Digital Imaging and Communications in Medicine (DICOM)

Supplement 241: Structural Heart Procedural SR Template

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Status: Public Comment
Developed pursuant to DICOM Work Item 2022-04-C

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Open Issues

1.	Should a qualitative findings template be added? Registry data elements include qualitative findings (e.g., mild, moderate, or severe stenosis). Including these elements in the DICOM SR template could add value depending on typical workflow practices, such as when a cardiologist performs Transesophageal Echocardiography. It is currently assumed that these elements are added by the cardiologist in a downstream IT reporting system and captured in another format, such as CDA within the IHE CPN profile. This should be confirmed with organizations such as: • Society for Cardiovascular Angiography and Interventions (SCAI) • American College of Cardiology (ACC) • European Association of Percutaneous Cardiovascular Interventions (EAPCI) • Heart Valve Society (HVS) • The American Association for Thoracic Surgery (AATS) • Transcatheter Cardiovascular Therapeutics (TCT) • American Heart Association (AHA) • American Society of Echocardiography (ASE)
2.	Should Heart Rate be encoded separately, or within TID 3602? newTID1 includes a row for “Heart Rate” to encode the heart rate at time of image acquisition, TID 3602 also includes “Heart Rate” (Row 11) “for use when the SR SOP Instance does not record vital signs at multiple procedure phases or stages”.
3.	Should the related Structural Heart Procedure be encoded in a separate "Indications for Procedure" container or within "Current Procedure Descriptions"?
4.	Is the term (1231449003, SCT, Transcatheter repair of tricuspid valve leaflet) in newCID1 sufficient to describe mitral or aortic valve procedures (e.g., clip, annuloplasty or replacement)?
5.	Is there a clinical guideline defining the boundary of the valvular “annulus” (e.g., as in newCODE7)? Should we specify inner surface of annulus, or is the ambiguity within the current definition acceptable? Such measurements are influenced by the image resolution which influences their repeatability.
6.	Is “coaptation length” or “coaptation height” preferred? This supplement uses length to describe the extent of leaflet contact (see newCODE24, newCODE59, and newCODE95). Coaptation height appears to be more applicable as an alternative to tenting height, rather than describing leaflet contact.
7.	Is the inclusion of the “Tricuspid valve sphericity index” necessary, or is it already represented by another terms? Public comment is sought on potential term inconsistencies. “Mitral annulus diameter ratio” (newCODE60) is similar in definition to the “Tricuspid valve sphericity index” (newCODE99). Additionally, “Mitral valve sphericity index” (newCODE81) bears resemblance to the existing LOINC term “Left ventricular sphericity index end diastole” (20324-0).

8.	Should separate codes be established to clearly differentiate measurements obtained from 3D views versus 2D views, or are the current definitions sufficient? For example, Mitral Valve Coaptation Length (newCODE59) could be measured in either 2D or 3D. MPR (Multi-Planar Reformation) image quality may not be as high as 2D, but it allows for more accurate positioning. Should this variability in image quality and positioning be reflected in the coding?
9.	Are there distance or length measurements that need to include max, average, minimum or median methods? For example, Mitral valve tenting height (newCODE82) is defined as "The perpendicular distance..." Should this be further specified as the max, average, minimum or median distance?
10.	Are the provided measurements sufficient for evaluating peri-device leaks, or are there additional measurements that should be included?
11.	How should the diagrams currently proposed in D. DICOM Controlled Terminology Definitions (Normative) be presented? After Public Comment, measurements will be proposed as LOINC codes. The ones that are not accepted will remain as DCM codes. Should the diagrams stay in-line, or should there be separate PS3.17 content?

Closed Issues

1.	Should this use pre-coordinated or post-coordinated terms? **Response**: Pre-coordinated for consistency and reduced ambiguity.
2.	Should Angiographic templates be added? **Response**: No This supplement does not introduce structural heart cath. measurements, as TID 3500 (Hemodynamics Report) includes the necessary measurements. In the future, there may be interest in incorporating templates for XA/Echo/CT fusion
3.	Should TID 3802 (Cardiovascular Patient History) be added to capture patient history? Registry data elements include patient history (see references). **Response**: No These are typically added by the cardiologist in a downstream IT reporting system, and captured in CDA (as in IHE CPN).
4.	Should acronyms be added to newCID1 Structural Heart Procedures? **Response**: No Acronyms vary by locale. SNOMED avoids the incorporation of acronyms.
5.	Should new terms be proposed to LOINC, or should DCM terms be created? **Response**: LOINC, after Public Comment.

7.	Should a separate template be created, or is incorporation into TID 5300 acceptable? **Response**: A separate template modeled after 5300 will be created, and 5300 sub-templates will be renamed, so they can be reused. WG-01/12 considered 4 approaches: 1. Add new rows referencing pre-coordinated measurements 2. Add a single row that references the 2 new CIDs 3. Add a single row referencing a composite CID 4. Don't modify TID 5300 and create a new template A single template for CT, Echo (and possibly MR), provides consistency for report consumers
8.	Is a dedicated SOP class needed, or is using Comprehensive SR sufficient? **Response**: Comprehensive SR is sufficient.
9.	Should TEE scan plane be pre-coordinated or post-coordinated? **Response**: Post-coordinated, since only one left atrial appendage closure device manufacturer requires them.

Scope and Field of Application

This supplement introduces SR templates for Structural Heart Procedures. These procedures involve interventions aimed at addressing various conditions or abnormalities affecting the structures of the heart, excluding the coronary arteries. Unlike open-heart surgery, these interventions are characterized by their minimally invasive nature or catheter-based approach.

Periprocedural imaging follows a consistent pattern of three phases: pre-operative assessment, intraprocedural assessment, and follow-up. Throughout all three phases, echocardiography emerges as the primary imaging modality. X-ray angiography is predominantly utilized for intraprocedural guidance. CT may also find application in the pre-operative assessment and follow-up. The templates proposed in the supplement are based the Simplified Adult Echocardiography Templates (root TID 5300), modified to support multimodality image acquisition.

Structural Heart Procedures include:

- **TAVI:** Transcatheter Aortic Valve implantation
- **TAVR:** Transcatheter Aortic Valve Replacement
- **TTVr:** Transcatheter Tricuspid Valve Replacement
- **TTVR:** Transcatheter Tricuspid Valve Repair
- **TEER:** Transcatheter Edge-to-Edge Repair
- **TMVr**: Transcatheter Mitral Leaflet Clip Replacement
- **TMVR:** Transcatheter Mitral Valve Replacement
- **LAAO:** Left Atrial Appendage Occlusion

References:

https://eurointervention.pcronline.com/article/ehra-eapci-expert-consensus-statement-on-catheter-based-left-atrial-appendage-occlusion-an-update EHRA/EAPCI expert consensus statement on catheter-based left atrial appendage occlusion – an update

https://www.accessdata.fda.gov/cdrh_docs/pdf20/P200049C.pdf Amplatzer™ Amulet™ Left Atrial Appendage Occluder Instructions for Use

https://www.bostonscientific.com/content/dam/elabeling/ic/watchman-flx/51065198-01A_WATCHMAN%20FLX_IFU_ML_s.pdf WATCHMAN FLX Instructions for Use

https://www.structuralheart.abbott/int/fileadmin/content/Solutions-Products/Mitraclip/MitraClip_G4_TEE_Echo_Acquisition_Guide_MAT-2004722_v2.0_OUS.pdf *Abbott MitraClip Transesophageal Echo Acquisition Guide*

https://www.frontiersin.org/articles/10.3389/fcvm.2022.864341/full *Advances in Procedural Echocardiographic Imaging in Transcatheter Edge-to-Edge Repair for Mitral Regurgitation*

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5752829/ *Echocardiographic evaluation and guidance for MitraClip procedure*

https://www.asecho.org/guideline/guidelines-for-the-evaluation-of-valvular-regurgitation-after-percutaneous-valve-repair-or-replacement/ *Guidelines for the Evaluation of Valvular Regurgitation After Percutaneous Valve Repair or Replacement*

https://www.asecho.org/wp-content/uploads/2017/04/2017VavularRegurgitationGuideline.pdf *Recommendations for Noninvasive Evaluation of Native Valvular Regurgitation A Report from the American Society of Echocardiography Developed in Collaboration with the Society for Cardiovascular Magnetic Resonance*

https://www.asecho.org/guideline/recommended-standards-for-the-performance-of-transesophageal-echocardiographic-screening-for-structural-heart-intervention/ *Recommended Standards for the Performance of Transesophageal Echocardiographic Screening for Structural Heart Intervention: From the American Society of Echocardiography*

https://www.onlinejase.com/article/S0894-7317(17)30133-5/pdf *Recommendations on the Echocardiographic Assessment of Aortic Valve Stenosis: A Focused Update from the European Association of Cardiovascular Imaging and the American Society of Echocardiography*

https://eurointervention.pcronline.com/article/echocardiographic-guidance-in-transcatheter-structural-cardiac-interventions *Echocardiographic guidance in transcatheter structural cardiac interventions*

https://core.ac.uk/download/pdf/82534145.pdf *A Practical Guide to Multimodality Imaging of Transcatheter Aortic Valve Replacement*

https://www.jacc.org/doi/abs/10.1016/j.jcmg.2014.12.014 *Recommendations for Comprehensive Intraprocedural Echocardiographic Imaging During TAVR*

https://www.jacc.org/doi/abs/10.1016/j.jcmg.2015.12.022 *A Bicuspid Aortic Valve Imaging Classification for the TAVR Era*

https://www.ihe.net/uploadedFiles/Documents/Cardiology/IHE_Card_Suppl_CPN.pdf *IHE Cardiology Technical Framework Supplement Cardiac Procedure Note (CPN)*

https://www.journalofcardiovasculararct.com/action/showPdf?pii=S1934-5925%2818%2930536-7 *Computed tomography imaging in the context of transcatheter aortic valve implantation (TAVI) / transcatheter aortic valve replacement (TAVR): An expert consensus document of the Society of Cardiovascular Computed Tomography*

https://link.springer.com/article/10.1007/s00330-019-06357-8 *CT and MR imaging prior to transcatheter aortic valve implantation: standardisation of scanning protocols, measurements and reporting—a consensus document by the European Society of Cardiovascular Radiology (ESCR)*

https://www.jacc.org/doi/abs/10.1016/j.jcmg.2014.12.014 *Recommendations for Comprehensive Intraprocedural Echocardiographic Imaging During TAVR*

https://www.ncdr.com/WebNCDR/docs/default-source/tvt-public-page-documents/tvt_v3_ttvp_dcf_1_26_2021-(1).pdf *STS/ACC TVT Registry v3 Data Collection Form*

https://www.ncdr.com/WebNCDR/docs/default-source/tvt-public-page-documents/tvt_v3_mitralleafetclip_dcf_1_26_2021-(1).pdf *Transcatheter Mitral Leaflet Clip Procedure (TMVr) Registry v3 Data Collection Form*

https://www.ncdr.com/WebNCDR/docs/default-source/tvt-public-page-documents/tvt_v3_tavr_dcf_1_26_2021-(1).pdf *Transcatheter Aortic Valve Replacement (TAVR) Registry v3 Data Collection Form*

https://www.ncdr.com/WebNCDR/docs/default-source/tvt-public-page-documents/tvt_v3_tavr_dcf_1_26_2021-(1).pdf *Transcatheter Mitral Valve Replacement (TMVR) Registry v3 Data Collection Form*

https://www.ahajournals.org/doi/full/10.1161/circimaging.114.001995 *Transfemoral Access Assessment for Transcatheter Aortic Valve Replacement*

https://www.asecho.org/wp-content/uploads/2019/01/2019_Comprehensive-TTE.pdf

Guidelines for Performing a Comprehensive Transthoracic Echocardiographic Examination in Adults: Recommendations from the American Society of Echocardiography

Changes to NEMA Standards Publication PS3.16

Digital Imaging and Communications in Medicine (DICOM)
Part 16: Content Mapping Resource

Modify Table TID 5240. Myocardial Strain Analysis as follows

Table TID 5240. Myocardial Strain Analysis

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	DT (59776-5, LN, "Findings")	1	M		
2	>	CONTAINS	CONTAINER	EV (125301, DCM, "Pre-coordinated Measurements")	1	M		
3	>>	CONTAINS	INCLUDE	DTID 5301 “Pre-coordinated **Cardiac~~Echo~~** Measurement”	1-n	U		$Measurement = DCID 12309 “Core Echo Strain Measurement” $Preferred = DCID 12301 “Measurement Selection Reason”
4	>	CONTAINS	CONTAINER	EV (125302, DCM, "Post-coordinated Measurements")	1	M		
5	>>	CONTAINS	INCLUDE	DTID 5302 “Post-coordinated **Cardiac~~Echo~~** Measurement”	1-n	U		$Preferred = DCID 12301 “Measurement Selection Reason” $Property = DCID 12311 “Echo Measured Strain Property”

Modify Table TID 5300. Simplified Echo Procedure Report as follows

Table TID 5300. Simplified Echo Procedure Report

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
…								
11	>>	CONTAINS	INCLUDE	DTID 5301 “Pre-coordinated **Cardiac~~Echo~~** Measurement”	1-n	M		$Measurement = DCID 12300 “Core Echo Measurement” $Preferred = DCID 12301 “Measurement Selection Reason”

12	>	CONTAINS	CONTAINER	EV (125302, DCM, "Post-coordinated Measurements")	1	M		
13	>>	CONTAINS	INCLUDE	DTID 5302 “Post-coordinated **Cardiac~~Echo~~** Measurement”	1-n	U		$Preferred = DCID 12301 “Measurement Selection Reason”
…								
20	>>>	CONTAINS	INCLUDE	DTID 5301 “Pre-coordinated **Cardiac~~Echo~~** Measurement”	1-n	U		$Measurement = DCID 12300 “Core Echo Measurement” $Preferred = DCID 12301 “Measurement Selection Reason”
21	>>	CONTAINS	CONTAINER	EV (125302, DCM, "Post-coordinated Measurements")	1	M		
22	>>>	CONTAINS	INCLUDE	DTID 5302 “Post-coordinated **Cardiac~~Echo~~** Measurement”	1-n	U		$Preferred = DCID 12301 “Measurement Selection Reason”
…								

Modify TID 5301 Pre-coordinated Echo Measurement as follows

TID 5301 Pre-coordinated Cardiac~~Echo~~ Measurement

This template codes numeric **cardiac~~echo~~** measurements where most of the details about the nature of the measurement have been pre-coordinated in the measurement code. In contrast, see TID 5302 “Post-coordinated **Cardiac~~Echo~~** Measurement”.

The pre-coordinated measurement code is provided when this Template is included from a parent Template.

Table TID 5301. Parameters

Parameter Name	Parameter Usage
$Measurement	Coded term or Context Group for Concept Name of measurement
$Preferred	Flag the preferred value by indicating the reason it was selected as preferred.

Type: Non-Extensible
Order: Significant
Root: No

Table TID 5301. Pre-coordinated Cardiac**~~Echo~~ Measurement**

…

Content Item Descriptions

Row 2	The reason that this value was selected as the preferred value for the measured concept. The parent template may allow TID 5301 “Pre-coordinated **Cardiac~~Echo~~** Measurement” to be included multiple times with the same Measurement Concept Name, for example to allow multiple samples of the measurement. A given Measurement Concept Name might appear only once in the instance, in which case this this row may or may not be present. A given Measurement Concept Name may appear multiple times, however this row shall not be present for more than one value of the given Measurement Concept Name. E.g. multiple measurements of (11706-9, LN, "Aortic Valve Peak Systolic Flow") may be present, but only one may be selected as preferred.
…	

Modify Table TID 5300. Simplified Echo Procedure Report as follows

Table TID 5300. Simplified Echo Procedure Report

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
…								
12	>	CONTAINS	CONTAINER	EV (125302, DCM, "Post-coordinated Measurements")	1	M		
13	>>	CONTAINS	INCLUDE	DTID 5302 “Post-coordinated Echo Measurement”	1-n	U		$Preferred = DCID 12301 “Measurement Selection Reason” **$AnatomicSite = DCID 12305 “Basic Echo Anatomic Site”**
…								
21	>>	CONTAINS	CONTAINER	EV (125302, DCM, "Post-coordinated Measurements")	1	M		
22	>>>	CONTAINS	INCLUDE	DTID 5302 “Post-coordinated Echo Measurement”	1-n	U		$Preferred = DCID 12301 “Measurement Selection Reason” **$AnatomicSite = DCID 12305 “Basic Echo Anatomic Site”**
…								

Modify Table TID 5240. Myocardial Strain Analysis

Table TID 5240. Myocardial Strain Analysis

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	DT (59776-5, LN, "Findings")	1	M		
2	>	CONTAINS	CONTAINER	EV (125301, DCM, "Pre-coordinated Measurements")	1	M		
3	>>	CONTAINS	INCLUDE	DTID 5301 “Pre-coordinated Echo Measurement”	1-n	U		$Measurement = DCID 12309 “Core Echo Strain Measurement” $Preferred = DCID 12301 “Measurement Selection Reason”
4	>	CONTAINS	CONTAINER	EV (125302, DCM, "Post-coordinated Measurements")	1	M		
5	>>	CONTAINS	INCLUDE	DTID 5302 “Post-coordinated Echo Measurement”	1-n	U		$Preferred = DCID 12301 “Measurement Selection Reason” $Property = DCID 12311 “Echo Measured Strain Property” **$AnatomicSite = DCID 12305 “Basic Echo Anatomic Site”**

Modify TID 5302 Post-coordinated Echo Measurement as follows

TID 5302 Post-coordinated Cardiac~~Echo~~ Measurement

This template codes numeric echo measurements where most of the details about the nature of the measurement have been post-coordinated in modifiers and acquisition context. In contrast, see TID 5301 “Pre-coordinated **Cardiac~~Echo~~** Measurement” .

This template is intended to be used for User-defined and Vendor-defined **Cardiac~~Echo~~** Measurements.

Several modifier rows are conditional and are omitted when the modifier concept is not significant for the measurement encoded in the item. When these modifiers are included by the sender, it indicates that the modifier concept is significant and receivers will generally treat the measurements differently than similar measurements sent that omit that modifier.

Note

The codes in the CIDs referenced below were sufficient to accurately encode all the best practice echo measurements recommended by the ASE. If, however, a new code is needed to record a specific User-defined or Vendor-defined measurement, most of the CIDs are extensible. It is not unreasonable to expect that measurements might be made at other Finding Sites than those

listed in CID 12305 "Basic Echo Anatomic Site" , or using Measurement Methods beyond those listed in CID 12227 "Echocardiography Measurement Method" .

The concept modifiers in the template below were sufficient to accurately encode all the best practice echo measurements recommended by the ASE. Although TID 5302 "Post-coordinated **Cardiac~~Echo~~** Measurement" is extensible and adding new modifiers is not prohibited, the meaning and significance of such new modifiers will generally not be understood by receiving systems, delaying or preventing import of such measurements. Further, adding modifiers that replicate the meaning of an existing modifier is prohibited.

If such measurements cannot be encoded with the following structure, an implementation may choose to code the measurement in TID 5303 "Adhoc Measurement" , or to use TID 5200 "Echocardiography Procedure Report" instead of TID 5300 "Simplified Echo Procedure Report" .

Table TID 5302. Parameters

Parameter Name	Parameter Usage
$Measurement	Coded term or Context Group for Concept Name of measurement
$Preferred	Flag the preferred value by indicating the reason it was selected as preferred.
$Property	Coded term or Context Group for the Measured Property.
$AnatomicSite	**Context Group for the measurement anatomic site.**

Type: Extensible
Order: Significant
Root: No

Table TID 5302. Post-coordinated Cardiac~~Echo~~ Measurement

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
…								
8	>	HAS CONCEPT MOD	CODE	EV (363698007, SCT, "Finding Site")	1	M		**$AnatomicSite** **~~DCID 12305 "Basic Echo Anatomic Site"~~**
…								
11	>	HAS CONCEPT MOD	CODE	EV (260674002, SCT, "Flow Direction")	1	MC	IFF value of Row 9 = (44324008, SCT, "Hemodynamic Measurements") and the Flow Direction is significant for this measurement.	DCID 12306 "Echo Flow Direction"
12	>	HAS CONCEPT MOD	CODE	EV (370129005, SCT, "Measurement Method")	1	MC	IFF the Measurement Method is significant for this measurement.	DCID 12227 "Echocardiography Measurement Method"

13	>	HAS ACQ CONTEXT	CODE	EV (399264008, SCT, "Image Mode")	1	MC	IFF the Image Mode is significant for this measurement.	DCID 12224 “Ultrasound Image Mode”
14	>	HAS ACQ CONTEXT	CODE	EV (111031, DCM, "Image View")	1	MC	IFF the Image View is significant for this measurement.	DCID 12226 “Echocardiography Image View”
14b	**>**	**HAS ACQ CONTEXT**	**CODE**	**EV (newCODE123, DCM, "Transesophageal Echocardiography Scan Plane")**	**1**	**MC**	**IFF the Transesophageal Echocardiography Scan Plane is significant for this measurement.**	**DCID newCID13 “Transesophageal Echocardiography Scan Plane”**
15	>	HAS CONCEPT MOD	CODE	EV (272518008, SCT, "Cardiac Cycle Point")	1	MC	IFF the Cardiac Cycle Point is significant for this measurement.	DCID 12307 “Cardiac Phase and Time Point”
…								

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…	
Row 3	The reason that this value was selected as the preferred value for the measured concept. The parent template may allow TID 5301 “Pre-coordinated **Cardiac~~Echo~~** Measurement” to be included multiple times with the same Measurement Concept Name, for example to allow multiple samples of the measurement. A given Measurement Concept Name might appear only once in the instance, in which case this this row may or may not be present. A given Measurement Concept Name may appear multiple times, however this row shall not be present for more than one value of a given measured concept. E.g. multiple measurements of (11706-9, LN, "Aortic Valve Peak Systolic Flow") may be present, but only one may be selected as preferred.
…	
Row 8**-8a**	The finding site reflects the anatomical location where the measurement is taken. CID 12305 “Basic Echo Anatomic Site” contains the codes which proved to be sufficient for mapping the full set of ASE standard measurements. **CID newCID9 “Structural Heart Procedure Anatomic Site” contains codes sufficient for mapping STS/ACC TVT Registry measurements.** It is recommended to use these locations unless a more detailed location is truly necessary.
…	

Add the following TID to Part 16 Annex A:

Structural Heart Procedure Templates

The templates that comprise the Structural Heart Procedure Templates Report are interconnected as in Figure A-xx.

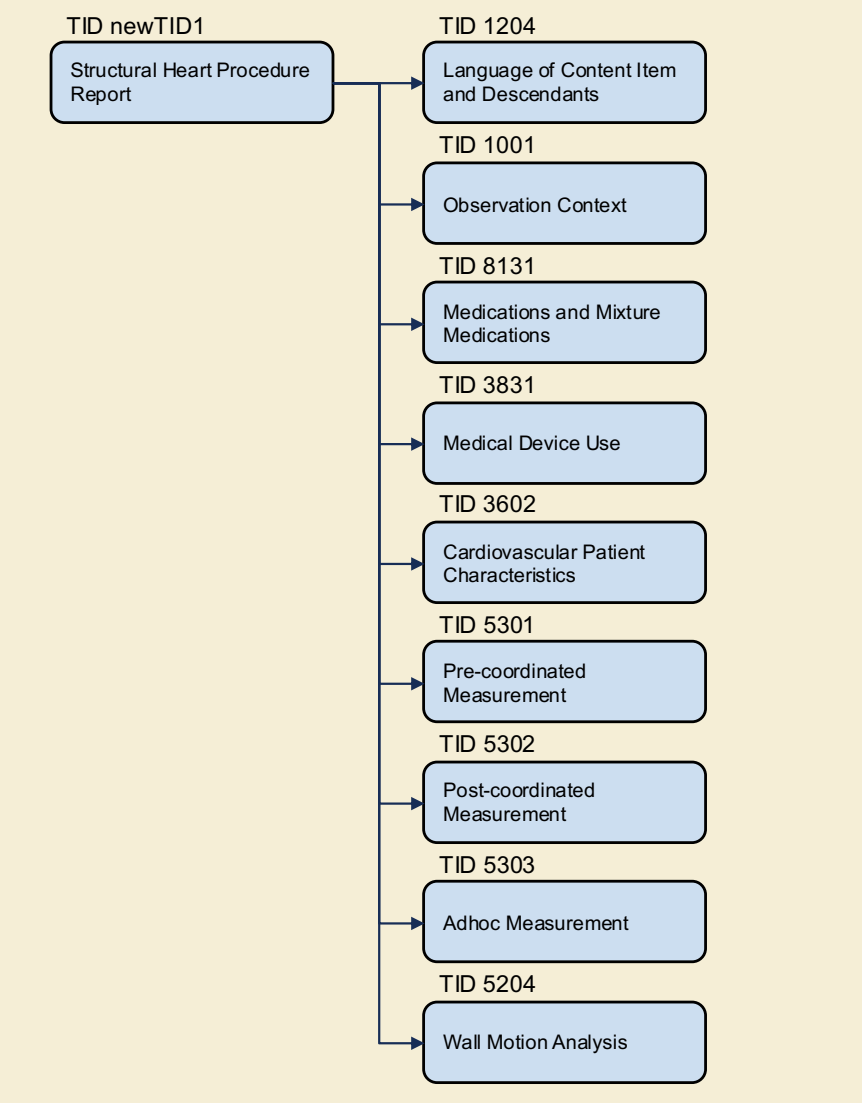

Figure A-xx. Structural Heart Procedure Template Structure

TID newTID1 Structural Heart Measurement Report

This template forms the top of a content tree that allows a device to describe the results of a periprocedural imaging associated with minimally invasive structural heart procedures during pre-operative assessment, intraprocedural assessment, or follow-up. While it mirrors the Simplified Echo Procedure Report, it is specifically designed for multimodality utilization, i.e., Echo, CT and MR.

This template does not include an Image Library. Image Content Items in the Echo Measurement templates (for example to indicate Source of Measurement) shall be included with by-value relationships, not with by-reference relationships.

Measurements in this template (except for the Wall Motion Analysis) are collected into one of three containers, each with a specific sub-template and constraints appropriate to the purpose of the container.

- Pre-coordinated Measurements (many taken from the STS/ACC TVT Registry).
- Post-coordinated Measurements
- Adhoc Measurements

Type: Non-Extensible
Order: Significant
Root: Yes

Table newTID1. Structural Heart Measurement Report

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (newCODE4, DCM, "Structural Heart Measurement Report")	1	M		
2	>	HAS CONCEPT MOD	INCLUDE	DTID 1204 “Language of Content Item and Descendants”	1	U		
3	>	HAS OBS CONTEXT	INCLUDE	DTID 1001 “Observation Context”	1	M		
4	>	CONTAINS	CONTAINER	DT (55111-9, LN, "Current Procedure Descriptions")	1	U		
5	>>	CONTAINS	CODE	EV (121139, DCM, "Modality")	1	M		Shall be taken from Modality (0008,0060) in the Image Instances.
6	>>	CONTAINS	TEXT	DT (125203, DCM, "Acquisition Protocol")	1-n	M		
7	>>	CONTAINS	INCLUDE	DTID 8131 “Medications and Mixture Medications”	1-n	U		$DrugAdministered = BCID newCID12. “Bradycardiac Agents”
8	>>	CONTAINS	NUM	EV (8867-4, LN, "Heart Rate")	1	U		UNITS = EV ({H.B.}/min, UCUM, "BPM")
9	>	CONTAINS	CONTAINER	EV (18785-6, LN, "Indications for Procedure")	1	U		
10	>>	CONTAINS	CODE	EV (118797008, SCT, "Heart Procedure")	1	U		BCID newCID1. “Structural Heart Procedures”

11	>>>	HAS CONCEPT MOD	CODE	EV (121071, DCM, "Finding")	1-n	U		DCID newCID11 “Indication for Structural Heart Procedure”
12	>>>	HAS CONCEPT MOD	TEXT	EV (121071, DCM, "Finding")	1	U		
13	>>>	HAS CONCEPT MOD	CODE	EV (118578006, SCT, "Relative time")	1	U		DCID 61 “Time Relative to Procedure”
14	>>>	HAS CONCEPT MOD	INCLUDE	DTID 3831 “Medical Device Use”	1	U		$Device = BCID newCID2. “Structural Heart Devices”
15	>	CONTAINS	INCLUDE	DTID 3602 “Cardiovascular Patient Characteristics”	1	U		
16	>	CONTAINS	CONTAINER	EV (125301, DCM, "Pre-coordinated Measurements")	1	M		
17	>>	CONTAINS	INCLUDE	DTID 5301 “Pre-coordinated Cardiac Measurement”	1-n	U		$Measurement = DCID newCID3 “Structural Heart Measurement” $Preferred = DCID 12301 “Measurement Selection Reason”
19	>	CONTAINS	CONTAINER	EV (125302, DCM, "Post-coordinated Measurements")	1	M		
20	>>	CONTAINS	INCLUDE	DTID 5302 Post-coordinated Cardiac Measurement	1-n	U		$Preferred = DCID 12301 “Measurement Selection Reason” $AnatomicSite = DCID newCID9 “Structural Heart Procedure Anatomic Site”
21	>	CONTAINS	CONTAINER	EV (125303, DCM, "Adhoc Measurements")	1	M		
22	>>	CONTAINS	INCLUDE	DTID 5303 “Adhoc Measurement”	1-n	U		$Property =DCID 12304 “Echo Measured Property”
26	>	CONTAINS	INCLUDE	DTID 5204 “Wall Motion Analysis”	1-n	UC	IFF Row 5 value is “US”	$Procedure = DT (35757004, SCT, "Echocardiography for Determining Ventricular Contraction")

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Row 4	This container describes the periprocedural imaging during which the measurements were taken.
Row 6	User-defined type of clinical acquisition protocol for creating images or image-derived measurements. May be taken from Protocol Name (0018,1030) or from Performed Procedure Step Description (0040,0254).
Row 7	Bradycardic medications administered to lower the heart rate during the imaging study.
Row 8	Heart rate during acquisition, i.e. after the administration of a bradycardiac agent.
Row 9	This container provides details regarding the structural heart surgical procedure that is supported by the periprocedural imaging procedure described in Row 4.
Row 12	A text string containing one or more sentences describing one or more indications, possibly with additional comments from the physician or technologist.
Row 13	This row establishes the relative time between imaging procedure in Row 4 and the structural heart procedure in Row 10 (i.e. whether Row 4 is modified with "pre-", “intra-“ or "post").
Row 17	These are measurements from a standardized list of pre-coordinated codes. Measurements which do not correspond to the full semantics of one of the pre-coordinated codes in the Value Set Constraint can likely be encoded in Row 23 instead. Multiple instances of the same measurement code may be present in the container. Each instance represents a different sample or derivation. This template makes no requirement that any or all samples be sent. For example, a mean value of all the samples of a given measurement could be sent without sending all or any of the samples from which the mean was calculated. Device configuration and/or operator interactions determine what measurements are sent.
Row 19	These are measurements that can be encoded using a standardized structure of post-coordinated codes. Measurements which correspond to the full semantics of one of the pre-coordinated codes in rows 17-21 should be encoded in there instead. $Measurement shall be provided, but is not constrained to a CID. Multiple instances of the same measurement code may be present in the container. Each instance represents a different sample or derivation. This template makes no requirement that any or all samples be sent. For example, a mean value of all the samples of a given measurement could be sent without sending all or any of the samples from which the mean was calculated. Device configuration and/or operator interactions determine what measurements are sent.
Row 21	These are adhoc measurements encoded with minimal semantics. Row 19 can be used to encode measurements with more complete semantics. $Units shall be provided, but is not constrained to a CID. Device configuration and/or operator interactions determine what measurements are sent.

Add the following CIDs to Part 16 Annex B:

CID newCID1 Structural Heart Procedures

This context group includes codes that may be used to identify Structural Heart Procedures that may be referred to in an Observation Context.

Resources: HTML | FHIR JSON | FHIR XML | IHE SVS XML
Keyword: StructuralHeartProcedures
FHIR Keyword: dicom-cid-newCID1-StructuralHeartProcedures
Type: Extensible
Version: 202xxxxx
UID: 1.2.840.newUID1

Table CID newCID1. Structural Heart Procedures

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-RT ID	UMLS Concept Unique ID
SCT	1184601001	Revision of transcatheter aortic valve implantation		C5568478
SCT	1217005008	Bioprosthetic transcatheter aortic valve implantation		C5687705
SCT	720583008	Transcatheter implantation of mitral valve		C4303983
SCT	1231449003	Transcatheter repair of tricuspid valve		C5202507
SCT	1255141008	Transcatheter annuloplasty of tricuspid valve		C5768806
SCT	1237589003	Transcatheter repair of leaflet of tricuspid valve		C5768119
SCT	787162002	Implantation of pulmonary valve prosthesis or synthetic device		C3161311
SCT	1231726001	Bioprosthetic mitral valve prosthesis transcatheter implantation		C5689010
SCT	8069005	Implantation of tricuspid valve prosthesis or synthetic device		C0190102
UMLS	C0844084	Percutaneous closure of atrial septal defect		C0844084
UMLS	C3275093	Left atrial appendage occlusion		C3275093
UMLS	C2921037	Implantation of mitral valve leaflet clip		C2921037

CID newCID2 Structural Heart Devices

Resources: HTML | FHIR JSON | FHIR XML | IHE SVS XML
Keyword: StructuralHeartDevices
FHIR Keyword: dicom-cid-newCID2-StructuralHeartDevices
Type: Extensible
Version: 202xxxxx
UID: 1.2.840.newUID2

Table CID newCID2. Structural Heart Devices

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-RT ID	UMLS Concept Unique ID	Trade Name (Informative)
DCM	newCODE1	Left atrial appendage closure device			
DCM	newCODE2	Ball type Left atrial appendage closure device			Watchman™, WaveCrest, Conformal
DCM	newCODE3	Ball and disk type left atrial appendage closure device			Amulet™
SCT	716779003	Mitral annuloplasty transvalvular implant		C4274279	Cardioband
SCT	17107009	Mitral valve prosthesis		C0182494	Sapien 3, Tendyne, Tiara, Intrepid, CardiAQ
SCT	464887003	Mitral valve clip		C3881921	MitraClip™, Pascal
SCT	1141607002	Transcatheter biologic tricuspid valve prosthesis		C5545443	Evoque
SCT	703201004	Tricuspid valve prosthesis		C1322659	
SCT	860585001	Transcatheter pulmonary valve bioprosthesis		C5395736	Melody™

CID newCID3 Structural Heart Measurement

The Units column contains the proper UCUM representation of the recommended units for the measured property.

Resources: HTML | FHIR JSON | FHIR XML | IHE SVS XML
Keyword: StructuralHeartMeasurements
FHIR Keyword: dicom-cid-newCID3-StructuralHeartMeasurement
Type: Extensible

Version: 202xxxxx
UID: 1.2.840.newUID3

Table CID newCID3. Structural Heart Measurement

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-RT ID	UMLS Concept Unique ID	Units
LN	8277-6	Body Surface Area		C0487992	(m2, UCUM, "m2")
DCM	newCODE122	Transseptal puncture height			(mm, UCUM, "mm")
Include CID newCID4 "Structural Heart Aortic Valve Measurement"					
Include CID newCID5 "Structural Heart Mitral Valve Measurement"					
Include CID newCID6 "Structural Heart Tricuspid Valve Measurement"					
Include CID newCID7 "Structural Heart Echo Measurement"					
Include CID newCID8 "Left Atrial Appendage Closure Measurement"					

Editorial Note: New measurement codes throughout this supplement use a DCM Coding Scheme Designator, most of these will be proposed to LOINC before Final Text.

CID newCID4 Structural Heart Aortic Valve Measurement

The Units column contains the proper UCUM representation of the recommended units for the measured property.

Resources: HTML | FHIR JSON | FHIR XML | IHE SVS XML
Keyword: StructuralHeartAorticValveMeasurement
FHIR Keyword: dicom-cid-newCID4-StructuralHeartAorticValveMeasurement
Type: Extensible
Version: 202xxxxx
UID: 1.2.840.newUID4

Table CID newCID4. Structural Heart Aortic Valve Measurement

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-RT ID	UMLS Concept Unique ID	Units
DCM	newCODE6	Aorta sinotubular junction area			(cm2, UCUM, "cm2")
DCM	newCODE7	Aortic annulus area		C2059685	(mm, UCUM, "mm")
DCM	newCODE8	Aortic annulus calcification severity			BCID 3716 "Severity"
DCM	newCODE9	Aortic annulus max diameter			(mm, UCUM, "mm")
DCM	newCODE10	Aortic annulus min diameter			(mm, UCUM, "mm")
DCM	newCODE11	Aortic annulus perimeter			(mm, UCUM, "mm")

DCM	newCODE12	Aortic calcification volume			(mm3, UCUM, "mm3")
DCM	newCODE13	Aortic commissures calcification severity			BCID 3716 “Severity”
DCM	newCODE16	Aortic root height			(mm, UCUM, "mm")
DCM	newCODE17	Aortic sinotubular junction diameter			(mm, UCUM, "mm")
DCM	newCODE19	Aortic sinus of valsalva area			(cm2, UCUM, "cm2")
DCM	newCODE20	Aortic sinus of valsalva diameter		C2059455	(mm, UCUM, "mm")
DCM	newCODE24	Aortic valve coaptation length			(mm, UCUM, "mm")
DCM	newCODE25	Aortic valve noncoronary leaflet intercommissural angle			(deg, UCUM, "deg")
DCM	newCODE26	Aortic valve right leaflet intercommissural angle			(deg, UCUM, "deg")
DCM	newCODE27	Aortic valve left leaflet intercommissural angle			(deg, UCUM, "deg")
DCM	newCODE28	Aortic valve noncoronary leaflet intercommissural distance			(mm, UCUM, "mm")
DCM	newCODE29	Aortic valve right leaflet intercommissural distance			(mm, UCUM, "mm")
DCM	newCODE30	Aortic valve left leaflet intercommissural distance			(mm, UCUM, "mm")
DCM	newCODE31	Aortic valve left coronary leaflet height			(mm, UCUM, "mm")
DCM	newCODE32	Aortic valve left coronary leaflet length			(mm, UCUM, "mm")
DCM	newCODE33	Aortic valve noncoronary leaflet height			(mm, UCUM, "mm")
DCM	newCODE34	Aortic valve noncoronary leaflet length			(mm, UCUM, "mm")
DCM	newCODE35	Aortic valve right coronary leaflet height			(mm, UCUM, "mm")
DCM	newCODE36	Aortic valve right coronary leaflet length			(mm, UCUM, "mm")
DCM	newCODE38	Ascending Aorta diameter			(mm, UCUM, "mm")
DCM	newCODE40	Left main coronary ostium height			(mm, UCUM, "mm")
DCM	newCODE43	Left ventricular outflow tract calcification severity			BCID 3716 “Severity”
DCM	newCODE41	Maximum aortic plaque thickness			(mm, UCUM, "mm")
DCM	newCODE42	Right coronary artery ostium height			(mm, UCUM, "mm")

DCM	newCODE44	Right ventricular Internal diameter major axis diastole			(mm, UCUM, "mm")
DCM	newCODE46	Right ventricular diastolic mid segment minor axis			(mm, UCUM, "mm")
DCM	newCODE48	Right ventricular diastolic basal minor axis			(mm, UCUM, "mm")

CID newCID5 Structural Heart Mitral Valve Measurement

The Units column contains the proper UCUM representation of the recommended units for the measured property.

Resources: HTML | FHIR JSON | FHIR XML | IHE SVS XML
Keyword: StructuralHeartMitralValveMeasurement
FHIR Keyword: dicom-cid-newCID5-StructuralHeartMitralValveMeasurement
Type: Extensible
Version: 202xxxxx
UID: 1.2.840.newUID5

Table CID newCID5. Structural Heart Mitral Valve Measurement

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-RT ID	UMLS Concept Unique ID	Units
DCM	newCODE50	Mitral anterior leaflet A1 scallop length			(mm, UCUM, "mm")
DCM	newCODE51	Mitral anterior leaflet A2 scallop length			(mm, UCUM, "mm")
DCM	newCODE124	Mitral anterior leaflet A3 scallop length			(mm, UCUM, "mm")
DCM	newCODE53	Mitral anterior leaflet area			(cm2, UCUM, "cm2")
DCM	newCODE54	Aorto-mitral Inter annular angle			(deg, UCUM, "deg")
DCM	newCODE66	Mitral commissure distance		C1185742	(mm, UCUM, "mm")
DCM	newCODE71	Mitral trigone-to-trigone distance			(mm, UCUM, "mm")
DCM	newCODE62	Mitral annular excursion			(mm, UCUM, "mm")
DCM	newCODE72	Mitral annulus anterolateral to posteromedial diameter			(mm, UCUM, "mm")
DCM	newCODE73	Mitral annulus anteroposterior diameter			(mm, UCUM, "mm")
DCM	newCODE74	Mitral annulus area			(mm, UCUM, "mm")
DCM	newCODE63	Mitral annulus calcification severity			BCID 3716 “Severity”

DCM	newCODE77	Mitral annulus commissural diameter			(mm, UCUM, "mm")
DCM	newCODE60	Mitral annulus diameter ratio			({ratio}, UCUM, "ratio")
DCM	newCODE75	Mitral annulus height			(mm, UCUM, "mm")
DCM	newCODE64	Mitral annulus nonplanarity angle			(deg, UCUM, "deg")
DCM	newCODE76	Mitral annulus perimeter			(mm, UCUM, "mm")
DCM	newCODE59	Mitral valve coaptation length			(mm, UCUM, "mm")
DCM	newCODE68	Mitral valve interpapillary distance			(mm, UCUM, "mm")
DCM	newCODE108	Anterolateral papillary muscle to the left trigone			(mm, UCUM, "mm")
DCM	newCODE70	Posteromedial papillary muscle to the right trigone			(mm, UCUM, "mm")
DCM	newCODE78	Mitral valve prolapse area			(cm2, UCUM, "cm2")
DCM	newCODE79	Mitral valve prolapse volume			(ml, UCUM, "ml")
DCM	newCODE80	Mitral valve segment flail gap			(mm, UCUM, "mm")
DCM	newCODE81	Mitral valve sphericity index			({ratio}, UCUM, "ratio")
DCM	newCODE82	Mitral valve tenting height			(mm, UCUM, "mm")
DCM	newCODE96	Mitral valve tenting area			(cm2, UCUM, "cm2")
DCM	newCODE83	Mitral valve tenting segment height A1-P1			(mm, UCUM, "mm")
DCM	newCODE84	Mitral valve tenting segment height A2-P2			(mm, UCUM, "mm")
DCM	newCODE85	Mitral valve tenting segment height A3-P3			(mm, UCUM, "mm")
DCM	newCODE86	Posterior mitral valve leaflet area			(cm2, UCUM, "cm2")
DCM	newCODE87	Posterior mitral valve leaflet length			(mm, UCUM, "mm")
DCM	newCODE88	Posterior mitral valve P1 leaflet scallop length			(mm, UCUM, "mm")
DCM	newCODE89	Posterior mitral valve P2 leaflet scallop length			(mm, UCUM, "mm")
DCM	newCODE90	Posterior mitral valve P3 leaflet scallop length			(mm, UCUM, "mm")

CID newCID6 Structural Heart Tricuspid Valve Measurement

The Units column contains the proper UCUM representation of the recommended units for the measured property.

Resources: HTML | FHIR JSON | FHIR XML | IHE SVS XML
Keyword: StructuralHeartTricuspidValveMeasurement
FHIR Keyword: dicom-cid-newCID5-StructuralHeartTricuspidValveMeasurement
Type: Extensible
Version: 202xxxxx
UID: 1.2.840.newUID6

Table CID newCID6. Structural Heart Tricuspid Valve Measurement

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-RT ID	UMLS Concept Unique ID	Units
DCM	newCODE94	Tricuspid annulus area			(cm2, UCUM, "cm2")
DCM	newCODE92	Tricuspid annulus area diastolic systolic ratio			(%, UCUM, "%")
DCM	newCODE93	Tricuspid annulus perimeter			(mm, UCUM, "mm")
DCM	newCODE95	Tricuspid valve coaptation length			(mm, UCUM, "mm")
DCM	newCODE97	Tricuspid valve major axis diastole			(mm, UCUM, "mm")
DCM	newCODE98	Tricuspid valve minor axis			(mm, UCUM, "mm")
DCM	newCODE99	Tricuspid valve sphericity index			(%, UCUM, "%")
DCM	newCODE100	Tricuspid valve tenting height			(mm, UCUM, "mm")
DCM	newCODE101	Tricuspid valve tenting volume			(ml, UCUM, "ml")

CID newCID7 Structural Heart Echo Measurement

The Units column contains the proper UCUM representation of the recommended units for the measured property.

Resources: HTML | FHIR JSON | FHIR XML | IHE SVS XML
Keyword: StructuralHeartEchoMeasurement
FHIR Keyword: dicom-cid-newCID7-StructuralHeartEchoMeasurement
Type: Extensible
Version: 202xxxxx
UID: 1.2.840.newUID7

Table CID newCID7. Structural Heart Echo Measurement

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-RT ID	UMLS Concept Unique ID	Units
LN	17997-8	Anterior mitral valve leaflet length		C0801047	(cm, UCUM, "cm")
LN	79955-1	Aorta sinotubular junction diameter at end systole by 2D		C4069750	(cm, UCUM, "cm")
LN	82339-3	Aorta sinotubular junction diameter by 2D		C4298778	(mm, UCUM, "mm")
LN	82338-5	Aorta sinotubular junction diameter by M-mode		C4285208	(mm, UCUM, "mm")
LN	79941-1	Aortic regurgitant flow		C4071396	(ml/s, UCUM, "ml/s")
LN	79947-8	Aortic regurgitation pressure half-time		C4069754	(ms, UCUM, "ms")
LN	79948-6	Aortic regurgitation vena contracta width		C4069753	(cm, UCUM, "cm")
LN	79950-2	Aortic regurgitation volume (Continuity VTI)		C4070676	(ml, UCUM, "ml")
LN	79951-0	Aortic regurgitation volume (PISA)		C4070675	(ml, UCUM, "ml")
LN	18016-6	Aortic valve annulus diameter		C0801066	(cm, UCUM, "cm")
LN	79940-3	Aortic valve annulus diameter at end systole		C4070180	(cm, UCUM, "cm")
LN	79958-5	Aortic valve area (Continuity VTI)		C4069747	(cm2, UCUM, "cm2")
LN	77909-0	Aortic valve Effective regurgitant orifice area (PISA)		C4036554	(cm2, UCUM, "cm2")
LN	77910-8	Aortic valve Effective regurgitant orifice area (Volumetric)		C4036553	(cm2, UCUM, "cm2")
LN	17996-0	Aortic valve maximum cusp separation length		C0801046	(mm, UCUM, "mm")
LN	18093-5	Aortic valve orifice area (Continuity Vmax+Area)		C0801142	(cm2, UCUM, "cm2")
LN	18094-3	Aortic valve orifice area (Continuity Vmax+Diameter)		C0801143	(cm2, UCUM, "cm2")
LN	18091-9	Aortic valve orifice area (Continuity VTI+Area)		C0801140	(cm2, UCUM, "cm2")
LN	18092-7	Aortic valve orifice area (Continuity VTI+Diameter)		C0801141	(cm2, UCUM, "cm2")
LN	18090-1	Aortic valve orifice area (Continuity)		C0801139	(cm2, UCUM, "cm2")
LN	18089-3	Aortic valve orifice area		C0801138	(cm2, UCUM, "cm2")
LN	18104-0	Aortic valve pressure half time		C0801153	(ms, UCUM, "ms")
LN	18105-7	Aortic valve regurgitant blood flow pressure half-time		C0801154	(ms, UCUM, "ms")

LN	77908-2	Aortic valve vena contracta diameter		C4036555	(cm, UCUM, "cm")
LN	18012-5	Ascending thoracic aorta diameter		C0801062	(cm, UCUM, "cm")
LN	79966-8	Ascending thoracic aorta diameter during systole by 2D		C4069741	(cm, UCUM, "cm")
LN	18013-3	Descending aortic diameter		C0801063	(cm, UCUM, "cm")
LN	79981-7	Left atrial end systolic volume biplane (area-length)		C4069726	(ml, UCUM, "ml")
LN	79982-5	Left atrial end systolic volume biplane (area-length) / BSA		C4069725	(ml/m2, UCUM, "ml/m2")
LN	79983-3	Left atrial end systolic volume biplane (MOD)		C4069724	(ml, UCUM, "ml")
LN	79984-1	Left atrial end systolic volume biplane (MOD) / BSA		C4069723	(ml/m2, UCUM, "ml/m2")
LN	79985-8	Left atrial end systolic volume single plane 2C (MOD)		C4069722	(ml, UCUM, "ml")
LN	79986-6	Left atrial end systolic volume single plane 4C (MOD)		C4069721	(ml, UCUM, "ml")
LN	24526-6	Left ventricular cardiac output		C0881769	(l/min, UCUM, "l/min")
LN	93649-2	Left ventricular cardiac output (biplane area-length)		C5212121	(l/min, UCUM, "l/min")
LN	20204-4	Left ventricular cardiac output (biplane ellipse)		C0803019	(l/min, UCUM, "l/min")
LN	20205-1	Left ventricular cardiac output (bullet)		C0803020	(l/min, UCUM, "l/min")
LN	76565-1	Left ventricular cardiac output (calculated)		C4037718	(l/min, UCUM, "l/min")
LN	76567-7	Left ventricular cardiac output (cube)		C4037716	(l/min, UCUM, "l/min")
LN	20206-9	Left ventricular cardiac output (cubed)		C0803021	(l/min, UCUM, "l/min")
LN	76571-9	Left ventricular cardiac output (Gibson)		C4037712	(l/min, UCUM, "l/min")
LN	20207-7	Left ventricular cardiac output (LVOT)		C0803022	(l/min, UCUM, "l/min")

LN	20208-5	Left ventricular cardiac output (modified biplane)		C0803023	(l/min, UCUM, "l/min")
LN	20212-7	Left ventricular cardiac output (single plane ellipse)		C0803027	(l/min, UCUM, "l/min")
LN	76569-3	Left ventricular cardiac output (Teichholz)		C4037714	(l/min, UCUM, "l/min")
LN	93647-6	Left ventricular cardiac output 2C (area-length)		C5212119	(l/min, UCUM, "l/min")
LN	93650-0	Left ventricular cardiac output 2C (MOD)		C5212122	(l/min, UCUM, "l/min")
LN	81390-7	Left ventricular cardiac output 3D		C4265387	(l/min, UCUM, "l/min")
LN	93648-4	Left ventricular cardiac output 4C (area-length)		C5212120	(l/min, UCUM, "l/min")
LN	93651-8	Left ventricular cardiac output 4C (MOD)		C5212123	(l/min, UCUM, "l/min")
LN	76564-4	Left ventricular cardiac output M-mode (calculated)		C4037719	(l/min, UCUM, "l/min")
LN	76566-9	Left ventricular cardiac output M-mode (cube)		C4037717	(l/min, UCUM, "l/min")
LN	76570-1	Left ventricular cardiac output M-mode (Gibson)		C4037713	(l/min, UCUM, "l/min")
LN	76568-5	Left ventricular cardiac output M-mode (Teichholz)		C4037715	(l/min, UCUM, "l/min")
LN	93632-8	Left ventricular outflow tract/Aortic valve VTI		C5212102	(%, UCUM, "%")
LN	80032-6	Left ventricular posterior wall diastolic thickness		C4069662	(cm, UCUM, "cm")
LN	80031-8	Left ventricular posterior wall diastolic thickness M-mode		C4069663	(cm, UCUM, "cm")
LN	93663-3	Left ventricular sphericity index end diastole		C5212135	({ratio}, UCUM, "ratio")
LN	20324-0	Left ventricular stroke volume (aortic root calculated)		C0803139	(ml, UCUM, "ml")
LN	80050-8	Mitral annulus diastolic diameter - A2C		C4069644	(cm, UCUM, "cm")
LN	80051-6	Mitral annulus diastolic diameter - A4C		C4069643	(cm, UCUM, "cm")

LN	80052-4	Mitral annulus diastolic diameter - PLAX		C4069642	(cm, UCUM, "cm")
LN	80053-2	Mitral annulus VTI		C4069641	(cm, UCUM, "cm")
LN	80059-9	Mitral regurgitation PISA radius		C4069635	(cm, UCUM, "cm")
LN	80061-5	Mitral regurgitation vena contracta width		C4069633	(cm, UCUM, "cm")
LN	20264-8	Mitral valve annulus area		C0803079	(cm2, UCUM, "cm2")
LN	18017-4	Mitral valve annulus diameter		C0801067	(cm, UCUM, "cm")
LN	29448-8	Mitral valve effective regurgitant orifice area (PISA)		C0944898	(cm2, UCUM, "cm2")
LN	77914-0	Mitral valve effective regurgitant orifice area (volumetric)		C4036549	(cm2, UCUM, "cm2")
LN	80073-0	Mitral valve mean gradient		C4069625	(mm[Hg], UCUM, "mmHg")
LN	77913-2	Mitral valve vena contracta diameter		C4036550	(cm, UCUM, "cm")
LN	59101-6	Pulmonary Artery Pressure using Accel Time		C2923436	(ms, UCUM, "ms")
LN	82341-9	Right ventricular Intrachamber systolic pressure		C4298777	(mm[Hg], UCUM, "mmHg")
LN	77903-3	Tricuspid Annular Plane Systolic Excursion		C4036560	(cm, UCUM, "cm")
LN	80091-2	Tricuspid annulus diameter end diastolic		C4069607	(cm, UCUM, "cm")
LN	18023-2	Tricuspid valve annulus diameter		C0801073	(cm, UCUM, "cm")
LN	20344-8	Tricuspid valve annulus region crossection area		C0803159	(cm2, UCUM, "cm2")
LN	79922-1	Tricuspid valve a-prime Vmax		C4069769	(cm/s, UCUM, "cm/s")
LN	81093-7	Tricuspid valve effective regurgitant orifice area (PISA)		C4265686	(mm2, UCUM, "mm2")
LN	81094-5	Tricuspid valve effective regurgitant orifice area (Volumetric)		C4265685	(mm2, UCUM, "mm2")
LN	79924-7	Tricuspid valve e-prime Vmax		C4069767	(cm/s, UCUM, "cm/s")
LN	79926-2	Tricuspid valve s-prime Vmax		C4069765	(cm/s, UCUM, "cm/s")

CID newCID8 Left Atrial Appendage Closure Measurement

The Units column contains the proper UCUM representation of the recommended units for the measured property.

Resources: HTML | FHIR JSON | FHIR XML | IHE SVS XML
Keyword: LeftAtrialAppendageClosureMeasurement
FHIR Keyword: dicom-cid-newCID8-LeftAtrialAppendageClosureMeasurement
Type: Extensible
Version: 202xxxxx
UID: 1.2.840.newUID8

Table CID newCID8. Left Atrial Appendage Closure Measurement

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-RT ID	UMLS Concept Unique ID	Units
DCM	newCODE108	Left atrial appendage closure device circumference			(mm, UCUM, "mm")
DCM	newCODE112	Left atrial appendage closure device compression			(%, UCUM, "%")
DCM	newCODE109	Left atrial appendage closure device diameter			(mm, UCUM, "mm")
DCM	newCODE110	Left atrial appendage closure device size			(mm, UCUM, "mm")
DCM	newCODE115	Left atrial appendage depth			(mm, UCUM, "mm")
DCM	newCODE114	Left atrial appendage landing zone			(mm, UCUM, "mm")
DCM	newCODE120	Left atrial appendage major axis			(mm, UCUM, "mm")
DCM	newCODE121	Left atrial appendage minor axis			(mm, UCUM, "mm")
DCM	newCODE116	Left atrial appendage ostium perimeter			(mm, UCUM, "mm")

CID newCID9 Structural Heart Procedure Anatomic Site

Resources: HTML | FHIR JSON | FHIR XML | IHE SVS XML
Keyword: StructuralHeartProcedureAnatomicSite
FHIR Keyword: dicom-cid-newCID9-StructuralHeartProcedureAnatomicSite
Type: Extensible
Version: 202xxxxx
UID: 1.2.840.newUID9

Table CID newCID9. Structural Heart Procedure Anatomic Site

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-RT ID	UMLS Concept Unique ID
SCT	57034009	Aortic arch	T-42300	C0003489

SCT	443167003	Aortic sinotubular junction	T-42102	C2733424
SCT	443167003	Aortic sinotubular junction	T-42102	C2733424
SCT	34202007	Aortic valve	T-35400	C0003501
SCT	46396001	Aortic valve commissure		C0225964
SCT	81797008	Aortic valve cusp		C0225958
SCT	77583004	Aortic valve ring	T-35410	C0225957
SCT	77583004	Aortic valve ring	T-35410	C0225957
SCT	54247002	Ascending aorta	T-42100	C0003956
SCT	36371001	Left Sinus of Valsalva	T-42220	C0226017
SCT	89093001	Right Sinus of Valsalva	T-42210	C0226016
SCT	81128002	Structure Sinus of Valsalva	T-42200	C0037197
SCT	58095006	Interatrial septum structure	T-32150	C0225836
SCT	82471001	Left atrium	T-32300	C0225860
SCT	33626005	Left auricular appendage	T-32310	C0225861
DCM	newCODE5	Ostium of Left Auricular Appendage		
SCT	59438005	Left anterior descending coronary artery	T-43110	C0226032
SCT	3227004	Left main coronary artery	T-43107	C0226031
SCT	87878005	Left ventricle	T-32600	C0225897
SCT	13418002	Left ventricle outflow tract	T-32650	C0225912
SCT	21498007	Anterior mitral valve leaflet		C0225950
SCT	399086000	Lateral mitral annulus	G-0392	C1302198
SCT	399093001	Medial mitral annulus	G-0391	C1302199
SCT	65197004	Mitral annulus	T-35310	C0225947
SCT	91134007	Mitral valve	T-35300	C0026264
SCT	19198003	Mitral valve commissure		C0225954
SCT	46807008	Mitral valve leaflet		C0225949
SCT	57793009	Posterior mitral valve leaflet		C0225951
SCT	81040000	Pulmonary artery	T-44000	C0034052
SCT	73829009	Right atrium	T-32200	C0225844
SCT	589001	Interventricular septum	T-32410	C0225870
SCT	53085002	Right ventricle	T-32500	C0225883
SCT	85235006	Left subclavian artery	T-46120	C0226262
SCT	29700009	Right subclavian artery	T-46110	C0226261
SCT	113259005	Tricuspid annulus	T-35110	C0225926
SCT	46030003	Tricuspid valve	T-35100	C0040960
SCT	3462006	Tricuspid valve commissure		C0225933
Include CID newCID10 "Peripheral Access Anatomic Site"				

CID newCID10 Peripheral Access Anatomic Site

Resources: HTML | FHIR JSON | FHIR XML | IHE SVS XML
Keyword: PeripheralAccessAnatomicSite
FHIR Keyword:dicom-cid-newCID10-PeripheralAccessAnatomicSite
Type: Extensible
Version: 202xxxxx
UID: 1.2.840.newUID10

Table CID newCID10. Peripheral Access Anatomic Site

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-RT ID	UMLS Concept Unique ID
SCT	69833005	Right femoral artery	T-47410	C0226447
SCT	113270003	Left femoral artery	T-47420	C0226448
SCT	85235006	Left subclavian artery	T-46120	C0226262
SCT	29700009	Right subclavian artery	T-46110	C0226261

CID newCID11 Indication for Structural Heart Procedure

Resources: HTML | FHIR JSON | FHIR XML | IHE SVS XML
Keyword: IndicationForStructuralHeartProcedure
FHIR Keyword: dicom-cid-newCID11-IndicationForStructuralHeartProcedure
Type: Extensible
Version: 202xxxxx
UID: 1.2.840.newUID11

Table CID newCID11. Indication for Structural Heart Procedure

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-RT ID	UMLS Concept Unique ID
SCT	60573004	Aortic stenosis	D3-29021	C0003507
SCT	79619009	Mitral stenosis	D3-29011	C0026269
SCT	11851006	Mitral valve disease	D3-29010	C0026265
SCT	79619009	Mitral stenosis	D3-29011	C0026269
SCT	48724000	Mitral regurgitation	D3-29012	C0026266
SCT	373116009	Acute mitral regurgitation	D3-29096	C1298807
SCT	409712001	Mitral valve prolapse	D3-1081C	C0026267
SCT	195020003	Hypertrophic cardiomyopathy without obstruction	D3-20003	C0340425
SCT	20721001	Tricuspid valve disease	D3-29040	C0264882
SCT	111287006	Tricuspid regurgitation	D3-29042	C0040961
SCT	49915006	Tricuspid valve stenosis		C0040963
SCT	409712001	Mitral valve prolapse	D3-1081C	C0026267
SCT	8722008	Aortic valve disease	D3-29020	C1260873
SCT	60573004	Aortic stenosis	D3-29021	C0003507
SCT	194983005	Aortic insufficiency	D3-29025	C0340377
SCT	60234000	Aortic regurgitation		C0003504
SCT	60573004	Aortic valve stenosis		C0003507
SCT	70142008	Atrial septal defect	D4-31220	C0018817
SCT	76267008	Pulmonic valve disease	D3-29050	C0034087
SCT	56786000	Pulmonic valve stenosis	D3-29051	C0034089
SCT	91434003	Pulmonic valve regurgitation		C0034088
SCT	30288003	Ventricular septal defect	D4-31150	C0018818

UMLS	C4015487	Left atrial dilation		C4015487
SCT	275514001	Impaired left ventricular function	C0242698	C1277291
SCT	49436004	Atrial fibrillation	D3-31520	C0004238
SCT	135877001	Stroke risk		C1277291
UMLS	C3468959	Intolerance to anticoagulation		C3468959

CID newCID12 Bradycardiac Agents

Resources: HTML | FHIR JSON | FHIR XML | IHE SVS XML
Keyword: BradyCardiacAgents
FHIR Keyword: dicom-cid-newCID12-BradyCardiacAgents
Type: Extensible
Version: 202xxxxx
UID: 1.2.840.newUID12

Table CID newCID12. Bradycardiac Agents

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-RT ID	UMLS Concept Unique ID
SCT	33252009	Beta blocker	C-80135	C0001645
SCT	48698004	Calcium channel blocker	C-80160	C0006684
SCT	372700007	Nitrate vasodilator	F-618B5	C0360716

CID newCID13 Transesophageal Echocardiography Scan Planes

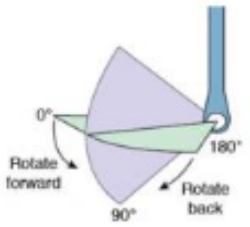
Resources: HTML | FHIR JSON | FHIR XML | IHE SVS XML
Keyword: TransesophagealEchocardiographyScanPlanes
FHIR Keyword: dicom-cid-newCID5-TransesophagealEchocardiographyScanPlanes
Type: Extensible
Version: 202xxxxx
UID: 1.2.840.newUID13

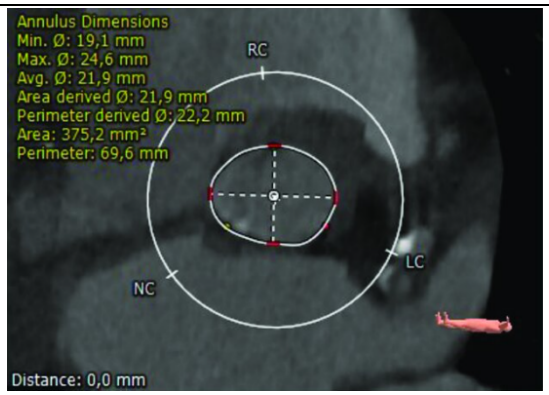
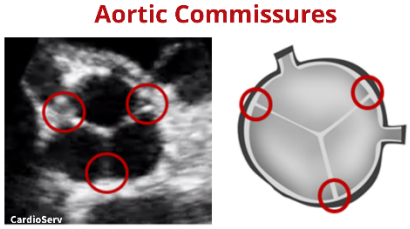
Coding Scheme Designator	Code Value	Code Meaning
DCM	newCODE104	0 degree scan plane
DCM	newCODE105	45 degree scan plane
DCM	newCODE106	90 degree scan plane
DCM	newCODE107	135 degree scan plane

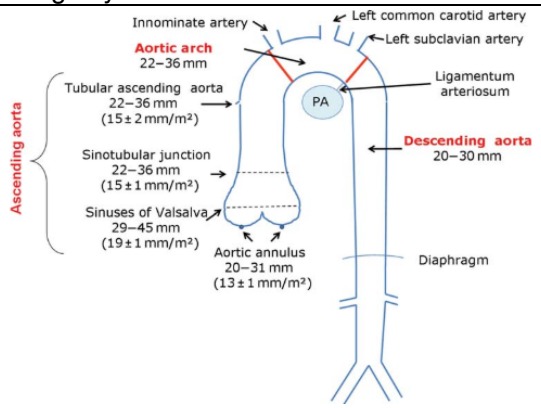
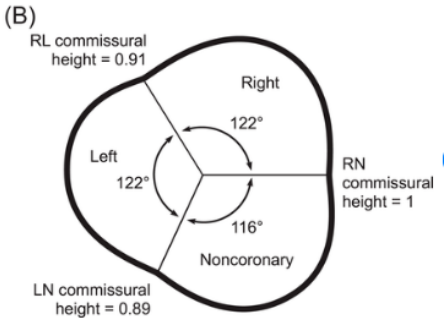
Add the following Definitions to Annex D

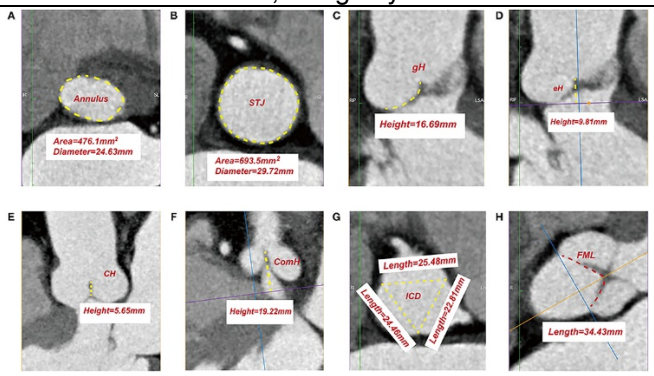
Not for reviewers: Figures are included to facilitate public comment and will not be included in final text. Figures include a hyperlink to their source.

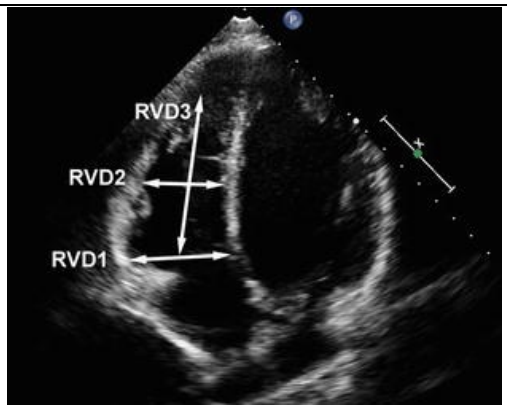
Coding Scheme Designator	Code Value	Code Meaning	Definition
…			

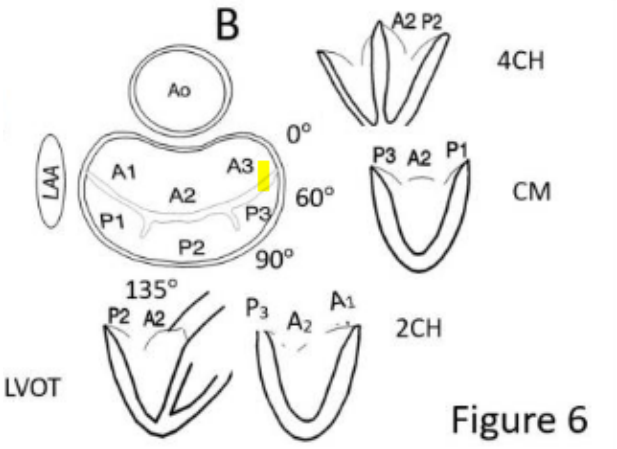
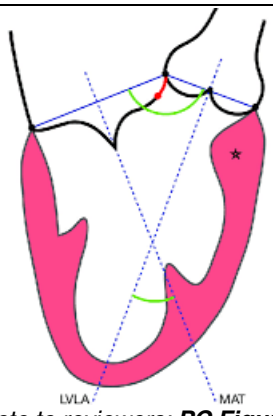
DCM	newCODE4	Structural Heart Measurement Report	A report containing the quantitative results of human or machine analysis of periprocedural imaging related to transcatheter structural heart procedures.
DCM	newCODE123	Transesophageal Echocardiography Scan Plane	The specific orientation of a transesophageal transducer during echocardiography imaging.
DCM	newCODE104	0 degree scan plane	Baseline orientation of the transesophageal transducer; a transverse plane directed anteriorly from the esophagus.
			 *Note to reviewers:* ***PC Figure 15***
		60 degree scan plane	
DCM	newCODE105	45 degree scan plane	Orientation of the transesophageal transducer 45 degrees counterclockwise from the 0 degree scan plane. *Note to reviewers: See* ***PC Figure 15***
DCM	newCODE106	90 degree scan plane	Orientation of the transesophageal transducer 90 degrees counterclockwise from the 0 degree scan plane. *Note to reviewers: See* ***PC Figure 15***
DCM	newCODE107	135 degree scan plane	Orientation of the transesophageal transducer 135 degrees counterclockwise from the 0 degree scan plane. *Note to reviewers: See* ***PC Figure 15***
DCM	newCODE3	Ball and disk type left atrial appendage closure device	A device, in the form of a disk and cylindrical lobe connected by a central waist, for sealing off a left atrium appendage.
DCM	newCODE2	Ball type left atrial appendage closure device	A spherical device for sealing off a left atrium appendage.
DCM	newCODE1	Left atrial appendage closure device	A device for sealing off a left atrium appendage.
DCM	newCODE5	Ostium of Left Auricular Appendage	The anatomical orifice connecting the left atrial appendage to the left atrium of the heart.
DCM	newCODE122	Transseptal puncture height	The distance from the mitral leaflets to the level of the transseptal puncture measured during systole in a four-chamber view, with the measurement line drawn parallel to the atrial septum, using any method.
DCM	newCODE6	Aorta sinotubular junction area	The cross-sectional area of the ascending aorta measured between the aortic sinuses of Valsalva and normal tubular configuration of the aorta during diastole in 2D or 3D, in the long axis view, using any method.

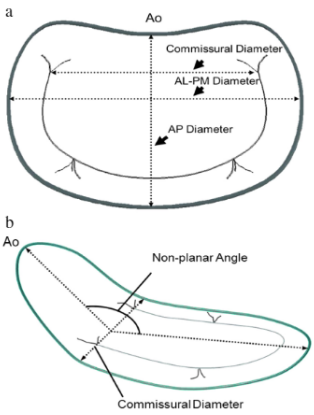
DCM	newCODE7	Aortic annulus area	The area within the annulus of the aortic valve measured during systole, in a short axis view at the level of the annulus of the aortic valve, using any method.
			 *Note to reviewers:* ***PC Figure 7***
DCM	newCODE8	Aortic annulus calcification severity	The qualitative severity of calcification of the annulus of the aortic valve, evaluated during systole, in any view at the level of the annulus of the aortic valve.
DCM	newCODE9	Aortic annulus max diameter	The widest diameter of the annulus of the aortic valve measured at systole, in a short axis view at the level of the annulus of the aortic valve, using any method. *Note to reviewers: See* ***PC Figure 7***
DCM	newCODE10	Aortic annulus min diameter	The narrowest diameter of the annulus of the aortic valve measured at systole, in a short axis view at the level of the annulus of the aortic valve, using any method. *Note to reviewers: See* ***PC Figure 7***
DCM	newCODE11	Aortic annulus perimeter	The length of the perimeter of the annulus of the aortic valve measured at systole, in a short axis view at the level of the annulus of the aortic valve, using any method. *Note to reviewers: See* ***PC Figure 7***
DCM	newCODE12	Aortic calcification volume	The volume of calcification of the annulus of the aortic valve, evaluated during systole, in a short axis view at the level of the annulus of the aortic valve, using a qualitative method.
DCM	newCODE13	Aortic commissures calcification severity	The qualitative severity of calcification of the commissures of the aortic valve, evaluated at any time during the cardiac cycle, in any view at the level of the annulus of the aortic valve. .
			 *Note to reviewers:* ***PC Figure 20***

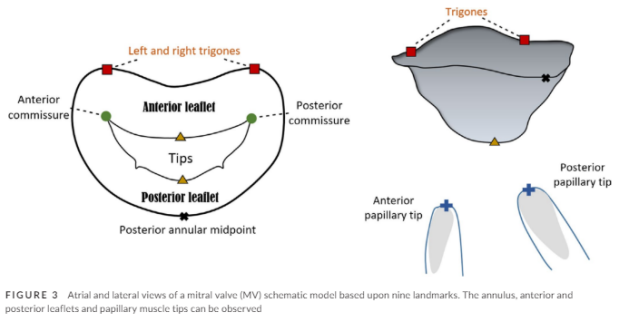
DCM	newCODE16	Aortic root height	The distance from the aortic annulus to the sinotubular junction measured during diastole in the long axis view, using any method.  *Note to reviewers:* ***PC Figure 2***
DCM	newCODE17	Aortic sinotubular junction diameter	The diameter of the ascending aorta measured at the level of the sinotubular junction during diastole, in any view, using any method. *Note to reviewers: See* ***PC Figure 2***
DCM	newCODE19	Aortic sinus of valsalva area	The area within the sinus of valsalva measured during diastole, in a short axis view, at the level of the sinus of valsalva, using any method. *Note to reviewers: See* ***PC Figure 2***
DCM	newCODE20	Aortic sinus of valsalva diameter	A diameter within the sinus of valsalva measured during diastole, in a short axis view, at the level of the sinus of valsalva, using any method. *Note to reviewers: See* ***PC Figure 2***
DCM	newCODE24	Aortic valve coaptation length	The length of coaptation (where the aortic valve leaflets are in contact), measured during diastole in the long axis view, using any method. *Note to reviewers: See* ***PC Figure 9***
DCM	newCODE25	Aortic valve noncoronary leaflet intercommissural angle	The angle between the two commissures of the noncoronary leaflet of the aortic valve measured during diastole, in a short axis view at the level of the aortic valve, using any method.  *Note to reviewers:* ***PC Figure 6***
DCM	newCODE26	Aortic valve right leaflet intercommissural angle	The angle between the two commissures of the right leaflet of the aortic valve measured during diastole, in a short axis view at the level of the aortic valve, using any method. *Note to reviewers: See* ***PC Figure 6***

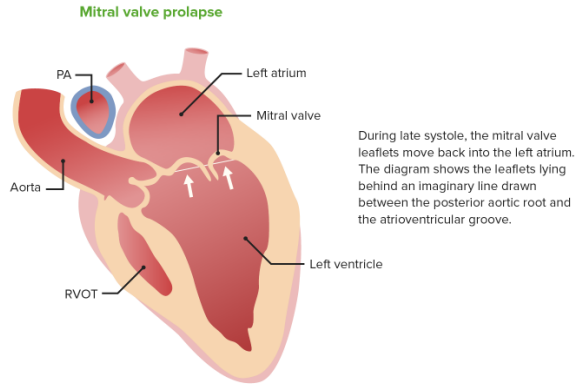
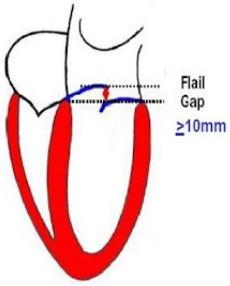
DCM	newCODE27	Aortic valve left leaflet intercommissural angle	The angle between the two commissures of the left leaflet of the aortic valve measured during diastole, in a short axis view at the level of the aortic valve, using any method. *Note to reviewers: See **PC Figure 6***
DCM	newCODE28	Aortic valve noncoronary leaflet intercommissural distance	The straight-line distance between the two commissures of the left leaflet of the aortic valve measured during diastole, in a short axis view at the level of the aortic valve, using any method.  *Note to reviewers: **PC Figure 12***
DCM	newCODE29	Aortic valve right leaflet intercommissural distance	The straight-line distance between the two commissures of the right leaflet of the aortic valve measured during diastole, in a short axis view at the level of the aortic valve, using any method. *Note to reviewers: See **PC Figure 12***
DCM	newCODE30	Aortic valve left leaflet intercommissural distance	The straight-line distance between the two commissures of the left leaflet of the aortic valve measured during diastole, in a short axis view at the level of the aortic valve, using any method. *Note to reviewers: See **PC Figure 12***
DCM	newCODE31	Aortic valve left coronary leaflet height	The perpendicular distance from the plane of the annulus to the tip of the left coronary leaflet measured during diastole, in a long axis view, using any method. *Note to reviewers: See **PC Figure 12***
DCM	newCODE32	Aortic valve left coronary leaflet length	The distance along the surface of the left coronary leaflet from the tip to the hinge point of the leaflet to the aortic annulus, measured during diastole, in a long axis view, using any method. *Note to reviewers: See **PC Figure 12***
DCM	newCODE33	Aortic valve noncoronary leaflet height	The perpendicular distance from the plane of the annulus to the tip of the noncoronary leaflet measured during diastole, in a long axis view, using any method. *Note to reviewers: See **PC Figure 12***
DCM	newCODE34	Aortic valve noncoronary leaflet length	The distance along the surface of the noncoronary leaflet from the tip to the hinge point of the leaflet to the aortic annulus, measured during diastole, in a long axis view, using any method. *Note to reviewers: See **PC Figure 12***
DCM	newCODE35	Aortic valve right coronary leaflet height	The perpendicular distance from the plane of the annulus to the tip of the right coronary leaflet measured during diastole, in a long axis view, using any method. *Note to reviewers: See **PC Figure 12***

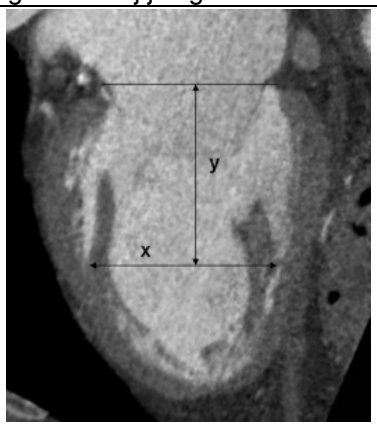
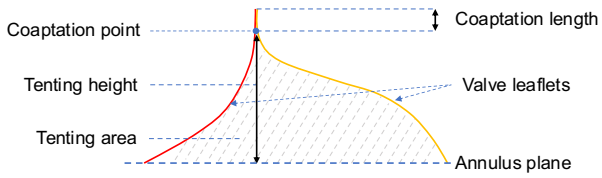
DCM	newCODE36	Aortic valve right coronary leaflet length	The distance along the surface of the right coronary leaflet from the tip to the hinge point of the leaflet to the aortic annulus, measured during diastole, in a long axis view, using any method. *Note to reviewers: See **PC Figure 12***
DCM	newCODE38	Ascending Aorta diameter	The diameter within the ascending aorta measured during diastole in 2D, in any view at the level of the right pulmonary artery, using any method. *Note to reviewers: See **PC Figure 2***
DCM	newCODE40	Left main coronary ostium height	The distance between the aortic annulus and the left main coronary ostium measured at their closest points, during systole, in a long axis view, using any method.
DCM	newCODE43	Left ventricular outflow tract calcification severity	The qualitative severity of calcification of the left ventricular outflow tract, evaluated at any time during the cardiac cycle and in any view, from the annular plane to 5 mm below.
DCM	newCODE41	Maximum aortic plaque thickness	The maximum thickness of the largest atherosclerotic plaque deposit found within the ascending aorta, measured during systole, in the view that demonstrates the thickest plaque, using any appropriate imaging method
DCM	newCODE42	Right coronary artery ostium height	The distance between the aortic annulus and the right main coronary ostium measured at their closest points, during systole, in a long axis view, using any method.
DCM	newCODE44	Right ventricle diastolic major axis	The internal longitudinal length from the apex of the right ventricle to the tricuspid annulus, measured during diastole, in a four-chamber view, using any method.  *Note to reviewers: **PC Figure 4** (RVD3)*
DCM	newCODE46	Right ventricular diastolic mid segment minor axis	The internal diameter of the right ventricle from the interventricular septum to the free wall, measured at the level of the papillary muscles during diastole, in a four-chamber view, using any method. *Note to reviewers: See **PC Figure 4** (RVD2)*
DCM	newCODE48	Right ventricular diastolic basal minor axis	The internal diameter of the right ventricle from the interventricular septum to the free wall, measured in the basal third of the right ventricle during diastole, in a four-chamber view, using any method. *Note to reviewers: See **PC Figure 4** (RVD1)*

DCM	newCODE50	Mitral anterior leaflet A1 scallop length	The distance along the hinge line of the A1 scallop of the anterior leaflet of the mitral valve, measured during systole, in the long axis view, using any method.  *Note to reviewers:* ***PC Figure 14***
DCM	newCODE51	Mitral anterior leaflet A2 scallop length	The distance along the hinge line of the A2 scallop of the anterior leaflet of the mitral valve, measured during systole, in the long axis view, using any method. *Note to reviewers: See* ***PC Figure 14***
DCM	newCODE124	Mitral anterior leaflet A3 scallop length	The distance along the hinge line of the A3 scallop of the anterior leaflet of the mitral valve, measured during systole, in the long axis view, using any method. *Note to reviewers: See* ***PC Figure 14***
DCM	newCODE53	Mitral anterior leaflet area	The area of the atrial surface of the anterior leaflet of the mitral valve measured during systole, in a 3D en face view of the mitral valve, using any method. *Note to reviewers: See* ***PC Figure 14***
DCM	newCODE54	Aorto-mitral inter annular angle	The angle between the plane passing through the aortic annulus and the plane passing through the mitral annulus measured during systole, in the long axis view, using any method.  *Note to reviewers:* ***PC Figure 5***
DCM	newCODE66	Mitral commissure distance	The straight-line distance between the two commissures of the anterior and posterior leaflets of the mitral valve measured during diastole, in a two-chamber view, using any method. *Note to reviewers: See* ***PC Figure 14***

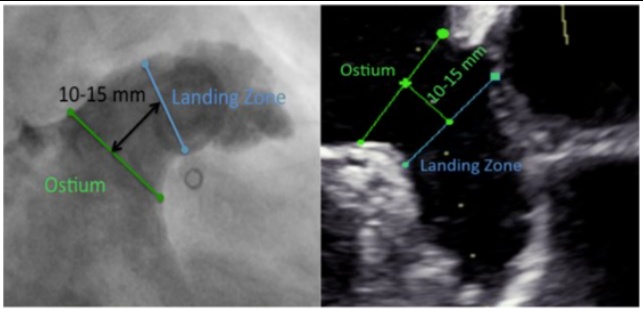
DCM	newCODE71	Mitral trigone-to-trigone distance	The straight-line distance between a point in the right trigone region of the mitral annulus and a point in the left trigone region of the mitral annulus, measured during systole, in a 3D en face view of the mitral valve, using any method. *Note to reviewers: See **PC Figure 19***
DCM	newCODE62	Mitral annular excursion	The longitudinal displacement of the plane of the mitral annulus over the course of a cardiac cycle, measured any view, using any method.
DCM	newCODE72	Mitral annulus anterolateral to posteromedial diameter	The diameter of the annulus of the mitral valve measured from the anterolateral aspect to the posteromedial aspect, during systole, in a 3D en face view of the mitral valve, using any method.  *Note to reviewers: **PC Figure 8***
DCM	newCODE73	Mitral annulus anteroposterior diameter	The diameter of the annulus of the mitral valve measured from the anterior aspect to the posterior aspect, during systole, in the short axis view at the level of the mitral annulus, using any method. *Note to reviewers: See **PC Figure 8***
DCM	newCODE74	Mitral annulus area	The area within the annulus of the mitral valve measured during systole, in a short axis view at the level of the annulus of the mitral valve, using any method. *Note to reviewers: See **PC Figure 8***
DCM	newCODE63	Mitral annulus calcification severity	The qualitative severity of calcification of the annulus of the mitral valve, evaluated during diastole, in any view, at the level of the annulus of the mitral valve.
DCM	newCODE77	Mitral annulus commissural diameter	The diameter of the annulus of the mitral valve at the level of the commissures of the annulus, measured during systole, in a 3D en face view of the mitral valve, using any method. *Note to reviewers: See **PC Figure 8***
DCM	newCODE60	Mitral annulus diameter ratio	The ratio of the anteroposterior diameter of the mitral annulus and the anterolateral diameter of the mitral annulus, measured during systole, using any method.

DCM	newCODE75	Mitral annulus height	The sum of the vertical distance from the highest point on the mitral annulus to the mitral annular plane and the vertical distance from the lowest point on the mitral annulus to the mitral annular plane. It is measured at systole, in a 3D transverse view of the mitral valve, using any method. *Note to reviewers: See **PC Figure 8** and this link*
DCM	newCODE64	Mitral annulus nonplanarity angle	The angle between a vector from the furthest anterior aspect of the annulus to the midpoint of the commissural diameter and a vector from the furthest posterior aspect of the annulus to the midpoint of the commissural diameter. It is measured at systole, in a 3D view of the mitral valve, using any method. *Note to reviewers: See **PC Figure 8***
DCM	newCODE76	Mitral annulus perimeter	The length of the perimeter of the annulus of the mitral valve measured during systole, in a short axis view at the level of the annulus of the mitral valve, using any method. *Note to reviewers: See **PC Figure 8***
DCM	newCODE59	Mitral valve coaptation length	The length of coaptation (where the anterior and posterior leaflets are in contact), measured during systole, in a 3D view, using any method. *Note to reviewers: See **PC Figure 9***
DCM	newCODE68	Mitral valve interpapillary distance	The distance between the two papillary muscle tips, measured during diastole in a four-chamber view, using any method.  FIGURE 3 Atrial and lateral views of a mitral valve (MV) schematic model based upon nine landmarks. The annulus, anterior and posterior leaflets and papillary muscle tips can be observed *Note to reviewers: **PC Figure 19***
DCM	newCODE108	Anterolateral papillary muscle to the left trigone	The distance between the anterolateral papillary muscle tip and a point in the left trigone region of the mitral annulus, measured during systole in a four-chamber view, using any method. *Note to reviewers: See **PC Figure 19***
DCM	newCODE70	Posteromedial papillary muscle to the right trigone	The distance between the posteromedial papillary muscle tip and a point in the right trigone region of the mitral annulus, measured during systole in a four-chamber view, using any method. *Note to reviewers: See **PC Figure 19***

DCM	newCODE78	Mitral valve prolapse area	The surface area of the portion of the mitral valve leaflets that is displaced above the annular plane (prolapsed) measured during systole, in a short axis view, using any method.
			 *Note to reviewers:* ***PC Figure 16***
DCM	newCODE79	Mitral valve prolapse volume	The volume encompassed by annular plane and the portion of the mitral valve leaflets that is displaced above the annular plane (prolapsed) measured during systole, in a short axis view, using any method.
DCM	newCODE80	Mitral valve segment flail gap	The distance between the tip of the free edge of a flail mitral valve leaflet or segment and the plane of the mitral annulus measured during systole, in any view, using any method.
			 *Note to reviewers:* ***PC Figure 1***

DCM	newCODE81	Mitral valve sphericity index	The ratio of the transverse diameter of the left ventricle at the level of the papillary muscle base divided by the longitudinal distance between the level of the papillary muscle base and the mitral annulus plane, measured at diastole in a four-chamber view, using any method. https://doi.org/10.1016/j.jcmg.2008.12.025  *Note to reviewers:* ***PC Figure 13***
DCM	newCODE82	Mitral valve tenting height	The perpendicular distance from the point of coaptation (where the anterior and posterior leaflets meet) to the annular plane measured during systole, in a 3D or 2D view at the level of the mitral annulus, using any method.  *Note to reviewers:* ***PC Figure 9***
DCM	newCODE96	Mitral valve tenting area	The area between the ventricular surface of the leaflets and the annular plane measured during systole, in a 3D view at the level of the mitral annulus, using any method. *Note to reviewers: See* ***PC Figure 9***
DCM	newCODE83	Mitral valve tenting segment height A1-P1	The distance from the point where the A1-P1 scallops of the mitral valve contact (coaptation point) to the annular plane measured during systole, in a four-chamber view at the level of the mitral annulus, using any method. *Note to reviewers: See* ***PC Figure 9***
DCM	newCODE84	Mitral valve tenting segment height A2-P2	The distance from the point where the A2-P2 scallops of the mitral valve contact (coaptation point) to the annular plane measured during systole, in a four-chamber view at the level of the mitral annulus, using any method. *Note to reviewers: See* ***PC Figure 9***

DCM	newCODE85	Mitral valve tenting segment height A3-P3	The distance from the point where the A3-P3 scallops of the mitral valve contact (coaptation point) to the annular plane measured during systole, in a four-chamber view at the level of the mitral annulus, using any method. *Note to reviewers: See **PC Figure 9***
DCM	newCODE86	Posterior mitral valve leaflet area	The area of the posterior mitral valve P1, P2 and P3 leaflet scallops measured during systole, in the long axis view, using any method. *Note to reviewers: See **PC Figure 14***
DCM	newCODE87	Posterior mitral valve leaflet length	The distance along the hinge line of the posterior mitral valve P1, P2 and P3 leaflet scallops measured during systole, in the long axis view, using any method. *Note to reviewers: See **PC Figure 14***
DCM	newCODE88	Posterior mitral valve P1 leaflet scallop length	The distance along the hinge line of the posterior mitral valve P1 leaflet scallop during systole, in the long axis view, using any method. *Note to reviewers: See **PC Figure 14***
DCM	newCODE89	Posterior mitral valve P2 leaflet scallop length	The distance along the hinge line of the posterior mitral valve P2 leaflet scallop during systole, in the long axis view, using any method. *Note to reviewers: See **PC Figure 14***
DCM	newCODE90	Posterior mitral valve P3 leaflet scallop length	The distance along the hinge line of the posterior mitral valve P3 leaflet scallop during systole, in the long axis view, using any method. *Note to reviewers: See **PC Figure 14***
DCM	newCODE94	Tricuspid annulus area	The area within the annulus of the tricuspid valve measured during diastole, in a 3D en face view of the tricuspid valve, using any method.
DCM	newCODE92	Tricuspid annulus area diastolic systolic ratio	The area within the annulus of the tricuspid valve calculated at diastole divided by the area within the annulus of the tricuspid valve calculated at systole, in a 3D en face view of the tricuspid valve, using any method.
DCM	newCODE93	Tricuspid annulus perimeter	The length of the perimeter of the annulus of the tricuspid valve measured during diastole, in a four-chamber view, using any method.
DCM	newCODE95	Tricuspid valve coaptation length	The length of coaptation (where the anterior, posterior, and septal leaflets are in contact), measured during systole, in a 3D view, using any method. *Note to reviewers: See **PC Figure 9***
DCM	newCODE97	Tricuspid valve major axis diastole	The maximum diameter of the annulus of the tricuspid valve measured during diastole, in a four-chamber view, using any method.
DCM	newCODE98	Tricuspid valve minor axis	The minimum diameter of the annulus of the tricuspid valve measured during diastole, in a four-chamber view, using any method.
DCM	newCODE99	Tricuspid valve sphericity index	The ratio of the maximum diameter of the annulus of the tricuspid valve and the minimum diameter of the annulus of the tricuspid valve, measured during diastole, in a four-chamber view, using any method.

DCM	newCODE100	Tricuspid valve tenting height	The distance from the point where the leaflets of the tricuspid valve contact (coaptation point) to the annular plane measured during systole, in a four-chamber 3D transverse view of the tricuspid valve, using any method.
DCM	newCODE101	Tricuspid valve tenting volume	The volume of the region between atrial surface of the leaflets and the annular plane measured during systole, in a 3D view of the tricuspid valve, using any method.
DCM	newCODE108	Left atrial appendage closure device circumference	The circumference of the left atrial appendage closure device after deployment, measured at the shoulder during end-systole in a 2D or 3D view of the left atrial appendage, using any method.
DCM	newCODE112	Left atrial appendage closure device compression ratio	The ratio of the diameter of the left atrial appendage closure device after deployment, measured at the shoulder during end-systole in a 2D or 3D view of the left atrial appendage, and diameter of the left atrial appendage closure device as specified by its manufacturer.
DCM	newCODE109	Left atrial appendage closure device diameter	The diameter of the left atrial appendage closure device after deployment, measured at the shoulder during end-systole in a 2D view of the left atrial appendage, using any method.
DCM	newCODE110	Left atrial appendage closure device size	The diameter of the left atrial appendage closure device as specified by its manufacturer.
DCM	newCODE115	Left atrial appendage depth	The maximum distance from the left atrial appendage orifice (the plane between the left upper pulmonary vein ridge and the left circumflex artery), to the most distal point of the left atrial appendage cavity, measured during end-diastole in a 2D view of the left atrial appendage, using any method.
DCM	newCODE114	Left atrial appendage landing zone	The maximum diameter of the left atrial appendage 1cm to 1.5cm inferior to the orifice (the plane between the left upper pulmonary vein ridge and the left circumflex artery), measured during end-systole, in a 2D view of the left atrial appendage, using any method.
			 *Note to reviewers:* ***PC Figure 18***

DCM	newCODE120	Left atrial appendage major axis	The maximum diameter of the left atrial appendage orifice (the plane between the left upper pulmonary vein ridge and the left circumflex artery), measured during end-systole, in a 2D view of the left atrial appendage, using any method.
DCM	newCODE121	Left atrial appendage minor axis	The minimum diameter of the left atrial appendage orifice (the plane between the left upper pulmonary vein ridge and the left circumflex artery), measured during end-systole, in a 2D view of the left atrial appendage, using any method.
DCM	newCODE116	Left atrial appendage ostium perimeter	The perimeter of the left atrial appendage orifice (the plane between the left upper pulmonary vein ridge and the left circumflex artery), measured during end-systole, in a 3D en face view of the left atrial appendage, using any method.

Add the following UID Values to Part 6 Annex A Table A-3:

Table A-3 CONTEXT GROUP UID VALUES

Context UID	Context Identifier	Context Group Name
...		
1.2.840.newUID1	**newCID1**	**Structural Heart Procedures**
1.2.840.newUID2	**newCID2**	**Structural Heart Devices**
1.2.840.newUID3	**newCID3**	**Structural Heart Measurement**
1.2.840.newUID4	**newCID4**	**Structural Heart Aortic Valve Measurement**
1.2.840.newUID5	**newCID5**	**Structural Heart Mitral Valve Measurement**
1.2.840.newUID6	**newCID6**	**Structural Heart Tricuspid Valve Measurement**
1.2.840.newUID7	**newCID7**	**Structural Heart Echo Measurements**
1.2.840.newUID8	**newCID8**	**Left Atrial Appendage Closure Measurement**
1.2.840.newUID9	**newCID9**	**Structural Heart Procedure Anatomic Site**
1.2.840.newUID10	**newCID10**	**Peripheral Access Anatomic Site**
1.2.840.newUID11	**newCID11**	**Indication for Structural Heart Procedure**
1.2.840.newUID12	**newCID12**	**Bradycardiac Agents**
1.2.840.newUID13	**newCID13**	**Transesophageal Echocardiography Scan Planes**