**Inclusion/Exclusion criteria and pathway for Transposition of the great arteries patients**

# Identify Transposition of the great arteries (TGA) group

## Step 1: Include patients who had evidence of Transposition of the great arteries with concordant AV connections - TGA including complex TGA

### Diagnostic code evidence of TGA

Diagnostic code evidence for TGA that meet at least one of the following criteria:

#### Patients who have a diagnosis code for TGA

##### Table A Diagnosis codes for TGA as listed for Top rank

|  |
| --- |
| **Diagnosis codes for TGA as listed for Top rank** |
| 010102. Transposition of great arteries (concordant AV & discordant VA connections) & IVS |
| 010118. Double outlet right ventricle: transposition type (subpulmonary VSD) |
| 010501. Discordant VA connections (TGA) |
| 010110.Transposition of the great arteries with concordant atrioventricular connections and ventricular septal defect. |

#### Patients who have a code that provides some evidence or indirect evidence for the diagnosis of TGA

##### Table B Diagnosis codes suggestive of TGA

|  |
| --- |
| None |
|  |

### Procedure code evidence of TGA

#### Procedure based evidence TGA

Any patients who are not picked up by diagnosis but who have procedure evidence of TGA be identified as follows Table C:

##### Table C Procedure codes linked to repair in TGA

|  |
| --- |
| **Definitive TGA repair codes** |
| 122921. Arterial switch procedure |
| 122940. Complex transposition of great arteries repair |
| 122911 Rastelli procedure: intraventricular left ventricle to aorta tunnel & right ventricle to pulmonary artery conduit, |
| 122745 REV procedure: intraventricular left ventricle to aorta tunnel with infundibular septum resection & direct right ventricle to pulmonary trunk anastomosis, |
| 122778 Aortic root translocation to over left ventricle (including Nikaidoh), |

## Step 2: Exclude patients who had more complex CHD

### Exclude patients who have a code listed in Table D, as well as those identified as having HLHS or FUH according to the CHANPION rules, which cannot be adequately captured by Table D alone

As this is a diagnosis-based analysis, we mainly use diagnostic exclusion codes with a small number of key procedure exclusion codes. This is because the procedures undertaken in the patients are very variable and we aim to be inclusive to variations in management pathway.

#### Table D TGA Exclusion Codes (codes that are indicative of more complex CHD condition)

|  |
| --- |
| **Diagnostic codes (since this is a diagnosis based analysis we mainly rely on diagnosis codes here)** |
| 010109. Hypoplastic left heart syndrome |
| 060201. Mitral atresia |
| 091503. Aortic atresia |
| 010114. Double inlet AV connection (double inlet ventricle) |
| 010122. Functionally univentricular heart |
| 010124. Double outlet right ventricle: with intact ventricular septum |
| 010403. Double inlet RV |
| 010404. Double inlet LV |
| 020305. Solitary ventricle of indeterminate morphology |
| 060101. Tricuspid atresia |
| 070841. Functionally univentricular heart |
| 070842. Functionally univentricular heart |
| 090101. Common arterial trunk (truncus arteriosus) |
| 090200. Truncal valvar abnormality |
| 090203. Truncal valvar regurgitation |
| 092931. Interrupted aortic arch |
| 010107. Pulmonary atresia + intact ventricular septum |
| 010106. Pulmonary atresia + VSD (including Fallot type) |
| 010125. Pulmonary atresia + VSD + systemic-to-pulmonary collateral artery(ies) (MAPCA(s)) |
| 090511. Pulmonary atresia |
| 090512. Pulmonary atresia: imperforate valve |
| 090726. Solitary arterial trunk (absent intrapericardial pulmonary arteries) |
| 010103. Congenitally corrected transposition of great arteries (discordant AV & VA connections) |
| 010116. Partially anomalous pulmonary venous connections: Scimitar syndrome |
| 010133. Shone's syndrome: left heart obstruction at multiple sites, |
| 010503. Double outlet left ventricle |
| 050201. Cor triatriatum (divided left atrium) |
| 090401. Aortopulmonary window |
| 091600. Supravalvar aortic stenosis |
| 094101. Anomalous origin of coronary artery from pulmonary artery |
| 060134. Ebstein's malformation of tricuspid valve |
| 050601. Common atrium (virtual absence of atrial septum) |
| 060501. AVSD AV valvar abnormality |
| 060506. AVSD AV valvar regurgitation |
| 060600. Atrioventricular septal defect |
| 060601. AVSD: isolated atrial component (primum ASD)(partial) |
| 060608. AVSD: isolated ventricular component |
| 060609. AVSD: atrial & ventricular components with common AV orifice (complete) |
| 060610. AVSD: atrial & (restrictive) ventricular components + separate AV valves ('intermediate') |
| 010120. AV septal defect and Tetralogy of Fallot |
| 060726. AVSD with ventricular imbalance |
| 010101. Tetralogy of Fallot |
| 010117. Double outlet right ventricle: Fallot type (subaortic or doubly committed VSD & pulmonary stenosis) |
| 091501. Aortic valvar stenosis: congenital |
| 091513. Aortic valvar stenosis |
| 091592. Aortic stenosis |
| 050202. Supravalvar mitral ring |
| 060207. Mitral valvar stenosis: congenital |
| 060213. Mitral subvalvar stenosis |
| 060256. Parachute malformation of mitral valve |
| 060292. Mitral stenosis |
| 060293. Mitral valve stenosis |
| 040600. Totally anomalous pulmonary venous connection: supracardiac |
| 040805. Totally anomalous pulmonary venous connection |
| 040806. Obstructed pulmonary venous connection(s) |
| 040810. Totally anomalous pulmonary venous connection: intracardiac |
| 040820. Totally anomalous pulmonary venous connection: infracardiac |
| 040830. Totally anomalous pulmonary venous connection: mixed |
| 030104. Right isomerism ('asplenia') |
| 030105. Left isomerism ('polysplenia') |
| 070200 right ventricular hypoplasia |
| 070700 left ventricular hypoplasia |
| 010405.Double inlet to solitary ventricle of indeterminate morphology. |
| 020303.Crisscross heart (twisted atrioventricular connections). |
| 060311.Congenital anomaly of right-sided atrioventricular valve in double inlet ventricle. |
| 060411.Congenital anomaly of left-sided atrioventricular valve in double inlet ventricle. |
| 090111. Common arterial trunk (truncus arteriosus) with aortic dominance and one pulmonary artery absent from trunk. isolated pulmonary artery. |
| 090112. Common arterial trunk (truncus arteriosus) with pulmonary dominance and aortic arch obstruction. |
| 090114. Common arterial trunk (truncus arteriosus) with aortic dominance and both pulmonary arteries arising from trunk. |
| 090115. Common arterial trunk (truncus arteriosus) with aortic dominance (no aortic arch obstruction). |
| 090118. Common arterial trunk (truncus arteriosus) with pulmonary dominance and interrupted aortic arch. |
| 090119. Common arterial trunk (truncus arteriosus) with pulmonary dominance and aortic coarctation. |
| 090201.Dysplasia of truncal valve. |
| 090218.Congenital truncal valvar stenosis. |
| 090219.Congenital truncal valvar regurgitation. |
| 092932. Interrupted aortic arch distal to subclavian artery. type A. |
| 092933. Interrupted aortic arch between subclavian & common carotid arteries. type B. |
| 092934. Interrupted aortic arch between carotid arteries. type C. |
| 090908. Pulmonary artery from ascending aorta (hemitruncus) |
| 091010. Discontinuous (non-confluent) pulmonary arteries |
| 010126.Tetralogy of Fallot with pulmonary atresia. |
| 010157.Tetralogy of Fallot with pulmonary atresia and systemic-to-pulmonary collateral artery(ies) (MAPCA(s)). |
| 090516.Congenital pulmonary atresia. |
| 090705. Absent or atretic pulmonary trunk (main pulmonary artery). |
| 090902.Right pulmonary artery from arterial duct. |
| 090903.Right pulmonary artery from ascending aorta. |
| 090904.Left pulmonary artery from arterial duct. |
| 090905.Left pulmonary artery from ascending aorta. |
| 090911. Pulmonary artery from arterial duct. |
| 091030.Congenitally discontinuous. non-confluent right and left pulmonary arteries. |
| 091075.Absent or atretic right pulmonary artery. |
| 091077.Absent or atretic left pulmonary artery. |
| 150503. Pulmonary vein obstruction |
| 020101.Extrathoracic heart (ectopia cordis). |
| 040802.Congenital atresia of pulmonary vein(s). |
| 040804.Congenital anomaly of pulmonary vein(s). |
| 040831.Congenital pulmonary venous stenosis and-or hypoplasia. |
| 090407.Congenital aortopulmonary window. |
| 091506. Aortic valvar atresia. |
| 091618. Congenital supravalvar aortic stenosis. |
| 093134.Vascular ring of left aortic arch and right arterial duct or ligament. |
| 093135.Vascular ring of right aortic arch and left arterial duct or ligament. |
| 094103. Anomalous origin of left coronary artery from pulmonary artery (ALCAPA). |
| 094221.Anomalous aortic origin of coronary artery with ventriculo-arterial concordance. |
| 060598. Deficient mural-lateral leaflet of left ventricular component of common atrioventricular valve (left atrioventricular vale) |
| 050603.Common atrium with common atrioventricular junction. |
| 060514.Atypical common atrioventricular valve. |
| 060525. Double orifice of left ventricular component of common atrioventricular valve (left atrioventricular valve). |
| 060560.Common atrioventricular valvar regurgitation. |
| 060571.Atypical right ventricular component of common atrioventricular valve (right atrioventricular valve). |
| 060572.Atypical left ventricular component of common atrioventricular valve (left atrioventricular valve). |
| 060705. Atrioventricular septal defect (AVSD) with ventricular imbalance with dominant right ventricle and hypoplastic left ventricle. |
| 060706. Atrioventricular septal defect (AVSD) with ventricular imbalance with dominant left ventricle and hypoplastic right ventricle. |
| 060727. Atrioventricular septal defect (AVSD) with balanced ventricles. |
| 060728.Common atrioventricular junction with spontaneous fibrous closure of atrioventricular septal defect (AVSD). |
| 060736. Common atrioventricular valve with unbalanced commitment of valve to ventricles. |
| 060737.Common atrioventricular valve with unbalanced commitment of valve to right ventricle. |
| 060738.Common atrioventricular valve with unbalanced commitment of valve to left ventricle. |
| 060104. Tricuspid annular hypoplasia. |
| 060105. Overriding tricuspid valve. |
| 060107. Congenital tricuspid valvar stenosis. |
| 060111. Congenital anomaly of tricuspid valve. |
| 060126. Tricuspid atresia with absent valvar annulus (connection-junction). |
| 060202. Mitral atresia with imperforate mitral valve. |
| 060203.Dysplasia of mitral valve. |
| 060204. Mitral annular hypoplasia. |
| 060205. Overriding mitral valve. |
| 060211.Congenital anomaly of mitral valve. |
| 060221.Congenital anomaly of mitral subvalvar apparatus. |
| 060222. Congenital mitral subvalvar stenosis. |
| 060226. Mitral atresia with absent valvar annulus (connection-junction). |
| 060272. Congenital mitral valvar prolapse. |
| 040807. Anomalous pulmonary venous connection. |
| **Procedure exclusion codes that have a special link to this diagnosis and therefore can lead to patients being misallocated** |
| 122926 Atrial inversion and Rastelli procedures, |
| 122746 Congenitally corrected transposition of great arteries repair |
| 122750 Double outlet left ventricle repair, |

# Step 3 Identify TGA Pathway

Consider patients selected in [step 1](#_Step_1:_Diagnostic) and [step 2](#_Step_2:_Procedure) and then assign pathway type to each procedure.

Note that assignment of procedures on a palliative pathway or a biventricular TGA reparative pathway are in parallel..

The individual types of pathway procedure are ‘Stage one palliative procedures’ these can occur in any patient, ‘stage two (glenn)’ and ‘stage three (fontan)’, which are palliative procedures for single ventricle pathway, and ‘reparative procedures for TGA’ which are of various types and are biventricular procedures.

In our data management, once a glenn or fontan occurs the patient goes on ‘single ventricle pathway sequence’. Patients who do not have a glenn or fontan are potential patients for the reparative pathway sequence, (assumption in TGA group is that these are biventricular patients).

If multiple types of pathway procedure happened in the same record, then we mark the individual procedure as the most complex one, i.e., the hierarchy/complexity order is reparative procedure for TGA then palliative procedures in these groups first stage three, then stage two, then stage one (procedures as listed). In TGA a reparative procedure for TGA never co occurs with a Fontan.

The first occurrence of a pathway procedure Identifies the occurrence of this type of pathway procedure. For any of the defined pathway procedures, i.e., palliative procedures (stages one two or three) and reparative procedure for TGA, only the first occurrence will be the pathway procedure of that type. Other subsequent occurrence of these individual procedures will be identified as re-do and off pathway. Patients can have up to 4 pathway procedures in whole history.  Of note, additional reparative or stage one procedure(s) after final expected reparative procedure will be identified as additional or off pathway. Stage two and three can arise at any time in journey, and when they occur then these procedures identify the overall management pathway of the patient as a single ventricle sequence of procedures.

Patients who have a procedure before the first pathway procedure are considered to have had a ‘pre-pathway procedure’. These will be described.

Patients who have no pathway procedures will be described.

Then patients who have a pathway procedure and then have additional post pathway / off pathway procedures which will be described divided by the stage at which they occur.

Pathway and off pathway procedures will later be described by TGA subtypes see Step 5.

## Pathway applicable to TGA

Assign pathway type to each procedure:

### Palliative procedures applicable in TGA

#### Palliative first stage procedure

##### Table E: Palliative stage one type procedures that may occur in TGA

|  |
| --- |
| **Palliative procedures – Type A Norwood** |
| 121000: Norwood type procedure |
| 120903: Damus-Kaye-Stansel type procedure: pulmonary trunk to aorta end/side anastomosis |
| **Palliative procedures – Type B Coarctation/interrupted arch repair, excluding procedures with co occurring VSD closure 120803, 120802, 120801** |
| 121800: Coarctation-hypoplasia of aorta repair |
| 122100: Interrupted aortic arch repair |
| 121810: Aortic coarctation-hypoplasia repair by resection & extended end to end anastomosis |
| 121801: Aortic coarctation-hypoplasia repair by resection & end to end anastomosis |
| 121802: Aortic coarctation-hypoplasia repair by patch aortoplasty |
| 121803: Aortic coarctation-hypoplasia repair by subclavian flap aortoplasty |
| 121830: Aortic arch repair |
| **Palliative procedures -Type C Hybrid** |
| 121004: Application of bilateral pulmonary arterial bands & transcatheter placement of stent in arterial duct |
| **Palliative procs in TGA – Type D Securing pulmonary blood flow** |
| 121014: Stent placement in arterial duct (PDA) |
| 123103: Modified R Blalock interposition shunt |
| 123104: Modified L Blalock interposition shunt |
| 123106: Central systemic-PA interposition shunt |
| 123130: Systemic-to-pulmonary arterial shunt procedure |
| 123146: Modified Blalock interposition shunt |
| 123601 Right ventricle to pulmonary arterial tree conduit construction, |
| **Palliative procedures in TGA – Type E PA band** |
| 121402: Pulmonary trunk band (PA band) |

If the patient has either or both of these procedures (Glenn and or Fontan), then the patient has undertaken a ‘single ventricle pathway’

In many clinical situations the stage three is diagnostic of single ventricle pathway and the stage two remans ambiguous as to whether or not single ventricle pathway has been undertaken. However in this analysis we will describe patients who have either or both of these stages (Glenn and Fontan) as having taken single ventricle pathway.

#### Stage two: Glenn

##### Table F: Glenn codes

|  |
| --- |
| 123111: Bidirectional superior cavopulmonary (Glenn) anastomosis |
| 123115: Hemi-Fontan procedure |
| 123144: Bilateral bidirectional superior cavopulmonary (Glenn) anastomoses |
| 123145: Unidirectional superior cavopulmonary (Glenn) anastomosis |
| 123172: Superior caval vein to pulmonary artery anastomosis. |

#### Stage three: Fontan

##### Table G: Fontan codes

|  |
| --- |
| 123001: Fontan type procedure |
| 123005: Total cavopulmonary connection (TCPC) using extracardiac inferior caval vein (IVC)-pulmonary artery conduit with fenestration |
| 123006: Total cavopulmonary connection (TCPC) with fenestrated lateral atrial tunnel |
| 123013: Fontan procedure with atrioventricular connection |
| 123028: Fontan-type connection without fenestration |
| 123032: Fontan procedure with direct atriopulmonary anastomosis |
| 123050: Total cavopulmonary connection (TCPC) |
| 123051: Total cavopulmonary connection (TCPC) with lateral atrial tunnel |
| 123054: Total cavopulmonary connection (TCPC) using extracardiac inferior caval vein (IVC)-pulmonary artery conduit |
| 123060: Completion of total cavopulmonary connection (TCPC) using transcatheter inferior to superior caval vein covered stent |
| 123092.Total cavopulmonary connection (TCPC) using intra-extracardiac conduit: fenestrated. |
| 123093.Total cavopulmonary connection (TCPC) using intra-extracardiac conduit: nonfenestrated. |

### TGA pathway (reparative procedure for TGA)

To label the Fallot repair pathway, the pathway is determined by the first pathway procedure that occurs for the patient. Then if two or more Fallot repair types (meaning from i-iv) occur in the same record at the same time. then there is a hierarchy to assign which it is assigned to i to v in this order

#### Complex TGA with pulmonary stenosis, repair pathway

##### Table H: Reparative procedures for Complex TGA with PS

|  |
| --- |
| **Single code for complex TGA with PS repair** |
| 122911 Rastelli procedure: intraventricular left ventricle to aorta tunnel & right ventricle to pulmonary artery conduit, |
| 122745 REV procedure: intraventricular left ventricle to aorta tunnel with infundibular septum resection & direct right ventricle to pulmonary trunk anastomosis, |
| 122778 Aortic root translocation to over left ventricle (including Nikaidoh), |
| **Code combinations for complex TGA with PS repair - This code** |
| 122921. Arterial switch procedure |
| **With one or more of these codes** |
| 120713 Left ventricular outflow tract obstruction relief, |
| 120822 Subaortic obstruction relief |
| 120701 Subaortic fibromuscular shelf resection, |

#### Complex TGA repair (without pulmonary stenosis) pathway

##### Table I: Reparative procedures for Complex TGA

|  |
| --- |
| **Single code for complex TGA repair** |
| 122940. Complex transposition of great arteries repair, |
| **Code combinations - This code** |
| 122921. Arterial switch procedure |
| **With one or more of these codes** |
| 122920. Double outlet RV repair |
| 120801. VSD closure |
| 120802. VSD closure by direct suture |
| 120803. VSD closure using patch |
| 120816. Closure of multiple VSDs |
| 120828. VSD closure with prosthesis - intraoperatively |
| 121800. Coarctation / hypoplasia of aorta repair |
| 121801. Aortic coarct/hypoplasia repair: resection & end/end anast |
| 121802. Aortic coarct/hypoplasia repair: patch aortoplasty |
| 121803. Aortic coarct/hypoplasia repair: subclavian flap aortoplasty |
| 121810. Aortic coarct/hypoplasia repair: extended resection & end/end anast |
| 121815. Aortic coarct/hypoplasia repair: resection + insertion tube graft |
| 121830. Aortic arch repair |
| 122100. Interrupted aortic arch repair |

#### TGA with intact ventricular septum repair pathway

##### Table J: Reparative procedure for TGA-IVS

|  |
| --- |
| **Repair in non-complex TGA** |
| 122921. Arterial switch procedure |

#### Senning or Mustard pathway

These are historic types of procedures that are palliative but not single ventricle pathway so we group them under the reparative group although this is not strictly accurate.

##### Table K: Senning or Mustard codes

|  |
| --- |
| **Senning or Mustard codes** |
| 122901 Senning procedure (atrial inversion) |
| 122902 Mustard procedure (atrial inversion) |

#### Other reparative procedure linked to TGA (may with atypical or incomplete coding)

These codes are not typical repair pathway codes however they are noted to arise even as first procedures in patients with, therefore if arising first we consider these to be the ‘pathway procedure’. These procedures may also appear as re operations later in the history. Note in flagging rules we will ask centres to check data if the patients repair is coded as per Table J. We will use the data if coded like this unless changed by centre in later routine use.

##### Table L: Codes for repair pathway with atypical or incomplete coding

|  |
| --- |
| **Repair codes for TGA with incomplete or atypical coding, always indicate complex TGA** |
| 122702: Double outlet right ventricle repair with intraventricular tunnel |
| 122920 Double outlet right ventricle repair, |

# Step 4: Identify TGA diagnostic subgroups

This is a hierarchy so type 1) then type 2) then type 3)

## Complex TGA & pulmonary stenosis (PS)

##### Table M Codes appearing in TGA which indicate complex TGA with PS

|  |
| --- |
| **Codes appearing in TGA which indicate complex TGA with PS** |
| 070901. Left ventricular outflow tract obstruction |
| 090501. Pulmonary valvar stenosis |
| 070530. Subpulmonary stenosis |
| 090504. Pulmonary valvar stenosis: congenital |
| 090592. Pulmonary stenosis |
| 070520.Congenital right ventricular outflow tract obstruction. |
| 070532.Congenital subpulmonary stenosis. |
| 090505.Pulmonary 'annular' hypoplasia. |
| 090715.Congenital supravalvar pulmonary stenosis. |
| 090716.Congenital anomaly of pulmonary arterial tree. |
| 090719. Congenital pulmonary trunk (main pulmonary artery) anomaly. |
| 090720. Congenital pulmonary trunk hypoplasia. |

Or repair codes for complex TGA with PS from Table H (Reparative procedures for Complex TGA with PS).

## Complex TGA without PS

Patients identified with any of these codes after allocation of type 1) patient group.

##### Table N Codes appearing in TGA which indicate complex TGA

|  |
| --- |
| **Codes appearing in TGA which indicate complex TGA** |
| 071000. VSD |
| 071001. Perimembranous VSD |
| 071012. VSD + malaligned outlet septum |
| 071101. Muscular VSD |
| 071200. Subarterial VSD |
| 071201. Doubly committed subarterial VSD |
| 071402. Communication between left ventricle + right atrium (Gerbode defect) |
| 071405. Inlet VSD |
| 071504. Multiple VSDs |
| 071505. Single VSD |
| 092901. Aortic coarctation |
| 092911. Aortic arch hypoplasia (tubular) |
| 010104. Double outlet right ventricle |
| 010119. Double outlet right ventricle: with non-committed VSD |
| 010118. Double outlet right ventricle: transposition type (subpulmonary VSD) |
| 071002.Inlet perimembranous ventricular septal defect (VSD) without atrioventricular malalignment without a common atrioventricular junction. |
| 071004. Outlet perimembranous ventricular septal defect (VSD) with anteriorly malaligned of outlet septum. |
| 071017.Outlet ventricular septal defect (VSD) with anteriorly malaligned outlet septum. |
| 071018.Outlet ventricular septal defect (VSD) with posteriorly malaligned outlet septum. |
| 071019. Outlet perimembranous ventricular septal defect (VSD) with posteriorly malaligned outlet septum. |
| 071102.Inlet muscular ventricular septal defect (VSD). |
| 071103.Trabecular muscular ventricular septal defect (VSD) apical. |
| 071104.Trabecular muscular ventricular septal defect (VSD) midseptal. |
| 071105.Trabecular muscular ventricular septal defect (VSD)s multiple (Swiss cheese septum). |
| 071106. Outlet muscular ventricular septal defect (VSD) without malalignment. |
| 071107.Trabecular muscular ventricular septal defect (VSD) anterosuperior. |
| 071112.Trabecular muscular ventricular septal defect (VSD) postero-inferior. |
| 071115. Outlet muscular ventricular septal defect (VSD) with anteriorly malaligned outlet septum. |
| 071116. Outlet muscular ventricular septal defect (VSD) with posteriorly malaligned outlet septum. |
| 071202. Doubly committed juxta-arterial ventricular septal defect (VSD) without malalignment and with muscular postero-inferior rim. |
| 071203. Doubly committed juxta-arterial ventricular septal defect (VSD) without malalignment and with perimembranous extension. |
| 071205. Doubly committed juxta-arterial ventricular septal defect (VSD) with anteriorly malaligned fibrous outlet septum and perimembranous extension. |
| 071206. Doubly committed juxta-arterial ventricular septal defect (VSD) with posteriorly malaligned fibrous outlet septum and perimembranous extension. |
| 071207. Doubly committed juxta-arterial ventricular septal defect (VSD) with anteriorly malaligned fibrous outlet septum and muscular postero-inferior rim. |
| 071208. Doubly committed juxta-arterial ventricular septal defect (VSD) with posteriorly malaligned outlet septum and muscular postero-inferior rim. |
| 071209.Outlet ventricular septal defect (VSD) without malalignment. |
| 071212.Doubly committed juxta-arterial ventricular septal defect (VSD) with anteriorly malaligned fibrous outlet septum. |
| 071213.Doubly committed juxta-arterial ventricular septal defect (VSD) with posteriorly malaligned fibrous outlet septum. |
| 071406.Inlet perimembranous ventricular septal defect (VSD) with atrioventricular septal malalignment and without common atrioventricular junction. |

Or reparative procedure codes from Table I (Reparative procedures for Complex TGA) or Table L (Codes for repair pathway with atypical or incomplete coding).

If patient was grouped to Complex TGA without PS and has palliative procedure type D secure pulmonary blood flow in isolation (allow if with a code of PA band), then group to complex TGA with PS.

## TGA with intact ventricular septum

The rest including those with repair in Table J (Reparative procedure for TGA-IVS)

If patient was grouped to TGA with intact septum and has one of these then:

Norwood and Arch repair (palliative procedure type A B) goes to complex TGA without PS

secure pulmonary blood flow (palliative procedure type D) goes to complex TGA with PS

# Step 6: Remove patients according to the violation rules.

I think we need to discuss with the wider team how to report these patients in champion research project. In a future audit these would be reported to centres for correction and once corrected could then be added back into the analysis

## Generic rule: Exclude patients if

* had only non-contributory procedure records via activity algorithm.

Consider the remaining patients as a suspect group for separate reporting if the patient meets these criteria – these are patients with records suspicious of miscoding or missing procedure information. In our reports – we will count these patients and report them as a separate subgroup of ‘suspected data error patients’ for whom we cannot report complete data.

## TGA specific violation rule: none

# Step 7: Flagging rules to centre

Include these in the cohort. In future routine monitoring all such patients will be flagged with the treating centres for correction.

## Patients with suspected miscoded/missing data

These patients will be excluded from pathway analysis and reintervention monitoring.

### Generic rule (for patients under SV pathway:)

* Patients recorded as having stage two at less than one month old
* Patients recorded as having stage three at less than six months old

### TGA specific rule:

If single ventricle pathway then

* Complex TGA with PS and without PS: Patients who had at least one procedure and then no stage two or three before age five years whilst surviving to the age of five years
* TGA IVS patients who had a SV pathway (stage two/three in records)

If presumably under BV ventricle pathway then

* Complex TGA with PS patients: Patients who survived to the age of five years who had at least one procedure but then no reparative procedure by age five years whatever happened to them after the age of five years
* Complex TGA without PS: Patients who survived to the age of three years who had at least one procedure but then no reparative procedure by age three years whatever happened to them after the age of three years
* TGA with IVS patients: Patients who survived to the age of four months and had no reparative procedure by age four months whatever happened to them after the age of four months.

## Patients with suspected miscoded/missing data

Generic flagging rule – if there is a cardiopulmonary bypass surgery as a pre pathway procedure then flag to centre as please check this patient’s diagnostic and procedure coding is correct

TGA flagging rule –

* if the reparative procedure is identified by Table L (Codes for repair pathway with atypical or incomplete coding) flag to centre to consider whether the procedure coding is complete or do they need to correct / add a code
* if there is a palliative procedure from group A or C flag to centre – is coding complete and accurate?
* if there is a diagnostic code 010309. AV and-or VA connections abnormal 010510. Concordant VA connections with parallel great arteries (anatomically corrected malposition) is coding complete and accurate?