- ◯ Valvuloplasty, Common atrioventricular valve
- ◯ Valvuloplasty converted to valve replacement in the same operation, Common atrioventricular valve
- ◯ Valve replacement, Common atrioventricular valve
- ◯ AP window repair
- ◯ Pulmonary artery origin from ascending aorta (hemitruncus) repair
- ◯ Truncus arteriosus repair
- ◯ Valvuloplasty, Truncal valve
- ◯ Valvuloplasty converted to valve replacement in the same operation, Truncal valve
- ◯ Valve replacement, Truncal valve
- ◯ Truncus + Interrupted aortic arch repair (IAA) repair
- ◯ PAPVC repair
- ◯ PAPVC, Scimitar, Repair
- ◯ PAPVC repair, Baffle redirection to left atrium with systemic vein translocation (Warden) (SVC sewn to right atrial appendage)
- ◯ TAPVC repair
- ◯ TAPVC repair + Shunt - systemic-to-pulmonary
- ◯ Cor triatriatum repair
- ◯ Pulmonary venous stenosis repair
- ◯ Atrial baffle procedure (non-Mustard, non-Senning)
- ◯ Anomalous systemic venous connection repair
- ◯ Systemic venous stenosis repair
- ◯ TOF repair, No Ventriculotomy
- ◯ TOF repair, Ventriculotomy, Nontransanular patch
- ◯ TOF repair, Ventriculotomy, Transanular patch
- ◯ TOF repair, RV-PA conduit
- ◯ TOF - AVC (AVSD) repair
- ◯ TOF - Absent pulmonary valve repair
- ◯ Pulmonary atresia - VSD (including TOF, PA) repair
- ◯ Pulmonary atresia - VSD - MAPCA repair, Complete single stage repair (1 stage that includes bilateral pulmonary unifocalization + VSD closure + RV to PA connection [with or without conduit])
- ◯ Pulmonary atresia - VSD - MAPCA repair, Status post prior complete unifocalization (includes VSD closure + RV to PA connection [with or without conduit])
- ◯ Pulmonary atresia - VSD - MAPCA repair, Status post prior incomplete unifocalization (includes completion of pulmonary unifocalization + VSD closure + RV to PA connection [with or without conduit])
- ◯ Unifocalization MAPCA(s), Bilateral pulmonary unifocalization - Complete unifocalization (all usable MAPCA[s] are incorporated)
- ◯ Unifocalization MAPCA(s), Bilateral pulmonary unifocalization - Incomplete unifocalization (not

all usable MAPCA[s] are incorporated)
◯ Unifocalization MAPCA(s), Unilateral pulmonary unifocalization
◯ Unifocalization MAPCA(s)
◯ Occlusion of MAPCA(s)
◯ Valvuloplasty, Tricuspid (do not use this code if tricuspid valve malfunction is secondary to Ebstein's anomaly. Use 465
◯ Valvuloplasty converted to valve replacement in the same operation, Tricuspid
◯ Ebstein's repair
◯ Valve replacement, Tricuspid (TVR)
◯ Valve closure, Tricuspid (exclusion, univentricular approach)
◯ Valve excision, Tricuspid (without replacement)
◯ Valve surgery, Other, Tricuspid
◯ RVOT procedure
◯ 1 1/2 ventricular repair
◯ PA, reconstruction (plasty), Main (trunk)
◯ PA, reconstruction (plasty), Branch, Central (within the hilar bifurcation)
◯ PA, reconstruction (plasty), Branch, Peripheral (at or beyond the hilar bifurcation)
◯ DCRV repair
◯ Valvuloplasty, Pulmonic
◯ Valvuloplasty converted to valve replacement in the same operation, Pulmonic
◯ Valve replacement, Pulmonic (PVR)
◯ Valve excision, Pulmonary (without replacement)
◯ Valve closure, Semilunar
◯ Valve surgery, Other, Pulmonic
◯ Conduit placement, RV to PA
◯ Conduit placement, LV to PA
◯ Conduit placement, Ventricle to aorta
◯ Conduit placement, Other
◯ Conduit reoperation
◯ Valvuloplasty, Aortic
◯ Valvuloplasty converted to valve replacement in the same operation, Aortic
◯ Valvuloplasty converted to valve replacement in the same operation, Aortic - with Ross procedure
◯ Valvuloplasty converted to valve replacement in the same operation, Aortic - with Ross-Konno procedure
◯ Valve replacement, Aortic (AVR)
◯ Valve replacement, Aortic (AVR), Mechanical
◯ Valve replacement, Aortic (AVR), Bioprosthetic
◯ Valve replacement, Aortic (AVR), Homograft
◯ Aortic root replacement, Bioprosthetic
◯ Aortic root replacement, Mechanical
◯ Aortic root replacement, Homograft
◯ Aortic root replacement, Valve sparing
◯ Ross procedure
◯ Konno procedure
◯ Ross-Konno procedure
◯ Other annular enlargement procedure
◯ Aortic stenosis, Subvalvar, Repair
◯ Aortic stenosis, Subvalvar, Repair, With myectomy for IHSS
◯ Aortic stenosis, Supravalvar, Repair
◯ Valve surgery, Other, Aortic
◯ Sinus of Valsalva, Aneurysm repair
◯ LV to aorta tunnel repair
◯ Valvuloplasty, Mitral
◯ Valvuloplasty converted to valve replacement in the same operation, Mitral
◯ Mitral stenosis, Supravalvar mitral ring repair
◯ Valve replacement, Mitral (MVR)
◯ Valve surgery, Other, Mitral
◯ Norwood procedure
◯ HLHS biventricular repair

- ◯ Conduit insertion right ventricle to pulmonary artery + Intraventricular tunnel left ventricle to neoaorta + arch reconstruction (Rastelli and Norwood type arch reconstruction) (Yasui)
- ◯ Hybrid Approach "Stage 1", Application of RPA & LPA bands
- ◯ Hybrid Approach "Stage 1", Stent placement in arterial duct (PDA)
- ◯ Hybrid Approach "Stage 1", Stent placement in arterial duct (PDA) + application of RPA & LPA bands
- ◯ Hybrid approach "Stage 2", Aortopulmonary amalgamation + Superior Cavopulmonary anastomosis(es) + PA Debanding + Aortic arch repair (Norwood [Stage 1] + Superior Cavopulmonary anastomosis(es) + PA Debanding)
- ◯ Hybrid approach "Stage 2", Aortopulmonary amalgamation + Superior Cavopulmonary anastomosis(es) + PA Debanding + Without aortic arch repair
- ◯ Hybrid Approach, Transcardiac balloon dilatation
- ◯ Hybrid Approach, Transcardiac transcatheter device placement
- ◯ Transplant, Heart
- ◯ Transplant, Heart and lung
- ◯ Partial left ventriculectomy (LV volume reduction surgery) (Batista)
- ◯ Pericardial drainage procedure
- ◯ Pericardiectomy
- ◯ Pericardial procedure, Other
- ◯ Fontan, Atrio-pulmonary connection
- ◯ Fontan, Atrio-ventricular connection
- ◯ Fontan, TCPC, Lateral tunnel, Fenestrated
- ◯ Fontan, TCPC, Lateral tunnel, Nonfenestrated
- ◯ Fontan, TCPC, External conduit, Fenestrated
- ◯ Fontan, TCPC, External conduit, Nonfenestrated
- ◯ Fontan, TCPC, Intra/extracardiac conduit, Fenestrated
- ◯ Fontan, TCPC, Intra/extracardiac conduit, Nonfenestrated
- ◯ Fontan, TCPC, External conduit, hepatic veins to pulmonary artery, Fenestrated
- ◯ Fontan, TCPC, External conduit, hepatic veins to pulmonary artery, Nonfenestrated
- ◯ Fontan revision or conversion (Re-do Fontan)
- ◯ Fontan, Other
- ◯ Fontan + Atrioventricular valvuloplasty
- ◯ Ventricular septation
- ◯ Congenitally corrected TGA repair, Atrial switch and ASO (double switch)
- ◯ Congenitally corrected TGA repair, Atrial switch and Rastelli
- ◯ Congenitally corrected TGA repair, VSD closure
- ◯ Congenitally corrected TGA repair, VSD closure and LV to PA conduit
- ◯ Congenitally corrected TGA repair, Other
- ◯ Arterial switch operation (ASO)
- ◯ Arterial switch operation (ASO) and VSD repair
- ◯ Arterial switch procedure + Aortic arch repair
- ◯ Arterial switch procedure and VSD repair + Aortic arch repair
- ◯ Senning
- ◯ Mustard
- ◯ Atrial baffle procedure, Mustard or Senning revision
- ◯ Rastelli
- ◯ REV
- ◯ Aortic root translocation over left ventricle (Including Nikaidoh procedure)
- ◯ TGA, Other procedures (Kawashima, LV-PA conduit, other)

- ◯ DORV, Intraventricular tunnel repair
- ◯ DOLV repair
- ◯ Coarctation repair, End to end
- ◯ Coarctation repair, End to end, Extended
- ◯ Coarctation repair, Subclavian flap
- ◯ Coarctation repair, Patch aortoplasty
- ◯ Coarctation repair, Interposition graft
- ◯ Coarctation repair, Other
- ◯ Coarctation repair + VSD repair
- ◯ Aortic arch repair
- ◯ Aortic arch repair + VSD repair
- ◯ Coronary artery fistula ligation
- ◯ Anomalous origin of coronary artery from pulmonary artery repair
- ◯ Coronary artery bypass
- ◯ Anomalous aortic origin of coronary artery (AAOCA) repair
- ◯ Coronary artery procedure, Other
- ◯ Interrupted aortic arch repair
- ◯ PDA closure, Surgical
- ◯ PDA closure, Device
- ◯ Vascular ring repair
- ◯ Aortopexy
- ◯ Pulmonary artery sling repair
- ◯ Aortic aneurysm repair
- ◯ Aortic dissection repair
- ◯ Lung biopsy
- ◯ Transplant, lung(s)
- ◯ Lung procedure, Other
- ◯ Tracheal procedure
- ◯ Muscle flap, Trunk (i.e. intercostal, pectus, or serratus muscle)
- ◯ Muscle flap, Trunk (i.e. latissimus dorsi)
- ◯ Removal, Sternal wire
- ◯ Rib excision, Complete
- ◯ Rib excision, Partial
- ◯ Sternal fracture, Open treatment
- ◯ Sternal resection, Radical resection of the sternum
- ◯ Sternal resection, Radical resection of the sternum with mediastinal lymphadenectomy
- ◯ Tumor of chest wall, Excision including ribs
- ◯ Tumor of chest wall, Excision including ribs, With reconstruction
- ◯ Tumor of soft tissue of thorax, Excision of deep subfascial or intramuscular tumor
- ◯ Tumor of soft tissue of thorax, Excision of subcutaneous tumor
- ◯ Tumor of soft tissue of thorax, Radical resection
- ◯ Hyoid myotomy and suspension
- ◯ Muscle flap, Neck
- ◯ Procedure on neck
- ◯ Tumor of soft tissue of neck, Excision of deep subfascial or intramuscular tumor
- ◯ Tumor of soft tissue of neck, Excision of subcutaneous tumor
- ◯ Tumor of soft tissue of neck, Radical resection
- ◯ Pectus bar removal
- ◯ Pectus bar repositioning
- ◯ Pectus repair, Minimally invasive repair (Nuss), With thoracoscopy
- ◯ Pectus repair, Minimally invasive repair (Nuss), Without thoracoscopy
- ◯ Pectus repair, Open repair
- ◯ Division of scalenus anticus, With resection of a cervical rib
- ◯ Division of scalenus anticus, Without resection of a cervical rib
- ◯ Rib excision, Excision of a cervical rib
- ◯ Rib excision, Excision of a cervical rib, With sympathectomy
- ◯ Rib excision, Excision of first rib

- ◯ Rib excision, Excision of first rib, With sympathectomy
- ◯ Procedure on thorax
- ◯ Pacemaker implantation, Permanent
- ◯ Pacemaker procedure
- ◯ Explantation of pacing system
- ◯ ICD (AICD) implantation
- ◯ ICD (AICD) ([automatic] implantable cardioverter defibrillator) procedure
- ◯ Arrhythmia surgery - atrial, Surgical Ablation
- ◯ Arrhythmia surgery - ventricular, Surgical Ablation
- ◯ Cardiovascular catheterization procedure, Diagnostic
- ◯ Cardiovascular catheterization procedure, Diagnostic, Angiographic data obtained
- ◯ Cardiovascular catheterization procedure, Diagnostic, Electrophysiology alteration
- ◯ Cardiovascular catheterization procedure, Diagnostic, Hemodynamic alteration
- ◯ Cardiovascular catheterization procedure, Diagnostic, Hemodynamic data obtained
- ◯ Cardiovascular catheterization procedure, Diagnostic, Transluminal test occlusion
- ◯ Cardiovascular catheterization procedure, Therapeutic
- ◯ Cardiovascular catheterization procedure, Therapeutic, Adjunctive therapy
- ◯ Cardiovascular catheterization procedure, Therapeutic, Balloon dilation
- ◯ Cardiovascular catheterization procedure, Therapeutic, Balloon valvotomy
- ◯ Cardiovascular catheterization procedure, Therapeutic, Coil implantation
- ◯ Cardiovascular catheterization procedure, Therapeutic, Device implantation
- ◯ Cardiovascular catheterization procedure, Therapeutic, Device implantation attempted
- ◯ Cardiovascular catheterization procedure, Therapeutic, Electrophysiological ablation
- ◯ Cardiovascular catheterization procedure, Therapeutic, Intravascular foreign body removal
- ◯ Cardiovascular catheterization procedure, Therapeutic, Perforation (establishing interchamber and/or intervessel communication)
- ◯ Cardiovascular catheterization procedure, Therapeutic, Septostomy
- ◯ Cardiovascular catheterization procedure, Therapeutic, Stent insertion
- ◯ Cardiovascular catheterization procedure, Therapeutic, Stent re-dilation
- ◯ Cardiovascular catheterization procedure, Therapeutic, Transcatheter Fontan completion
- ◯ Cardiovascular catheterization procedure, Therapeutic, Transcatheter implantation of valve
- ◯ Shunt, Systemic to pulmonary, Modified Blalock-Taussig Shunt (MBTS)
- ◯ Shunt, Systemic to pulmonary, Central (shunt from aorta)
- ◯ Shunt, Systemic to pulmonary, Central (shunt from aorta) Central shunt with an end-to-side connection between the transected main pulmonary artery and the side of the ascending aorta (i.e. Mee shunt)
- ◯ Shunt, Systemic to pulmonary, Potts - Smith type (descending aorta to pulmonary artery)
- ◯ Shunt, Systemic to pulmonary, Other
- ◯ Shunt, Ligation and takedown
- ◯ Shunt, Reoperation
- ◯ PA banding (PAB)
- ◯ PA debanding
- ◯ PA band adjustment

◯ Damus-Kaye-Stansel procedure (DKS) (creation of AP anastomosis without arch reconstruction)
◯ Bidirectional cavopulmonary anastomosis (BDCPA) (bidirectional Glenn)
◯ Glenn (unidirectional cavopulmonary anastomosis) (unidirectional Glenn)
◯ Bilateral bidirectional cavopulmonary anastomosis (BBDCPA) (bilateral bidirectional Glenn)
◯ HemiFontan
◯ Superior cavopulmonary anastomosis(es) (Glenn or HemiFontan) + Atrioventricular valvuloplasty
◯ Superior Cavopulmonary anastomosis(es) + PA reconstruction
◯ Takedown of superior cavopulmonary anastomosis
◯ Hepatic vein to azygous vein connection, Direct
◯ Hepatic vein to azygous vein connection, Interposition graft
◯ Kawashima operation (superior cavopulmonary connection in setting of interrupted IVC with azygous continuation)
◯ Palliation, Other
◯ Attempted fetal intervention, percutaneous trans-catheter directed at interatrial septum
◯ Attempted fetal intervention, percutaneous trans-catheter directed at aortic valve
◯ Attempted fetal intervention, percutaneous trans-catheter directed at pulmonic valve
◯ Attempted fetal intervention "open" (maternal laparotomy with hysterotomy), directed at interatrial septum
◯ Attempted fetal intervention "open" (maternal laparotomy with hysterotomy), directed at aortic valve
◯ Attempted fetal intervention "open" (maternal laparotomy with hysterotomy), directed at pulmonic valve
◯ ECMO cannulation
◯ ECMO decannulation
◯ ECMO procedure
◯ Intraaortic balloon pump (IABP) insertion
◯ Right/left heart assist device procedure
◯ VAD explantation
◯ VAD implantation
◯ VAD change out
◯ Echocardiography procedure, Sedated transesophageal echocardiogram
◯ Echocardiography procedure, Sedated transthoracic echocardiogram
◯ Non-cardiovascular, Non-thoracic procedure on cardiac patient with cardiac anesthesia
◯ Radiology procedure on cardiac patient, Cardiac Computerized Axial Tomography (CT Scan)
◯ Radiology procedure on cardiac patient, Cardiac Magnetic Resonance Imaging (MRI)
◯ Radiology procedure on cardiac patient, Diagnostic radiology
◯ Radiology procedure on cardiac patient, Non-Cardiac Computerized Tomography (CT) on cardiac patient
◯ Radiology procedure on cardiac patient, Non-cardiac Magnetic Resonance Imaging (MRI) on cardiac patient
◯ Radiology procedure on cardiac patient, Therapeutic radiology
◯ Aneurysm, Ventricular, Right, Repair
◯ Aneurysm, Ventricular, Left, Repair
◯ Aneurysm, Pulmonary artery, Repair
◯ Cardiac tumor resection
◯ Pulmonary AV fistula repair/occlusion
◯ Ligation, Pulmonary artery
◯ Pulmonary embolectomy, Acute pulmonary embolus

◯ Pulmonary embolectomy, Chronic pulmonary embolus
◯ Pleural drainage procedure
◯ Pleural procedure, Other
◯ Ligation, Thoracic duct
◯ Decortication
◯ Esophageal procedure
◯ Mediastinal procedure
◯ Bronchoscopy
◯ Diaphragm plication
◯ Diaphragm procedure, Other
◯ VATS (video-assisted thoracoscopic surgery)
◯ Minimally invasive procedure
◯ Bypass for noncardiac lesion
◯ Delayed sternal closure
◯ Mediastinal exploration
◯ Sternotomy wound drainage
◯ Intravascular stent removal
◯ Removal of transcatheter delivered device from heart
◯ Removal of transcatheter delivered device from blood vessel
◯ Thoracotomy, Other
◯ Cardiotomy, Other
◯ Cardiac procedure, Other
◯ Thoracic and/or mediastinal procedure, Other
◯ Peripheral vascular procedure, Other
◯ Miscellaneous procedure, Other
◯ Organ procurement
◯ Other procedure

Specify the secondary cardiac procedure (if any)

- ◯ None
- ◯ PFO, Primary closure
- ◯ ASD repair, Primary closure
- ◯ ASD repair, Patch
- ◯ ASD repair, Device
- ◯ ASD repair, Patch + PAPVC repair
- ◯ ASD, Common atrium (single atrium), Septation
- ◯ ASD creation/enlargement
- ◯ ASD partial closure
- ◯ Atrial septal fenestration
- ◯ Atrial fenestration closure
- ◯ VSD repair, Primary closure
- ◯ VSD repair, Patch
- ◯ VSD repair, Device
- ◯ VSD, Multiple, Repair
- ◯ VSD creation/enlargement
- ◯ Ventricular septal fenestration
- ◯ AVC (AVSD) repair, Complete (CAVSD)
- ◯ AVC (AVSD) repair, Intermediate (Transitional)
- ◯ AVC (AVSD) repair, Partial (Incomplete) (PAVSD)
- ◯ Valvuloplasty, Common atrioventricular valve
- ◯ Valvuloplasty converted to valve replacement in the same operation, Common atrioventricular valve
- ◯ Valve replacement, Common atrioventricular valve
- ◯ AP window repair
- ◯ Pulmonary artery origin from ascending aorta (hemitruncus) repair
- ◯ Truncus arteriosus repair
- ◯ Valvuloplasty, Truncal valve
- ◯ Valvuloplasty converted to valve replacement in the same operation, Truncal valve
- ◯ Valve replacement, Truncal valve
- ◯ Truncus + Interrupted aortic arch repair (IAA) repair
- ◯ PAPVC repair
- ◯ PAPVC, Scimitar, Repair
- ◯ PAPVC repair, Baffle redirection to left atrium with systemic vein translocation (Warden) (SVC sewn to right atrial appendage)
- ◯ TAPVC repair
- ◯ TAPVC repair + Shunt - systemic-to-pulmonary
- ◯ Cor triatriatum repair
- ◯ Pulmonary venous stenosis repair
- ◯ Atrial baffle procedure (non-Mustard, non-Senning)
- ◯ Anomalous systemic venous connection repair
- ◯ Systemic venous stenosis repair
- ◯ TOF repair, No Ventriculotomy
- ◯ TOF repair, Ventriculotomy, Nontransanular patch
- ◯ TOF repair, Ventriculotomy, Transanular patch
- ◯ TOF repair, RV-PA conduit
- ◯ TOF - AVC (AVSD) repair
- ◯ TOF - Absent pulmonary valve repair
- ◯ Pulmonary atresia - VSD (including TOF, PA) repair
- ◯ Pulmonary atresia - VSD - MAPCA repair, Complete single stage repair (1 stage that includes bilateral pulmonary unifocalization + VSD closure + RV to PA connection [with or without conduit])
- ◯ Pulmonary atresia - VSD - MAPCA repair, Status post prior complete unifocalization (includes VSD closure + RV to PA connection [with or without conduit])
- ◯ Pulmonary atresia - VSD - MAPCA repair, Status post prior incomplete unifocalization (includes completion of pulmonary unifocalization + VSD closure + RV to PA connection [with or without conduit])
- ◯ Unifocalization MAPCA(s), Bilateral pulmonary unifocalization - Complete unifocalization (all usable MAPCA[s] are incorporated)
- ◯ Unifocalization MAPCA(s), Bilateral pulmonary

unifocalization - Incomplete unifocalization (not all usable MAPCA[s] are incorporated)
- ◯ Unifocalization MAPCA(s), Unilateral pulmonary unifocalization
- ◯ Unifocalization MAPCA(s)
- ◯ Occlusion of MAPCA(s)
- ◯ Valvuloplasty, Tricuspid (do not use this code if tricuspid valve malfunction is secondary to Ebstein's anomaly. Use 465
- ◯ Valvuloplasty converted to valve replacement in the same operation, Tricuspid
- ◯ Ebstein's repair
- ◯ Valve replacement, Tricuspid (TVR)
- ◯ Valve closure, Tricuspid (exclusion, univentricular approach)
- ◯ Valve excision, Tricuspid (without replacement)
- ◯ Valve surgery, Other, Tricuspid
- ◯ RVOT procedure
- ◯ 1 1/2 ventricular repair
- ◯ PA, reconstruction (plasty), Main (trunk)
- ◯ PA, reconstruction (plasty), Branch, Central (within the hilar bifurcation)
- ◯ PA, reconstruction (plasty), Branch, Peripheral (at or beyond the hilar bifurcation)
- ◯ DCRV repair
- ◯ Valvuloplasty, Pulmonic
- ◯ Valvuloplasty converted to valve replacement in the same operation, Pulmonic
- ◯ Valve replacement, Pulmonic (PVR)
- ◯ Valve excision, Pulmonary (without replacement)
- ◯ Valve closure, Semilunar
- ◯ Valve surgery, Other, Pulmonic
- ◯ Conduit placement, RV to PA
- ◯ Conduit placement, LV to PA
- ◯ Conduit placement, Ventricle to aorta
- ◯ Conduit placement, Other
- ◯ Conduit reoperation
- ◯ Valvuloplasty, Aortic
- ◯ Valvuloplasty converted to valve replacement in the same operation, Aortic
- ◯ Valvuloplasty converted to valve replacement in the same operation, Aortic - with Ross procedure
- ◯ Valvuloplasty converted to valve replacement in the same operation, Aortic - with Ross-Konno procedure
- ◯ Valve replacement, Aortic (AVR)
- ◯ Valve replacement, Aortic (AVR), Mechanical
- ◯ Valve replacement, Aortic (AVR), Bioprosthetic
- ◯ Valve replacement, Aortic (AVR), Homograft
- ◯ Aortic root replacement, Bioprosthetic
- ◯ Aortic root replacement, Mechanical
- ◯ Aortic root replacement, Homograft
- ◯ Aortic root replacement, Valve sparing
- ◯ Ross procedure
- ◯ Konno procedure
- ◯ Ross-Konno procedure
- ◯ Other annular enlargement procedure
- ◯ Aortic stenosis, Subvalvar, Repair
- ◯ Aortic stenosis, Subvalvar, Repair, With myectomy for IHSS
- ◯ Aortic stenosis, Supravalvar, Repair
- ◯ Valve surgery, Other, Aortic
- ◯ Sinus of Valsalva, Aneurysm repair
- ◯ LV to aorta tunnel repair
- ◯ Valvuloplasty, Mitral
- ◯ Valvuloplasty converted to valve replacement in the same operation, Mitral
- ◯ Mitral stenosis, Supravalvar mitral ring repair
- ◯ Valve replacement, Mitral (MVR)
- ◯ Valve surgery, Other, Mitral
- ◯ Norwood procedure

- ◯ HLHS biventricular repair
- ◯ Conduit insertion right ventricle to pulmonary artery + Intraventricular tunnel left ventricle to neoaorta + arch reconstruction (Rastelli and Norwood type arch reconstruction) (Yasui)
- ◯ Hybrid Approach "Stage 1", Application of RPA & LPA bands
- ◯ Hybrid Approach "Stage 1", Stent placement in arterial duct (PDA)
- ◯ Hybrid Approach "Stage 1", Stent placement in arterial duct (PDA) + application of RPA & LPA bands
- ◯ Hybrid approach "Stage 2", Aortopulmonary amalgamation + Superior Cavopulmonary anastomosis(es) + PA Debanding + Aortic arch repair (Norwood [Stage 1] + Superior Cavopulmonary anastomosis(es) + PA Debanding)
- ◯ Hybrid approach "Stage 2", Aortopulmonary amalgamation + Superior Cavopulmonary anastomosis(es) + PA Debanding + Without aortic arch repair
- ◯ Hybrid Approach, Transcardiac balloon dilatation
- ◯ Hybrid Approach, Transcardiac transcatheter device placement
- ◯ Transplant, Heart
- ◯ Transplant, Heart and lung
- ◯ Partial left ventriculectomy (LV volume reduction surgery) (Batista)
- ◯ Pericardial drainage procedure
- ◯ Pericardiectomy
- ◯ Pericardial procedure, Other
- ◯ Fontan, Atrio-pulmonary connection
- ◯ Fontan, Atrio-ventricular connection
- ◯ Fontan, TCPC, Lateral tunnel, Fenestrated
- ◯ Fontan, TCPC, Lateral tunnel, Nonfenestrated
- ◯ Fontan, TCPC, External conduit, Fenestrated
- ◯ Fontan, TCPC, External conduit, Nonfenestrated
- ◯ Fontan, TCPC, Intra/extracardiac conduit, Fenestrated
- ◯ Fontan, TCPC, Intra/extracardiac conduit, Nonfenestrated
- ◯ Fontan, TCPC, External conduit, hepatic veins to pulmonary artery, Fenestrated
- ◯ Fontan, TCPC, External conduit, hepatic veins to pulmonary artery, Nonfenestrated
- ◯ Fontan revision or conversion (Re-do Fontan)
- ◯ Fontan, Other
- ◯ Fontan + Atrioventricular valvuloplasty
- ◯ Ventricular septation
- ◯ Congenitally corrected TGA repair, Atrial switch and ASO (double switch)
- ◯ Congenitally corrected TGA repair, Atrial switch and Rastelli
- ◯ Congenitally corrected TGA repair, VSD closure
- ◯ Congenitally corrected TGA repair, VSD closure and LV to PA conduit
- ◯ Congenitally corrected TGA repair, Other
- ◯ Arterial switch operation (ASO)
- ◯ Arterial switch operation (ASO) and VSD repair
- ◯ Arterial switch procedure + Aortic arch repair
- ◯ Arterial switch procedure and VSD repair + Aortic arch repair
- ◯ Senning
- ◯ Mustard
- ◯ Atrial baffle procedure, Mustard or Senning revision
- ◯ Rastelli
- ◯ REV
- ◯ Aortic root translocation over left ventricle (Including Nikaidoh procedure)
- ◯ TGA, Other procedures (Kawashima, LV-PA conduit,

other)
- ◯ DORV, Intraventricular tunnel repair
- ◯ DOLV repair
- ◯ Coarctation repair, End to end
- ◯ Coarctation repair, End to end, Extended
- ◯ Coarctation repair, Subclavian flap
- ◯ Coarctation repair, Patch aortoplasty
- ◯ Coarctation repair, Interposition graft
- ◯ Coarctation repair, Other
- ◯ Coarctation repair + VSD repair
- ◯ Aortic arch repair
- ◯ Aortic arch repair + VSD repair
- ◯ Coronary artery fistula ligation
- ◯ Anomalous origin of coronary artery from pulmonary artery repair
- ◯ Coronary artery bypass
- ◯ Anomalous aortic origin of coronary artery (AAOCA) repair
- ◯ Coronary artery procedure, Other
- ◯ Interrupted aortic arch repair
- ◯ PDA closure, Surgical
- ◯ PDA closure, Device
- ◯ Vascular ring repair
- ◯ Aortopexy
- ◯ Pulmonary artery sling repair
- ◯ Aortic aneurysm repair
- ◯ Aortic dissection repair
- ◯ Lung biopsy
- ◯ Transplant, lung(s)
- ◯ Lung procedure, Other
- ◯ Tracheal procedure
- ◯ Muscle flap, Trunk (i.e. intercostal, pectus, or serratus muscle)
- ◯ Muscle flap, Trunk (i.e. latissimus dorsi)
- ◯ Removal, Sternal wire
- ◯ Rib excision, Complete
- ◯ Rib excision, Partial
- ◯ Sternal fracture, Open treatment
- ◯ Sternal resection, Radical resection of the sternum
- ◯ Sternal resection, Radical resection of the sternum with mediastinal lymphadenectomy
- ◯ Tumor of chest wall, Excision including ribs
- ◯ Tumor of chest wall, Excision including ribs, With reconstruction
- ◯ Tumor of soft tissue of thorax, Excision of deep subfascial or intramuscular tumor
- ◯ Tumor of soft tissue of thorax, Excision of subcutaneous tumor
- ◯ Tumor of soft tissue of thorax, Radical resection
- ◯ Hyoid myotomy and suspension
- ◯ Muscle flap, Neck
- ◯ Procedure on neck
- ◯ Tumor of soft tissue of neck, Excision of deep subfascial or intramuscular tumor
- ◯ Tumor of soft tissue of neck, Excision of subcutaneous tumor
- ◯ Tumor of soft tissue of neck, Radical resection
- ◯ Pectus bar removal
- ◯ Pectus bar repositioning
- ◯ Pectus repair, Minimally invasive repair (Nuss), With thoracoscopy
- ◯ Pectus repair, Minimally invasive repair (Nuss), Without thoracoscopy
- ◯ Pectus repair, Open repair
- ◯ Division of scalenus anticus, With resection of a cervical rib
- ◯ Division of scalenus anticus, Without resection of a cervical rib
- ◯ Rib excision, Excision of a cervical rib
- ◯ Rib excision, Excision of a cervical rib, With sympathectomy

- ◯ Rib excision, Excision of first rib
- ◯ Rib excision, Excision of first rib, With sympathectomy
- ◯ Procedure on thorax
- ◯ Pacemaker implantation, Permanent
- ◯ Pacemaker procedure
- ◯ Explantation of pacing system
- ◯ ICD (AICD) implantation
- ◯ ICD (AICD) ([automatic] implantable cardioverter defibrillator) procedure
- ◯ Arrhythmia surgery - atrial, Surgical Ablation
- ◯ Arrhythmia surgery - ventricular, Surgical Ablation
- ◯ Cardiovascular catheterization procedure, Diagnostic
- ◯ Cardiovascular catheterization procedure, Diagnostic, Angiographic data obtained
- ◯ Cardiovascular catheterization procedure, Diagnostic, Electrophysiology alteration
- ◯ Cardiovascular catheterization procedure, Diagnostic, Hemodynamic alteration
- ◯ Cardiovascular catheterization procedure, Diagnostic, Hemodynamic data obtained
- ◯ Cardiovascular catheterization procedure, Diagnostic, Transluminal test occlusion
- ◯ Cardiovascular catheterization procedure, Therapeutic
- ◯ Cardiovascular catheterization procedure, Therapeutic, Adjunctive therapy
- ◯ Cardiovascular catheterization procedure, Therapeutic, Balloon dilation
- ◯ Cardiovascular catheterization procedure, Therapeutic, Balloon valvotomy
- ◯ Cardiovascular catheterization procedure, Therapeutic, Coil implantation
- ◯ Cardiovascular catheterization procedure, Therapeutic, Device implantation
- ◯ Cardiovascular catheterization procedure, Therapeutic, Device implantation attempted
- ◯ Cardiovascular catheterization procedure, Therapeutic, Electrophysiological ablation
- ◯ Cardiovascular catheterization procedure, Therapeutic, Intravascular foreign body removal
- ◯ Cardiovascular catheterization procedure, Therapeutic, Perforation (establishing interchamber and/or intervessel communication)
- ◯ Cardiovascular catheterization procedure, Therapeutic, Septostomy
- ◯ Cardiovascular catheterization procedure, Therapeutic, Stent insertion
- ◯ Cardiovascular catheterization procedure, Therapeutic, Stent re-dilation
- ◯ Cardiovascular catheterization procedure, Therapeutic, Transcatheter Fontan completion
- ◯ Cardiovascular catheterization procedure, Therapeutic, Transcatheter implantation of valve
- ◯ Shunt, Systemic to pulmonary, Modified Blalock-Taussig Shunt (MBTS)
- ◯ Shunt, Systemic to pulmonary, Central (shunt from aorta)
- ◯ Shunt, Systemic to pulmonary, Central (shunt from aorta) Central shunt with an end-to-side connection between the transected main pulmonary artery and the side of the ascending aorta (i.e. Mee shunt)
- ◯ Shunt, Systemic to pulmonary, Potts - Smith type (descending aorta to pulmonary artery)
- ◯ Shunt, Systemic to pulmonary, Other
- ◯ Shunt, Ligation and takedown
- ◯ Shunt, Reoperation
- ◯ PA banding (PAB)
- ◯ PA debanding

- ◯ PA band adjustment
- ◯ Damus-Kaye-Stansel procedure (DKS) (creation of AP anastomosis without arch reconstruction)
- ◯ Bidirectional cavopulmonary anastomosis (BDCPA) (bidirectional Glenn)
- ◯ Glenn (unidirectional cavopulmonary anastomosis) (unidirectional Glenn)
- ◯ Bilateral bidirectional cavopulmonary anastomosis (BBDCPA) (bilateral bidirectional Glenn)
- ◯ HemiFontan
- ◯ Superior cavopulmonary anastomosis(es) (Glenn or HemiFontan) + Atrioventricular valvuloplasty
- ◯ Superior Cavopulmonary anastomosis(es) + PA reconstruction
- ◯ Takedown of superior cavopulmonary anastomosis
- ◯ Hepatic vein to azygous vein connection, Direct
- ◯ Hepatic vein to azygous vein connection, Interposition graft
- ◯ Kawashima operation (superior cavopulmonary connection in setting of interrupted IVC with azygous continuation)
- ◯ Palliation, Other
- ◯ Attempted fetal intervention, percutaneous trans-catheter directed at interatrial septum
- ◯ Attempted fetal intervention, percutaneous trans-catheter directed at aortic valve
- ◯ Attempted fetal intervention, percutaneous trans-catheter directed at pulmonic valve
- ◯ Attempted fetal intervention "open" (maternal laparotomy with hysterotomy), directed at interatrial septum
- ◯ Attempted fetal intervention "open" (maternal laparotomy with hysterotomy), directed at aortic valve
- ◯ Attempted fetal intervention "open" (maternal laparotomy with hysterotomy), directed at pulmonic valve
- ◯ ECMO cannulation
- ◯ ECMO decannulation
- ◯ ECMO procedure
- ◯ Intraaortic balloon pump (IABP) insertion
- ◯ Right/left heart assist device procedure
- ◯ VAD explantation
- ◯ VAD implantation
- ◯ VAD change out
- ◯ Echocardiography procedure, Sedated transesophageal echocardiogram
- ◯ Echocardiography procedure, Sedated transthoracic echocardiogram
- ◯ Non-cardiovascular, Non-thoracic procedure on cardiac patient with cardiac anesthesia
- ◯ Radiology procedure on cardiac patient, Cardiac Computerized Axial Tomography (CT Scan)
- ◯ Radiology procedure on cardiac patient, Cardiac Magnetic Resonance Imaging (MRI)
- ◯ Radiology procedure on cardiac patient, Diagnostic radiology
- ◯ Radiology procedure on cardiac patient, Non-Cardiac Computerized Tomography (CT) on cardiac patient
- ◯ Radiology procedure on cardiac patient, Non-cardiac Magnetic Resonance Imaging (MRI) on cardiac patient
- ◯ Radiology procedure on cardiac patient, Therapeutic radiology
- ◯ Aneurysm, Ventricular, Right, Repair
- ◯ Aneurysm, Ventricular, Left, Repair
- ◯ Aneurysm, Pulmonary artery, Repair
- ◯ Cardiac tumor resection
- ◯ Pulmonary AV fistula repair/occlusion
- ◯ Ligation, Pulmonary artery

◯ Pulmonary embolectomy, Acute pulmonary embolus
◯ Pulmonary embolectomy, Chronic pulmonary embolus
◯ Pleural drainage procedure
◯ Pleural procedure, Other
◯ Ligation, Thoracic duct
◯ Decortication
◯ Esophageal procedure
◯ Mediastinal procedure
◯ Bronchoscopy
◯ Diaphragm plication
◯ Diaphragm procedure, Other
◯ VATS (video-assisted thoracoscopic surgery)
◯ Minimally invasive procedure
◯ Bypass for noncardiac lesion
◯ Delayed sternal closure
◯ Mediastinal exploration
◯ Sternotomy wound drainage
◯ Intravascular stent removal
◯ Removal of transcatheter delivered device from heart
◯ Removal of transcatheter delivered device from blood vessel
◯ Thoracotomy, Other
◯ Cardiotomy, Other
◯ Cardiac procedure, Other
◯ Thoracic and/or mediastinal procedure, Other
◯ Peripheral vascular procedure, Other
◯ Miscellaneous procedure, Other
◯ Organ procurement
◯ Other procedure

Specify the other cardiac procedure (if any)

- ◯ None
- ◯ PFO, Primary closure
- ◯ ASD repair, Primary closure
- ◯ ASD repair, Patch
- ◯ ASD repair, Device
- ◯ ASD repair, Patch + PAPVC repair
- ◯ ASD, Common atrium (single atrium), Septation
- ◯ ASD creation/enlargement
- ◯ ASD partial closure
- ◯ Atrial septal fenestration
- ◯ Atrial fenestration closure
- ◯ VSD repair, Primary closure
- ◯ VSD repair, Patch
- ◯ VSD repair, Device
- ◯ VSD, Multiple, Repair
- ◯ VSD creation/enlargement
- ◯ Ventricular septal fenestration
- ◯ AVC (AVSD) repair, Complete (CAVSD)
- ◯ AVC (AVSD) repair, Intermediate (Transitional)
- ◯ AVC (AVSD) repair, Partial (Incomplete) (PAVSD)
- ◯ Valvuloplasty, Common atrioventricular valve
- ◯ Valvuloplasty converted to valve replacement in the same operation, Common atrioventricular valve
- ◯ Valve replacement, Common atrioventricular valve
- ◯ AP window repair
- ◯ Pulmonary artery origin from ascending aorta (hemitruncus) repair
- ◯ Truncus arteriosus repair
- ◯ Valvuloplasty, Truncal valve
- ◯ Valvuloplasty converted to valve replacement in the same operation, Truncal valve
- ◯ Valve replacement, Truncal valve
- ◯ Truncus + Interrupted aortic arch repair (IAA) repair
- ◯ PAPVC repair
- ◯ PAPVC, Scimitar, Repair
- ◯ PAPVC repair, Baffle redirection to left atrium with systemic vein translocation (Warden) (SVC sewn to right atrial appendage)
- ◯ TAPVC repair
- ◯ TAPVC repair + Shunt - systemic-to-pulmonary
- ◯ Cor triatriatum repair
- ◯ Pulmonary venous stenosis repair
- ◯ Atrial baffle procedure (non-Mustard, non-Senning)
- ◯ Anomalous systemic venous connection repair
- ◯ Systemic venous stenosis repair
- ◯ TOF repair, No Ventriculotomy
- ◯ TOF repair, Ventriculotomy, Nontransanular patch
- ◯ TOF repair, Ventriculotomy, Transanular patch
- ◯ TOF repair, RV-PA conduit
- ◯ TOF - AVC (AVSD) repair
- ◯ TOF - Absent pulmonary valve repair
- ◯ Pulmonary atresia - VSD (including TOF, PA) repair
- ◯ Pulmonary atresia - VSD - MAPCA repair, Complete single stage repair (1 stage that includes bilateral pulmonary unifocalization + VSD closure + RV to PA connection [with or without conduit])
- ◯ Pulmonary atresia - VSD - MAPCA repair, Status post prior complete unifocalization (includes VSD closure + RV to PA connection [with or without conduit])
- ◯ Pulmonary atresia - VSD - MAPCA repair, Status post prior incomplete unifocalization (includes completion of pulmonary unifocalization + VSD closure + RV to PA connection [with or without conduit])
- ◯ Unifocalization MAPCA(s), Bilateral pulmonary unifocalization - Complete unifocalization (all usable MAPCA[s] are incorporated)
- ◯ Unifocalization MAPCA(s), Bilateral pulmonary

unifocalization - Incomplete unifocalization (not all usable MAPCA[s] are incorporated)
- ◯ Unifocalization MAPCA(s), Unilateral pulmonary unifocalization
- ◯ Unifocalization MAPCA(s)
- ◯ Occlusion of MAPCA(s)
- ◯ Valvuloplasty, Tricuspid (do not use this code if tricuspid valve malfunction is secondary to Ebstein's anomaly. Use 465
- ◯ Valvuloplasty converted to valve replacement in the same operation, Tricuspid
- ◯ Ebstein's repair
- ◯ Valve replacement, Tricuspid (TVR)
- ◯ Valve closure, Tricuspid (exclusion, univentricular approach)
- ◯ Valve excision, Tricuspid (without replacement)
- ◯ Valve surgery, Other, Tricuspid
- ◯ RVOT procedure
- ◯ 1 1/2 ventricular repair
- ◯ PA, reconstruction (plasty), Main (trunk)
- ◯ PA, reconstruction (plasty), Branch, Central (within the hilar bifurcation)
- ◯ PA, reconstruction (plasty), Branch, Peripheral (at or beyond the hilar bifurcation)
- ◯ DCRV repair
- ◯ Valvuloplasty, Pulmonic
- ◯ Valvuloplasty converted to valve replacement in the same operation, Pulmonic
- ◯ Valve replacement, Pulmonic (PVR)
- ◯ Valve excision, Pulmonary (without replacement)
- ◯ Valve closure, Semilunar
- ◯ Valve surgery, Other, Pulmonic
- ◯ Conduit placement, RV to PA
- ◯ Conduit placement, LV to PA
- ◯ Conduit placement, Ventricle to aorta
- ◯ Conduit placement, Other
- ◯ Conduit reoperation
- ◯ Valvuloplasty, Aortic
- ◯ Valvuloplasty converted to valve replacement in the same operation, Aortic
- ◯ Valvuloplasty converted to valve replacement in the same operation, Aortic - with Ross procedure
- ◯ Valvuloplasty converted to valve replacement in the same operation, Aortic - with Ross-Konno procedure
- ◯ Valve replacement, Aortic (AVR)
- ◯ Valve replacement, Aortic (AVR), Mechanical
- ◯ Valve replacement, Aortic (AVR), Bioprosthetic
- ◯ Valve replacement, Aortic (AVR), Homograft
- ◯ Aortic root replacement, Bioprosthetic
- ◯ Aortic root replacement, Mechanical
- ◯ Aortic root replacement, Homograft
- ◯ Aortic root replacement, Valve sparing
- ◯ Ross procedure
- ◯ Konno procedure
- ◯ Ross-Konno procedure
- ◯ Other annular enlargement procedure
- ◯ Aortic stenosis, Subvalvar, Repair
- ◯ Aortic stenosis, Subvalvar, Repair, With myectomy for IHSS
- ◯ Aortic stenosis, Supravalvar, Repair
- ◯ Valve surgery, Other, Aortic
- ◯ Sinus of Valsalva, Aneurysm repair
- ◯ LV to aorta tunnel repair
- ◯ Valvuloplasty, Mitral
- ◯ Valvuloplasty converted to valve replacement in the same operation, Mitral
- ◯ Mitral stenosis, Supravalvar mitral ring repair
- ◯ Valve replacement, Mitral (MVR)
- ◯ Valve surgery, Other, Mitral
- ◯ Norwood procedure

- ◯ HLHS biventricular repair
- ◯ Conduit insertion right ventricle to pulmonary artery + Intraventricular tunnel left ventricle to neoaorta + arch reconstruction (Rastelli and Norwood type arch reconstruction) (Yasui)
- ◯ Hybrid Approach "Stage 1", Application of RPA & LPA bands
- ◯ Hybrid Approach "Stage 1", Stent placement in arterial duct (PDA)
- ◯ Hybrid Approach "Stage 1", Stent placement in arterial duct (PDA) + application of RPA & LPA bands
- ◯ Hybrid approach "Stage 2", Aortopulmonary amalgamation + Superior Cavopulmonary anastomosis(es) + PA Debanding + Aortic arch repair (Norwood [Stage 1] + Superior Cavopulmonary anastomosis(es) + PA Debanding)
- ◯ Hybrid approach "Stage 2", Aortopulmonary amalgamation + Superior Cavopulmonary anastomosis(es) + PA Debanding + Without aortic arch repair
- ◯ Hybrid Approach, Transcardiac balloon dilatation
- ◯ Hybrid Approach, Transcardiac transcatheter device placement
- ◯ Transplant, Heart
- ◯ Transplant, Heart and lung
- ◯ Partial left ventriculectomy (LV volume reduction surgery) (Batista)
- ◯ Pericardial drainage procedure
- ◯ Pericardiectomy
- ◯ Pericardial procedure, Other
- ◯ Fontan, Atrio-pulmonary connection
- ◯ Fontan, Atrio-ventricular connection
- ◯ Fontan, TCPC, Lateral tunnel, Fenestrated
- ◯ Fontan, TCPC, Lateral tunnel, Nonfenestrated
- ◯ Fontan, TCPC, External conduit, Fenestrated
- ◯ Fontan, TCPC, External conduit, Nonfenestrated
- ◯ Fontan, TCPC, Intra/extracardiac conduit, Fenestrated
- ◯ Fontan, TCPC, Intra/extracardiac conduit, Nonfenestrated
- ◯ Fontan, TCPC, External conduit, hepatic veins to pulmonary artery, Fenestrated
- ◯ Fontan, TCPC, External conduit, hepatic veins to pulmonary artery, Nonfenestrated
- ◯ Fontan revision or conversion (Re-do Fontan)
- ◯ Fontan, Other
- ◯ Fontan + Atrioventricular valvuloplasty
- ◯ Ventricular septation
- ◯ Congenitally corrected TGA repair, Atrial switch and ASO (double switch)
- ◯ Congenitally corrected TGA repair, Atrial switch and Rastelli
- ◯ Congenitally corrected TGA repair, VSD closure
- ◯ Congenitally corrected TGA repair, VSD closure and LV to PA conduit
- ◯ Congenitally corrected TGA repair, Other
- ◯ Arterial switch operation (ASO)
- ◯ Arterial switch operation (ASO) and VSD repair
- ◯ Arterial switch procedure + Aortic arch repair
- ◯ Arterial switch procedure and VSD repair + Aortic arch repair
- ◯ Senning
- ◯ Mustard
- ◯ Atrial baffle procedure, Mustard or Senning revision
- ◯ Rastelli
- ◯ REV
- ◯ Aortic root translocation over left ventricle (Including Nikaidoh procedure)
- ◯ TGA, Other procedures (Kawashima, LV-PA conduit,

other)
- ◯ DORV, Intraventricular tunnel repair
- ◯ DOLV repair
- ◯ Coarctation repair, End to end
- ◯ Coarctation repair, End to end, Extended
- ◯ Coarctation repair, Subclavian flap
- ◯ Coarctation repair, Patch aortoplasty
- ◯ Coarctation repair, Interposition graft
- ◯ Coarctation repair, Other
- ◯ Coarctation repair + VSD repair
- ◯ Aortic arch repair
- ◯ Aortic arch repair + VSD repair
- ◯ Coronary artery fistula ligation
- ◯ Anomalous origin of coronary artery from pulmonary artery repair
- ◯ Coronary artery bypass
- ◯ Anomalous aortic origin of coronary artery (AAOCA) repair
- ◯ Coronary artery procedure, Other
- ◯ Interrupted aortic arch repair
- ◯ PDA closure, Surgical
- ◯ PDA closure, Device
- ◯ Vascular ring repair
- ◯ Aortopexy
- ◯ Pulmonary artery sling repair
- ◯ Aortic aneurysm repair
- ◯ Aortic dissection repair
- ◯ Lung biopsy
- ◯ Transplant, lung(s)
- ◯ Lung procedure, Other
- ◯ Tracheal procedure
- ◯ Muscle flap, Trunk (i.e. intercostal, pectus, or serratus muscle)
- ◯ Muscle flap, Trunk (i.e. latissimus dorsi)
- ◯ Removal, Sternal wire
- ◯ Rib excision, Complete
- ◯ Rib excision, Partial
- ◯ Sternal fracture, Open treatment
- ◯ Sternal resection, Radical resection of the sternum
- ◯ Sternal resection, Radical resection of the sternum with mediastinal lymphadenectomy
- ◯ Tumor of chest wall, Excision including ribs
- ◯ Tumor of chest wall, Excision including ribs, With reconstruction
- ◯ Tumor of soft tissue of thorax, Excision of deep subfascial or intramuscular tumor
- ◯ Tumor of soft tissue of thorax, Excision of subcutaneous tumor
- ◯ Tumor of soft tissue of thorax, Radical resection
- ◯ Hyoid myotomy and suspension
- ◯ Muscle flap, Neck
- ◯ Procedure on neck
- ◯ Tumor of soft tissue of neck, Excision of deep subfascial or intramuscular tumor
- ◯ Tumor of soft tissue of neck, Excision of subcutaneous tumor
- ◯ Tumor of soft tissue of neck, Radical resection
- ◯ Pectus bar removal
- ◯ Pectus bar repositioning
- ◯ Pectus repair, Minimally invasive repair (Nuss), With thoracoscopy
- ◯ Pectus repair, Minimally invasive repair (Nuss), Without thoracoscopy
- ◯ Pectus repair, Open repair
- ◯ Division of scalenus anticus, With resection of a cervical rib
- ◯ Division of scalenus anticus, Without resection of a cervical rib
- ◯ Rib excision, Excision of a cervical rib
- ◯ Rib excision, Excision of a cervical rib, With sympathectomy

- ◯ Rib excision, Excision of first rib
- ◯ Rib excision, Excision of first rib, With sympathectomy
- ◯ Procedure on thorax
- ◯ Pacemaker implantation, Permanent
- ◯ Pacemaker procedure
- ◯ Explantation of pacing system
- ◯ ICD (AICD) implantation
- ◯ ICD (AICD) ([automatic] implantable cardioverter defibrillator) procedure
- ◯ Arrhythmia surgery - atrial, Surgical Ablation
- ◯ Arrhythmia surgery - ventricular, Surgical Ablation
- ◯ Cardiovascular catheterization procedure, Diagnostic
- ◯ Cardiovascular catheterization procedure, Diagnostic, Angiographic data obtained
- ◯ Cardiovascular catheterization procedure, Diagnostic, Electrophysiology alteration
- ◯ Cardiovascular catheterization procedure, Diagnostic, Hemodynamic alteration
- ◯ Cardiovascular catheterization procedure, Diagnostic, Hemodynamic data obtained
- ◯ Cardiovascular catheterization procedure, Diagnostic, Transluminal test occlusion
- ◯ Cardiovascular catheterization procedure, Therapeutic
- ◯ Cardiovascular catheterization procedure, Therapeutic, Adjunctive therapy
- ◯ Cardiovascular catheterization procedure, Therapeutic, Balloon dilation
- ◯ Cardiovascular catheterization procedure, Therapeutic, Balloon valvotomy
- ◯ Cardiovascular catheterization procedure, Therapeutic, Coil implantation
- ◯ Cardiovascular catheterization procedure, Therapeutic, Device implantation
- ◯ Cardiovascular catheterization procedure, Therapeutic, Device implantation attempted
- ◯ Cardiovascular catheterization procedure, Therapeutic, Electrophysiological ablation
- ◯ Cardiovascular catheterization procedure, Therapeutic, Intravascular foreign body removal
- ◯ Cardiovascular catheterization procedure, Therapeutic, Perforation (establishing interchamber and/or intervessel communication)
- ◯ Cardiovascular catheterization procedure, Therapeutic, Septostomy
- ◯ Cardiovascular catheterization procedure, Therapeutic, Stent insertion
- ◯ Cardiovascular catheterization procedure, Therapeutic, Stent re-dilation
- ◯ Cardiovascular catheterization procedure, Therapeutic, Transcatheter Fontan completion
- ◯ Cardiovascular catheterization procedure, Therapeutic, Transcatheter implantation of valve
- ◯ Shunt, Systemic to pulmonary, Modified Blalock-Taussig Shunt (MBTS)
- ◯ Shunt, Systemic to pulmonary, Central (shunt from aorta)
- ◯ Shunt, Systemic to pulmonary, Central (shunt from aorta) Central shunt with an end-to-side connection between the transected main pulmonary artery and the side of the ascending aorta (i.e. Mee shunt)
- ◯ Shunt, Systemic to pulmonary, Potts - Smith type (descending aorta to pulmonary artery)
- ◯ Shunt, Systemic to pulmonary, Other
- ◯ Shunt, Ligation and takedown
- ◯ Shunt, Reoperation
- ◯ PA banding (PAB)
- ◯ PA debanding

- ◯ PA band adjustment
- ◯ Damus-Kaye-Stansel procedure (DKS) (creation of AP anastomosis without arch reconstruction)
- ◯ Bidirectional cavopulmonary anastomosis (BDCPA) (bidirectional Glenn)
- ◯ Glenn (unidirectional cavopulmonary anastomosis) (unidirectional Glenn)
- ◯ Bilateral bidirectional cavopulmonary anastomosis (BBDCPA) (bilateral bidirectional Glenn)
- ◯ HemiFontan
- ◯ Superior cavopulmonary anastomosis(es) (Glenn or HemiFontan) + Atrioventricular valvuloplasty
- ◯ Superior Cavopulmonary anastomosis(es) + PA reconstruction
- ◯ Takedown of superior cavopulmonary anastomosis
- ◯ Hepatic vein to azygous vein connection, Direct
- ◯ Hepatic vein to azygous vein connection, Interposition graft
- ◯ Kawashima operation (superior cavopulmonary connection in setting of interrupted IVC with azygous continuation)
- ◯ Palliation, Other
- ◯ Attempted fetal intervention, percutaneous trans-catheter directed at interatrial septum
- ◯ Attempted fetal intervention, percutaneous trans-catheter directed at aortic valve
- ◯ Attempted fetal intervention, percutaneous trans-catheter directed at pulmonic valve
- ◯ Attempted fetal intervention "open" (maternal laparotomy with hysterotomy), directed at interatrial septum
- ◯ Attempted fetal intervention "open" (maternal laparotomy with hysterotomy), directed at aortic valve
- ◯ Attempted fetal intervention "open" (maternal laparotomy with hysterotomy), directed at pulmonic valve
- ◯ ECMO cannulation
- ◯ ECMO decannulation
- ◯ ECMO procedure
- ◯ Intraaortic balloon pump (IABP) insertion
- ◯ Right/left heart assist device procedure
- ◯ VAD explantation
- ◯ VAD implantation
- ◯ VAD change out
- ◯ Echocardiography procedure, Sedated transesophageal echocardiogram
- ◯ Echocardiography procedure, Sedated transthoracic echocardiogram
- ◯ Non-cardiovascular, Non-thoracic procedure on cardiac patient with cardiac anesthesia
- ◯ Radiology procedure on cardiac patient, Cardiac Computerized Axial Tomography (CT Scan)
- ◯ Radiology procedure on cardiac patient, Cardiac Magnetic Resonance Imaging (MRI)
- ◯ Radiology procedure on cardiac patient, Diagnostic radiology
- ◯ Radiology procedure on cardiac patient, Non-Cardiac Computerized Tomography (CT) on cardiac patient
- ◯ Radiology procedure on cardiac patient, Non-cardiac Magnetic Resonance Imaging (MRI) on cardiac patient
- ◯ Radiology procedure on cardiac patient, Therapeutic radiology
- ◯ Aneurysm, Ventricular, Right, Repair
- ◯ Aneurysm, Ventricular, Left, Repair
- ◯ Aneurysm, Pulmonary artery, Repair
- ◯ Cardiac tumor resection
- ◯ Pulmonary AV fistula repair/occlusion
- ◯ Ligation, Pulmonary artery

◯ Pulmonary embolectomy, Acute pulmonary embolus
◯ Pulmonary embolectomy, Chronic pulmonary embolus
◯ Pleural drainage procedure
◯ Pleural procedure, Other
◯ Ligation, Thoracic duct
◯ Decortication
◯ Esophageal procedure
◯ Mediastinal procedure
◯ Bronchoscopy
◯ Diaphragm plication
◯ Diaphragm procedure, Other
◯ VATS (video-assisted thoracoscopic surgery)
◯ Minimally invasive procedure
◯ Bypass for noncardiac lesion
◯ Delayed sternal closure
◯ Mediastinal exploration
◯ Sternotomy wound drainage
◯ Intravascular stent removal
◯ Removal of transcatheter delivered device from heart
◯ Removal of transcatheter delivered device from blood vessel
◯ Thoracotomy, Other
◯ Cardiotomy, Other
◯ Cardiac procedure, Other
◯ Thoracic and/or mediastinal procedure, Other
◯ Peripheral vascular procedure, Other
◯ Miscellaneous procedure, Other
◯ Organ procurement
◯ Other procedure

Specify the other cardiac procedure (if any)

- ◯ None
- ◯ PFO, Primary closure
- ◯ ASD repair, Primary closure
- ◯ ASD repair, Patch
- ◯ ASD repair, Device
- ◯ ASD repair, Patch + PAPVC repair
- ◯ ASD, Common atrium (single atrium), Septation
- ◯ ASD creation/enlargement
- ◯ ASD partial closure
- ◯ Atrial septal fenestration
- ◯ Atrial fenestration closure
- ◯ VSD repair, Primary closure
- ◯ VSD repair, Patch
- ◯ VSD repair, Device
- ◯ VSD, Multiple, Repair
- ◯ VSD creation/enlargement
- ◯ Ventricular septal fenestration
- ◯ AVC (AVSD) repair, Complete (CAVSD)
- ◯ AVC (AVSD) repair, Intermediate (Transitional)
- ◯ AVC (AVSD) repair, Partial (Incomplete) (PAVSD)
- ◯ Valvuloplasty, Common atrioventricular valve
- ◯ Valvuloplasty converted to valve replacement in the same operation, Common atrioventricular valve
- ◯ Valve replacement, Common atrioventricular valve
- ◯ AP window repair
- ◯ Pulmonary artery origin from ascending aorta (hemitruncus) repair
- ◯ Truncus arteriosus repair
- ◯ Valvuloplasty, Truncal valve
- ◯ Valvuloplasty converted to valve replacement in the same operation, Truncal valve
- ◯ Valve replacement, Truncal valve
- ◯ Truncus + Interrupted aortic arch repair (IAA) repair
- ◯ PAPVC repair
- ◯ PAPVC, Scimitar, Repair
- ◯ PAPVC repair, Baffle redirection to left atrium with systemic vein translocation (Warden) (SVC sewn to right atrial appendage)
- ◯ TAPVC repair
- ◯ TAPVC repair + Shunt - systemic-to-pulmonary
- ◯ Cor triatriatum repair
- ◯ Pulmonary venous stenosis repair
- ◯ Atrial baffle procedure (non-Mustard, non-Senning)
- ◯ Anomalous systemic venous connection repair
- ◯ Systemic venous stenosis repair
- ◯ TOF repair, No Ventriculotomy
- ◯ TOF repair, Ventriculotomy, Nontransanular patch
- ◯ TOF repair, Ventriculotomy, Transanular patch
- ◯ TOF repair, RV-PA conduit
- ◯ TOF - AVC (AVSD) repair
- ◯ TOF - Absent pulmonary valve repair
- ◯ Pulmonary atresia - VSD (including TOF, PA) repair
- ◯ Pulmonary atresia - VSD - MAPCA repair, Complete single stage repair (1 stage that includes bilateral pulmonary unifocalization + VSD closure + RV to PA connection [with or without conduit])
- ◯ Pulmonary atresia - VSD - MAPCA repair, Status post prior complete unifocalization (includes VSD closure + RV to PA connection [with or without conduit])
- ◯ Pulmonary atresia - VSD - MAPCA repair, Status post prior incomplete unifocalization (includes completion of pulmonary unifocalization + VSD closure + RV to PA connection [with or without conduit])
- ◯ Unifocalization MAPCA(s), Bilateral pulmonary unifocalization - Complete unifocalization (all usable MAPCA[s] are incorporated)
- ◯ Unifocalization MAPCA(s), Bilateral pulmonary

unifocalization - Incomplete unifocalization (not all usable MAPCA[s] are incorporated)
- ◯ Unifocalization MAPCA(s), Unilateral pulmonary unifocalization
- ◯ Unifocalization MAPCA(s)
- ◯ Occlusion of MAPCA(s)
- ◯ Valvuloplasty, Tricuspid (do not use this code if tricuspid valve malfunction is secondary to Ebstein's anomaly. Use 465
- ◯ Valvuloplasty converted to valve replacement in the same operation, Tricuspid
- ◯ Ebstein's repair
- ◯ Valve replacement, Tricuspid (TVR)
- ◯ Valve closure, Tricuspid (exclusion, univentricular approach)
- ◯ Valve excision, Tricuspid (without replacement)
- ◯ Valve surgery, Other, Tricuspid
- ◯ RVOT procedure
- ◯ 1 1/2 ventricular repair
- ◯ PA, reconstruction (plasty), Main (trunk)
- ◯ PA, reconstruction (plasty), Branch, Central (within the hilar bifurcation)
- ◯ PA, reconstruction (plasty), Branch, Peripheral (at or beyond the hilar bifurcation)
- ◯ DCRV repair
- ◯ Valvuloplasty, Pulmonic
- ◯ Valvuloplasty converted to valve replacement in the same operation, Pulmonic
- ◯ Valve replacement, Pulmonic (PVR)
- ◯ Valve excision, Pulmonary (without replacement)
- ◯ Valve closure, Semilunar
- ◯ Valve surgery, Other, Pulmonic
- ◯ Conduit placement, RV to PA
- ◯ Conduit placement, LV to PA
- ◯ Conduit placement, Ventricle to aorta
- ◯ Conduit placement, Other
- ◯ Conduit reoperation
- ◯ Valvuloplasty, Aortic
- ◯ Valvuloplasty converted to valve replacement in the same operation, Aortic
- ◯ Valvuloplasty converted to valve replacement in the same operation, Aortic - with Ross procedure
- ◯ Valvuloplasty converted to valve replacement in the same operation, Aortic - with Ross-Konno procedure
- ◯ Valve replacement, Aortic (AVR)
- ◯ Valve replacement, Aortic (AVR), Mechanical
- ◯ Valve replacement, Aortic (AVR), Bioprosthetic
- ◯ Valve replacement, Aortic (AVR), Homograft
- ◯ Aortic root replacement, Bioprosthetic
- ◯ Aortic root replacement, Mechanical
- ◯ Aortic root replacement, Homograft
- ◯ Aortic root replacement, Valve sparing
- ◯ Ross procedure
- ◯ Konno procedure
- ◯ Ross-Konno procedure
- ◯ Other annular enlargement procedure
- ◯ Aortic stenosis, Subvalvar, Repair
- ◯ Aortic stenosis, Subvalvar, Repair, With myectomy for IHSS
- ◯ Aortic stenosis, Supravalvar, Repair
- ◯ Valve surgery, Other, Aortic
- ◯ Sinus of Valsalva, Aneurysm repair
- ◯ LV to aorta tunnel repair
- ◯ Valvuloplasty, Mitral
- ◯ Valvuloplasty converted to valve replacement in the same operation, Mitral
- ◯ Mitral stenosis, Supravalvar mitral ring repair
- ◯ Valve replacement, Mitral (MVR)
- ◯ Valve surgery, Other, Mitral
- ◯ Norwood procedure

- ◯ HLHS biventricular repair
- ◯ Conduit insertion right ventricle to pulmonary artery + Intraventricular tunnel left ventricle to neoaorta + arch reconstruction (Rastelli and Norwood type arch reconstruction) (Yasui)
- ◯ Hybrid Approach "Stage 1", Application of RPA & LPA bands
- ◯ Hybrid Approach "Stage 1", Stent placement in arterial duct (PDA)
- ◯ Hybrid Approach "Stage 1", Stent placement in arterial duct (PDA) + application of RPA & LPA bands
- ◯ Hybrid approach "Stage 2", Aortopulmonary amalgamation + Superior Cavopulmonary anastomosis(es) + PA Debanding + Aortic arch repair (Norwood [Stage 1] + Superior Cavopulmonary anastomosis(es) + PA Debanding)
- ◯ Hybrid approach "Stage 2", Aortopulmonary amalgamation + Superior Cavopulmonary anastomosis(es) + PA Debanding + Without aortic arch repair
- ◯ Hybrid Approach, Transcardiac balloon dilatation
- ◯ Hybrid Approach, Transcardiac transcatheter device placement
- ◯ Transplant, Heart
- ◯ Transplant, Heart and lung
- ◯ Partial left ventriculectomy (LV volume reduction surgery) (Batista)
- ◯ Pericardial drainage procedure
- ◯ Pericardiectomy
- ◯ Pericardial procedure, Other
- ◯ Fontan, Atrio-pulmonary connection
- ◯ Fontan, Atrio-ventricular connection
- ◯ Fontan, TCPC, Lateral tunnel, Fenestrated
- ◯ Fontan, TCPC, Lateral tunnel, Nonfenestrated
- ◯ Fontan, TCPC, External conduit, Fenestrated
- ◯ Fontan, TCPC, External conduit, Nonfenestrated
- ◯ Fontan, TCPC, Intra/extracardiac conduit, Fenestrated
- ◯ Fontan, TCPC, Intra/extracardiac conduit, Nonfenestrated
- ◯ Fontan, TCPC, External conduit, hepatic veins to pulmonary artery, Fenestrated
- ◯ Fontan, TCPC, External conduit, hepatic veins to pulmonary artery, Nonfenestrated
- ◯ Fontan revision or conversion (Re-do Fontan)
- ◯ Fontan, Other
- ◯ Fontan + Atrioventricular valvuloplasty
- ◯ Ventricular septation
- ◯ Congenitally corrected TGA repair, Atrial switch and ASO (double switch)
- ◯ Congenitally corrected TGA repair, Atrial switch and Rastelli
- ◯ Congenitally corrected TGA repair, VSD closure
- ◯ Congenitally corrected TGA repair, VSD closure and LV to PA conduit
- ◯ Congenitally corrected TGA repair, Other
- ◯ Arterial switch operation (ASO)
- ◯ Arterial switch operation (ASO) and VSD repair
- ◯ Arterial switch procedure + Aortic arch repair
- ◯ Arterial switch procedure and VSD repair + Aortic arch repair
- ◯ Senning
- ◯ Mustard
- ◯ Atrial baffle procedure, Mustard or Senning revision
- ◯ Rastelli
- ◯ REV
- ◯ Aortic root translocation over left ventricle (Including Nikaidoh procedure)
- ◯ TGA, Other procedures (Kawashima, LV-PA conduit,

other)
- ◯ DORV, Intraventricular tunnel repair
- ◯ DOLV repair
- ◯ Coarctation repair, End to end
- ◯ Coarctation repair, End to end, Extended
- ◯ Coarctation repair, Subclavian flap
- ◯ Coarctation repair, Patch aortoplasty
- ◯ Coarctation repair, Interposition graft
- ◯ Coarctation repair, Other
- ◯ Coarctation repair + VSD repair
- ◯ Aortic arch repair
- ◯ Aortic arch repair + VSD repair
- ◯ Coronary artery fistula ligation
- ◯ Anomalous origin of coronary artery from pulmonary artery repair
- ◯ Coronary artery bypass
- ◯ Anomalous aortic origin of coronary artery (AAOCA) repair
- ◯ Coronary artery procedure, Other
- ◯ Interrupted aortic arch repair
- ◯ PDA closure, Surgical
- ◯ PDA closure, Device
- ◯ Vascular ring repair
- ◯ Aortopexy
- ◯ Pulmonary artery sling repair
- ◯ Aortic aneurysm repair
- ◯ Aortic dissection repair
- ◯ Lung biopsy
- ◯ Transplant, lung(s)
- ◯ Lung procedure, Other
- ◯ Tracheal procedure
- ◯ Muscle flap, Trunk (i.e. intercostal, pectus, or serratus muscle)
- ◯ Muscle flap, Trunk (i.e. latissimus dorsi)
- ◯ Removal, Sternal wire
- ◯ Rib excision, Complete
- ◯ Rib excision, Partial
- ◯ Sternal fracture, Open treatment
- ◯ Sternal resection, Radical resection of the sternum
- ◯ Sternal resection, Radical resection of the sternum with mediastinal lymphadenectomy
- ◯ Tumor of chest wall, Excision including ribs
- ◯ Tumor of chest wall, Excision including ribs, With reconstruction
- ◯ Tumor of soft tissue of thorax, Excision of deep subfascial or intramuscular tumor
- ◯ Tumor of soft tissue of thorax, Excision of subcutaneous tumor
- ◯ Tumor of soft tissue of thorax, Radical resection
- ◯ Hyoid myotomy and suspension
- ◯ Muscle flap, Neck
- ◯ Procedure on neck
- ◯ Tumor of soft tissue of neck, Excision of deep subfascial or intramuscular tumor
- ◯ Tumor of soft tissue of neck, Excision of subcutaneous tumor
- ◯ Tumor of soft tissue of neck, Radical resection
- ◯ Pectus bar removal
- ◯ Pectus bar repositioning
- ◯ Pectus repair, Minimally invasive repair (Nuss), With thoracoscopy
- ◯ Pectus repair, Minimally invasive repair (Nuss), Without thoracoscopy
- ◯ Pectus repair, Open repair
- ◯ Division of scalenus anticus, With resection of a cervical rib
- ◯ Division of scalenus anticus, Without resection of a cervical rib
- ◯ Rib excision, Excision of a cervical rib
- ◯ Rib excision, Excision of a cervical rib, With sympathectomy

- ◯ Rib excision, Excision of first rib
- ◯ Rib excision, Excision of first rib, With sympathectomy
- ◯ Procedure on thorax
- ◯ Pacemaker implantation, Permanent
- ◯ Pacemaker procedure
- ◯ Explantation of pacing system
- ◯ ICD (AICD) implantation
- ◯ ICD (AICD) ([automatic] implantable cardioverter defibrillator) procedure
- ◯ Arrhythmia surgery - atrial, Surgical Ablation
- ◯ Arrhythmia surgery - ventricular, Surgical Ablation
- ◯ Cardiovascular catheterization procedure, Diagnostic
- ◯ Cardiovascular catheterization procedure, Diagnostic, Angiographic data obtained
- ◯ Cardiovascular catheterization procedure, Diagnostic, Electrophysiology alteration
- ◯ Cardiovascular catheterization procedure, Diagnostic, Hemodynamic alteration
- ◯ Cardiovascular catheterization procedure, Diagnostic, Hemodynamic data obtained
- ◯ Cardiovascular catheterization procedure, Diagnostic, Transluminal test occlusion
- ◯ Cardiovascular catheterization procedure, Therapeutic
- ◯ Cardiovascular catheterization procedure, Therapeutic, Adjunctive therapy
- ◯ Cardiovascular catheterization procedure, Therapeutic, Balloon dilation
- ◯ Cardiovascular catheterization procedure, Therapeutic, Balloon valvotomy
- ◯ Cardiovascular catheterization procedure, Therapeutic, Coil implantation
- ◯ Cardiovascular catheterization procedure, Therapeutic, Device implantation
- ◯ Cardiovascular catheterization procedure, Therapeutic, Device implantation attempted
- ◯ Cardiovascular catheterization procedure, Therapeutic, Electrophysiological ablation
- ◯ Cardiovascular catheterization procedure, Therapeutic, Intravascular foreign body removal
- ◯ Cardiovascular catheterization procedure, Therapeutic, Perforation (establishing interchamber and/or intervessel communication)
- ◯ Cardiovascular catheterization procedure, Therapeutic, Septostomy
- ◯ Cardiovascular catheterization procedure, Therapeutic, Stent insertion
- ◯ Cardiovascular catheterization procedure, Therapeutic, Stent re-dilation
- ◯ Cardiovascular catheterization procedure, Therapeutic, Transcatheter Fontan completion
- ◯ Cardiovascular catheterization procedure, Therapeutic, Transcatheter implantation of valve
- ◯ Shunt, Systemic to pulmonary, Modified Blalock-Taussig Shunt (MBTS)
- ◯ Shunt, Systemic to pulmonary, Central (shunt from aorta)
- ◯ Shunt, Systemic to pulmonary, Central (shunt from aorta) Central shunt with an end-to-side connection between the transected main pulmonary artery and the side of the ascending aorta (i.e. Mee shunt)
- ◯ Shunt, Systemic to pulmonary, Potts - Smith type (descending aorta to pulmonary artery)
- ◯ Shunt, Systemic to pulmonary, Other
- ◯ Shunt, Ligation and takedown
- ◯ Shunt, Reoperation
- ◯ PA banding (PAB)
- ◯ PA debanding

- ◯ PA band adjustment
- ◯ Damus-Kaye-Stansel procedure (DKS) (creation of AP anastomosis without arch reconstruction)
- ◯ Bidirectional cavopulmonary anastomosis (BDCPA) (bidirectional Glenn)
- ◯ Glenn (unidirectional cavopulmonary anastomosis) (unidirectional Glenn)
- ◯ Bilateral bidirectional cavopulmonary anastomosis (BBDCPA) (bilateral bidirectional Glenn)
- ◯ HemiFontan
- ◯ Superior cavopulmonary anastomosis(es) (Glenn or HemiFontan) + Atrioventricular valvuloplasty
- ◯ Superior Cavopulmonary anastomosis(es) + PA reconstruction
- ◯ Takedown of superior cavopulmonary anastomosis
- ◯ Hepatic vein to azygous vein connection, Direct
- ◯ Hepatic vein to azygous vein connection, Interposition graft
- ◯ Kawashima operation (superior cavopulmonary connection in setting of interrupted IVC with azygous continuation)
- ◯ Palliation, Other
- ◯ Attempted fetal intervention, percutaneous trans-catheter directed at interatrial septum
- ◯ Attempted fetal intervention, percutaneous trans-catheter directed at aortic valve
- ◯ Attempted fetal intervention, percutaneous trans-catheter directed at pulmonic valve
- ◯ Attempted fetal intervention "open" (maternal laparotomy with hysterotomy), directed at interatrial septum
- ◯ Attempted fetal intervention "open" (maternal laparotomy with hysterotomy), directed at aortic valve
- ◯ Attempted fetal intervention "open" (maternal laparotomy with hysterotomy), directed at pulmonic valve
- ◯ ECMO cannulation
- ◯ ECMO decannulation
- ◯ ECMO procedure
- ◯ Intraaortic balloon pump (IABP) insertion
- ◯ Right/left heart assist device procedure
- ◯ VAD explantation
- ◯ VAD implantation
- ◯ VAD change out
- ◯ Echocardiography procedure, Sedated transesophageal echocardiogram
- ◯ Echocardiography procedure, Sedated transthoracic echocardiogram
- ◯ Non-cardiovascular, Non-thoracic procedure on cardiac patient with cardiac anesthesia
- ◯ Radiology procedure on cardiac patient, Cardiac Computerized Axial Tomography (CT Scan)
- ◯ Radiology procedure on cardiac patient, Cardiac Magnetic Resonance Imaging (MRI)
- ◯ Radiology procedure on cardiac patient, Diagnostic radiology
- ◯ Radiology procedure on cardiac patient, Non-Cardiac Computerized Tomography (CT) on cardiac patient
- ◯ Radiology procedure on cardiac patient, Non-cardiac Magnetic Resonance Imaging (MRI) on cardiac patient
- ◯ Radiology procedure on cardiac patient, Therapeutic radiology
- ◯ Aneurysm, Ventricular, Right, Repair
- ◯ Aneurysm, Ventricular, Left, Repair
- ◯ Aneurysm, Pulmonary artery, Repair
- ◯ Cardiac tumor resection
- ◯ Pulmonary AV fistula repair/occlusion
- ◯ Ligation, Pulmonary artery

◯ Pulmonary embolectomy, Acute pulmonary embolus
◯ Pulmonary embolectomy, Chronic pulmonary embolus
◯ Pleural drainage procedure
◯ Pleural procedure, Other
◯ Ligation, Thoracic duct
◯ Decortication
◯ Esophageal procedure
◯ Mediastinal procedure
◯ Bronchoscopy
◯ Diaphragm plication
◯ Diaphragm procedure, Other
◯ VATS (video-assisted thoracoscopic surgery)
◯ Minimally invasive procedure
◯ Bypass for noncardiac lesion
◯ Delayed sternal closure
◯ Mediastinal exploration
◯ Sternotomy wound drainage
◯ Intravascular stent removal
◯ Removal of transcatheter delivered device from heart
◯ Removal of transcatheter delivered device from blood vessel
◯ Thoracotomy, Other
◯ Cardiotomy, Other
◯ Cardiac procedure, Other
◯ Thoracic and/or mediastinal procedure, Other
◯ Peripheral vascular procedure, Other
◯ Miscellaneous procedure, Other
◯ Organ procurement
◯ Other procedure

Specify the other cardiac procedure (if any)

- ◯ None
- ◯ PFO, Primary closure
- ◯ ASD repair, Primary closure
- ◯ ASD repair, Patch
- ◯ ASD repair, Device
- ◯ ASD repair, Patch + PAPVC repair
- ◯ ASD, Common atrium (single atrium), Septation
- ◯ ASD creation/enlargement
- ◯ ASD partial closure
- ◯ Atrial septal fenestration
- ◯ Atrial fenestration closure
- ◯ VSD repair, Primary closure
- ◯ VSD repair, Patch
- ◯ VSD repair, Device
- ◯ VSD, Multiple, Repair
- ◯ VSD creation/enlargement
- ◯ Ventricular septal fenestration
- ◯ AVC (AVSD) repair, Complete (CAVSD)
- ◯ AVC (AVSD) repair, Intermediate (Transitional)
- ◯ AVC (AVSD) repair, Partial (Incomplete) (PAVSD)
- ◯ Valvuloplasty, Common atrioventricular valve
- ◯ Valvuloplasty converted to valve replacement in the same operation, Common atrioventricular valve
- ◯ Valve replacement, Common atrioventricular valve
- ◯ AP window repair
- ◯ Pulmonary artery origin from ascending aorta (hemitruncus) repair
- ◯ Truncus arteriosus repair
- ◯ Valvuloplasty, Truncal valve
- ◯ Valvuloplasty converted to valve replacement in the same operation, Truncal valve
- ◯ Valve replacement, Truncal valve
- ◯ Truncus + Interrupted aortic arch repair (IAA) repair
- ◯ PAPVC repair
- ◯ PAPVC, Scimitar, Repair
- ◯ PAPVC repair, Baffle redirection to left atrium with systemic vein translocation (Warden) (SVC sewn to right atrial appendage)
- ◯ TAPVC repair
- ◯ TAPVC repair + Shunt - systemic-to-pulmonary
- ◯ Cor triatriatum repair
- ◯ Pulmonary venous stenosis repair
- ◯ Atrial baffle procedure (non-Mustard, non-Senning)
- ◯ Anomalous systemic venous connection repair
- ◯ Systemic venous stenosis repair
- ◯ TOF repair, No Ventriculotomy
- ◯ TOF repair, Ventriculotomy, Nontransanular patch
- ◯ TOF repair, Ventriculotomy, Transanular patch
- ◯ TOF repair, RV-PA conduit
- ◯ TOF - AVC (AVSD) repair
- ◯ TOF - Absent pulmonary valve repair
- ◯ Pulmonary atresia - VSD (including TOF, PA) repair
- ◯ Pulmonary atresia - VSD - MAPCA repair, Complete single stage repair (1 stage that includes bilateral pulmonary unifocalization + VSD closure + RV to PA connection [with or without conduit])
- ◯ Pulmonary atresia - VSD - MAPCA repair, Status post prior complete unifocalization (includes VSD closure + RV to PA connection [with or without conduit])
- ◯ Pulmonary atresia - VSD - MAPCA repair, Status post prior incomplete unifocalization (includes completion of pulmonary unifocalization + VSD closure + RV to PA connection [with or without conduit])
- ◯ Unifocalization MAPCA(s), Bilateral pulmonary unifocalization - Complete unifocalization (all usable MAPCA[s] are incorporated)
- ◯ Unifocalization MAPCA(s), Bilateral pulmonary

unifocalization - Incomplete unifocalization (not all usable MAPCA[s] are incorporated)
- ◯ Unifocalization MAPCA(s), Unilateral pulmonary unifocalization
- ◯ Unifocalization MAPCA(s)
- ◯ Occlusion of MAPCA(s)
- ◯ Valvuloplasty, Tricuspid (do not use this code if tricuspid valve malfunction is secondary to Ebstein's anomaly. Use 465
- ◯ Valvuloplasty converted to valve replacement in the same operation, Tricuspid
- ◯ Ebstein's repair
- ◯ Valve replacement, Tricuspid (TVR)
- ◯ Valve closure, Tricuspid (exclusion, univentricular approach)
- ◯ Valve excision, Tricuspid (without replacement)
- ◯ Valve surgery, Other, Tricuspid
- ◯ RVOT procedure
- ◯ 1 1/2 ventricular repair
- ◯ PA, reconstruction (plasty), Main (trunk)
- ◯ PA, reconstruction (plasty), Branch, Central (within the hilar bifurcation)
- ◯ PA, reconstruction (plasty), Branch, Peripheral (at or beyond the hilar bifurcation)
- ◯ DCRV repair
- ◯ Valvuloplasty, Pulmonic
- ◯ Valvuloplasty converted to valve replacement in the same operation, Pulmonic
- ◯ Valve replacement, Pulmonic (PVR)
- ◯ Valve excision, Pulmonary (without replacement)
- ◯ Valve closure, Semilunar
- ◯ Valve surgery, Other, Pulmonic
- ◯ Conduit placement, RV to PA
- ◯ Conduit placement, LV to PA
- ◯ Conduit placement, Ventricle to aorta
- ◯ Conduit placement, Other
- ◯ Conduit reoperation
- ◯ Valvuloplasty, Aortic
- ◯ Valvuloplasty converted to valve replacement in the same operation, Aortic
- ◯ Valvuloplasty converted to valve replacement in the same operation, Aortic - with Ross procedure
- ◯ Valvuloplasty converted to valve replacement in the same operation, Aortic - with Ross-Konno procedure
- ◯ Valve replacement, Aortic (AVR)
- ◯ Valve replacement, Aortic (AVR), Mechanical
- ◯ Valve replacement, Aortic (AVR), Bioprosthetic
- ◯ Valve replacement, Aortic (AVR), Homograft
- ◯ Aortic root replacement, Bioprosthetic
- ◯ Aortic root replacement, Mechanical
- ◯ Aortic root replacement, Homograft
- ◯ Aortic root replacement, Valve sparing
- ◯ Ross procedure
- ◯ Konno procedure
- ◯ Ross-Konno procedure
- ◯ Other annular enlargement procedure
- ◯ Aortic stenosis, Subvalvar, Repair
- ◯ Aortic stenosis, Subvalvar, Repair, With myectomy for IHSS
- ◯ Aortic stenosis, Supravalvar, Repair
- ◯ Valve surgery, Other, Aortic
- ◯ Sinus of Valsalva, Aneurysm repair
- ◯ LV to aorta tunnel repair
- ◯ Valvuloplasty, Mitral
- ◯ Valvuloplasty converted to valve replacement in the same operation, Mitral
- ◯ Mitral stenosis, Supravalvar mitral ring repair
- ◯ Valve replacement, Mitral (MVR)
- ◯ Valve surgery, Other, Mitral
- ◯ Norwood procedure

- ◯ HLHS biventricular repair
- ◯ Conduit insertion right ventricle to pulmonary artery + Intraventricular tunnel left ventricle to neoaorta + arch reconstruction (Rastelli and Norwood type arch reconstruction) (Yasui)
- ◯ Hybrid Approach "Stage 1", Application of RPA & LPA bands
- ◯ Hybrid Approach "Stage 1", Stent placement in arterial duct (PDA)
- ◯ Hybrid Approach "Stage 1", Stent placement in arterial duct (PDA) + application of RPA & LPA bands
- ◯ Hybrid approach "Stage 2", Aortopulmonary amalgamation + Superior Cavopulmonary anastomosis(es) + PA Debanding + Aortic arch repair (Norwood [Stage 1] + Superior Cavopulmonary anastomosis(es) + PA Debanding)
- ◯ Hybrid approach "Stage 2", Aortopulmonary amalgamation + Superior Cavopulmonary anastomosis(es) + PA Debanding + Without aortic arch repair
- ◯ Hybrid Approach, Transcardiac balloon dilatation
- ◯ Hybrid Approach, Transcardiac transcatheter device placement
- ◯ Transplant, Heart
- ◯ Transplant, Heart and lung
- ◯ Partial left ventriculectomy (LV volume reduction surgery) (Batista)
- ◯ Pericardial drainage procedure
- ◯ Pericardiectomy
- ◯ Pericardial procedure, Other
- ◯ Fontan, Atrio-pulmonary connection
- ◯ Fontan, Atrio-ventricular connection
- ◯ Fontan, TCPC, Lateral tunnel, Fenestrated
- ◯ Fontan, TCPC, Lateral tunnel, Nonfenestrated
- ◯ Fontan, TCPC, External conduit, Fenestrated
- ◯ Fontan, TCPC, External conduit, Nonfenestrated
- ◯ Fontan, TCPC, Intra/extracardiac conduit, Fenestrated
- ◯ Fontan, TCPC, Intra/extracardiac conduit, Nonfenestrated
- ◯ Fontan, TCPC, External conduit, hepatic veins to pulmonary artery, Fenestrated
- ◯ Fontan, TCPC, External conduit, hepatic veins to pulmonary artery, Nonfenestrated
- ◯ Fontan revision or conversion (Re-do Fontan)
- ◯ Fontan, Other
- ◯ Fontan + Atrioventricular valvuloplasty
- ◯ Ventricular septation
- ◯ Congenitally corrected TGA repair, Atrial switch and ASO (double switch)
- ◯ Congenitally corrected TGA repair, Atrial switch and Rastelli
- ◯ Congenitally corrected TGA repair, VSD closure
- ◯ Congenitally corrected TGA repair, VSD closure and LV to PA conduit
- ◯ Congenitally corrected TGA repair, Other
- ◯ Arterial switch operation (ASO)
- ◯ Arterial switch operation (ASO) and VSD repair
- ◯ Arterial switch procedure + Aortic arch repair
- ◯ Arterial switch procedure and VSD repair + Aortic arch repair
- ◯ Senning
- ◯ Mustard
- ◯ Atrial baffle procedure, Mustard or Senning revision
- ◯ Rastelli
- ◯ REV
- ◯ Aortic root translocation over left ventricle (Including Nikaidoh procedure)
- ◯ TGA, Other procedures (Kawashima, LV-PA conduit,

other)
- ◯ DORV, Intraventricular tunnel repair
- ◯ DOLV repair
- ◯ Coarctation repair, End to end
- ◯ Coarctation repair, End to end, Extended
- ◯ Coarctation repair, Subclavian flap
- ◯ Coarctation repair, Patch aortoplasty
- ◯ Coarctation repair, Interposition graft
- ◯ Coarctation repair, Other
- ◯ Coarctation repair + VSD repair
- ◯ Aortic arch repair
- ◯ Aortic arch repair + VSD repair
- ◯ Coronary artery fistula ligation
- ◯ Anomalous origin of coronary artery from pulmonary artery repair
- ◯ Coronary artery bypass
- ◯ Anomalous aortic origin of coronary artery (AAOCA) repair
- ◯ Coronary artery procedure, Other
- ◯ Interrupted aortic arch repair
- ◯ PDA closure, Surgical
- ◯ PDA closure, Device
- ◯ Vascular ring repair
- ◯ Aortopexy
- ◯ Pulmonary artery sling repair
- ◯ Aortic aneurysm repair
- ◯ Aortic dissection repair
- ◯ Lung biopsy
- ◯ Transplant, lung(s)
- ◯ Lung procedure, Other
- ◯ Tracheal procedure
- ◯ Muscle flap, Trunk (i.e. intercostal, pectus, or serratus muscle)
- ◯ Muscle flap, Trunk (i.e. latissimus dorsi)
- ◯ Removal, Sternal wire
- ◯ Rib excision, Complete
- ◯ Rib excision, Partial
- ◯ Sternal fracture, Open treatment
- ◯ Sternal resection, Radical resection of the sternum
- ◯ Sternal resection, Radical resection of the sternum with mediastinal lymphadenectomy
- ◯ Tumor of chest wall, Excision including ribs
- ◯ Tumor of chest wall, Excision including ribs, With reconstruction
- ◯ Tumor of soft tissue of thorax, Excision of deep subfascial or intramuscular tumor
- ◯ Tumor of soft tissue of thorax, Excision of subcutaneous tumor
- ◯ Tumor of soft tissue of thorax, Radical resection
- ◯ Hyoid myotomy and suspension
- ◯ Muscle flap, Neck
- ◯ Procedure on neck
- ◯ Tumor of soft tissue of neck, Excision of deep subfascial or intramuscular tumor
- ◯ Tumor of soft tissue of neck, Excision of subcutaneous tumor
- ◯ Tumor of soft tissue of neck, Radical resection
- ◯ Pectus bar removal
- ◯ Pectus bar repositioning
- ◯ Pectus repair, Minimally invasive repair (Nuss), With thoracoscopy
- ◯ Pectus repair, Minimally invasive repair (Nuss), Without thoracoscopy
- ◯ Pectus repair, Open repair
- ◯ Division of scalenus anticus, With resection of a cervical rib
- ◯ Division of scalenus anticus, Without resection of a cervical rib
- ◯ Rib excision, Excision of a cervical rib
- ◯ Rib excision, Excision of a cervical rib, With sympathectomy

- ◯ Rib excision, Excision of first rib
- ◯ Rib excision, Excision of first rib, With sympathectomy
- ◯ Procedure on thorax
- ◯ Pacemaker implantation, Permanent
- ◯ Pacemaker procedure
- ◯ Explantation of pacing system
- ◯ ICD (AICD) implantation
- ◯ ICD (AICD) ([automatic] implantable cardioverter defibrillator) procedure
- ◯ Arrhythmia surgery - atrial, Surgical Ablation
- ◯ Arrhythmia surgery - ventricular, Surgical Ablation
- ◯ Cardiovascular catheterization procedure, Diagnostic
- ◯ Cardiovascular catheterization procedure, Diagnostic, Angiographic data obtained
- ◯ Cardiovascular catheterization procedure, Diagnostic, Electrophysiology alteration
- ◯ Cardiovascular catheterization procedure, Diagnostic, Hemodynamic alteration
- ◯ Cardiovascular catheterization procedure, Diagnostic, Hemodynamic data obtained
- ◯ Cardiovascular catheterization procedure, Diagnostic, Transluminal test occlusion
- ◯ Cardiovascular catheterization procedure, Therapeutic
- ◯ Cardiovascular catheterization procedure, Therapeutic, Adjunctive therapy
- ◯ Cardiovascular catheterization procedure, Therapeutic, Balloon dilation
- ◯ Cardiovascular catheterization procedure, Therapeutic, Balloon valvotomy
- ◯ Cardiovascular catheterization procedure, Therapeutic, Coil implantation
- ◯ Cardiovascular catheterization procedure, Therapeutic, Device implantation
- ◯ Cardiovascular catheterization procedure, Therapeutic, Device implantation attempted
- ◯ Cardiovascular catheterization procedure, Therapeutic, Electrophysiological ablation
- ◯ Cardiovascular catheterization procedure, Therapeutic, Intravascular foreign body removal
- ◯ Cardiovascular catheterization procedure, Therapeutic, Perforation (establishing interchamber and/or intervessel communication)
- ◯ Cardiovascular catheterization procedure, Therapeutic, Septostomy
- ◯ Cardiovascular catheterization procedure, Therapeutic, Stent insertion
- ◯ Cardiovascular catheterization procedure, Therapeutic, Stent re-dilation
- ◯ Cardiovascular catheterization procedure, Therapeutic, Transcatheter Fontan completion
- ◯ Cardiovascular catheterization procedure, Therapeutic, Transcatheter implantation of valve
- ◯ Shunt, Systemic to pulmonary, Modified Blalock-Taussig Shunt (MBTS)
- ◯ Shunt, Systemic to pulmonary, Central (shunt from aorta)
- ◯ Shunt, Systemic to pulmonary, Central (shunt from aorta) Central shunt with an end-to-side connection between the transected main pulmonary artery and the side of the ascending aorta (i.e. Mee shunt)
- ◯ Shunt, Systemic to pulmonary, Potts - Smith type (descending aorta to pulmonary artery)
- ◯ Shunt, Systemic to pulmonary, Other
- ◯ Shunt, Ligation and takedown
- ◯ Shunt, Reoperation
- ◯ PA banding (PAB)
- ◯ PA debanding

- ◯ PA band adjustment
- ◯ Damus-Kaye-Stansel procedure (DKS) (creation of AP anastomosis without arch reconstruction)
- ◯ Bidirectional cavopulmonary anastomosis (BDCPA) (bidirectional Glenn)
- ◯ Glenn (unidirectional cavopulmonary anastomosis) (unidirectional Glenn)
- ◯ Bilateral bidirectional cavopulmonary anastomosis (BBDCPA) (bilateral bidirectional Glenn)
- ◯ HemiFontan
- ◯ Superior cavopulmonary anastomosis(es) (Glenn or HemiFontan) + Atrioventricular valvuloplasty
- ◯ Superior Cavopulmonary anastomosis(es) + PA reconstruction
- ◯ Takedown of superior cavopulmonary anastomosis
- ◯ Hepatic vein to azygous vein connection, Direct
- ◯ Hepatic vein to azygous vein connection, Interposition graft
- ◯ Kawashima operation (superior cavopulmonary connection in setting of interrupted IVC with azygous continuation)
- ◯ Palliation, Other
- ◯ Attempted fetal intervention, percutaneous trans-catheter directed at interatrial septum
- ◯ Attempted fetal intervention, percutaneous trans-catheter directed at aortic valve
- ◯ Attempted fetal intervention, percutaneous trans-catheter directed at pulmonic valve
- ◯ Attempted fetal intervention "open" (maternal laparotomy with hysterotomy), directed at interatrial septum
- ◯ Attempted fetal intervention "open" (maternal laparotomy with hysterotomy), directed at aortic valve
- ◯ Attempted fetal intervention "open" (maternal laparotomy with hysterotomy), directed at pulmonic valve
- ◯ ECMO cannulation
- ◯ ECMO decannulation
- ◯ ECMO procedure
- ◯ Intraaortic balloon pump (IABP) insertion
- ◯ Right/left heart assist device procedure
- ◯ VAD explantation
- ◯ VAD implantation
- ◯ VAD change out
- ◯ Echocardiography procedure, Sedated transesophageal echocardiogram
- ◯ Echocardiography procedure, Sedated transthoracic echocardiogram
- ◯ Non-cardiovascular, Non-thoracic procedure on cardiac patient with cardiac anesthesia
- ◯ Radiology procedure on cardiac patient, Cardiac Computerized Axial Tomography (CT Scan)
- ◯ Radiology procedure on cardiac patient, Cardiac Magnetic Resonance Imaging (MRI)
- ◯ Radiology procedure on cardiac patient, Diagnostic radiology
- ◯ Radiology procedure on cardiac patient, Non-Cardiac Computerized Tomography (CT) on cardiac patient
- ◯ Radiology procedure on cardiac patient, Non-cardiac Magnetic Resonance Imaging (MRI) on cardiac patient
- ◯ Radiology procedure on cardiac patient, Therapeutic radiology
- ◯ Aneurysm, Ventricular, Right, Repair
- ◯ Aneurysm, Ventricular, Left, Repair
- ◯ Aneurysm, Pulmonary artery, Repair
- ◯ Cardiac tumor resection
- ◯ Pulmonary AV fistula repair/occlusion
- ◯ Ligation, Pulmonary artery

◯ Pulmonary embolectomy, Acute pulmonary embolus
◯ Pulmonary embolectomy, Chronic pulmonary embolus
◯ Pleural drainage procedure
◯ Pleural procedure, Other
◯ Ligation, Thoracic duct
◯ Decortication
◯ Esophageal procedure
◯ Mediastinal procedure
◯ Bronchoscopy
◯ Diaphragm plication
◯ Diaphragm procedure, Other
◯ VATS (video-assisted thoracoscopic surgery)
◯ Minimally invasive procedure
◯ Bypass for noncardiac lesion
◯ Delayed sternal closure
◯ Mediastinal exploration
◯ Sternotomy wound drainage
◯ Intravascular stent removal
◯ Removal of transcatheter delivered device from heart
◯ Removal of transcatheter delivered device from blood vessel
◯ Thoracotomy, Other
◯ Cardiotomy, Other
◯ Cardiac procedure, Other
◯ Thoracic and/or mediastinal procedure, Other
◯ Peripheral vascular procedure, Other
◯ Miscellaneous procedure, Other
◯ Organ procurement
◯ Other procedure

Specify the other cardiac procedure (if any)

- ◯ None
- ◯ PFO, Primary closure
- ◯ ASD repair, Primary closure
- ◯ ASD repair, Patch
- ◯ ASD repair, Device
- ◯ ASD repair, Patch + PAPVC repair
- ◯ ASD, Common atrium (single atrium), Septation
- ◯ ASD creation/enlargement
- ◯ ASD partial closure
- ◯ Atrial septal fenestration
- ◯ Atrial fenestration closure
- ◯ VSD repair, Primary closure
- ◯ VSD repair, Patch
- ◯ VSD repair, Device
- ◯ VSD, Multiple, Repair
- ◯ VSD creation/enlargement
- ◯ Ventricular septal fenestration
- ◯ AVC (AVSD) repair, Complete (CAVSD)
- ◯ AVC (AVSD) repair, Intermediate (Transitional)
- ◯ AVC (AVSD) repair, Partial (Incomplete) (PAVSD)
- ◯ Valvuloplasty, Common atrioventricular valve
- ◯ Valvuloplasty converted to valve replacement in the same operation, Common atrioventricular valve
- ◯ Valve replacement, Common atrioventricular valve
- ◯ AP window repair
- ◯ Pulmonary artery origin from ascending aorta (hemitruncus) repair
- ◯ Truncus arteriosus repair
- ◯ Valvuloplasty, Truncal valve
- ◯ Valvuloplasty converted to valve replacement in the same operation, Truncal valve
- ◯ Valve replacement, Truncal valve
- ◯ Truncus + Interrupted aortic arch repair (IAA) repair
- ◯ PAPVC repair
- ◯ PAPVC, Scimitar, Repair
- ◯ PAPVC repair, Baffle redirection to left atrium with systemic vein translocation (Warden) (SVC sewn to right atrial appendage)
- ◯ TAPVC repair
- ◯ TAPVC repair + Shunt - systemic-to-pulmonary
- ◯ Cor triatriatum repair
- ◯ Pulmonary venous stenosis repair
- ◯ Atrial baffle procedure (non-Mustard, non-Senning)
- ◯ Anomalous systemic venous connection repair
- ◯ Systemic venous stenosis repair
- ◯ TOF repair, No Ventriculotomy
- ◯ TOF repair, Ventriculotomy, Nontransanular patch
- ◯ TOF repair, Ventriculotomy, Transanular patch
- ◯ TOF repair, RV-PA conduit
- ◯ TOF - AVC (AVSD) repair
- ◯ TOF - Absent pulmonary valve repair
- ◯ Pulmonary atresia - VSD (including TOF, PA) repair
- ◯ Pulmonary atresia - VSD - MAPCA repair, Complete single stage repair (1 stage that includes bilateral pulmonary unifocalization + VSD closure + RV to PA connection [with or without conduit])
- ◯ Pulmonary atresia - VSD - MAPCA repair, Status post prior complete unifocalization (includes VSD closure + RV to PA connection [with or without conduit])
- ◯ Pulmonary atresia - VSD - MAPCA repair, Status post prior incomplete unifocalization (includes completion of pulmonary unifocalization + VSD closure + RV to PA connection [with or without conduit])
- ◯ Unifocalization MAPCA(s), Bilateral pulmonary unifocalization - Complete unifocalization (all usable MAPCA[s] are incorporated)
- ◯ Unifocalization MAPCA(s), Bilateral pulmonary

unifocalization - Incomplete unifocalization (not all usable MAPCA[s] are incorporated)
- ◯ Unifocalization MAPCA(s), Unilateral pulmonary unifocalization
- ◯ Unifocalization MAPCA(s)
- ◯ Occlusion of MAPCA(s)
- ◯ Valvuloplasty, Tricuspid (do not use this code if tricuspid valve malfunction is secondary to Ebstein's anomaly. Use 465
- ◯ Valvuloplasty converted to valve replacement in the same operation, Tricuspid
- ◯ Ebstein's repair
- ◯ Valve replacement, Tricuspid (TVR)
- ◯ Valve closure, Tricuspid (exclusion, univentricular approach)
- ◯ Valve excision, Tricuspid (without replacement)
- ◯ Valve surgery, Other, Tricuspid
- ◯ RVOT procedure
- ◯ 1 1/2 ventricular repair
- ◯ PA, reconstruction (plasty), Main (trunk)
- ◯ PA, reconstruction (plasty), Branch, Central (within the hilar bifurcation)
- ◯ PA, reconstruction (plasty), Branch, Peripheral (at or beyond the hilar bifurcation)
- ◯ DCRV repair
- ◯ Valvuloplasty, Pulmonic
- ◯ Valvuloplasty converted to valve replacement in the same operation, Pulmonic
- ◯ Valve replacement, Pulmonic (PVR)
- ◯ Valve excision, Pulmonary (without replacement)
- ◯ Valve closure, Semilunar
- ◯ Valve surgery, Other, Pulmonic
- ◯ Conduit placement, RV to PA
- ◯ Conduit placement, LV to PA
- ◯ Conduit placement, Ventricle to aorta
- ◯ Conduit placement, Other
- ◯ Conduit reoperation
- ◯ Valvuloplasty, Aortic
- ◯ Valvuloplasty converted to valve replacement in the same operation, Aortic
- ◯ Valvuloplasty converted to valve replacement in the same operation, Aortic - with Ross procedure
- ◯ Valvuloplasty converted to valve replacement in the same operation, Aortic - with Ross-Konno procedure
- ◯ Valve replacement, Aortic (AVR)
- ◯ Valve replacement, Aortic (AVR), Mechanical
- ◯ Valve replacement, Aortic (AVR), Bioprosthetic
- ◯ Valve replacement, Aortic (AVR), Homograft
- ◯ Aortic root replacement, Bioprosthetic
- ◯ Aortic root replacement, Mechanical
- ◯ Aortic root replacement, Homograft
- ◯ Aortic root replacement, Valve sparing
- ◯ Ross procedure
- ◯ Konno procedure
- ◯ Ross-Konno procedure
- ◯ Other annular enlargement procedure
- ◯ Aortic stenosis, Subvalvar, Repair
- ◯ Aortic stenosis, Subvalvar, Repair, With myectomy for IHSS
- ◯ Aortic stenosis, Supravalvar, Repair
- ◯ Valve surgery, Other, Aortic
- ◯ Sinus of Valsalva, Aneurysm repair
- ◯ LV to aorta tunnel repair
- ◯ Valvuloplasty, Mitral
- ◯ Valvuloplasty converted to valve replacement in the same operation, Mitral
- ◯ Mitral stenosis, Supravalvar mitral ring repair
- ◯ Valve replacement, Mitral (MVR)
- ◯ Valve surgery, Other, Mitral
- ◯ Norwood procedure

- ◯ HLHS biventricular repair
- ◯ Conduit insertion right ventricle to pulmonary artery + Intraventricular tunnel left ventricle to neoaorta + arch reconstruction (Rastelli and Norwood type arch reconstruction) (Yasui)
- ◯ Hybrid Approach "Stage 1", Application of RPA & LPA bands
- ◯ Hybrid Approach "Stage 1", Stent placement in arterial duct (PDA)
- ◯ Hybrid Approach "Stage 1", Stent placement in arterial duct (PDA) + application of RPA & LPA bands
- ◯ Hybrid approach "Stage 2", Aortopulmonary amalgamation + Superior Cavopulmonary anastomosis(es) + PA Debanding + Aortic arch repair (Norwood [Stage 1] + Superior Cavopulmonary anastomosis(es) + PA Debanding)
- ◯ Hybrid approach "Stage 2", Aortopulmonary amalgamation + Superior Cavopulmonary anastomosis(es) + PA Debanding + Without aortic arch repair
- ◯ Hybrid Approach, Transcardiac balloon dilatation
- ◯ Hybrid Approach, Transcardiac transcatheter device placement
- ◯ Transplant, Heart
- ◯ Transplant, Heart and lung
- ◯ Partial left ventriculectomy (LV volume reduction surgery) (Batista)
- ◯ Pericardial drainage procedure
- ◯ Pericardiectomy
- ◯ Pericardial procedure, Other
- ◯ Fontan, Atrio-pulmonary connection
- ◯ Fontan, Atrio-ventricular connection
- ◯ Fontan, TCPC, Lateral tunnel, Fenestrated
- ◯ Fontan, TCPC, Lateral tunnel, Nonfenestrated
- ◯ Fontan, TCPC, External conduit, Fenestrated
- ◯ Fontan, TCPC, External conduit, Nonfenestrated
- ◯ Fontan, TCPC, Intra/extracardiac conduit, Fenestrated
- ◯ Fontan, TCPC, Intra/extracardiac conduit, Nonfenestrated
- ◯ Fontan, TCPC, External conduit, hepatic veins to pulmonary artery, Fenestrated
- ◯ Fontan, TCPC, External conduit, hepatic veins to pulmonary artery, Nonfenestrated
- ◯ Fontan revision or conversion (Re-do Fontan)
- ◯ Fontan, Other
- ◯ Fontan + Atrioventricular valvuloplasty
- ◯ Ventricular septation
- ◯ Congenitally corrected TGA repair, Atrial switch and ASO (double switch)
- ◯ Congenitally corrected TGA repair, Atrial switch and Rastelli
- ◯ Congenitally corrected TGA repair, VSD closure
- ◯ Congenitally corrected TGA repair, VSD closure and LV to PA conduit
- ◯ Congenitally corrected TGA repair, Other
- ◯ Arterial switch operation (ASO)
- ◯ Arterial switch operation (ASO) and VSD repair
- ◯ Arterial switch procedure + Aortic arch repair
- ◯ Arterial switch procedure and VSD repair + Aortic arch repair
- ◯ Senning
- ◯ Mustard
- ◯ Atrial baffle procedure, Mustard or Senning revision
- ◯ Rastelli
- ◯ REV
- ◯ Aortic root translocation over left ventricle (Including Nikaidoh procedure)
- ◯ TGA, Other procedures (Kawashima, LV-PA conduit,

other)
- ◯ DORV, Intraventricular tunnel repair
- ◯ DOLV repair
- ◯ Coarctation repair, End to end
- ◯ Coarctation repair, End to end, Extended
- ◯ Coarctation repair, Subclavian flap
- ◯ Coarctation repair, Patch aortoplasty
- ◯ Coarctation repair, Interposition graft
- ◯ Coarctation repair, Other
- ◯ Coarctation repair + VSD repair
- ◯ Aortic arch repair
- ◯ Aortic arch repair + VSD repair
- ◯ Coronary artery fistula ligation
- ◯ Anomalous origin of coronary artery from pulmonary artery repair
- ◯ Coronary artery bypass
- ◯ Anomalous aortic origin of coronary artery (AAOCA) repair
- ◯ Coronary artery procedure, Other
- ◯ Interrupted aortic arch repair
- ◯ PDA closure, Surgical
- ◯ PDA closure, Device
- ◯ Vascular ring repair
- ◯ Aortopexy
- ◯ Pulmonary artery sling repair
- ◯ Aortic aneurysm repair
- ◯ Aortic dissection repair
- ◯ Lung biopsy
- ◯ Transplant, lung(s)
- ◯ Lung procedure, Other
- ◯ Tracheal procedure
- ◯ Muscle flap, Trunk (i.e. intercostal, pectus, or serratus muscle)
- ◯ Muscle flap, Trunk (i.e. latissimus dorsi)
- ◯ Removal, Sternal wire
- ◯ Rib excision, Complete
- ◯ Rib excision, Partial
- ◯ Sternal fracture, Open treatment
- ◯ Sternal resection, Radical resection of the sternum
- ◯ Sternal resection, Radical resection of the sternum with mediastinal lymphadenectomy
- ◯ Tumor of chest wall, Excision including ribs
- ◯ Tumor of chest wall, Excision including ribs, With reconstruction
- ◯ Tumor of soft tissue of thorax, Excision of deep subfascial or intramuscular tumor
- ◯ Tumor of soft tissue of thorax, Excision of subcutaneous tumor
- ◯ Tumor of soft tissue of thorax, Radical resection
- ◯ Hyoid myotomy and suspension
- ◯ Muscle flap, Neck
- ◯ Procedure on neck
- ◯ Tumor of soft tissue of neck, Excision of deep subfascial or intramuscular tumor
- ◯ Tumor of soft tissue of neck, Excision of subcutaneous tumor
- ◯ Tumor of soft tissue of neck, Radical resection
- ◯ Pectus bar removal
- ◯ Pectus bar repositioning
- ◯ Pectus repair, Minimally invasive repair (Nuss), With thoracoscopy
- ◯ Pectus repair, Minimally invasive repair (Nuss), Without thoracoscopy
- ◯ Pectus repair, Open repair
- ◯ Division of scalenus anticus, With resection of a cervical rib
- ◯ Division of scalenus anticus, Without resection of a cervical rib
- ◯ Rib excision, Excision of a cervical rib
- ◯ Rib excision, Excision of a cervical rib, With sympathectomy

- ◯ Rib excision, Excision of first rib
- ◯ Rib excision, Excision of first rib, With sympathectomy
- ◯ Procedure on thorax
- ◯ Pacemaker implantation, Permanent
- ◯ Pacemaker procedure
- ◯ Explantation of pacing system
- ◯ ICD (AICD) implantation
- ◯ ICD (AICD) ([automatic] implantable cardioverter defibrillator) procedure
- ◯ Arrhythmia surgery - atrial, Surgical Ablation
- ◯ Arrhythmia surgery - ventricular, Surgical Ablation
- ◯ Cardiovascular catheterization procedure, Diagnostic
- ◯ Cardiovascular catheterization procedure, Diagnostic, Angiographic data obtained
- ◯ Cardiovascular catheterization procedure, Diagnostic, Electrophysiology alteration
- ◯ Cardiovascular catheterization procedure, Diagnostic, Hemodynamic alteration
- ◯ Cardiovascular catheterization procedure, Diagnostic, Hemodynamic data obtained
- ◯ Cardiovascular catheterization procedure, Diagnostic, Transluminal test occlusion
- ◯ Cardiovascular catheterization procedure, Therapeutic
- ◯ Cardiovascular catheterization procedure, Therapeutic, Adjunctive therapy
- ◯ Cardiovascular catheterization procedure, Therapeutic, Balloon dilation
- ◯ Cardiovascular catheterization procedure, Therapeutic, Balloon valvotomy
- ◯ Cardiovascular catheterization procedure, Therapeutic, Coil implantation
- ◯ Cardiovascular catheterization procedure, Therapeutic, Device implantation
- ◯ Cardiovascular catheterization procedure, Therapeutic, Device implantation attempted
- ◯ Cardiovascular catheterization procedure, Therapeutic, Electrophysiological ablation
- ◯ Cardiovascular catheterization procedure, Therapeutic, Intravascular foreign body removal
- ◯ Cardiovascular catheterization procedure, Therapeutic, Perforation (establishing interchamber and/or intervessel communication)
- ◯ Cardiovascular catheterization procedure, Therapeutic, Septostomy
- ◯ Cardiovascular catheterization procedure, Therapeutic, Stent insertion
- ◯ Cardiovascular catheterization procedure, Therapeutic, Stent re-dilation
- ◯ Cardiovascular catheterization procedure, Therapeutic, Transcatheter Fontan completion
- ◯ Cardiovascular catheterization procedure, Therapeutic, Transcatheter implantation of valve
- ◯ Shunt, Systemic to pulmonary, Modified Blalock-Taussig Shunt (MBTS)
- ◯ Shunt, Systemic to pulmonary, Central (shunt from aorta)
- ◯ Shunt, Systemic to pulmonary, Central (shunt from aorta) Central shunt with an end-to-side connection between the transected main pulmonary artery and the side of the ascending aorta (i.e. Mee shunt)
- ◯ Shunt, Systemic to pulmonary, Potts - Smith type (descending aorta to pulmonary artery)
- ◯ Shunt, Systemic to pulmonary, Other
- ◯ Shunt, Ligation and takedown
- ◯ Shunt, Reoperation
- ◯ PA banding (PAB)
- ◯ PA debanding

- ◯ PA band adjustment
- ◯ Damus-Kaye-Stansel procedure (DKS) (creation of AP anastomosis without arch reconstruction)
- ◯ Bidirectional cavopulmonary anastomosis (BDCPA) (bidirectional Glenn)
- ◯ Glenn (unidirectional cavopulmonary anastomosis) (unidirectional Glenn)
- ◯ Bilateral bidirectional cavopulmonary anastomosis (BBDCPA) (bilateral bidirectional Glenn)
- ◯ HemiFontan
- ◯ Superior cavopulmonary anastomosis(es) (Glenn or HemiFontan) + Atrioventricular valvuloplasty
- ◯ Superior Cavopulmonary anastomosis(es) + PA reconstruction
- ◯ Takedown of superior cavopulmonary anastomosis
- ◯ Hepatic vein to azygous vein connection, Direct
- ◯ Hepatic vein to azygous vein connection, Interposition graft
- ◯ Kawashima operation (superior cavopulmonary connection in setting of interrupted IVC with azygous continuation)
- ◯ Palliation, Other
- ◯ Attempted fetal intervention, percutaneous trans-catheter directed at interatrial septum
- ◯ Attempted fetal intervention, percutaneous trans-catheter directed at aortic valve
- ◯ Attempted fetal intervention, percutaneous trans-catheter directed at pulmonic valve
- ◯ Attempted fetal intervention "open" (maternal laparotomy with hysterotomy), directed at interatrial septum
- ◯ Attempted fetal intervention "open" (maternal laparotomy with hysterotomy), directed at aortic valve
- ◯ Attempted fetal intervention "open" (maternal laparotomy with hysterotomy), directed at pulmonic valve
- ◯ ECMO cannulation
- ◯ ECMO decannulation
- ◯ ECMO procedure
- ◯ Intraaortic balloon pump (IABP) insertion
- ◯ Right/left heart assist device procedure
- ◯ VAD explantation
- ◯ VAD implantation
- ◯ VAD change out
- ◯ Echocardiography procedure, Sedated transesophageal echocardiogram
- ◯ Echocardiography procedure, Sedated transthoracic echocardiogram
- ◯ Non-cardiovascular, Non-thoracic procedure on cardiac patient with cardiac anesthesia
- ◯ Radiology procedure on cardiac patient, Cardiac Computerized Axial Tomography (CT Scan)
- ◯ Radiology procedure on cardiac patient, Cardiac Magnetic Resonance Imaging (MRI)
- ◯ Radiology procedure on cardiac patient, Diagnostic radiology
- ◯ Radiology procedure on cardiac patient, Non-Cardiac Computerized Tomography (CT) on cardiac patient
- ◯ Radiology procedure on cardiac patient, Non-cardiac Magnetic Resonance Imaging (MRI) on cardiac patient
- ◯ Radiology procedure on cardiac patient, Therapeutic radiology
- ◯ Aneurysm, Ventricular, Right, Repair
- ◯ Aneurysm, Ventricular, Left, Repair
- ◯ Aneurysm, Pulmonary artery, Repair
- ◯ Cardiac tumor resection
- ◯ Pulmonary AV fistula repair/occlusion
- ◯ Ligation, Pulmonary artery

◯ Pulmonary embolectomy, Acute pulmonary embolus
◯ Pulmonary embolectomy, Chronic pulmonary embolus
◯ Pleural drainage procedure
◯ Pleural procedure, Other
◯ Ligation, Thoracic duct
◯ Decortication
◯ Esophageal procedure
◯ Mediastinal procedure
◯ Bronchoscopy
◯ Diaphragm plication
◯ Diaphragm procedure, Other
◯ VATS (video-assisted thoracoscopic surgery)
◯ Minimally invasive procedure
◯ Bypass for noncardiac lesion
◯ Delayed sternal closure
◯ Mediastinal exploration
◯ Sternotomy wound drainage
◯ Intravascular stent removal
◯ Removal of transcatheter delivered device from heart
◯ Removal of transcatheter delivered device from blood vessel
◯ Thoracotomy, Other
◯ Cardiotomy, Other
◯ Cardiac procedure, Other
◯ Thoracic and/or mediastinal procedure, Other
◯ Peripheral vascular procedure, Other
◯ Miscellaneous procedure, Other
◯ Organ procurement
◯ Other procedure

Specify the other cardiac procedure (if any)

- ◯ None
- ◯ PFO, Primary closure
- ◯ ASD repair, Primary closure
- ◯ ASD repair, Patch
- ◯ ASD repair, Device
- ◯ ASD repair, Patch + PAPVC repair
- ◯ ASD, Common atrium (single atrium), Septation
- ◯ ASD creation/enlargement
- ◯ ASD partial closure
- ◯ Atrial septal fenestration
- ◯ Atrial fenestration closure
- ◯ VSD repair, Primary closure
- ◯ VSD repair, Patch
- ◯ VSD repair, Device
- ◯ VSD, Multiple, Repair
- ◯ VSD creation/enlargement
- ◯ Ventricular septal fenestration
- ◯ AVC (AVSD) repair, Complete (CAVSD)
- ◯ AVC (AVSD) repair, Intermediate (Transitional)
- ◯ AVC (AVSD) repair, Partial (Incomplete) (PAVSD)
- ◯ Valvuloplasty, Common atrioventricular valve
- ◯ Valvuloplasty converted to valve replacement in the same operation, Common atrioventricular valve
- ◯ Valve replacement, Common atrioventricular valve
- ◯ AP window repair
- ◯ Pulmonary artery origin from ascending aorta (hemitruncus) repair
- ◯ Truncus arteriosus repair
- ◯ Valvuloplasty, Truncal valve
- ◯ Valvuloplasty converted to valve replacement in the same operation, Truncal valve
- ◯ Valve replacement, Truncal valve
- ◯ Truncus + Interrupted aortic arch repair (IAA) repair
- ◯ PAPVC repair
- ◯ PAPVC, Scimitar, Repair
- ◯ PAPVC repair, Baffle redirection to left atrium with systemic vein translocation (Warden) (SVC sewn to right atrial appendage)
- ◯ TAPVC repair
- ◯ TAPVC repair + Shunt - systemic-to-pulmonary
- ◯ Cor triatriatum repair
- ◯ Pulmonary venous stenosis repair
- ◯ Atrial baffle procedure (non-Mustard, non-Senning)
- ◯ Anomalous systemic venous connection repair
- ◯ Systemic venous stenosis repair
- ◯ TOF repair, No Ventriculotomy
- ◯ TOF repair, Ventriculotomy, Nontransanular patch
- ◯ TOF repair, Ventriculotomy, Transanular patch
- ◯ TOF repair, RV-PA conduit
- ◯ TOF - AVC (AVSD) repair
- ◯ TOF - Absent pulmonary valve repair
- ◯ Pulmonary atresia - VSD (including TOF, PA) repair
- ◯ Pulmonary atresia - VSD - MAPCA repair, Complete single stage repair (1 stage that includes bilateral pulmonary unifocalization + VSD closure + RV to PA connection [with or without conduit])
- ◯ Pulmonary atresia - VSD - MAPCA repair, Status post prior complete unifocalization (includes VSD closure + RV to PA connection [with or without conduit])
- ◯ Pulmonary atresia - VSD - MAPCA repair, Status post prior incomplete unifocalization (includes completion of pulmonary unifocalization + VSD closure + RV to PA connection [with or without conduit])
- ◯ Unifocalization MAPCA(s), Bilateral pulmonary unifocalization - Complete unifocalization (all usable MAPCA[s] are incorporated)
- ◯ Unifocalization MAPCA(s), Bilateral pulmonary

unifocalization - Incomplete unifocalization (not all usable MAPCA[s] are incorporated)
- ◯ Unifocalization MAPCA(s), Unilateral pulmonary unifocalization
- ◯ Unifocalization MAPCA(s)
- ◯ Occlusion of MAPCA(s)
- ◯ Valvuloplasty, Tricuspid (do not use this code if tricuspid valve malfunction is secondary to Ebstein's anomaly. Use 465
- ◯ Valvuloplasty converted to valve replacement in the same operation, Tricuspid
- ◯ Ebstein's repair
- ◯ Valve replacement, Tricuspid (TVR)
- ◯ Valve closure, Tricuspid (exclusion, univentricular approach)
- ◯ Valve excision, Tricuspid (without replacement)
- ◯ Valve surgery, Other, Tricuspid
- ◯ RVOT procedure
- ◯ 1 1/2 ventricular repair
- ◯ PA, reconstruction (plasty), Main (trunk)
- ◯ PA, reconstruction (plasty), Branch, Central (within the hilar bifurcation)
- ◯ PA, reconstruction (plasty), Branch, Peripheral (at or beyond the hilar bifurcation)
- ◯ DCRV repair
- ◯ Valvuloplasty, Pulmonic
- ◯ Valvuloplasty converted to valve replacement in the same operation, Pulmonic
- ◯ Valve replacement, Pulmonic (PVR)
- ◯ Valve excision, Pulmonary (without replacement)
- ◯ Valve closure, Semilunar
- ◯ Valve surgery, Other, Pulmonic
- ◯ Conduit placement, RV to PA
- ◯ Conduit placement, LV to PA
- ◯ Conduit placement, Ventricle to aorta
- ◯ Conduit placement, Other
- ◯ Conduit reoperation
- ◯ Valvuloplasty, Aortic
- ◯ Valvuloplasty converted to valve replacement in the same operation, Aortic
- ◯ Valvuloplasty converted to valve replacement in the same operation, Aortic - with Ross procedure
- ◯ Valvuloplasty converted to valve replacement in the same operation, Aortic - with Ross-Konno procedure
- ◯ Valve replacement, Aortic (AVR)
- ◯ Valve replacement, Aortic (AVR), Mechanical
- ◯ Valve replacement, Aortic (AVR), Bioprosthetic
- ◯ Valve replacement, Aortic (AVR), Homograft
- ◯ Aortic root replacement, Bioprosthetic
- ◯ Aortic root replacement, Mechanical
- ◯ Aortic root replacement, Homograft
- ◯ Aortic root replacement, Valve sparing
- ◯ Ross procedure
- ◯ Konno procedure
- ◯ Ross-Konno procedure
- ◯ Other annular enlargement procedure
- ◯ Aortic stenosis, Subvalvar, Repair
- ◯ Aortic stenosis, Subvalvar, Repair, With myectomy for IHSS
- ◯ Aortic stenosis, Supravalvar, Repair
- ◯ Valve surgery, Other, Aortic
- ◯ Sinus of Valsalva, Aneurysm repair
- ◯ LV to aorta tunnel repair
- ◯ Valvuloplasty, Mitral
- ◯ Valvuloplasty converted to valve replacement in the same operation, Mitral
- ◯ Mitral stenosis, Supravalvar mitral ring repair
- ◯ Valve replacement, Mitral (MVR)
- ◯ Valve surgery, Other, Mitral
- ◯ Norwood procedure

- ◯ HLHS biventricular repair
- ◯ Conduit insertion right ventricle to pulmonary artery + Intraventricular tunnel left ventricle to neoaorta + arch reconstruction (Rastelli and Norwood type arch reconstruction) (Yasui)
- ◯ Hybrid Approach "Stage 1", Application of RPA & LPA bands
- ◯ Hybrid Approach "Stage 1", Stent placement in arterial duct (PDA)
- ◯ Hybrid Approach "Stage 1", Stent placement in arterial duct (PDA) + application of RPA & LPA bands
- ◯ Hybrid approach "Stage 2", Aortopulmonary amalgamation + Superior Cavopulmonary anastomosis(es) + PA Debanding + Aortic arch repair (Norwood [Stage 1] + Superior Cavopulmonary anastomosis(es) + PA Debanding)
- ◯ Hybrid approach "Stage 2", Aortopulmonary amalgamation + Superior Cavopulmonary anastomosis(es) + PA Debanding + Without aortic arch repair
- ◯ Hybrid Approach, Transcardiac balloon dilatation
- ◯ Hybrid Approach, Transcardiac transcatheter device placement
- ◯ Transplant, Heart
- ◯ Transplant, Heart and lung
- ◯ Partial left ventriculectomy (LV volume reduction surgery) (Batista)
- ◯ Pericardial drainage procedure
- ◯ Pericardiectomy
- ◯ Pericardial procedure, Other
- ◯ Fontan, Atrio-pulmonary connection
- ◯ Fontan, Atrio-ventricular connection
- ◯ Fontan, TCPC, Lateral tunnel, Fenestrated
- ◯ Fontan, TCPC, Lateral tunnel, Nonfenestrated
- ◯ Fontan, TCPC, External conduit, Fenestrated
- ◯ Fontan, TCPC, External conduit, Nonfenestrated
- ◯ Fontan, TCPC, Intra/extracardiac conduit, Fenestrated
- ◯ Fontan, TCPC, Intra/extracardiac conduit, Nonfenestrated
- ◯ Fontan, TCPC, External conduit, hepatic veins to pulmonary artery, Fenestrated
- ◯ Fontan, TCPC, External conduit, hepatic veins to pulmonary artery, Nonfenestrated
- ◯ Fontan revision or conversion (Re-do Fontan)
- ◯ Fontan, Other
- ◯ Fontan + Atrioventricular valvuloplasty
- ◯ Ventricular septation
- ◯ Congenitally corrected TGA repair, Atrial switch and ASO (double switch)
- ◯ Congenitally corrected TGA repair, Atrial switch and Rastelli
- ◯ Congenitally corrected TGA repair, VSD closure
- ◯ Congenitally corrected TGA repair, VSD closure and LV to PA conduit
- ◯ Congenitally corrected TGA repair, Other
- ◯ Arterial switch operation (ASO)
- ◯ Arterial switch operation (ASO) and VSD repair
- ◯ Arterial switch procedure + Aortic arch repair
- ◯ Arterial switch procedure and VSD repair + Aortic arch repair
- ◯ Senning
- ◯ Mustard
- ◯ Atrial baffle procedure, Mustard or Senning revision
- ◯ Rastelli
- ◯ REV
- ◯ Aortic root translocation over left ventricle (Including Nikaidoh procedure)
- ◯ TGA, Other procedures (Kawashima, LV-PA conduit,

other)
- ◯ DORV, Intraventricular tunnel repair
- ◯ DOLV repair
- ◯ Coarctation repair, End to end
- ◯ Coarctation repair, End to end, Extended
- ◯ Coarctation repair, Subclavian flap
- ◯ Coarctation repair, Patch aortoplasty
- ◯ Coarctation repair, Interposition graft
- ◯ Coarctation repair, Other
- ◯ Coarctation repair + VSD repair
- ◯ Aortic arch repair
- ◯ Aortic arch repair + VSD repair
- ◯ Coronary artery fistula ligation
- ◯ Anomalous origin of coronary artery from pulmonary artery repair
- ◯ Coronary artery bypass
- ◯ Anomalous aortic origin of coronary artery (AAOCA) repair
- ◯ Coronary artery procedure, Other
- ◯ Interrupted aortic arch repair
- ◯ PDA closure, Surgical
- ◯ PDA closure, Device
- ◯ Vascular ring repair
- ◯ Aortopexy
- ◯ Pulmonary artery sling repair
- ◯ Aortic aneurysm repair
- ◯ Aortic dissection repair
- ◯ Lung biopsy
- ◯ Transplant, lung(s)
- ◯ Lung procedure, Other
- ◯ Tracheal procedure
- ◯ Muscle flap, Trunk (i.e. intercostal, pectus, or serratus muscle)
- ◯ Muscle flap, Trunk (i.e. latissimus dorsi)
- ◯ Removal, Sternal wire
- ◯ Rib excision, Complete
- ◯ Rib excision, Partial
- ◯ Sternal fracture, Open treatment
- ◯ Sternal resection, Radical resection of the sternum
- ◯ Sternal resection, Radical resection of the sternum with mediastinal lymphadenectomy
- ◯ Tumor of chest wall, Excision including ribs
- ◯ Tumor of chest wall, Excision including ribs, With reconstruction
- ◯ Tumor of soft tissue of thorax, Excision of deep subfascial or intramuscular tumor
- ◯ Tumor of soft tissue of thorax, Excision of subcutaneous tumor
- ◯ Tumor of soft tissue of thorax, Radical resection
- ◯ Hyoid myotomy and suspension
- ◯ Muscle flap, Neck
- ◯ Procedure on neck
- ◯ Tumor of soft tissue of neck, Excision of deep subfascial or intramuscular tumor
- ◯ Tumor of soft tissue of neck, Excision of subcutaneous tumor
- ◯ Tumor of soft tissue of neck, Radical resection
- ◯ Pectus bar removal
- ◯ Pectus bar repositioning
- ◯ Pectus repair, Minimally invasive repair (Nuss), With thoracoscopy
- ◯ Pectus repair, Minimally invasive repair (Nuss), Without thoracoscopy
- ◯ Pectus repair, Open repair
- ◯ Division of scalenus anticus, With resection of a cervical rib
- ◯ Division of scalenus anticus, Without resection of a cervical rib
- ◯ Rib excision, Excision of a cervical rib
- ◯ Rib excision, Excision of a cervical rib, With sympathectomy

- ◯ Rib excision, Excision of first rib
- ◯ Rib excision, Excision of first rib, With sympathectomy
- ◯ Procedure on thorax
- ◯ Pacemaker implantation, Permanent
- ◯ Pacemaker procedure
- ◯ Explantation of pacing system
- ◯ ICD (AICD) implantation
- ◯ ICD (AICD) ([automatic] implantable cardioverter defibrillator) procedure
- ◯ Arrhythmia surgery - atrial, Surgical Ablation
- ◯ Arrhythmia surgery - ventricular, Surgical Ablation
- ◯ Cardiovascular catheterization procedure, Diagnostic
- ◯ Cardiovascular catheterization procedure, Diagnostic, Angiographic data obtained
- ◯ Cardiovascular catheterization procedure, Diagnostic, Electrophysiology alteration
- ◯ Cardiovascular catheterization procedure, Diagnostic, Hemodynamic alteration
- ◯ Cardiovascular catheterization procedure, Diagnostic, Hemodynamic data obtained
- ◯ Cardiovascular catheterization procedure, Diagnostic, Transluminal test occlusion
- ◯ Cardiovascular catheterization procedure, Therapeutic
- ◯ Cardiovascular catheterization procedure, Therapeutic, Adjunctive therapy
- ◯ Cardiovascular catheterization procedure, Therapeutic, Balloon dilation
- ◯ Cardiovascular catheterization procedure, Therapeutic, Balloon valvotomy
- ◯ Cardiovascular catheterization procedure, Therapeutic, Coil implantation
- ◯ Cardiovascular catheterization procedure, Therapeutic, Device implantation
- ◯ Cardiovascular catheterization procedure, Therapeutic, Device implantation attempted
- ◯ Cardiovascular catheterization procedure, Therapeutic, Electrophysiological ablation
- ◯ Cardiovascular catheterization procedure, Therapeutic, Intravascular foreign body removal
- ◯ Cardiovascular catheterization procedure, Therapeutic, Perforation (establishing interchamber and/or intervessel communication)
- ◯ Cardiovascular catheterization procedure, Therapeutic, Septostomy
- ◯ Cardiovascular catheterization procedure, Therapeutic, Stent insertion
- ◯ Cardiovascular catheterization procedure, Therapeutic, Stent re-dilation
- ◯ Cardiovascular catheterization procedure, Therapeutic, Transcatheter Fontan completion
- ◯ Cardiovascular catheterization procedure, Therapeutic, Transcatheter implantation of valve
- ◯ Shunt, Systemic to pulmonary, Modified Blalock-Taussig Shunt (MBTS)
- ◯ Shunt, Systemic to pulmonary, Central (shunt from aorta)
- ◯ Shunt, Systemic to pulmonary, Central (shunt from aorta) Central shunt with an end-to-side connection between the transected main pulmonary artery and the side of the ascending aorta (i.e. Mee shunt)
- ◯ Shunt, Systemic to pulmonary, Potts - Smith type (descending aorta to pulmonary artery)
- ◯ Shunt, Systemic to pulmonary, Other
- ◯ Shunt, Ligation and takedown
- ◯ Shunt, Reoperation
- ◯ PA banding (PAB)
- ◯ PA debanding

- ◯ PA band adjustment
- ◯ Damus-Kaye-Stansel procedure (DKS) (creation of AP anastomosis without arch reconstruction)
- ◯ Bidirectional cavopulmonary anastomosis (BDCPA) (bidirectional Glenn)
- ◯ Glenn (unidirectional cavopulmonary anastomosis) (unidirectional Glenn)
- ◯ Bilateral bidirectional cavopulmonary anastomosis (BBDCPA) (bilateral bidirectional Glenn)
- ◯ HemiFontan
- ◯ Superior cavopulmonary anastomosis(es) (Glenn or HemiFontan) + Atrioventricular valvuloplasty
- ◯ Superior Cavopulmonary anastomosis(es) + PA reconstruction
- ◯ Takedown of superior cavopulmonary anastomosis
- ◯ Hepatic vein to azygous vein connection, Direct
- ◯ Hepatic vein to azygous vein connection, Interposition graft
- ◯ Kawashima operation (superior cavopulmonary connection in setting of interrupted IVC with azygous continuation)
- ◯ Palliation, Other
- ◯ Attempted fetal intervention, percutaneous trans-catheter directed at interatrial septum
- ◯ Attempted fetal intervention, percutaneous trans-catheter directed at aortic valve
- ◯ Attempted fetal intervention, percutaneous trans-catheter directed at pulmonic valve
- ◯ Attempted fetal intervention "open" (maternal laparotomy with hysterotomy), directed at interatrial septum
- ◯ Attempted fetal intervention "open" (maternal laparotomy with hysterotomy), directed at aortic valve
- ◯ Attempted fetal intervention "open" (maternal laparotomy with hysterotomy), directed at pulmonic valve
- ◯ ECMO cannulation
- ◯ ECMO decannulation
- ◯ ECMO procedure
- ◯ Intraaortic balloon pump (IABP) insertion
- ◯ Right/left heart assist device procedure
- ◯ VAD explantation
- ◯ VAD implantation
- ◯ VAD change out
- ◯ Echocardiography procedure, Sedated transesophageal echocardiogram
- ◯ Echocardiography procedure, Sedated transthoracic echocardiogram
- ◯ Non-cardiovascular, Non-thoracic procedure on cardiac patient with cardiac anesthesia
- ◯ Radiology procedure on cardiac patient, Cardiac Computerized Axial Tomography (CT Scan)
- ◯ Radiology procedure on cardiac patient, Cardiac Magnetic Resonance Imaging (MRI)
- ◯ Radiology procedure on cardiac patient, Diagnostic radiology
- ◯ Radiology procedure on cardiac patient, Non-Cardiac Computerized Tomography (CT) on cardiac patient
- ◯ Radiology procedure on cardiac patient, Non-cardiac Magnetic Resonance Imaging (MRI) on cardiac patient
- ◯ Radiology procedure on cardiac patient, Therapeutic radiology
- ◯ Aneurysm, Ventricular, Right, Repair
- ◯ Aneurysm, Ventricular, Left, Repair
- ◯ Aneurysm, Pulmonary artery, Repair
- ◯ Cardiac tumor resection
- ◯ Pulmonary AV fistula repair/occlusion
- ◯ Ligation, Pulmonary artery

- ◯ Pulmonary embolectomy, Acute pulmonary embolus
- ◯ Pulmonary embolectomy, Chronic pulmonary embolus
- ◯ Pleural drainage procedure
- ◯ Pleural procedure, Other
- ◯ Ligation, Thoracic duct
- ◯ Decortication
- ◯ Esophageal procedure
- ◯ Mediastinal procedure
- ◯ Bronchoscopy
- ◯ Diaphragm plication
- ◯ Diaphragm procedure, Other
- ◯ VATS (video-assisted thoracoscopic surgery)
- ◯ Minimally invasive procedure
- ◯ Bypass for noncardiac lesion
- ◯ Delayed sternal closure
- ◯ Mediastinal exploration
- ◯ Sternotomy wound drainage
- ◯ Intravascular stent removal
- ◯ Removal of transcatheter delivered device from heart
- ◯ Removal of transcatheter delivered device from blood vessel
- ◯ Thoracotomy, Other
- ◯ Cardiotomy, Other
- ◯ Cardiac procedure, Other
- ◯ Thoracic and/or mediastinal procedure, Other
- ◯ Peripheral vascular procedure, Other
- ◯ Miscellaneous procedure, Other
- ◯ Organ procurement
- ◯ Other procedure

Notes on cardiac procedure

Any additional information or specifications regarding cardiac procedure (ex. delayed sternal closure, extubation, occlusion, etc.)

SECTION: DETAILS OF CARDIAC PROCEDURE

Cardiopulmonary bypass time (min) _____

Aortic cross clamp time (min) _____

Cardiac procedure date of discharge _____

Postop hospital stay duration (days) _____

information can be found in the discharge summary

Complications

- ◯ Yes
- ◯ No

(ex. respiratory arrest, hypotension, dependent on mechanical ventilation, etc.)

Specify the complications _____

SECTION: UPLOADS

Upload de-identified OR report of [studyid]
(OR date: [carddt])

Upload de-identified discharge summary report of [studyid]
(OR date: [carddt])

uploading the OR reports and discharge summaries will help with data verification and data quality checks.

It can also help if the research coordinator is unfamiliar with some of the terminology.

PV surgery

This form is to record any surgery that involves repair of the pulmonary veins. If other cardiac surgery was done at the same surgery- there is a place to enter the information

PULMONARY VEIN SURGERY

PV surgery date _____

Age (years) _____
(e.g., for age 2 years and 9 months > put "2")

Age (months) _____
(e.g., for age 2 years and 11 months > put "11")

Addition: Age (days) _____
(e.g., for age 2 years & 11 months > this field displays "2.92")

Age in years (calculated filed)

SECTION: INTRAOPERATIVE DETAILS

if the specific PV is absent anatomically, select "not applicable"

Surgical procedure on RCPV

- ◯ Conventional
- ◯ Sutureless
- ◯ Patch-PTFE
- ◯ Patch- pericardium
- ◯ Redo conventional
- ◯ Redo sutureless
- ◯ Redo patch-PTFE
- ◯ Redo patch- pericar
- ◯ Other
- ◯ No procedure
- ◯ Not applicable

example:conventional venoplasty

aka marsuplization, coles

redo is not redo sternotomy but rather redo repair on a previously operated on pulmonary vein

Specify the other procedure on RCPV (ex. PAPVC repair, etc.) _____

Surgical precedure on RUPV

- ◯ Conventional
- ◯ Sutureless
- ◯ Patch-PTFE
- ◯ Patch- pericardium
- ◯ Redo conventional
- ◯ Redo sutureless
- ◯ Redo patch-PTFE
- ◯ Redo patch- pericardium
- ◯ Other
- ◯ No procedure
- ◯ Not applicable

Specify the other procedure on RUPV (ex. PAPVC repair, etc.) _____

Surgical precedure on RLPV

- ◯ Conventional
- ◯ Sutureless
- ◯ Patch-PTFE
- ◯ Patch- pericardium
- ◯ Redo conventional
- ◯ Redo sutureless
- ◯ Redo patch-PTFE
- ◯ Redo patch- pericardium
- ◯ Other
- ◯ No procedure
- ◯ Not applicable

Specify the other procedure on RLPV (ex. PAPVC repair, etc.)

Surgical precedure on RMPV

- ◯ Conventional
- ◯ Sutureless
- ◯ Patch-PTFE
- ◯ Patch- pericardium
- ◯ Redo conventional
- ◯ Redo sutureless
- ◯ Redo patch-PTFE
- ◯ Redo patch- pericardium
- ◯ Other
- ◯ No procedure
- ◯ Not applicable

Specify the other procedure on RMPV (ex. PAPVC repair, etc.)

Surgical precedure on LCPV

- ◯ Conventional
- ◯ Sutureless
- ◯ Patch-PTFE
- ◯ Patch- pericardium
- ◯ Redo conventional
- ◯ Redo sutureless
- ◯ Redo patch-PTFE
- ◯ Redo patch- pericardium
- ◯ Other
- ◯ No procedure
- ◯ Not applicable

Specify the other procedure on LCPV (ex. PAPVC repair, etc.)

Surgical precedure on LUPV

- ◯ Conventional
- ◯ Sutureless
- ◯ Patch-PTFE
- ◯ Patch- pericardium
- ◯ Redo conventional
- ◯ Redo sutureless
- ◯ Redo patch-PTFE
- ◯ Redo patch- pericardium
- ◯ Other
- ◯ No procedure
- ◯ Not applicable

Specify the other procedure on LUPV (ex. PAPVC repair, etc.)

Surgical precedure on LLPV

- ◯ Conventional
- ◯ Sutureless
- ◯ Patch-PTFE
- ◯ Patch- pericardium
- ◯ Redo conventional
- ◯ Redo sutureless
- ◯ Redo patch-PTFE
- ◯ Redo patch- pericardium
- ◯ Other
- ◯ No procedure
- ◯ Not applicable

Specify the other procedure on LLPV (ex. PAPVC repair, etc.) _____

Cardiopulmonary bypass time (min) _____

Aortic cross clamp time (min) _____

Hypothermic circulatory arrest time (min) _____

Any other cardiac surgery during the same OR

- ◯ Yes
- ◯ No

Specify the other cardiac surgery

_____

Comments on pulmonary vein surgery Any additional information or clarification regarding pulmonary vein surgery (ex. date of discharge from admission, left Coles procedure, etc.) _____

SECTION: POSTOPERATIVE COURSE

Date of extubation _____

Postop ventilation duration (days) _____

Date of discharge from ICU _____

Postop ICU duration (days) _____

Delayed chest closure

- ◯ Yes
- ◯ No

Extracorporeal life support postoperatively

- ◯ Yes
- ◯ No

Type of extracorporeal life support

- ◯ VA ECMO
- ◯ VV ECMO
- ◯ Novalung/PLAD

Date of start of ECLS _____

Date of end of ECLS _____

Medications used for PHTN in the postop period

- ◯ Yes
- ◯ No

Inhaled nitric oxide

- ◯ Yes
- ◯ No

Sildenafil
◯ Yes
◯ No

Other medications for PHTN
◯ Yes
◯ No

Specify the other medication used
(ex. amlodipine, etc.)

Postoperative complications
◯ Yes
◯ No

Type of complications
(select all that apply)
☐ Infection
☐ Acute kidney injury
☐ Pulmonary hypertensive crisis
☐ Right ventricular failure
☐ Prolonged intubation
☐ Cerebral embolization/Stroke
☐ Systemic embolization to organ other than brain
☐ Other complication 1
☐ Other complication 2
☐ Other complication 3

Specify the other complication 1

Specify the other complication 2
(ex. chylothorax cardiac arrest, bleeding, respiratory distress, increased work of breathing, slow weaning of diuretics, etc.)

Specify the other complication 3

Comments on PV surgery postop complications
Any additional information or clarification regarding post-op complications and treatments (ex. cardiac arrest, steroids prescribed, GERB, date of delayed sternal closure, etc.)

SECTION: UPLOADS

Upload de-identified OR report of [studyid]
(OR date: [pvsdt])

Upload de-identified discharge summary of [studyid]
(OR date: [pvsdt])

PV cath intervention

This form is to capture all catheter based interventions

There is a place to upload the Cath report- this will be important as we will extract the size of balloons and stents for future studies

PULMONARY VEIN CATHETER INTERVENTION

PV cath intervention date _____

Age (years) _____
(e.g., for age 2 years and 9 months > put "2")

Age (months) _____
(e.g., for age 2 years and 11 months > put "11")

Age (days) _____
(e.g., for age 2 years & 11 months > this field displays "2.92")

Age in years (calculated filed)

SECTION: DIAGNOSTIC CATH COMBINED WITH INTERVENTION

Normal/no stenosis | Veno-atrial stenosis | Veno-atrial stenosis with upstream disease | Diffuse disease or hypoplasia | Occluded or atretic

RCPV stenosis

- ◯ Veno-atrial junction only
- ◯ Veno-atrial junction with upstream/intraparenchymal disease
- ◯ Diffuse disease/hypoplasia
- ◯ Atretic/occluded
- ◯ No stenosis/unobstructed
- ◯ Not specified
- ◯ Not applicable

RUPV stenosis

- ◯ Veno-atrial junction only
- ◯ Veno-atrial junction with upstream/intraparenchymal disease
- ◯ Diffuse disease/hypoplasia
- ◯ Atretic/occluded
- ◯ No stenosis/unobstructed
- ◯ Not specified
- ◯ Not applicable

RLPV stenosis

- ◯ Veno-atrial junction only
- ◯ Veno-atrial junction with upstream/intraparenchymal disease
- ◯ Diffuse disease/hypoplasia
- ◯ Atretic/occluded
- ◯ No stenosis/unobstructed
- ◯ Not specified
- ◯ Not applicable

RMPV stenosis

- ◯ Veno-atrial junction only
- ◯ Veno-atrial junction with upstream/intraparenchymal disease
- ◯ Diffuse disease/hypoplasia
- ◯ Atretic/occluded
- ◯ No stenosis/unobstructed
- ◯ Not specified
- ◯ Not applicable

LCPV stenosis

- ◯ Veno-atrial junction only
- ◯ Veno-atrial junction with upstream/intraparenchymal disease
- ◯ Diffuse disease/hypoplasia
- ◯ Atretic/occluded
- ◯ No stenosis/unobstructed
- ◯ Not specified
- ◯ Not applicable

LUPV stenosis

- ◯ Veno-atrial junction only
- ◯ Veno-atrial junction with upstream/intraparenchymal disease
- ◯ Diffuse disease/hypoplasia
- ◯ Atretic/occluded
- ◯ No stenosis/unobstructed
- ◯ Not specified
- ◯ Not applicable

LLPV stenosis

- ◯ Veno-atrial junction only
- ◯ Veno-atrial junction with upstream/intraparenchymal disease
- ◯ Diffuse disease/hypoplasia
- ◯ Atretic/occluded
- ◯ No stenosis/unobstructed
- ◯ Not specified
- ◯ Not applicable

Comments on diagnostic cath

Any additional information or clarification regarding procedure or specific pulmonary vein anatomy, connections or stenosis (ex. LUPV angiogram and direct injection, proximal severe stenosis close to veno atrial junction, balloon dilation of stenotic right pulmonary vein, RUPV severely obstructed at orifice, good sized peripheral veins, etc.)

SECTION: INTERVENTION PROCEDURE DETAILS

if the specific PV is absent anatomically, select "not applicable"

Catheter based procedure on RCPV

- ◯ Dilation only
- ◯ Dilation requiring cutting balloons
- ◯ Dilation+Stent implantation
- ◯ Stent rupture/fracture only
- ◯ Other
- ◯ No intervention
- ◯ Not applicable

Specify the stent on RCPV

- ◯ BMS
- ◯ Covered
- ◯ DES (Everolimus)
- ◯ DES (Sirolimus)
- ◯ DES (Paclitaxel)
- ◯ DES (other)
- ◯ Bioabsorbable DES

Specify the other drug eluting stent on RCPV _____

Specify the other procedure on RCPV _____

Catheter based procedure on RUPV

- ◯ Dilation only
- ◯ Dilation requiring cutting balloons
- ◯ Dilation+Stent implantation
- ◯ Stent rupture/fracture only
- ◯ Other
- ◯ No intervention
- ◯ Not applicable

Specify the stent on RUPV

- ◯ BMS
- ◯ Covered
- ◯ DES (Everolimus)
- ◯ DES (Sirolimus)
- ◯ DES (Paclitaxel)
- ◯ DES (other)
- ◯ Bioabsorbable DES

Specify the other drug eluting stent on RUPV _____

Specify the other procedure on RUPV _____

Catheter based procedure on RLPV

- ◯ Dilation only
- ◯ Dilation requiring cutting balloons
- ◯ Dilation+Stent implantation
- ◯ Stent rupture/fracture only
- ◯ Other
- ◯ No intervention
- ◯ Not applicable

Specify the stent on RLPV

- ◯ BMS
- ◯ Covered
- ◯ DES (Everolimus)
- ◯ DES (Sirolimus)
- ◯ DES (Paclitaxel)
- ◯ DES (other)
- ◯ Bioabsorbable DES

Specify the other drug eluting stent on RLPV _____

Specify the other procedure on RLPV _____

Catheter based procedure on RMPV

- ◯ Dilation only
- ◯ Dilation requiring cutting balloons
- ◯ Dilation+Stent implantation
- ◯ Stent rupture/fracture only
- ◯ Other
- ◯ No intervention
- ◯ Not applicable

Specify the stent on RMPV

- ◯ BMS
- ◯ Covered
- ◯ DES (Everolimus)
- ◯ DES (Sirolimus)
- ◯ DES (Paclitaxel)
- ◯ DES (other)
- ◯ Bioabsorbable DES

Specify the other drug eluting stent on RMPV _____

Specify the other procedure on RMPV _____

Catheter based procedure on LCPV

- ◯ Dilation only
- ◯ Dilation requiring cutting balloons
- ◯ Dilation+Stent implantation
- ◯ Stent rupture/fracture only
- ◯ Other
- ◯ No intervention
- ◯ Not applicable

Specify the stent on LCPV

- ◯ BMS
- ◯ Covered
- ◯ DES (Everolimus)
- ◯ DES (Sirolimus)
- ◯ DES (Paclitaxel)
- ◯ DES (other)
- ◯ Bioabsorbable DES

Specify the other drug eluting stent on LCPV _____

Specify the other procedure on LCPV _____

Catheter based procedure on LUPV

- ◯ Dilation only
- ◯ Dilation requiring cutting balloons
- ◯ Dilation+Stent implantation
- ◯ Stent rupture/fracture only
- ◯ Other
- ◯ No intervention
- ◯ Not applicable

Specify the stent on LUPV

- ◯ BMS
- ◯ Covered
- ◯ DES (Everolimus)
- ◯ DES (Sirolimus)
- ◯ DES (Paclitaxel)
- ◯ DES (other)
- ◯ Bioabsorbable DES

Specify the other drug eluting stent on LUPV _____

Specify the other procedure on LUPV _____

Catheter based procedure on LLPV

- ◯ Dilation only
- ◯ Dilation requiring cutting balloons
- ◯ Dilation+Stent implantation
- ◯ Stent rupture/fracture only
- ◯ Other
- ◯ No intervention
- ◯ Not applicable

Specify the stent on LLPV

- ◯ BMS
- ◯ Covered
- ◯ DES (Everolimus)
- ◯ DES (Sirolimus)
- ◯ DES (Paclitaxel)
- ◯ DES (other)
- ◯ Bioabsorbable DES

Specify the other drug eluting stent on LLPV _____

Specify the other procedure on LLPV _____

SECTION: PRE-PROCEDURE CATHETER HEMODYNAMIC PARAMETERS

some or all of this data may be available on the Cath report

there is a place for pre-procedure values and post-procedure values

Pulmonary artery systolic pressure (mmHg) _____

Pulmonary artery diastolic pressure (mmHg) _____

Addition: Pulmonary artery mean pressure (mmHg)

Aortic systolic pressure (mmHg) _____

Aortic diastolic pressure (mmHg) _____

Right ventricular systolic pressure (mmHg) _____

Right ventricular diastolic pressure (mmHg) _____

Left ventricular systolic pressure (mmHg) _____

Left ventricular diastolic pressure (mmHg) _____

Pulmonary arterial wedge pressure (mmHg) _____

Mean left atrial pressure (mmHg) _____

Mean right atrial pressure (mmHg) _____

Addition: Transpulmonary gradient (mmHg)

Pulmonary vascular resistance (indexed) (dynes/cm square) _____

RCPV pressure (mean) (mmHg) _____

RUPV pressure (mean) (mmHg) _____

RLPV pressure (mean) (mmHg) _____

RMPV pressure (mean) (mmHg) _____

LCPV pressure (mean) (mmHg) _____

LUPV pressure (mean) (mmHg) _____

LLPV pressure (mean) (mmHg) _____

Cardiac index (L/min/m2) _____

Flow measurement

- ◯ Individual measurements of pulmonary and systemic blood flow
- ◯ Qp:Qs , if individual numbers not reported

Pulmonary blood flow (L/min) _____

Systemic blood flow (L/min) _____

Qp _____

Qs _____

SECTION: POST-PROCEDURE CATHETER HEMODYNAMIC PARAMETERS

Pulmonary artery systolic pressure (mmHg) _____

Pulmonary artery diastolic pressure (mmHg) _____

Addition: Pulmonary artery mean pressure (mmHg)

Aortic systolic pressure (mmHg) _____

Aortic diastolic pressure (mmHg) _____

Right ventricular systolic pressure (mmHg) _____

Right ventricular diastolic pressure (mmHg) _____

Left ventricular systolic pressure (mmHg) _____

Left ventricular diastolic pressure (mmHg) _____

Pulmonary arterial wedge pressure (mmHg) _____

Mean left atrial pressure (mmHg) _____

Mean right atrial pressure (mmHg) _____

Addition: Transpulmonary gradient (mmHg)

Pulmonary vascular resistance (indexed) (dynes/cm square) _____

RCPV pressure (mean) (mmHg) _____

RUPV pressure (mean) (mmHg) _____

RLPV pressure (mean) (mmHg) _____

RMPV pressure (mean) (mmHg) _____

LCPV pressure (mean) (mmHg) _____

LUPV pressure (mean) (mmHg) _____

LLPV pressure (mean) (mmHg) _____

Cardiac index (L/min/m2) _____

Flow measurement

◯ Individual measurements of pulmonary and systemic blood flow
◯ Qp:Qs , if individual numbers not reported

Pulmonary blood flow (L/min) _____

Systemic blood flow (L/min) _____

Qp _____

Qs _____

Comments on residual lesions after cath based intervention

text based entry: can put reason why vein not addressed- ie. could not cannulate orfice

(ex. final angiogram showed improvement in caliber of LUPV, limited catheter manipulation through fenestration-unable to access left pulmonary veins, etc.)

SECTION: COMPLICATIONS

Complications

◯ Yes
◯ No

Type of complications (select all that apply)

This will be found on the discharge summary from the cath procedure. <10% of all cath procedures will have a major complication associated with it.

☐ Infection
☐ Acute kidney injury
☐ Pulmonary hypertensive crisis
☐ Right ventricular failure
☐ Prolonged intubation
☐ Cerebral embolization/Stroke
☐ Systemic embolization to organ other than brain
☐ Other complications 1
☐ Other complications 2
☐ Other complications 3

Specify the other complication 1

Specify the other complication 2

(ex. left superficial femoral artery occlusive thrombus, etc.)

Specify the other complication 3

Comments on PV cath intervention postop complications

(ex. treated with enoxaparin, etc.)

SECTION: UPLOADS

Upload de-identified cath report of [studyid]
(cath date: [cathdt])

Upload de-identified cath report (summary) of [studyid]
(cath date: [cathdt])

Upload de-identified discharge summary of [studyid]
(cath date: [cathdt])

uploading documents will help to verify data and input data that coordinators are unsure of.

Cath reports can have a summary document and also a document with all the raw measurements - both can be uploaded

Echocardiography

Each echo can be inputted as a separate event.

Sometimes an echo is done just to check a pericardial effusion- these do not need to be recorded.

Formal echo studies that address the pulmonary veins are the studies we would like to capture.

There is a place to upload de-identified reports

ECHOCARDIOGRAPHY

Echo date

Age (years) _____
(e.g., for age 2 years and 9 months > put "2")

Age (months) _____
(e.g., for age 2 years and 11 months > put "11")

Addition: Age (days)

Age in years (calculated filed) _____
(e.g., for age 2 years & 11 months > this field displays "2.92")

SECTION: ECHO GENERAL DATA

Imaging Indication

this may be known- ie written in the reason for echo

- ◯ Diagnosis / Baseline imaging
- ◯ Post-Intervention surveillance
- ◯ Surveillance with no previous intervention
- ◯ Symptom driven / Change in clinical status

Type of echocardiography

- ◯ Transthoracic
- ◯ Transesophageal
- ◯ Epicardial

Weight (kg) _____

BSA (kg/m2) _____

SECTION: PV GRADIENTS

some reports will contain this information - some echo reports will not mention it. uploading de-identified report will help data verification

Right pulmonary artery flow

- ◯ Antegrade
- ◯ Diastolic flow reversal
- ◯ Systolic flow reversal
- ◯ Other

if other, specify the RPA flow _____

Left pulmonary artery flow

- ◯ Antegrade
- ◯ Diastolic flow reversal
- ◯ Systolic flow reversal
- ◯ Other

if other, specify the LPA flow _____

RCPV mean gradient (mmHg) _____

RCPV peak gradient (mmHg) _____

RUPV mean gradient (mmHg) _____

RUPV peak gradient (mmHg) _____

RLPV mean gradient (mmHg) _____

RLPV peak gradient (mmHg) _____

RMPV mean gradient (mmHg) _____

RMPV peak gradient (mmHg) _____

LCPV mean gradient (mmHg) _____

LCPV peak gradient (mmHg) _____

LUPV mean gradient (mmHg) _____

LUPV peak gradient (mmHg) _____

LLPV mean gradient (mmHg) _____

LLPV peak gradient (mmHg) _____

SECTION: PV STENOSIS LOCATION/DESCRIPTION

if the specific PV is absent anatomically, select "not applicable"

Normal/no stenosis | Veno-atrial stenosis | Veno-atrial stenosis with upstream disease | Diffuse disease or hypoplasia | Occluded or atretic

RCPV stenosis

- ◯ Veno-atrial junction only
- ◯ Veno-atrial junction with upstream/intraparenchymal disease
- ◯ Diffuse/hypoplasia only
- ◯ Atertic/occluded
- ◯ No stenosis/unobstructed
- ◯ Not specified
- ◯ Not applicable

RUPV stenosis

- ◯ Veno-atrial junction only
- ◯ Veno-atrial junction with upstream/intraparenchymal disease
- ◯ Diffuse/hypoplasia only
- ◯ Atertic/occluded
- ◯ No stenosis/unobstructed
- ◯ Not specified
- ◯ Not applicable

RLPV stenosis

- ◯ Veno-atrial junction only
- ◯ Veno-atrial junction with upstream/intraparenchymal disease
- ◯ Diffuse/hypoplasia only
- ◯ Atertic/occluded
- ◯ No stenosis/unobstructed
- ◯ Not specified
- ◯ Not applicable

RMPV stenosis

- ◯ Veno-atrial junction only
- ◯ Veno-atrial junction with upstream/intraparenchymal disease
- ◯ Diffuse/hypoplasia only
- ◯ Atertic/occluded
- ◯ No stenosis/unobstructed
- ◯ Not specified
- ◯ Not applicable

LCPV stenosis

- ◯ Veno-atrial junction only
- ◯ Veno-atrial junction with upstream/intraparenchymal disease
- ◯ Diffuse/hypoplasia only
- ◯ Atertic/occluded
- ◯ No stenosis/unobstructed
- ◯ Not specified
- ◯ Not applicable

LUPV stenosis

- ◯ Veno-atrial junction only
- ◯ Veno-atrial junction with upstream/intraparenchymal disease
- ◯ Diffuse/hypoplasia only
- ◯ Atertic/occluded
- ◯ No stenosis/unobstructed
- ◯ Not specified
- ◯ Not applicable

LLPV stenosis

- ◯ Veno-atrial junction only
- ◯ Veno-atrial junction with upstream/intraparenchymal disease
- ◯ Diffuse/hypoplasia only
- ◯ Atertic/occluded
- ◯ No stenosis/unobstructed
- ◯ Not specified
- ◯ Not applicable

Addition:
Comment on PV stenosis- location/description

Any additional information or clarification regarding the location and details of pulmonary vein stenosis (ex. mild flow acceleration, obstruction, mean gradient, stenosis of RLPV, etc.)

SECTION: CARDIAC FUNCTION/DIMENSIONS

Ejection fraction (%) _____

LV end-diastolic dimension (cm) _____

LV end-systolic dimension (cm) _____

E wave velocity (m/s) _____

A wave velocity (m/s) _____

E' wave velocity (m/s) _____

A' wave velocity (m/s) _____

TAPSE (mm) _____

LVET (ms) _____

Right ventricular dysfunction
- ◯ None
- ◯ Mild
- ◯ Moderate
- ◯ Severe
- ◯ Not specified/applicable

Right ventricular enlargement
- ◯ None
- ◯ Mild
- ◯ Moderate
- ◯ Severe
- ◯ Not specified/applicable

RVSP (mmHg) _____

RV FAC% _____

RV end-diastolic dimension (cm) _____

RV end-systolic dimension (cm) _____

Left atrial size (minor axis) (cm) _____

Left atrial size (major axis) (cm) _____

Left atrial volume (ml) _____

Comments on septal motion/ septal curvature
- ◯ Normal
- ◯ Flattened/ D shaped
- ◯ Paradoxical septal motion
- ◯ Other

If other, specify the septal motion _____

SECTION: CARDIAC VALVES

Mitral valve regurgitation
- ◯ None/no regurgitation
- ◯ Mild
- ◯ Moderate
- ◯ Severe
- ◯ Not reported

Aortic valve regurgitation
- ◯ None/no regurgitation
- ◯ Mild
- ◯ Moderate
- ◯ Severe
- ◯ Not reported

Pulmonary valve regurgitation
- ◯ None/no regurgitation
- ◯ Mild
- ◯ Moderate
- ◯ Severe
- ◯ Not reported

Tricuspid valve regurgitation
- ◯ None/no regurgitation
- ◯ Mild
- ◯ Moderate
- ◯ Severe
- ◯ Not reported

Left AV valve regurgitation

- ◯ None/no regurgitation
- ◯ Mild
- ◯ Moderate
- ◯ Severe
- ◯ Not reported

Right AV valve regurgitation

- ◯ None/no regurgitation
- ◯ Mild
- ◯ Moderate
- ◯ Severe
- ◯ Not reported

Mitral valve stenosis

- ◯ Yes
- ◯ No

Mitral valve stenosis mean gradient (mmHg) _____

Tricuspid valve stenosis

- ◯ Yes
- ◯ No

Tricuspid valve stenosis mean gradient (mmHg) _____

Aortic stenosis

- ◯ Yes
- ◯ No

Aortic stenosis/LVOT mean gradient (mmHg) _____

Pulmonary stenosis

- ◯ Yes
- ◯ No

Pulmonary stenosis/RVOT gradient (mmHg) _____

SECTION: CARDIAC LESIONS

Other cardiac lesions

- ◯ Yes
- ◯ No

Specify other cardiac lesions (select all that apply)

- ☐ PDA
- ☐ VSD
- ☐ ASD
- ☐ AVSD
- ☐ PFO
- ☐ Cor Triatriatum
- ☐ Coarctation of the aorta
- ☐ HLHS
- ☐ DORV
- ☐ Right atrial isomerism
- ☐ TAPVD
- ☐ TOF
- ☐ Other

Specify the other cardiac lesion (ex. TAPVC, mixed drainage, pulmonary atresia, right aortic arch, ventriculoarterial connection discordant, dextrocardia situs inversus, etc.)

PDA: size (cm) _____

PDA: mean gradient across (mmHg) _____

PDA: peak gradient across (mmHg) _____

PDA: shunt direction
- ◯ Left to right
- ◯ Right to left
- ◯ Bidirectional

VSD: size (cm) _____

VSD: mean gradient across (mmHg) _____

VSD: peak gradient across (mmHg) _____

VSD: shunt direction
- ◯ Left to right
- ◯ Right to left
- ◯ Bidirectional

ASD: size (cm) _____

ASD: mean gradient across (mmHg) _____

ASD: peak gradient across (mmHg) _____

ASD: shunt direction
- ◯ Left to right
- ◯ Right to left
- ◯ Bidirectional

PFO: size (cm) _____

PFO: mean gradient across (mmHg) _____

PFO: peak gradient across (mmHg) _____

PFO: shunt direction
- ◯ Left to right
- ◯ Right to left
- ◯ Bidirectional

Cor triatriatum: size (cm) _____

Cor triatriatum: mean gradient across (mmHg) _____

Cor triatriatum: peak gradient across (mmHg) _____

Cor triatriatum: shunt direction
- ◯ Left to right
- ◯ Right to left
- ◯ Bidirectional

COA: size (cm) _____

COA: mean gradient across (mmHg) _____

COA: peak gradient across (mmHg) _____

COA: shunt direction
- ◯ Left to right
- ◯ Right to left
- ◯ Bidirectional

AVSD type
- ◯ Balanced
- ◯ Unbalanced
- ◯ Not specified

Comments

Any additional information or clarification regarding echocardiography

_____

SECTION: UPLOADS

Upload de-identified echo report of [studyid] (echo date: [echdt])	this will help with data verification or extraction of data at Sickkids

Diagnostic cath

this is for diagnostic caths where no procedure was performed- ie. balloon angioplasty or stent

there is a place at the end of the form to upload the de-identified report

DIAGNOSTIC CATHETERIZATION

Diagnostic catheterization date _____

Age (years) _____
(e.g., for age 2 years and 9 months > put "2")

Age (months) _____
(e.g., for age 2 years and 11 months > put "11")

Addition: Age (days)

Age in years (calculated filed) _____
(e.g., for age 2 years & 11 months > this field displays "2.92")

SECTION: GENERAL DATA ON DIAGNOSTIC CATH

Indications for cath
- ◯ Diagnosis / Baseline imaging
- ◯ Post-Intervention surveillance
- ◯ Surveillance with no previous intervention
- ◯ Symptom driven / Change in clinical status

Height (cm) _____

Weight (cm) _____

SECTION: BASELINE MEASUREMENTS

Fraction of inspired oxygen during baseline measurements _____

Pulmonary artery systolic pressure (mmHg) _____

Pulmonary artery diastolic pressure (mmHg) _____

Addition: Pulmonary artery mean pressure (mmHg)

Aortic systolic pressure (mmHg) _____

Aortic diastolic pressure (mmHg) _____

Pulmonary arterial wedge pressure (mmHg) _____

Mean left atrial pressure (mmHg) _____

Mean right atrial pressure (mmHg) _____

Addition: Transpulmonary gradient (mmHg)

Pulmonary vascular resistance (indexed) (dynes/cm square) _____

Right ventricular systolic pressure (mmHg) _____

Right ventricular diastolic pressure (mmHg) _____

Left ventricular systolic pressure (mmHg) _____

Left ventricular diastolic pressure (mmHg) _____

RUPV pressure (mean) (mmHg) _____

RMPV pressure (mean) (mmHg) _____

RLPV pressure (mean) (mmHg) _____

LUPV pressure (mean) (mmHg) _____

LLPV pressure (mean) (mmHg) _____

Cardiac index (L/min/m2) _____

Flow measurement

- ◯ Individual measurements of pulmonary and systemic blood flow
- ◯ Qp:Qs , if individual numbers not reported

Pulmonary blood flow (L/min) _____

Systemic blood flow (L/min/m2) _____

Qp _____

Qs _____

SECTION: DESCRIPTION ON PVS

Normal/no stenosis | Veno-atrial stenosis | Veno-atrial stenosis with upstream disease | Diffuse disease or hypoplasia | Occluded or atretic

RCPV stenosis

- ◯ Veno-atrial junction only
- ◯ Veno-atrial junction with upstream/intraparenchymal disease
- ◯ Diffuse disease/hypoplasia
- ◯ Atretic/occluded
- ◯ No stenosis/unobstructed
- ◯ Not specified
- ◯ Not applicable

RUPV stenosis

- ◯ Veno-atrial junction only
- ◯ Veno-atrial junction with upstream/intraparenchymal disease
- ◯ Diffuse disease/hypoplasia
- ◯ Atretic/occluded
- ◯ No stenosis/unobstructed
- ◯ Not specified
- ◯ Not applicable

RLPV stenosis

- ◯ Veno-atrial junction only
- ◯ Veno-atrial junction with upstream/intraparenchymal disease
- ◯ Diffuse disease/hypoplasia
- ◯ Atretic/occluded
- ◯ No stenosis/unobstructed
- ◯ Not specified
- ◯ Not applicable

RMPV stenosis

- ◯ Veno-atrial junction only
- ◯ Veno-atrial junction with upstream/intraparenchymal disease
- ◯ Diffuse disease/hypoplasia
- ◯ Atretic/occluded
- ◯ No stenosis/unobstructed
- ◯ Not specified
- ◯ Not applicable

LCPV stenosis

- ◯ Veno-atrial junction only
- ◯ Veno-atrial junction with upstream/intraparenchymal disease
- ◯ Diffuse disease/hypoplasia
- ◯ Atretic/occluded
- ◯ No stenosis/unobstructed
- ◯ Not specified
- ◯ Not applicable

LUPV stenosis

- ◯ Veno-atrial junction only
- ◯ Veno-atrial junction with upstream/intraparenchymal disease
- ◯ Diffuse disease/hypoplasia
- ◯ Atretic/occluded
- ◯ No stenosis/unobstructed
- ◯ Not specified
- ◯ Not applicable

LLPV stenosis

- ◯ Veno-atrial junction only
- ◯ Veno-atrial junction with upstream/intraparenchymal disease
- ◯ Diffuse disease/hypoplasia
- ◯ Atretic/occluded
- ◯ No stenosis/unobstructed
- ◯ Not specified
- ◯ Not applicable

SECTION: PULMONARY HYPERTENSION TEST

Pulmonary hypertension test done
- ◯ Yes
- ◯ No

Agents used to achieve the lowest measurements
- ◯ > 50% oxygen alone
- ◯ > 50% oxygen with nitric oxide
- ◯ Other

Specify the other agent _____

Lowest pulmonary vascular resistance (indexed) (mmHg) _____

Lowest Qp _____

Lowest Qs _____

Lowest mean pulmonary artery pressure (mmHg) _____

Lowest transpulmonary gradient (mmHg) _____

SECTION: COMPLICATIONS POST DIAGNOSTIC CATH

Complications
- ◯ Yes
- ◯ No

Type of complications
(select all that apply)
- ☐ Infection
- ☐ Acute kidney injury
- ☐ Pulmonary hypertensive crisis
- ☐ Right ventricular failure
- ☐ Prolonged intubation
- ☐ Cerebral embolization/Stroke
- ☐ Systemic embolization to organ other than brain
- ☐ Other complication 1
- ☐ Other complication 2
- ☐ Other complication 3

Specify the other complication 1 _____

Specify the other complication 2 (ex. arrest during catheter manipulation, etc.)

Specify the other complication 3 _____

SECTION: UPLOADS

Upload de-identified cath procedure (hemodynamic) report of [studyid] (cath date: [diagdt])

Upload de-identified cath report (summary) of [studyid]
(cath date: [diagdt])

Upload de-identified discharge summary of [studyid]
(cath date: [diagdt])

Lung perfusion scan

This is for lung perfusion scans.

There is a place to upload the de-identified report at the end of the form.

LUNG PERFUSION SCAN

Lung perfusion scan date _____

Age (years) _____

(e.g., for age 2 years and 9 months > put "2")

Age (months) _____

(e.g., for age 2 years and 11 months > put "11")

Addition: Age (days) _____

Age in years (calculated filed)

(e.g., for age 2 years & 11 months > this field displays "2.92")

SECTION: DATA ON PERFUSION SCAN

Indication for lung perfusion scan

- ◯ Diagnosis / Baseline imaging
- ◯ Post-Intervention surveillance
- ◯ Surveillance with no previous intervention
- ◯ Symptom driven / Change in clinical status

Height (cm) _____

Weight (kg) _____

Right lung perfusion (%) _____

Left lung perfusion (%) _____

Right upper lung perfusion (%) _____

Right middle perfusion (%) _____

Right lower perfusion (%) _____

Left upper perfusion (%) _____

Left lower perfusion (%) _____

Comments on lung perfusion

Any additional information or clarification regarding lung perfusion (ex. perfusion to right lung is homogeneous, etc.)

_____

SECTION: UPLOADS

Upload de-identified scan of [studyid] (scan date: [lungdt])

Cardiac 3D imaging

This form is for CT or MRI data.

There is a place to upload the de-identified report at the end of the form.

CARDIAC 3D IMAGING

Cardiac 3D imaging date _____

Age (years) _____
(e.g., for age 2 years and 9 months > put "2")

Age (months) _____
(e.g., for age 2 years and 11 months > put "11")

Addition: Age (days)

Age in years (calculated filed) _____
(e.g., for age 2 years & 11 months > this field displays "2.92")

SECTION: PV ANATOMY AND CONNECTIONS IMAGING DATA

Type of 3D imaging
- ◯ CT
- ◯ MRI

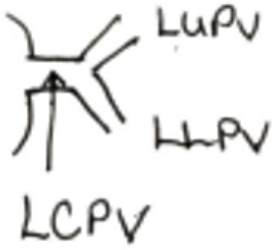
Contrast medium used
- ◯ Ablavar
- ◯ Multihance
- ◯ Gadovist
- ◯ Dotarem
- ◯ Not specified
- ◯ Other

PULMONARY VEIN ANATOMY

If the coordinator does not feel comfortable extracting this data- the de-identified form can be uploaded and it can be abstracted at Sickkids.

Typically 4 pulmonary veins draining into left atrium (LA)

RUPV, right upper pulmonary vein
RMPV, right middle pulmonary vein
RLPV, right lower pulmonary vein
LUPV, left upper pulmonary vein
LLPV, left lower pulmonary vein



Variation:
Common pulmonary vein drains into the LA

Ie. Left common pulmonary vein (LCPV) or right common pulmonary vein (RCPV)

Right sided pulmonary vein anatomy (check all that apply)

- ☐ RUPV
- ☐ RMPV
- ☐ RLPV
- ☐ RCPV
- ☐ Other

Comment right sided pulmonary vein anatomy and connection

(ex. unobstructed connection of right upper and lower pulmonary veins through common confluence to common atrium, single pulmonary vein draining each lung, etc.)

Left sided pulmonary vein anatomy (check all that apply)

- ☐ LUPV
- ☐ LLPV
- ☐ LCPV
- ☐ Other

Comment left sided pulmonary vein anatomy and connection

(ex. small LUPV has unobstructed connection to left atrium, left pulmonary venous confluence connects to left atrium, etc.)

RUPV connection

- ◯ Connected to left atrium
- ◯ Connected to right atrium
- ◯ Connected to common atrium
- ◯ Connected to systemic venous system
- ◯ Not applicable

RMPV connection

- ◯ Connected to left atrium
- ◯ Connected to right atrium
- ◯ Connected to common atrium
- ◯ Connected to systemic venous system
- ◯ Not applicable

RLPV connection

- ◯ Connected to left atrium
- ◯ Connected to right atrium
- ◯ Connected to common atrium
- ◯ Connected to systemic venous system
- ◯ Not applicable

RCPV connection

- ◯ Connected to left atrium
- ◯ Connected to right atrium
- ◯ Connected to common atrium
- ◯ Connected to systemic venous system
- ◯ Not applicable

LUPV connection

- ◯ Connected to left atrium
- ◯ Connected to right atrium
- ◯ Connected to common atrium
- ◯ Connected to systemic venous system
- ◯ Not applicable

LLPV connection

- ◯ Connected to left atrium
- ◯ Connected to right atrium
- ◯ Connected to common atrium
- ◯ Connected to systemic venous system
- ◯ Not applicable

LCPV connection

- ◯ Connected to left atrium
- ◯ Connected to right atrium
- ◯ Connected to common atrium
- ◯ Connected to systemic venous system
- ◯ Not applicable

Specify the abnormal PV connections

(ex. pulmonary veins drain into single confluence which drains through an obstructed vertical vein into the RSVC, etc.)

Any other connection

- ◯ Yes
- ◯ No

Specify the other connection

Specify the connection type for other connection

- ◯ Connected to left atrium
- ◯ Connected to right atrium
- ◯ Connected to common atrium
- ◯ Connected to systemic venous system
- ◯ Not applicable

DESCRIPTION OF PVS

Normal/no stenosis | Veno-atrial stenosis | Veno-atrial stenosis with upstream disease | Diffuse disease or hypoplasia | Occluded or atretic

RUPV stenosis

- ◯ Veno-atrial junction only
- ◯ Veno-atrial junction with upstream/intraparenchymal disease
- ◯ Diffuse disease/hypoplasia
- ◯ Atretic/occluded
- ◯ No stenosis/unobstructed
- ◯ Not specified
- ◯ Not applicable

RMPV stenosis

- ◯ Veno-atrial junction only
- ◯ Veno-atrial junction with upstream/intraparenchymal disease
- ◯ Diffuse disease/hypoplasia
- ◯ Atretic/occluded
- ◯ No stenosis/unobstructed
- ◯ Not specified
- ◯ Not applicable

RLPV stenosis

- ◯ Veno-atrial junction only
- ◯ Veno-atrial junction with upstream/intraparenchymal disease
- ◯ Diffuse disease/hypoplasia
- ◯ Atretic/occluded
- ◯ No stenosis/unobstructed
- ◯ Not specified
- ◯ Not applicable

RCPV stenosis

- ◯ Veno-atrial junction only
- ◯ Veno-atrial junction with upstream/intraparenchymal disease
- ◯ Diffuse disease/hypoplasia
- ◯ Atretic/occluded
- ◯ No stenosis/unobstructed
- ◯ Not specified
- ◯ Not applicable

LUPV stenosis

- ◯ Veno-atrial junction only
- ◯ Veno-atrial junction with upstream/intraparenchymal disease
- ◯ Diffuse disease/hypoplasia
- ◯ Atretic/occluded
- ◯ No stenosis/unobstructed
- ◯ Not specified
- ◯ Not applicable

LLPV stenosis

- ◯ Veno-atrial junction only
- ◯ Veno-atrial junction with upstream/intraparenchymal disease
- ◯ Diffuse disease/hypoplasia
- ◯ Atretic/occluded
- ◯ No stenosis/unobstructed
- ◯ Not specified
- ◯ Not applicable

LCPV stenosis

- ◯ Veno-atrial junction only
- ◯ Veno-atrial junction with upstream/intraparenchymal disease
- ◯ Diffuse disease/hypoplasia
- ◯ Atretic/occluded
- ◯ No stenosis/unobstructed
- ◯ Not specified
- ◯ Not applicable

Number of stenotic right pulmonary veins (subjective) _____

Comments on stenotic right pulmonary veins

(ex. focal stenosis of RLPV at entrance to left atrium, low of phasic flow, obstructed drainage, etc.)

Number of stenotic left pulmonary veins (subjective)

Comments on stenotic left pulmonary veins

(ex. left pulmonary veins severely narrowed at connection to left atrium, loss of phasic flow, LUPV measures 3.1 mm, etc.)

Adjacent structures contributing to external compression of PV

- ◯ None compressing PVs
- ◯ Descending Aorta
- ◯ Pulmonary artery
- ◯ Right aortic arch
- ◯ Left aortic arch
- ◯ Other structures

Specify the other structure

(ex. left main bronchus compressed by enlarged left atrium, pulmonary vein shows mild narrowing at anastomosis to left atrium, etc.)

Systemic arterial collaterals

- ◯ No collaterals
- ◯ Major collaterals
- ◯ Minor collaterals
- ◯ Both minor and major collaterals

Comments on CT

Any additional information or clarification regarding CT (ex. status post repair of TAPVC, dilated pulmonary arteries, pulmonary hypertension, narrowing, etc.)

SECTION: CT UPLOADS

Upload de-identified CT report of [studyid] (CT date: [imgdt])

This will help with data verification or abstraction of data at sickkids

SECTION: MRI FUNCTIONAL DATA

RV EF (%)

RVEDi (ml/m2)

RV ESVi (ml/m2)

RV SVi (ml/m2)

RV mass (g)

LV EF (%)

LVEDi (ml/m2)

LV ESVi (ml/m2)

LV SVi (ml/m2)

LV mass (g)

SECTION: MRI FLOW MEASUREMENTS

this data may be available on the MRI report

Descending aortic blood flow (ml/min/m2) _____

Superior vena cava blood flow (ml/min/m2) _____

Inferior vena cava flow (ml/min/m2) _____

RPA net flow (ml/min/m2) _____

RPA forward flow (ml/min/m2) _____

RPA retrograde flow (ml/min/m2) _____

RPA regurgitant fraction (%) _____

LPA net flow (ml/min/m2) _____

LPA forward flow (ml/min/m2) _____

LPA retrograde flow (ml/min/m2) _____

LPA regurgitant fracton (%) _____

Flow ratio (RPA:LPA) _____

Qp _____

Qs _____

Flow suggestive of pulmonary hypertension
- ◯ Yes
- ◯ No

RUPV flow (ml/min/m2) _____

RUPV flow pattern
- ◯ Phasic
- ◯ Loss of phasic pattern
- ◯ Continuous flow
- ◯ Fast flow
- ◯ Flow not specified/reported
- ◯ Not applicable

RMPV flow (ml/min/m2) _____

RMPV flow pattern
- ◯ Phasic
- ◯ Loss of phasic pattern
- ◯ Continuous flow
- ◯ Fast flow
- ◯ Flow not specified/reported
- ◯ Not applicable

RLPV flow (ml/min/m2) _____

RLPV flow pattern
- ◯ Phasic
- ◯ Loss of phasic pattern
- ◯ Continuous flow
- ◯ Fast flow
- ◯ Flow not specified/reported
- ◯ Not applicable

RCPV flow (ml/min/m2) _____

RCPV flow pattern

- ◯ Phasic
- ◯ Loss of phasic pattern
- ◯ Continuous flow
- ◯ Fast flow
- ◯ Flow not specified/reported
- ◯ Not applicable

LUPV flow (ml/min/m2) _____

LUPV flow pattern

- ◯ Phasic
- ◯ Loss of phasic pattern
- ◯ Continuous flow
- ◯ Fast flow
- ◯ Flow not specified/reported
- ◯ Not applicable

LLPV flow (ml/min/m2) _____

LLPV flow pattern

- ◯ Phasic
- ◯ Loss of phasic pattern
- ◯ Continuous flow
- ◯ Fast flow
- ◯ Flow not specified/reported
- ◯ Not applicable

LCPV flow (ml/min/m2) _____

LCPV flow pattern

- ◯ Phasic
- ◯ Loss of phasic pattern
- ◯ Continuous flow
- ◯ Fast flow
- ◯ Flow not specified/reported
- ◯ Not applicable

Ratio of flow through obstructed PV: ipsilateral pulmonary artery _____

LV ECV fraction on T1 mapping (T1 / ECV LV) _____

RV ECV fraction on T1 mapping (T1 / ECV RV) _____

Septum ECV fraction on T1 mapping (T1 / ECV septum) _____

Comments on MRI

Any additional information or clarification regarding MRI (ex. dilated common ventricle, severe stenosis of right pulmonary vein, etc.)

_____

SECTION: MRI UPLOADS

This will help with data verification or abstraction of data at sickkids

Upload de-identified MRI report of [studyid] (MRI date: [imgdt])

Cardiac 3D specialized

These are specialized measurements that require measurements done by the radiologist at the time of reporting. Not all centers will have the measurements

We may re-analyze images at a later timepoint once we identify the cohorts we would like to study

CARDIAC 3D IMAGING SPECIALIZED MEASUREMENTS

Cardiac 3D specialized measurements date _____

Age (years) _____

(e.g., for age 2 years and 9 months > put "2")

Age (months) _____

(e.g., for age 2 years and 11 months > put "11")

Addition: Age (days) _____

Age in years (calculated filed)

(e.g., for age 2 years & 11 months > this field displays "2.92")

SECTION: THORACIC GEOMETRIC MEASUREMENTS

Antero-posterior dimension (unit?) _____

Horizontal dimension (unit?) _____

Distance from vertebra to aorta _____

Lung dimension (mm2) _____

Right cardiac dimension (mm2) _____

Left cardiac dimension (mm2) _____

Total cardiac dimension (mm2) _____

Right thoracic dimension (mm2) _____

Left thoracic dimension (mm2) _____

Total thoracic dimension (mm2) _____

Comments on thoracic measurements

_____

SECTION: PULMONARY VEIN CROSS SECTIONAL AREA MEASUREMENTS

RUPV veno atrial CSA (mm2/m2) _____

RUPV upsteam CSA (mm2/m2) _____

RMPV veno atrial CSA (mm2/m2) _____

RMPV upstream CSA (mm2/m2) _____

RLPV veno atrial CSA (mm2/m2) _____

RLPV upstream CSA (mm2/m2) _____

RCPV veno atrial CSA (mm2/m2) _____

RCPV upstream CSA (mm2/m2) _____

LUPV veno atrial CSA (mm2/m2) _____

LUPV upstream CSA (mm2/m2) _____

LLPV veno atrial CSA (mm2/m2) _____

LLPV upstream CSA (mm2/m2) _____

LCPV veno atrial CSA (mm2/m2) _____

LCPV upstream CSA (mm2/m2) _____

Comments on PV CSA measurements

_____

SECTION: T1 / ECV FOR FIBROSIS MEASUREMENTS

LV ECV fraction on T1 mapping (T1 / ECV LV) _____

RV ECV fraction on T1 mapping (T1 / ECV LV) _____

Septum ECV fraction on T1 mapping (T1 / ECV septum) _____

Comments on fibrosis

_____

SECTION: UPLOADS

Upload de-identified specialized 3D imaging report of [studyid] (scan date: [specdt])

Outcome

This is to record all the outcomes of patients at your institution

it is important to provide the most up to date status.

OUTCOME

SECTION: LUNG TRANSPLANT AND MECHANICAL SUPPORT

Transplant

- ◯ Not a candidate for lung transplant
- ◯ Lung transplant candidate, on waiting list
- ◯ Heart-Lung transplant candidate, on waiting list
- ◯ Transplanted - Lung
- ◯ Transplanted - Heart-Lung

Type of lung transplant

- ◯ Single - right lung
- ◯ Single - left lung
- ◯ Double

Date of transplant _____

Mechanical support bridge

- ◯ Yes
- ◯ No

Type of mechanical support

- ◯ VV ECMO
- ◯ VA ECMO
- ◯ Novalung/PLAD

Addition: Duration of mechanical support (days)

SECTION: LAST FOLLOW-UP

Status at last follow-up

- ◯ Dead
- ◯ Alive
- ◯ Unknown

Date of last follow-up

_____
(if patient is not alive, last follow-up date is the date of death)

Primary cause of death

this should be listed on the final report from ICU, death report or clinic report

- ◯ Right heart failure attributed to PVS
- ◯ Infection
- ◯ Death attributed to other cardiac diagnosis
- ◯ Other

Specify the other cause(s) of death

(ex. progressive deteriorating with hypoxic failure, etc.)
_____

Death on transplant waiting list

- ◯ Yes
- ◯ No

Comments on cause(s) of death

text field for comments and clarification

(ex. complex congenital heart disease, cardiac arrest, hypoxic ischemic brain injury, etc.)
_____

Lung complications at last follow up

At clinic visit, they may specify recent complications and procedures etc

- ◯ Functional single lung due to unilateral PVS
- ◯ Pneumonectomy
- ◯ Episodes of hemoptysis

Comments on last follow-up status

Any additional information or clarification regarding last follow-up and patient's status (ex. in cardiology clinic, meeting developmental milestones, follow-up MRI, discharged, etc.)

SECTION: UPLOADS

Upload de-identified last follow up/death summary of [studyid]
(last follow-up date: [lfudt])