

# A Practical Approach to Incorporating the Detailed First Trimester Ultrasound Examination Into Clinical Practice

Reem S Abu-Rustum, MD, FACOG, FACS, FAIUM, RDMS , Erica Smith, MD, FACOG, RDMS , Kam Szlachetka, RDMS, Oxana M Zarudskaya, MD, PhD, FACOG, RDMS 

Received July 12, 2025, from the Department of Obstetrics and Gynecology, Division of Maternal Fetal Medicine, University of Florida College of Medicine, Gainesville, FL, USA (R.S.A.-R., K.S.); Intermountain Healthcare, Salt Lake City, UT, USA (E.S.); Santa Fe College, Gainesville, FL, USA (K.S.); Department of Obstetrics and Gynecology, Division of Maternal Fetal Medicine, University of Texas Health Science Center at San Antonio, San Antonio, TX, USA (O.M.Z.); and Maternal Fetal Medicine, ProMedica Toledo Hospital, Toledo, OH, USA (O.M.Z.). Manuscript accepted for publication August 22, 2025.

The authors report no conflict of interest.

Address correspondence to Oxana M Zarudskaya, MD, PhD, FACOG, RDMS, University of Texas Health Science Center at San Antonio, TX, USA; ProMedica Toledo Hospital Maternal Fetal Medicine, Toledo, OH, USA.

E-mail: [zarudskayaom@gmail.com](mailto:zarudskayaom@gmail.com)

## Abbreviations

AIUM, American Institute of Ultrasound in Medicine; CPT, current procedural terminology; CRL, crown rump length; DFTU, detailed first trimester ultrasound; HD, high-definition; ISUOG, International Society of Ultrasound in Obstetrics & Gynecology; NIPS, non-invasive prenatal screening

doi:10.1002/jum.70044

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Tremendous advances in ultrasound equipment and knowledge have expanded possibilities for the first trimester detailed ultrasound examination. Recommendations from national organizations to offer this service to patients with indications, coupled with recent modifications for dual use of the current procedural terminology code 76811 during pregnancy, will result in increased demand from patients and referring physicians. While proper reimbursement may motivate healthcare professionals to incorporate the first trimester detailed ultrasound examination into their practice and raise the standards of care in the first trimester, it can also be a challenging transition. In this article, we present a practical approach and share tips and pearls on how to incorporate the first trimester detailed ultrasound into clinical practice.

**Key Words**—Detailed First Trimester Ultrasound; First trimester screening; Practical approach to first trimester screening

The first guideline on performing the detailed first trimester ultrasound (DFTU) examination was published by the International Society of Ultrasound in Obstetrics & Gynecology (ISUOG) in 2013<sup>1</sup> and was revised in 2023.<sup>2</sup> ISUOG recommends offering DFTU to all patients.<sup>2</sup> The American Institute of Ultrasound in Medicine (AIUM) published its practice parameter on the DFTU in 2020<sup>3</sup> with the mounting evidence<sup>4–7</sup> as to the ability to detect major fetal anomalies at this point in gestation. The AIUM recommends that this examination is indication driven, to be offered to the high-risk patient. In addition, the AIUM introduced practice accreditation in the DFTU.

Despite recent guidelines and evidence supporting the ability of late first trimester imaging to detect major anomalies, the DFTU has not been uniformly adopted in clinical practice in the United States. Challenges related to the DFTU include the requirement for a special skill set to perform and interpret the scan and additional time for the examination and counseling. In addition, there has been a lack of appropriate Current Procedural Terminology (CPT) code.

On June 16, 2025, a Multi-Society Guideline for Coding, Billing, and Clinical Training for Detailed Fetal Anatomy Ultrasound in the First Trimester<sup>8,9</sup> was released with recommendations for billing and coding of the DFTU to use the detailed second trimester obstetric ultrasound examination CPT code 76811 in the first as well as in the second trimester based on indications. Since then, ACOG<sup>10</sup> has updated its clinical guidance, recommending offering

the DFTU to high-risk patients and allowing CPT 76811 to be billed twice in pregnancy. This will result in increased demand from patients and referring physicians for the DFTU.

The ultrasound unit at the University of Florida is AIUM-accredited in DFTU practice and has been offering the DFTU to patients since 2018. In addition, it has been involved in the education and training of physicians and sonographers in the DFTU. Our aim is to present a practical approach and share tips and pearls on how to incorporate the DFTU into clinical practice. [Correction added on 22 September 2025, after first online publication: The preceding sentence has been added for clarity.]

## General Considerations for the Performance of First Trimester Detailed Diagnostic Ultrasound Examination

The biggest challenge in imaging the fetus at this point in gestation is its size and the anatomical differences due to early gestation. This requires technical skills, high-resolution equipment, dedicated time, and expertise. There are several factors to consider, and these include 10 main aspects:

- Sonologist skills and learning curve
- Sonographic equipment, approach, and optimization
- Timing of the examination
- Allotted time for scan completion
- Following a dedicated protocol
- Limitations related to gestational age
- Training and accreditation
- Genetic counseling and diagnostic testing
- Pediatric Cardiology
- Coding and billing

## Sonologist Skill and Learning Curve

Performing the DFTU requires expertise in the detailed second trimester obstetric ultrasound examination (CPT 76811) performed in Maternal Fetal Medicine Centers by experienced MFM Sonologists and interpreted by experienced MFM Practitioners. In addition, expertise in transvaginal scanning is required.

Once the sonologist has acquired the expertise in the detailed second trimester obstetric ultrasound

examination, they can transition into the first trimester. It has been shown that approximately 50 scans are required to be able to obtain the anatomic and biometric planes of the DFTU,<sup>11</sup> and a significant improvement in the learning curve of assessing the fetal heart is achieved after 52 scans with a time allotment of roughly 10 minutes.<sup>12</sup>

*We recommend that the sonologist performing a first trimester scan for viability or nuchal translucency obtain both sagittal and axial sweeps of the fetus, commencing with the low BMI patient. A 3D volume acquired in the midsagittal plane is also of great utility.<sup>13</sup> The sweeps and 3D volume can be saved for off-line review to gain experience in identifying the key anatomic and biometric planes as per the AIUM Practice Parameter.<sup>3</sup>*

## Sonographic Equipment, Approach, and Optimization

Performing the DFTU requires equipment with high-resolution transducers and magnification capabilities. The ability to perform a transvaginal examination is also a requirement in case of poor acoustic windows and when an abnormality is suspected. In the high BMI patient, the DFTU offers a unique advantage because, coupled with a second trimester ultrasound, it may allow a more complete assessment than 2 second trimester scans.<sup>14–16</sup> In addition, it may be a consideration to use a transvaginal transducer through the umbilicus in the high BMI patient.

Image optimization is key. Utilization of first-trimester presets, high-frequency transducers, decreasing depth, adjusting focal zone, and using cine-loop are the keys to optimal imaging.

The fetal heart poses a unique challenge given its size and complexity. The keys to optimization of the fetal heart are summarized in Table 1.

Safety and adhering to the ALARA principle are of utmost importance in the first trimester. M-mode should be used for determining the fetal heart rate. Color flow and pulse-wave imaging should be minimized and only used in accordance with the safety statements of the AIUM and ISUOG, keeping the TI  $\leq 0.7$ .<sup>16,17</sup>

*We recommend high-resolution transabdominal and transvaginal transducers using high magnification. The umbilicus may be used as an acoustic window. We*

**Table 1.** Tips and Pearls to Optimize the Fetal Heart Examination in the First Trimester

| Gray Scale                                                                                                                                                                                                                                                                                                                                                   | Color Doppler                                                                                                                                                                                                                                                                            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Use a high-frequency transducer<sup>a</sup></li> <li>• Decrease depth</li> <li>• Narrow sector width</li> <li>• Have fetal thorax occupy 1/3 image</li> <li>• Magnify image after optimization</li> <li>• Use high contrast</li> <li>• Insonate apically to right laterally</li> <li>• Use the cine loop</li> </ul> | <ul style="list-style-type: none"> <li>• Optimize gray-scale first</li> <li>• Narrow color box</li> <li>• Decrease wall filter (mid)</li> <li>• Decrease PRF</li> <li>• Increase color persistence (mid to high)</li> <li>• Adjust color gain</li> <li>• Adjust color balance</li> </ul> |

<sup>a</sup>Curvilinear transducer with a frequency of 2–9 MHz or greater for transabdominal approach and endocavitary transducer with a frequency of 5 MHz or greater for transvaginal approach.

*recommend that proper first-trimester presets are utilized, and once the image is optimized, utilize the high-definition zoom (HD zoom) to lock in the resolution. This is particularly applicable to the fetal heart. Safety and adherence to the ALARA principle are critical.*<sup>18</sup>

## Timing of the Examination

The earliest optimal time for performing the DFTU is around 12w5d or when the crown rump length (CRL) is ~65 mm.<sup>6</sup> This is at a point in gestation when the physiologic gut herniation should have resolved, and it is easier to assess the fetal heart. While 12w5d is the earliest optimal time to assess anatomy in the first trimester for anomaly detection, it has been shown that anomaly detection is significantly improved between 13 and 14 weeks compared to 11 weeks.<sup>6</sup>

*We recommend performing the DFTU as close to 13 weeks as possible, where feasible.*

## Allotted Time for Scan Completion

As previously mentioned, there is a learning curve associated with transitioning from the detailed second-trimester obstetric ultrasound examination to the detailed first-trimester obstetric ultrasound examination, and time allocation is an important

consideration. Several factors impact the duration of the scan, including sonologist skill, fetal CRL, maternal body habitus, following a protocol, presence of an anomaly, and the need for a transvaginal scan.

*We recommend dedicating at least 40 minutes of scanning time for the DFTU.*

## Following a Dedicated Protocol

Following a protocol has a direct impact on the ability to detect anomalies using the DFTU.<sup>19</sup> Both the AIUM<sup>4</sup> and ISUOG<sup>2</sup> offer guidance as to the key anatomic and biometric planes to obtain. The AIUM has required components and additional components “as indicated.”<sup>3</sup> On the other hand, ISUOG’s guidelines have a basic and an advanced approach. ISUOG recommends the basic components as a minimum while aiming for the advanced components if the expertise is available.<sup>2</sup>

*We recommend devising a unit-specific protocol that can be adapted with gained expertise in the unit.*

## Limitations Due to Gestational Age

Small fetal size and differences in fetal anatomy related to early gestational age may lead to false-positive and false-negative interpretations and undue parental anxiety. The fetal skull and skeleton may not be well ossified, raising concern for a skeletal dysplasia. The cavum septum pellucidum, corpus callosum, and cerebellum are not well developed and may not be visualized. There is asymmetry in the choroid plexus,<sup>20</sup> there tends to be a cavum velli interpositi in 24% of fetuses that may be mistaken for a dilated third ventricle.<sup>21</sup> The coronary sinus is proportionately larger with respect to the atrial width,<sup>22</sup> and there may be a higher incidence of ventricular septal defects due to development and acoustic dropout. There is physiologic gut herniation that tends to resolve around 12 weeks. It has been well established that the detection of various anomalies in the first trimester is quite variable depending on the type of anomaly, with some having a high detection rate (>80%) and others a lower detection rate.<sup>23</sup>

*We recommend vigilance in interpreting subtle findings at this point in gestation to avoid undue parental*

*anxiety. When uncertain, disclose to the patient the need for reassessment due to gestational age-related suboptimal imaging.*

## Training and Accreditation

Performing the DFTU for fetal evaluation in the first trimester requires a commitment from the entire team of physicians and sonographers for ongoing education and training. First, all providers should be familiar with the available guidelines and their unit-specific protocol. Second, attending in-person or virtual courses dedicated to imaging the fetus in early gestation is advised. Third, reading reference textbooks on early fetal anatomic assessment is encouraged.<sup>24</sup> Fourth, ongoing sonologist skill enhancement and constantly aiming to add new views are crucial. This ensures the team is familiar with and able to obtain all the biometric and anatomic planes that will be instrumental in case an anomaly is encountered.

With proper education and gained skills, it is advisable for the clinical practice to seek accreditation in the DFTU to ensure adherence to the highest standards.

*We recommend ongoing technical training and building on the unit's skill set in addition to pursuing AIUM unit accreditation in the DFTU for optimal safety and quality.*

## Genetic Counseling and Diagnostic Testing

While abnormal non-invasive first-trimester screening is an indication for the DFTU, it also increases the need for confirmatory diagnostic testing in the presence of a sonographic anomaly. In addition, some patients may be undergoing a DFTU without prior non-invasive prenatal screening (NIPS). As such, if a center is offering the DFTU, this should be coupled with proper counseling provided by genetic counselors and maternal-fetal medicine specialists to provide the patients with all the necessary information as to the sensitivity of the DFTU, its limitations, and when further diagnostic testing is indicated. The center should be able to perform or refer the patient to

centers where chorionic villus sampling may be performed when indicated.

*We recommend that centers offering the DFTU offer access to genetic counseling and diagnostic testing at this point in gestation.*

## Pediatric Cardiology

Imaging the fetal heart remains a challenge, particularly in the first trimester. If a cardiac anomaly is suspected, an early fetal echocardiogram or a detailed early second trimester fetal anatomic survey should be considered. In many institutions, Pediatric Cardiologists prefer to delay assessing the fetal heart until around 16–18 weeks of gestation. During the time period waiting for confirmation, patients may experience increased stress. As such, centers offering the DFTU should communicate with their Pediatric Cardiologists to explore options whereby they may collaborate in scanning patients together and at earlier points in gestation.

*We recommend collaboration between centers offering the DFTU and Pediatric Cardiology to explore scanning the patients together to confirm congenital heart defects as early in gestation as possible for optimal counseling and management.*

## Coding and Billing

The implementation of the DFTU in the United States has lagged behind other centers globally due, in part, to the lack of CPT code. With the recent multi-society recommendations for using the CPT code 76811 twice in pregnancy based on patient indications,<sup>8,9</sup> and ACOG's updated Clinical Practice Guideline,<sup>10</sup> we anticipate an increase in uptake by third-party payors. Centers offering DFTU should consult with their billing departments and start transitioning from the CPT 76801, 76813, and 76817 in the first trimester to the 76811 for patients with indications as the expertise becomes available and their units are accredited.

*We recommend that centers consult with their billing departments regarding using the 76811 twice in pregnancy as per indications.*

**Table 2.** General Considerations for Incorporating the Detailed First Trimester Ultrasound Examination into Clinical Practice

| Clinical Practice Considerations                  | Recommendations                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sonologist's skill and learning curve             | <ul style="list-style-type: none"> <li>Acquire sagittal and axial sweeps, 3D volumes during viability and NT scans to gain skill and maximize the learning curve</li> <li>Use these sweeps/volumes offline for a collective experience to identify the key anatomic and biometric planes as per the AIUM Practice Parameter</li> </ul>                                      |
| Sonographic equipment, approach, and optimization | <ul style="list-style-type: none"> <li>Use high-resolution transabdominal and transvaginal transducers</li> <li>Use the umbilicus as an acoustic window</li> <li>Use high magnification</li> <li>Use proper first-trimester presets, optimize image, and apply HD zoom to lock in the resolution</li> <li>Adhere to the safety standards and the ALARA principle</li> </ul> |
| Timing of the examination                         | <ul style="list-style-type: none"> <li>Perform the DFTU close to 13 weeks, or CRL is ~65 mm</li> </ul>                                                                                                                                                                                                                                                                      |
| Allotted time for scan completion                 | <ul style="list-style-type: none"> <li>Dedicate at least 40 minutes of scanning time</li> </ul>                                                                                                                                                                                                                                                                             |
| Following a dedicated protocol                    | <ul style="list-style-type: none"> <li>Develop a unit-specific protocol that can be adapted with gained expertise</li> </ul>                                                                                                                                                                                                                                                |
| Limitations related to gestational age            | <ul style="list-style-type: none"> <li>Employ vigilance in interpreting subtle findings to avoid undue parental anxiety</li> <li>When uncertain, disclose to the patient the need for reassessment due to gestational age related suboptimal imaging</li> </ul>                                                                                                             |
| Training and accreditation                        | <ul style="list-style-type: none"> <li>Invest in ongoing technical training and building on the unit's skill set</li> <li>Aim for and achieve AIUM accreditation in the DFTU</li> </ul>                                                                                                                                                                                     |
| Genetic counseling and diagnostic testing         | <ul style="list-style-type: none"> <li>Ensure access to genetic counseling and invasive testing</li> </ul>                                                                                                                                                                                                                                                                  |
| Pediatric cardiology                              | <ul style="list-style-type: none"> <li>Collaborate with Pediatric Cardiology to allow for early assessment and confirmation of suspected congenital heart defects for optimal counseling and management</li> </ul>                                                                                                                                                          |
| Coding and billing                                | <ul style="list-style-type: none"> <li>Use CPT code 76811 twice in pregnancy as per indications</li> </ul>                                                                                                                                                                                                                                                                  |

The summary of all general considerations for incorporating DFTU into clinical practice is presented in Table 2.

## Conclusion

The DFTU is a pillar in obstetrical care, enabling the diagnosis of roughly 67% of major abnormalities.<sup>23</sup> It is also a powerful tool for early reassurance to families with a prior affected child. Until this year, reimbursement for the additional time and skill required of centers offering the DFTU has been a limiting factor. With the recommendations from national organizations<sup>3,10</sup> and the recent multi-society recommendation to utilize CPT code 76811 twice during pregnancy in patients with indications,<sup>8–10</sup> there will be increased demand from patients and referring physicians to offer this service. The practical approach presented in this article may facilitate the process for centers aiming to incorporate the DFTU into their clinical practice.

## Data Availability Statement

Data sharing not applicable to this article as no datasets were generated or analysed during the current study.

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## APPENDIX

### A.1. List and Links to the Contemporary Guidelines in DFTU

1. International Society of Ultrasound in Obstetrics and Gynecology, Bilardo CM, Chaoui R, Hyett JA, Kagan KO, Karim JN, Papageorgiou AT, Poon LC, Salomon LJ, Syngelaki A, Nicolaides KH. ISUOG Practice Guidelines (updated): performance of 11–14-week ultrasound scan. *Ultrasound Obstet Gynecol* 2023; 61:127–143. <https://pubmed.ncbi.nlm.nih.gov/36594739/>

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