DICOM Correction Proposal

STATUS	Assigned
Date of Last Update	2025/01/06
Person Assigned	Kevin O'Donnell
Submitter Name	Kevin O'Donnell
Submission Date	2025/01/06

Correction Number	CP-2501
Log Summary: Add More Fetal Cardiac Codes	
Name of Standard PS 3.16	

Rationale for Correction:

Assessment of the orientation of the long axis of the fetal heart is recommended by the International Society of Ultrasound in Obstetrics and Gynecology (ISUOG) in their fetal cardiac screening practice guidelines. An abnormal angle can indicate an increased risk of a cardiac malformation.

ISUOG Practice Guidelines (updated): fetal cardiac screening (2023)

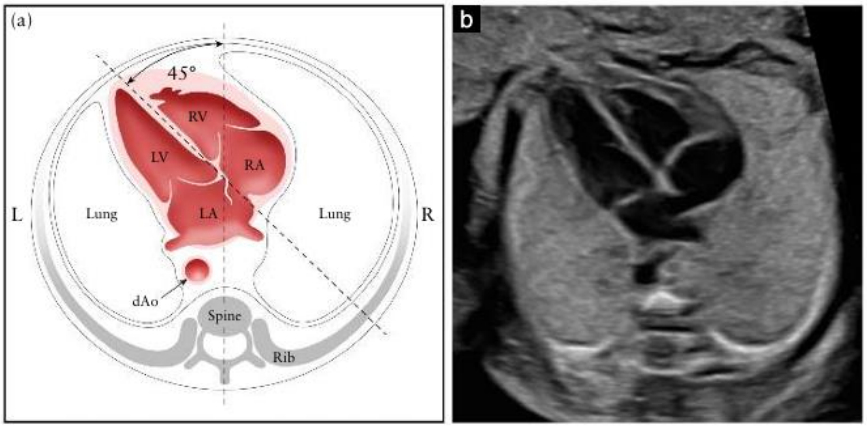

Figure 4 Determination of cardiac position and axis, shown in schematic diagram (a) and corresponding grayscale ultrasound image (b). Imaginary line drawn from spine posteriorly to sternum anteriorly divides thorax into two equal parts, left (L) and right (R). Normal fetal heart lies mainly on left, with cardiac apex pointing to left at an angle of $45 \pm 20°$ in relation to anteroposterior axis of chest. dAo, descending aorta; LA, left atrium; LV, left ventricle; RA, right atrium; RV, right ventricle.

Note: SNOMED has code (251191008, SCT, "Cardiac axis (observable entity)"), however its children are P Wave Axis and QRS Axis, indicating that it is related to depolarization vectors, not structural orientation.

It has also been requested to add codes for the ductus venosus (DV) that mirror the blood velocity ratio measurements already included for the inferior vena cava (IVC).

(Could add a findings location of Cardiac Axis to CID 12305 and do as post coordinated instead of adding to CID 12279. Might also need a method)

Correction Wording:

Modify CID 12279 to add Cardiac Axis

CID 12279 Cardiac Ultrasound Fetal General Measurement

Resources: HTML | FHIR JSON | FHIR XML | IHE SVS XML
Keyword: CardiacUltrasoundFetalGeneralMeasurement
FHIR Keyword: dicom-cid-12279-CardiacUltrasoundFetalGeneralMeasurement
Type: Extensible
Version: 20yymmdd~~240920~~
UID: 1.2.840.10008.6.1.859

Table CID 12279. Cardiac Ultrasound Fetal General Measurement

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-RT ID	UMLS Concept Unique ID
LN	11988-3	Thoracic Circumference		C0552104
LN	33068-8	Thoracic Area		C1315539
LN	59073-7	Cardiac Circumference, transverse by US		C2923390
LN	59074-5	Cardiothoracic Circumference Ratio		C2923392
LN	59075-2	Cardiac Cross-sectional Area, transverse by US		C2923394
LN	59076-0	Cardiothoracic Area Ratio		C2923396
LN	11864-6	Transverse Thoracic Diameter		C0551981
LN	59077-8	Foramen Ovale Diameter/Aortic Root Diameter		C2923398
LN	59078-6	Left Ventricle/Right Ventricle Diameter Ratio		C2923400
SCT	249192005	Number of umbilical arteries	F-00AA0	C0426250
DCM	**Newcode1**	**Cardiac Axis Angle**		

Add codes to CID 12314

CID 12314 Common Fetal Echocardiography Measurements

Resources: HTML | FHIR JSON | FHIR XML | IHE SVS XML
Keyword: CommonFetalEchocardiographyMeasurements
FHIR Keyword: dicom-cid-12314-CommonFetalEchocardiographyMeasurements
Type: Extensible
Version: 20yymmdd~~240920~~
UID: 1.2.840.10008.6.1.1500

Table CID 12314. Common Fetal Echocardiography Measurements

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-RT ID	UMLS Concept Unique ID
…				
DCM	131062	IVC S-wave peak velocity		
DCM	**Newcode2**	**DV S-wave peak velocity**		
DCM	131060	Mitral valve annulus diameter		
…				
DCM	131063	IVC a-wave peak velocity		
DCM	**Newcode3**	**DV a-wave peak velocity**		
LN	80070-6	Mitral E-wave peak velocity		
…				

DCM	131011	IVC preload index		
DCM	131012	IVC S/a		
DCM	**Newcode11**	**DV preload index**		
DCM	**Newcode12**	**DV S/a**		

Add definitions to PS 3.16 Annex D

Table D-1. DICOM Controlled Terminology Definitions

Code Value	Code Meaning	Definition	Notes
…			
Newcode1	**Cardiac Axis Angle**	**The angle between the line from the sternum to the center of the spine, and the long axis of the heart (typically aligned with the septum between the left and right ventricles). A positive angle indicates the cardiac apex pointing towards the patient's left.** **Typically, this value is roughly 45 degrees.**	
Newcode2	**DV S-wave peak velocity**	**The peak velocity measured in the ductus venosus during the S-wave in pulsed doppler mode in any view.**	
Newcode3	**DV a-wave peak velocity**	**The peak velocity measured in the ductus venosus during the a-wave in pulsed doppler mode in any view.**	
Newcode11	**DV preload index**	**The ratio of the peak retrograde flow during the A-wave to the peak forward flow during the S-wave, as measured at the ductus venosus using pulsed-wave doppler.** **Abbreviated a/S.**	
Newcode12	**DV S/a**	**The ratio of the peak forward flow during the S-wave to the peak retrograde flow during the A-wave, as measured at the ductus venosus using pulsed-wave doppler.** **This is the inverse of the Preload index.**	

Add rows to PS3.17 Table DDDDD-1 and fix a couple of typos

Annex DDDDD Post-coordinated Fetal Cardiac Ultrasound Measurement Examples (Informative)

Encoding a wide range of measurements in a predictable, organized pattern can be achieved with well-managed post-coordination. To provide report sections containing such post-coordinated measurements, TID 5228 Cardiac Ultrasound Fetal Measurement Section includes TID 5229 Cardiac Ultrasound Post-Coordinated Measurement Section which in turn includes TID 5302 Post-coordinated Echo Measurement. Table X-1 provides examples of common fetal cardiac ultrasound measurements and demonstrates how the post-coordinated elements in key rows of TID 5302 can be populated to encode them.

Row 1 of TID 5302 contains a fully pre-coordinated code which encompasses the details in the subsequent rows of TID 5302. Table DDDDD-1 has a Pre-Coord column which offers such a pre-coordinated code value for the measurement. If a code is not present, the recording system is responsible for finding or creating a code, as described in the Content Item Descriptions for TID 5302 Row 1.

Table DDDDD-1. Examples of Post-Coordination of Fetal Cardiac Ultrasound Measurements

Nominal Measurement	Pre-Coord	Key Post-Coordinated Elements of TID 5302				Notes
		Finding Site	Measured Property	Image Mode	Cardiac Cycle Point	
TID 5302 – Row 1 (Code Meaning)	**Row 1 (Code Value)**	**Row 8**	**Row 10**	**Row 13**	**Row 15**	
Measurement Type = Direct						
…						
IVC S-wave peak velocity	DCM 131062	Inferior Vena Cava	Peak Blood **Vel~~Flow~~**	PW Dop	S-wave	
DV S-wave peak velocity	**DCM Newcode2**	**(367624001, SCT, "Ductus Venosus")**	**Peak Blood Vel**	**PW Dop**	**S-wave**	
…						
IVC a-wave peak velocity	DCM 131063	Inferior Vena Cava	Peak Blood **Vel~~Flow~~**	PW Dop	A-wave	
DV a-wave peak velocity	**DCM Newcode3**	**(367624001, SCT, "Ductus Venosus")**	**Peak Blood Vel**	**PW Dop**	**A-wave**	
…						
DV Pulsatility Index in Veins	DCM 131014	(367624001, SCT, "Ductus Venosus")	Pulsatility Index	PW Dop	Full Cycle	
DV Peak Velocity Index in Veins	DCM 131015	(367624001, SCT, "Ductus Venosus")	Peak Velocity Index	PW Dop	Full Cycle	
…						
Measurement Type = Ratio						
…						
IVC preload index	DCM 131011	Inferior Vena Cava	Peak Blood Vel	PW Dop	A-Wave	Flow=Retrograde (during numerator) Measurement Divisor = IVC S-wave peak velocity
IVC S/a	DCM 131012	Inferior Vena Cava	Peak Blood Vel	PW Dop	S-wave	Flow=Antegrade (during numerator) Measurement Divisor = IVC a-wave peak velocity
DV preload index	**DCM Newcode11**	**(367624001, SCT, "Ductus Venosus")**	**Peak Blood Vel**	**PW Dop**	**A-Wave**	**Flow=Retrograde (during numerator) Measurement Divisor = DV S-wave peak velocity**
DV S/a	**DCM Newcode12**	**(367624001, SCT, "Ductus Venosus")**	**Peak Blood Vel**	**PW Dop**	**S-wave**	**Flow=Antegrade (during numerator) Measurement Divisor = DV a-wave peak velocity**