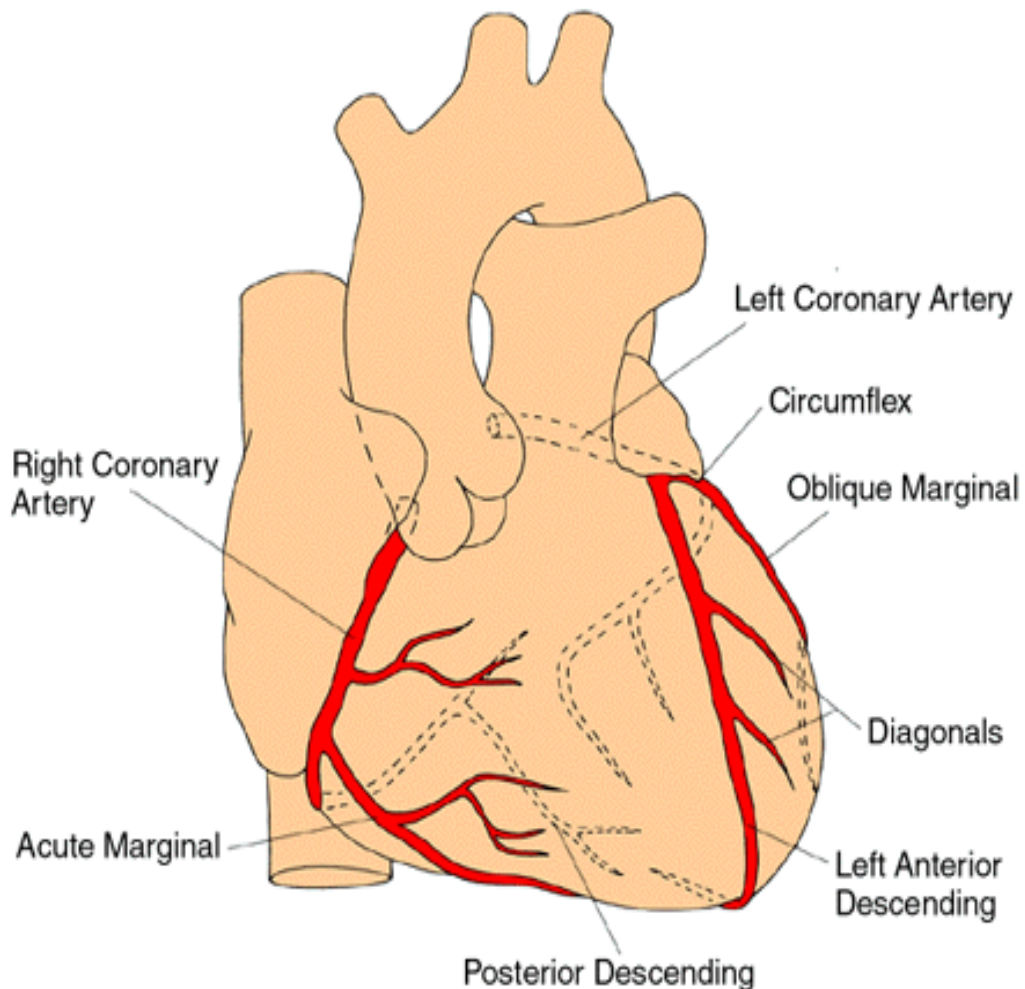


Section H: HEMODYNAMICS AND CARDIAC CATHETERIZATION

Section Intent: The intent of this section is to record the cardiac catheterization results in regard to: 1) Coronary Artery Disease 2) Cardiac Hemodynamics, and 3) Valvular Disease (Stenosis and Insufficiency). The intent of this section is to record the results that may be captured from cardiac catheterization, echocardiography, CT (64 slice) reports, etc.

Sequence #	Data Field	Data Field Intent	Field Name Clarification	Source Document
1050	Num Dis Vessels	Identify the number of diseased major native coronary systems that have significant measurable atherosclerotic disease.	<p>There are three (3) major coronary systems; Left Anterior Descending (LAD), Circumflex and Right Coronary System (RCA). Each system has “branches” that are considered part of their corresponding system. Vessel stenosis or narrowing is measured in percentages (%), most often expressed as a range of “stenosis”.</p> <p>Coronary anatomy is also identified as either right or left dominant. Dominance is determined by which system the posterior descending artery (PDA) branches from. In 85% of the population the PDA originates from the RCA, and in 8-10% the PDA originates from the LAD system.</p> <p>The number of diseased vessels does not necessarily match the number of bypass grafts performed. A patient may never have more than three vessel disease. Once a coronary artery is found to be diseased, for the purposes of the STS, the vessel is considered diseased for the remainder of the patient’s life and all subsequent reoperations.</p> <p>Note: Left main disease ($\geq 50\%$) is counted as TWO vessels (LAD and Circumflex). For example, left main and RCA would count as a total of three.</p> <p>Note: If bypass is performed for an anomalous kinked vessel, this vessel is counted as one diseased or abnormal vessel.</p> <p>The diagram on the following page represents the right dominate heart.</p>	<p>Cardiac cath report Consultations CT (64 slice) History & Physical Operative report Physician progress notes</p>

Coronary Arteries of the Heart



Coronary arteries normally arise from immediately above the aortic valve on the ascending aorta.

LEFT MAIN: When diseased, this counts as TWO (2) vessel disease. Any additional disease in the circumflex or LAD system does not count as additional number of vessels diseased. Significant left main disease may put a patient at additional risk; should occlusion of the left main occur, the patients entire left heart is compromised.

LAD System: The LAD system branches off of the left main and nourishes the anterior and lateral wall of the left ventricle and travels down to the apex of the heart. Typical branches off the LAD are the first, second or third Diagonal.

Circumflex System: The "Circ" system branches off the left main and nourishes the posterior (backside) and lateral (left side) portion of the heart. Obtuse Marginal (OM one, two or three) branches arise form the circumflex system.

Right Coronary System (RCA): The RCA nourishes the right atria and ventricle and it extends down to the acute marginal (bottom side of the heart).

Posterior Descending Artery (PDA): In approximately 90% of patients the PDA is an extension of the RCA and travels as far as the obtuse marginal.

Ramus/Intermediate: Occasionally (about 70%) a coronary branch arises early off the left main system and is called the ramus, intermediate or intermedium. This branch will then nourish the area of the heart between the diagonal branches of the LAD system and the obtuse marginals of the circ system.

Sequence #	Data Field	Data Field Intent	Field Name Clarification	Source Document
1060	Left Main Dis > = to 50%	Identify, pre-operatively, if the left main branch has significant (>=50%) stenotic disease compromising the internal lumen blood flow.	<p>There will always be concerns regarding the coding of a left main (LM) or, in-fact all other vessels, with a recorded stenosis of > 50%. A > or = 50% reported stenosis qualifies for a "Yes". When ranges are reported, such as 45- 50% for stenosis, report as a whole number using the mean value, i.e., 45-50 % stenosis = 47% stenosis and does not equate left main disease of > or = 50%.</p> <p>A stenosis significant enough to impede the coronary blood flow of the left main will compromise the lateral and anterolateral walls of the left ventricle.</p> <p>Stenosis at the ostia of the LAD and circumflex is not considered left main disease for the purpose of Society of Thoracic Surgeons (STS). Stenosis > = 50% needs to be in the left main artery.</p> <p>If the cath report states 40% LM disease, but the Intravascular Ultrasound (IVUS) shows 70% LM, code 70% LM. IVUS is an accurate intra-luminal measurement of the stenosis.</p> <p>Code "No" to left main disease if the patient has a stent in the left main from a previous intervention that is open with brisk flow at the time of the preoperative cath.</p>	<p>Cardiac cath report Consultations CT (64 slice) History & Physical (IVUS) Operative report Physician progress report Surgeon estimate report</p>

Sequence #	Data Field	Data Field Intent	Field Name Clarification	Source Document
1070	Hemo Data-EF Done	Indicate whether the ejection fraction was measured prior to the induction of anesthesia. Since an EF is a risk-modeling variable, every effort should be made to capture information from multiple sources.	<p>Some patients may not have had an LV Gram performed due to existing clinical conditions. Ejection fraction (EF) and hemodynamic pressures may be obtained from other sources other than coronary angiogram.</p> <p>Because anesthesia can alter the values to be collected, do not collect data from intra-operative transeophageal echography (TEE) after the induction of anesthesia. Collect data from the most recent source before surgery, even it is several months.</p>	<p>Cardiac cath report Consultations Echocardiogram MUGA or other cardiac scan Physician estimate Physician progress notes</p>
1080	Hemo Data-EF	Capture the percent of blood emptied from the ventricle at the end of the contraction of the heart.	<p>Use the most recent determination prior to the surgical intervention documented on a diagnostic report, regardless of the diagnostic procedure to obtain it.</p> <p>Enter a range of 1-99. If a percentage range is reported, report a whole number using the “mean” (i.e., 50-55% is reported as 53%).</p> <p>The following guideline is to be used when the EF is not documented as a percentage; but rather, the EF is documented using a word descriptor:</p> <p>Values reported as: Normal = 60% Good function = 50% Mildly reduced = 45% Fair function = 40% Moderately reduced = 30% Poor function = 25% Severely reduced = 20%</p> <p>Note: If no diagnostic procedural report specifying an EF is in the medical record, a value documented in the progress record is acceptable.</p>	<p>Cardiac cath report Consultations Echocardiogram MUGA or other cardiac scan Physician estimate Physician progress notes</p>

Sequence#	Data Field	Data Field Intent	Field Name Clarification	Source Document
1090	Hemo Data-EF Method	What diagnostic method was utilized for the determination of the ejection fraction? Determine, for consistency, if a left ventriculogram was performed to measure the ejection fraction.	<p>If an ejection fraction is obtained from an MRI (choices LV Gram, Radionuclide, Estimate, & Echo), code as Radionuclide.</p> <p>Note: At the current time, there is no place in the current data specifications to capture the value captured by CT (64 slice).</p>	<p>Cardiac cath report Consultations Echocardiogram MRI/CT Physician progress notes</p>
1100	Hemo Data-HDPA Mean Done	Was a pulmonary artery pressure in mm HG recorded from catheterization data or Swan-Ganz catheter BEFORE the induction of anesthesia?	<p>Elevated pulmonary artery pressures are indicative of pulmonary hypertension, mitral valve disease and other pulmonary/cardiac diseases.</p> <p>Normal mean pulmonary artery pressure readings are between 9-17mm of pressure. If there are not any PA pressure readings recorded or available from heart cath –one may use PA pressure values from Swan Ganz Catheter inserted for surgery. If you capture the PA value from the Swan Ganz, it must be obtained prior to anesthesia induction.</p>	<p>Cardiac cath report Intra-op flow sheet (prior to anesthesia induction) Pre-op or holding area hemodynamic flow sheet</p>
1110	Hemo Data-PA Mean	Indicate whether the mean pulmonary artery pressure, in mm Hg, was recorded from catheterization data or Swan-Ganz catheter BEFORE the induction of anesthesia.	<p>Normal values are 9 – 17 mm Hg. Values reflect basic cardiopulmonary function. Lower values may represent hypovolemia or vascular dilatation, while higher values may represent volume overload or vascular constriction. Values may also be medication induced.</p> <p>The PA should be marked not done unless specifically a right heart cath was done or the patient has a pre-op PA catheter. Do not record the PA catheter number in the OR after anesthesia induction or use the LVEDP as a surrogate.</p> <p>When diagnostic heart cath are done on an outpatient basis, most cardiovascular (CV) surgeons allow for cath data to be considered current if they are performed within six months of the date of surgery.</p>	<p>Cardiac cath report Intra-op flow sheet (prior to anesthesia induction) Operative report Pre-op hemodynamic flow sheet</p>

Sequence #	Data Field	Data Field Intent	Field Name Clarification	Source Document
1120	VD-Stenosis-Aortic	Capture if there is any degree of aortic valve stenosis present. Even if the patient was not scheduled for valve replacement, record if available. If not documented or not done, indicate as NA.	Stenosis is described in descriptive terms; trace, mild, moderate or severe. Any valve stenosis may be caused by aging (leaflets become calcified, thick and stiff), birth defects (congenital bicuspid (2) leaflets) or other disease processes like rheumatic fever. Capture even if the patient is not scheduled for valve repair or replacement.	Cardiac cath report Consultations Echocardiogram History & Physical Physician progress notes
1130	VD-Gradient-Aortic	Capture the mean gradient across the aortic valve pre-operatively.	Measured either by heart catheterization or echocardiogram. The gradient (velocity) at which blood travels across the valve opening. Normal aortic valve gradients range from 5-12. Note: Calculated valve area cannot be converted into gradient. The mean gradient is required by the data specifications. The peak gradient <u>cannot</u> be used if the mean gradient is not documented.	Cardiac cath report Echocardiogram Physician progress notes (if refers to echo or cath report)
1140	VD-Stenosis-Mitral	Does the patient have any stenosis of the mitral valve? If not documented or not done, indicate as NA.	Stenosis is the narrowing of the valve opening. Valve stenosis is most often caused by rheumatic fever, causing the leaflets to become rigid, stiff, thick and/or fused reducing the amount of blood able to be ejected from the left atria into the left ventricle. Mitral stenosis (MS) causes blood to back up, dilate the left atria and create build up of fluid in the lungs (congestive heart failure). Atrial fibrillation is a common arrhythmia in patients with MS.	Anesthesia record Cardiac cath report Consultations Echocardiogram History & Physical Physician progress notes Pre-op checklist
1150	VD-Stenosis-Tricuspid	Does the patient have any stenosis of the tricuspid valve? If not documented or not done, indicate as NA.	The tricuspid valve is the largest of the four valves. Stenosis, over time, may create an enlarged right atria, reducing the amount of blood flow into the right ventricle; thereby, reducing cardiac output. Prolonged or chronic tricuspid stenosis may cause systemic vascular congestion, manifested primarily in the liver. Capture even if patient is not scheduled for valve repair or replacement.	Anesthesia record Cardiac cath report Consultations Echocardiogram History & Physical Physician progress notes Pre-op checklist

Sequence #	Data Field	Data Field Intent	Field Name Clarification	Source Document
1160	VS-Stenosis-Pulmonic	Does the patient have any stenosis of the pulmonary valve? If not documented or not done, indicate as NA.	Pulmonary stenosis (PS) is often due to congenital malformation of the valve. As it restricts blood flow from the right ventricle into the pulmonary artery, patients experience extreme fatigue and heart palpitations. Severe PS may create a bluish tint to the skin and is life threatening. Capture even if patient is not scheduled for valve repair or replacement. Defined in descriptive terms: trace, mild, moderate or severe.	Anesthesia record Cardiac cath report Consultations Echocardiogram History & Physical Physician progress notes Pre-operative checklist

Pulmonary Valve:

Three leaflets

Located between Right Vent & Pulmonary Artery

Aortic Valve:

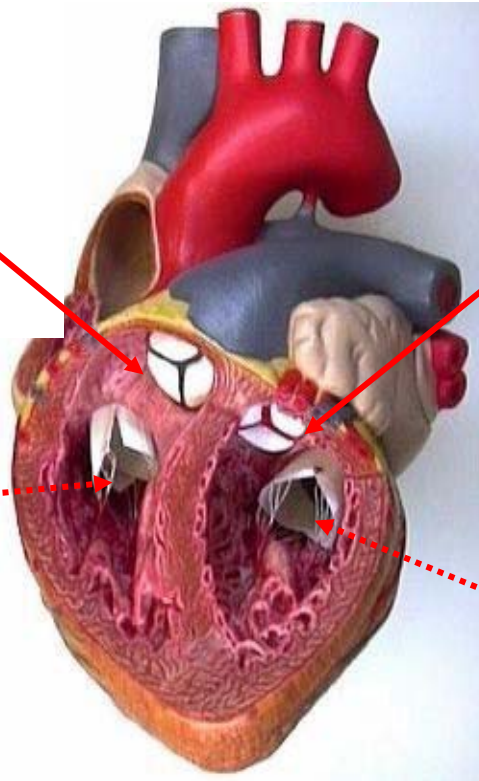
Three Leaflets

Located between Left Vent. & Aorta

Tricuspid Valve:

Two Leaflets

Located between Right Atria & Right Vent.

**Mitral Valve:**

Two Leaflets

Located between Left Atria & Vent.

Sequence #	Data Field	Data Field Intent	Field Name Clarification	Source Document
1170	VD-Insuff-Aortic	Indicate if there is evidence of aortic valve regurgitation. Enter level of valve function associated with highest risk (i.e. worst performance).	<p>Regurgitation/insufficiency is incompetence of the aortic valve or any of its valvular apparatus which allows diastolic blood flow to flow back into the left ventricular chamber. This may be a chronic or an acute condition. Capture even if patient is not scheduled for valve repair and/or replacement when available.</p> <p>Descriptive terms: 0 = None 1 = Trivial 2 = Mild 3 = Moderate 4 = Severe 5 = N/A</p> <p>Enter the highest level recorded in the chart, i.e., worst performance level. "Moderately severe" should be coded as "severe". Enter N/A if data is not available or study is suboptimal.</p>	Anesthesia record Cardiac cath report Consultations Echocardiogram History & Physical Physician progress notes Pre-op checklist
1180	VD-Insuff-Mitral	Indicate if there is mitral valve regurgitation. Enter level of valve function associated with highest risk (i.e. worst performance).	<p>Mitral regurgitation/insufficiency may be an acute or chronic condition manifesting itself as increased left heart filling pressures which increase the left ventricular stroke volume (amount of blood ejected from the Left Vent. with each heart beat). Over time and depending upon the severity, MR can result in pulmonary edema and systemic volume overload. In chronic MR, Left Vent. hypertrophy results. Mitral prolapse and rheumatic fever are the most common cause of MR. Capture even if patient is not scheduled for valve repair and/or replacement when available.</p> <p>Descriptive terms: 0 = None 1 = Trivial 2 = Mild 3 = Moderate 4 = Severe 5 = N/A</p> <p>Enter the highest level recorded in the chart, i.e., worst performance level. "Moderately severe" should be coded as "severe". Enter N/A if data is not available or study is suboptimal.</p>	Anesthesia record Cardiac cath report Consultations Echocardiogram History & Physical Physician progress notes Pre-op checklist

Sequence #	Data Field	Data Field Intent	Field Name Clarification	Source Document
1190	VD-Insuff- Tricuspid	Indicate if there is evidence of tricuspid regurgitation. Enter level of valve function associated with highest risk (i.e. worst performance).	Tricuspid regurgitation/insufficiency creates a backwards flow of blood across the tricuspid valve and causes enlargement or hypertrophy of the Right Vent. Capture even if patient is not scheduled for valve repair and/or replacement when available. Descriptive terms: 0 = None 1 = Trivial 2 = Mild 3 = Moderate 4 = Severe 5 = N/A Enter the highest level recorded in the chart, i.e., worst performance. “Moderately severe” should be coded as “severe”. Enter N/A if data is not available or study is suboptimal.	Anesthesia record Cardiac cath report Consultations Echocardiogram History & Physical Physician progress notes Pre-op checklist
1200	VD-Insuff- Pulmonic	Indicate if there is evidence of pulmonic valve regurgitation. Enter level of valve function associated with highest risk (i.e. worst performance).	Most common cause is from chronic pulmonary hypertension (noted by high PA pressures > 30mm Hg). Incompetent pulmonary leaflets allow blood to flow back into the Right Vent. Capture even if patient is not scheduled for valve repair and/or replacement when available. Descriptive terms: 0 = None 1 = Trivial 2 = Mild 3 = Moderate 4 = Severe 5 = N/A Enter the highest level recorded in the chart, i.e., worst performance. “Moderately severe” should be coded as “severe”. Enter N/A if data is not available or study is suboptimal.	Anesthesia record Cardiac cath report Consultations Echocardiogram History & Physical Physician progress notes Pre-op checklist