I'm not a robot

Between the nausea,cravings and constant need to pee, you know somethings going on in there. But pregnancy sometimes doesnt feel entirely real until you have that first peek at your baby during yourfirst prenatal ultrasound. Fortunately, pregnancy ultrasounds are a very standard and very welcome part of prenatal care.What is an ultrasound?An ultrasound is a type of imaging technology that uses soundwaves to create a picture, or sonogram, of structures inside your body, including your growing baby. During pregnancy, a transducer or wand is placed in your vagina or on top of your belly. The wand emits soundwaves that bounce off your babys tissues, fluids and bones and translates them into the image of your baby that you see on the screen.Early in pregnancy, ultrasounds are used to confirm that fetal heartbeat and the babys position in your uterus. Later, ultrasounds screen for fetal growth and placenta location, as well as baby's general health and anatomy. Toward the end of pregnancy, ultrasounds can be used to check the length of your cervix (especially if there is any suspicion that you may be in preterm labor) as well as verifying that your baby is in a heads-down position before delivery.When an ultrasound during pregnancy is doneThe American College of Obstetricians and Gynecologists (ACOG) says that women should get at least one sonogram in the second trimester, between weeks 18 and 22 of pregnancy. American College of Obstetricians and GynecologistsUltrasound ExamsSee All Sources [1] You may also receive an additional ultrasound in the first trimester, before your 14th week of pregnancy.However, if you have certain chronic conditions such asasthma or obesity, the timing of your ultrasounds may vary.First-trimester ultrasoundAn early ultrasound is often a routine part of prenatal care between 6 and 9 weeks of pregnancy, though it can happen anytime before week 14. But a first-trimester ultrasound isnt standard practice because its still too early for your practitioner to see your baby in detail. Most practitioners wait until at least 6 weeks to perform the first pregnancy ultrasound. However, a gestational sac can be seen as early as 4 1/2 weeks after your last period, and a fetal heartbeat can be detected at 5 to 6 weeks (though that isnt always the case).The gestational sac provides nourishment and eventually produces cells that turn into babys umbilical cord, blood cells and reproductive organs.If your doctor decides to perform an early ultrasound, it gives you a welcome first glance of your baby. This sneak peak is used to: National Institutes of Health, National Library of Medicine, Medline PlusUltrasoundSee All Sources [2]Second-trimester ultrasoundMidway through your pregnancy, between weeks 18 and week 22, a level 2 ultrasound will be done to see babys anatomy in detail. The second-trimester ultrasound is reassuring and fun to watch. It also offers you and your practitioner a picture of the overall health of your baby and your pregnancy by:Measuring your babys size and checking all major organsEstimating the amount of amniotic fluid in your uterus to make sure the level is normalVerifying the position of the placentaTelling you your baby's sex (if you want to know)Giving you a glimpse of your baby's hands, feet and faceRoutine second trimester ultrasounds are usually done in 2D. Most practitioners reserve themore detailed 3D and 4D ultrasounds for when theyre medically necessary to more closely examine a fetus for a suspected anomaly.Additional ultrasounds during pregnancyThere are several reasons you may have additional ultrasounds during your pregnancy, including if:You have any spotting during pregnancy, to confirm that all is wellYoure carrying multiples, to monitor their growthYoure at risk of preterm labor, to check for changes in the cervixYour practitioner wants to check whether your baby may be too large to deliver vaginally (for example, you have a very small pelvis or your practitioner suspects your baby is very large due to gestational diabetes)Your practitioner wants to verify if your baby is in a heads-down position before birthAdditionally, ultrasounds are a part of several other pregnancy tests, including:Doctors sometimes recommend a fetal echocardiogram, or a detailed ultrasound of a babys heart thats performed by a trained technician and analyzed by a pediatric cardiologist. Your practitioner may suggest an echocardiogram if you have certain risk factors, including:You have a family history of congenital heart defectsYour babys been diagnosed with a genetic condition (like Down syndrome)You had abnormal results during another pregnancy testYou have certain health conditions (like diabetes or an autoimmune disease)Your baby has an abnormal heart rhythm or rateYou had certain infections during pregnancy, including rubella orcytomegalovirus (CMV)How to prepare for pregnancy ultrasoundIf your doctor orders a transabdominal ultrasound, you should arrive at your appointment with a full bladder. This makes it easier for your doctor or sonographer to see around or through your bladder.To time it right, some practitioners suggest emptying your bladder about 90 minutes before your exam. Then drink an 8-ounce beverage of your choice (water, juice and milk are all fine) about an hour before your appointment.Eating about an hour before your appointment especially something sugary will also get your baby moving around. This can help the sonographer take better pictures.Otherwise, there are no other specific preparations required for a pregnancy ultrasound. Your job: Sit back and enjoy the show!What to expect during first pregnancy ultrasoundThere are two main types of ultrasounds used during pregnancy: transvaginal and transabdominal ultrasounds. Both types of scans are painless and typically last about 20 minutes. The type you have will depend on how far along you are in your pregnancy. During your first ultrasound, you'll be able to watch along with your practitioner (though you'll probably need help understanding what you're seeing). Youll likely even take home a small printout as a souvenir.Transvaginal ultrasoundIf you're getting your first pregnancy ultrasound before week 6 or 7, your practitioner will likely perform a transvaginal ultrasound. A small, long transducer (or wand) is wrapped in a sterile condom-like cover and inserted into the vagina.The practitioner will then move the wand within the vaginal cavity to scan your uterus. Youll feel pressure, but it should be painless.The transducer emits soundwaves, which bounce off your baby to produce an image you can see on a computer or video screen.Transabdominal ultrasoundIf your first ultrasound is after week 6 or 7, you'll likely get a transabdominal ultrasound. Gel is rubbed onto your belly to help the sound waves move more easily. Then the wand is rubbed over your stomach to produce images of your baby.This exam shouldnt hurt, although it can be somewhat uncomfortable (especially with a full bladder) if the sonographer needs to press hard on your abdomen to see a particular part of your baby more clearly.The difference between sonogram and ultrasoundThough the words sonogram and ultrasound are often used interchangeably, there is a distinction:Ultrasound is the term for an imaging test that uses sound to produce pictures.Sonogram is the picture produced by ultrasound technology.Risks of ultrasounds during pregnancyUltrasounds are noninvasive and very low-risk when performed by your health care practitioner. There is no set rule for how many ultrasounds are safe during pregnancy, but ACOG recommends sticking to just one to two ultrasounds in total (outside of other circumstances where more are medically necessary).That said, some research has found that the average number of ultrasounds women are having is much higher than recommended more than five over the course of pregnancy.Both ACOG and the Food and Drug Administration (FDA) also recommend that pregnant women avoid keepsake 3D and 4D sonograms marketed by private companies, along with at-home fetal monitors. While the FDA says there is a lack of evidence of any harm due to ultrasound imaging and heartbeat monitors, they also note there isnt enough research to rule out any long-term effects.What's more, although ultrasounds are usually relatively accurate at estimating a baby's size, they can also underestimate or overestimate weight, which may occasionally result in unnecessary C-sections or premature deliveries.So if your doctor recommends more than two ultrasounds when you're expecting, dont hesitate to ask questions to ensure that the extra ultrasounds are medically required. During a pregnancy ultrasound, your health care provider or a skilled technician uses a plastic transducer to transmit high-frequency sound waves through your uterus. These sound waves send signals back to a machine that converts them into images of your baby. Most pregnant people have only a couple of ultrasounds throughout their prenatal care, but some get them more frequently. Read on for a breakdown of the most common types of pregnancy ultrasounds, when you might get them, and what to expect during the prenatal scans. According to the American College of Obstetricians and Gynecologists (ACOG), health care providers may use baby ultrasounds for the following reasons:Monitoring your baby's growth and developmentDetecting congenital anomaliesGuiding chorionic villus sampling(CVS) or amniocentesisHelping predict your due dateDetermining whether you're carrying multiplesShowing the position of your placentaEstimating your baby's sizeMeasuring amniotic fluidRevealing your baby's genitals Uncomplicated pregnancies typically have fewer ultrasounds than high-risk pregnancies, but how many you receive over the course of your pregnancy will vary. Factors influencing the number of ultrasounds you'll receive include your preference, your provider's standard protocol, ultrasound machine access, medical history, and pregnancy complications. Not everyone receives a first-trimester ultrasound during pregnancy. That said, a health care provider may sometimes use them for determining viability, dating the pregnancy, or ruling out suspected complications. Your first ultrasound, also known as a fetal ultrasound or sonogram, could occur as early as six to eight weeks into your pregnancy. In addition to a pregnancy test, some health care providers use ultrasounds for the following reasons. Detecting the fetal heartbeat The main reason to conduct an ultrasound this early on is to detect the fetal heartbeat. An abdominal ultrasound can usually detect a baby's heartbeat if you are at least 8 weeks into your pregnancy. If your pregnancy has a gestational age of less than 8 weeks (between 6 and 8 weeks), atransvaginal ultrasound(inserting the ultrasound probe into your vagina) is usually needed for accurate results. Although the heart structures aren't yet fully developed at six weeks gestation, it's possible to see the electrical impulses of their developing heart (sometimes referred to as embryonic cardiac activity). Determining a due date Evidence suggests that ultrasounds more accuratelypredict your due datethan using your last menstrual period, but only in thefirst trimesterand early second trimester (until roughly20 weeks). Early ultrasound due dates have a margin of error of roughly 1.2 weeks. After 20 weeks of pregnancy, your estimated due date shouldn't change based on an ultrasound because it will be less accurate. And remember: It's anestimateddue date; the vast majority of people don't deliver their babies the day they're due. In fact, it's thought that only around 4% of people give birth naturally on their due date. A nuchal translucency (NT) ultrasound occurs around weeks 10 to 13 of pregnancy. According to ACOG, this ultrasound measures the space at the back of a fetus' neck. Abnormal measurements can indicate Down syndrome and other congenital disabilities of the heart, abdomen, and skeleton. In addition to an abdominal ultrasound, an NT screening includes measuring hormones and proteins with a blood test. A nuchal translucency ultrasound is optional for everyone who is pregnant. Sometimes, people choose to have this ultrasound to alleviate concerns about their baby's health. Other times, your health care provider might recommend it if you're at risk of complications or have a family history of congenital disorders. In addition to screening for anomalies, this pregnancy ultrasound can offer the same information as an earlier scan, including an estimated due date, your baby's "crown-rump length" (measurement from head to bottom), the number of babies in the womb, and fetal cardiac activity. According to the International Society of Ultrasound in Obstetrics and Gynecology (ISUOG), early pregnancy ultrasounds can also determine the following: Determine the number of fetusesDetermine if multiples share a placenta and amniotic sac But not everyone will get this early scan. ISUOG does not recommend routine early pregnancy ultrasounds unless there's a clinical indication of a complication. For example, some health care providers will only conduct early ultrasounds for certain high-risk pregnancy conditions like bleeding and abdominal pain, or to rule out ectopic pregnancy, congenital disorders, or miscarriage. Photo: Ursa Hoogle/Getty Images The second trimester is the most common time for a routine prenatal ultrasound. The anatomy scan, a thorough scan of your baby's developing body and organs, is offered to every pregnant person. According to ACOG, this detailed pregnancy ultrasound generally happens between weeks 18 and 22 in the second trimester. It's the most thorough check-up your baby will have before they're born. During the anatomy scan, also called a level II ultrasound, the health care provider will check your baby's heart rate and look for abnormalities in their brain, heart, kidneys, and liver, says Jane Chueh, MD, director of prenatal diagnosis and therapy at Lucile Children's Hospital Stanford, in Palo Alto, California. In other cases, such asDown syndrome, however, ultrasound can't offer a firm diagnosis. Instead, it can show markers associated with a higher risk of various conditions. They'll also count your baby's fingers and toes, examine the placenta, and measure the amniotic fluid level. And they'll probably be able to see your baby's genitals to guess your baby's sex, although it's not a slam dunk. If you don't want to know about your baby's genitalia, be sure to inform the technician ahead of time. Even though people often look forward to this pregnancy ultrasound to learn their baby's gender, it's important to note that gender is a personal identity that exists on a spectrum, can change over the course of a person's lifetimeand most importantlyis something that a person defines for themselves. Sex is assigned at birth based on the appearance of a baby's genitalia. While sex assigned at birth often matches a person's gender (called cisgender), sometimes it does not. Many parents-to-be don't need an ultrasound in the third trimester. But if your pregnancy is considered high-riskor if you didn't get a screening during the first or second trimesterit may be recommended. For example, if you have high blood pressure, bleeding, low levels of amniotic fluid, preterm contractions, or are over age 35, your doctor may perform in-office, low-resolution ultrasounds during some of your third-trimester prenatal visits for reassurance, says Dr. Chueh. In addition, if an earlier scan found your placenta was near or covering the cervix (called placenta previa), you'll require additional ultrasounds to monitor its location. Your health care provider may recommend an ultrasound during pregnancy outside of the situations mentioned above. For example, ultrasounds might be indicated if you have certain health conditions that warrant specific monitoring or if you have a procedure that uses ultrasound guidance. Doppler ultrasound is a special imaging test showing blood moving through vessels. In pregnancy, a Doppler ultrasound can help determine if your baby's blood is circulating properly. According to a Cochrane review, Doppler ultrasound in high-risk pregnancies may reduce the risk of perinatal death and obstetric interventions. Your health care provider may recommend fetal Doppler ultrasound in the following circumstances: You have diabetesYou have high blood pressureYou have heart or kidney problemsThe placenta does not develop properlySuspected fetal growth problems Handheld fetal heart rate monitors also utilize Doppler technology. Health care providers commonly use these devices to monitor your baby's heartbeat during prenatal exams and labor. While these are available over the counter, the Food and Drug Administration (FDA) advises against using them at home due to lack of oversight and unnecessary ultrasound exposure. Your health care provider may also order other pregnancy tests that require ultrasounds for guidance. These might include chorionic villus sampling (CVS) or amniocentesis, which screen the baby for congenital disorders. Fetal echocardiograms, which show the baby's heart rate and detect anomalies, also use ultrasound technology. Ultrasound is considered safe for you and your baby when used for medical purposes. Although ultrasounds require no radiation, only a trained professional who can accurately interpret the results should perform them. Your technician should have education in obstetrical ultrasound, preferably at a center accredited by the American Institute of Ultrasound in Medicine. Some medical practices offer 3D (high quality and lifelike) and 4D (moving picture) ultrasounds, which may help doctors detect specific fetal abnormalities and congenital disorders. However, these exams are also available at fetal portrait studios in places like shopping malls. Experts discourage these "keepsake" ultrasounds since untrained personnel may give out inaccurate information, says Michele Hakakha, MD, an OB-GYN in Beverly Hills and author of Expecting 411: The Insider's Guide to Pregnancy and Childbirth. Plus, according to the FDA, although ultrasounds are safe in medical settings, they might heat tissues or produce bubbles (cavitation) during use if not performed correctly. Experts aren't sure about the long-term effects of heated tissues or cavitation, especially when not medically indicated. Therefore, the FDA advises that people use ultrasound scans judiciouslyonly when there is a medical need, based on a prescription, and performed by appropriately-trained health care providers. Ultrasounds aren't cheap; they can cost hundreds or thousands of dollars, depending on your location and health care provider. However, most health insurance plans will cover the cost of prenatal ultrasounds (at least partially) if they are for medical purposes. Always ask your health care provider and insurance company if you're unsure how much you will need to pay. Thanks for your feedback! Key MessagesNo relevant evidence was identified comparing the safety of frequent obstetrical ultrasounds compared to the routine use of obstetrical ultrasound during pregnancy.This review identified 10 evidence-based guidelines that provided recommendations regarding various indications for obstetrical ultrasound, as well as the frequency of obstetrical ultrasound; however, the methodological rigour of these guidelines is limited and recommendations should be interpreted with caution.One guideline recommended against obstetrical ultrasound for non-medical purposes and recommended that ultrasound exposure be as low as reasonably possible during pregnancy. These recommendations were based on moderate-quality evidence and expert opinion, and should be interpreted with caution.The guidelines made recommendations for specific patient populations for whom more frequent obstetrical ultrasound examinations may be required. These populations included pregnancies affected by certain congenital infections, people pregnant with twins, pregnant adolescents, and pregnant people at high risk for fetal anomalies or for whom mid-trimester transabdominal ultrasound would be challenging.Obstetricians have been using ultrasound to diagnose intrauterine pregnancy since the 1960s and 1970s.1 Ultrasound is a non-invasive diagnostic modality that has typically been associated with little to no risk1; however, epidemiologic research on ultrasound is limited.2 A systematic review by Whitworth and colleagues (2014)3 demonstrated that there is debate in the literature about whether ultrasound examination, especially multiple exposures, is harmful in individuals who are pregnant. Currently, the Society of Obstetricians and Gynaecologists of Canada recommends that all pregnant individuals have 2 ultrasounds; 1 between 11 to 14 weeks gestation to date the pregnancy and 1 between 18 to 20 weeks gestation to assess anatomic features.4 Despite these recommendations, decision-makers have identified that that pregnant individuals may be receiving additional ultrasounds as part of their routine prenatal care at physicians offices and obstetrical clinics, and may also receive an ultrasound during an emergency room visit. This has led to a lack of consistency in the process and there is concern that this has contributed to the potential overuse of ultrasounds during pregnancy.In response to these concerns regarding the frequent use of ultrasounds during pregnancy, there is a need to review the evidence and evidence-based guidance regarding obstetrical ultrasound to ensure that decision-makers have the best evidence to inform decisions about care pathways for individuals who are pregnant. The 2 objectives of this report are: 1) to identify and summarize the available evidence regarding the safety of routine versus more frequent use of obstetrical ultrasound among individuals who are pregnant; and 2) to identify and summarize the evidence-based guidance regarding the use of obstetrical ultrasound during pregnancy.Research QuestionsWhat is the clinical evidence for the safety related to the frequent use of obstetrical ultrasound during pregnancy?What are the evidence-based guidelines for the use of obstetrical ultrasound during pregnancy?A limited literature search was conducted by an information specialist on key resources including MEDLINE, the Cochrane Database of Systematic Reviews, the international HTA database, the websites of Canadian and major international health technology agencies, as well as a focused internet search. The search strategy comprised both controlled vocabulary, such as the National Library of Medicines MeSH (Medical Subject Headings), and keywords. The main search concepts were obstetrical ultrasound and adverse events. CADTH-developed search filters were applied to limit retrieval to health technology assessments, systematic reviews, meta-analyses, or network meta-analyses; and randomized controlled trials, controlled clinical trials, or any other type of clinical trial. An additional search was done for obstetrical ultrasound, with CADTH-developed search filters applied to limit retrieval to guidelines. Where possible, retrieval was limited to the human population. The search was also limited to English-language documents published between January 1, 2015 and November 1, 2021.One reviewer screened citations and selected studies. In the first level of screening, titles and abstracts were reviewed and potentially relevant articles were retrieved and assessed for inclusion. The final selection of full-text articles was based on the inclusion criteria presented in Table 1.Articles were excluded if they did not meet the selection criteria outlined in Table 1, they were duplicate publications, or they were published before 2015. Guidelines with unclear methodology were also excluded.The included publications were critically appraised by 1 reviewer using the following tools as a guide: the Appraisal of Guidelines for Research and Evaluation (AGREE) II instrument5 for guidelines. The strengths and limitations of each included publication were described narratively.A total of 352 citations were identified in the literature search. Following the screening of titles and abstracts, 318 citations were excluded and 34 potentially relevant reports from the electronic search were retrieved for full-text review. Ten potentially relevant publications were retrieved from the grey literature search for full-text review. Of these potentially relevant articles, 34 publications were excluded for various reasons and 10 publications met the inclusion criteria and were included in this report. These 10 publications were evidence-based guidelines. Appendix 1 presents the PRISMA6 flow chart of the study selection.No eligible health technology assessments, systematics reviews, randomized controlled trials, or non-randomized studies were identified. Ten evidence-based guidelines with recommendations regarding obstetrical ultrasound were identified.2,7-15Additional details regarding the characteristics of included publications are provided in Appendix 2.Ten evidence-based guidelines with recommendations regarding obstetrical ultrasound were identified.2,7-15 Six of the guidelines were developed by the Society of Obstetricians and Gynaecologists of Canada,2,8,10-12,15 2 were developed by ISUOG the International Society of Ultrasound in Obstetrics and Gynecology,7,14 1 was developed by the U.S. Department of Veterans Affairs and the U.S. Department of Defense,9 and 1 was developed by the American College of Obstetricians and Gynecologists.13 Each of the 10 included guidelines collected evidence using a review of the literature and expert opinion, when needed.2,7-15 One of the guidelines also used patient focus groups to inform their recommendations.9 Five of the included guidelines2,8,10,11,15 used the criteria described by the Canadian Task Force on Preventive Health Care to determine the quality of evidence and classify the strength of recommendations. Evidence was graded from I (evidence obtained from at least 1 randomized controlled trial) to III (opinions of respected authorities and based on clinical experience, descriptive studies, or reports of expert committees). Two guidelines9,12 followed the Grading of Recommendations Assessment, Development and Evaluation system to assess the quality of evidence from high to very low and classify the strength of recommendations as strong or weak. Two guidelines7,14 used an 8-category rating for grading the quality of evidence coupled with a 5-category system for grading the strength of recommendations. Finally, 1 guideline9 followed a method outlined by the United States Preventive Services Task Force to review and evaluate the evidence and assigned 1 of 3 categories to the groups recommendations.Six of the included guidelines were Canadian,2,8,10-12,15 2 were from the US,9,13 and 2 were international.7,14The intended users for each of the 10 included guidelines were health care providers.2,7-15 In half of the included guidelines, the target population broadly covered pregnant individuals.2,7,8,10,13 Two of the guidelines focused on individuals who are pregnant with twins.11,14 One guideline focused specifically on service members or veterans belonging to the U.S. Department of Veterans Affairs or the U.S. Department of Defense and who are pregnant.9 One guideline focused on pregnant individuals with a higher risk of fetal anomalies or who may have complications with a mid-second trimester ultrasound.12 The last guideline focused on pregnant adolescents.15All 10 guidelines discussed the role of obstetrical ultrasound during pregnancy.2,7-15 Comparators are not relevant to the guideline research question in this report.The guidelines included in this review provided a series of recommendations related to various outcomes that are of relevance to the use of obstetrical ultrasound and, more broadly, to the management of pregnancy. The outcomes that were considered in the supporting literature for the guidelines included the clinical indications, the benefits and risks of obstetrical ultrasound,2,7,8,10-14 and the monitoring of healthy pregnancy.9,15The included evidence-based guidelines demonstrated both strengths and limitations. Strengths included the clarity of the scope and purpose for each of the included guidelines, as well as the clarity of presentation for each of the recommendations.2,7-15 Each of the included guidelines were also developed by groups of individuals from all relevant professional organizations.2,7-15 The guidelines also had limitations. Perspectives from members of the target audience (i.e., people who are pregnant) seemed to be present in only 1 of the included guidelines,9 which could limit the applicability of the recommendations.There were also limitations regarding the rigour of development. While each of the included guidelines included a description of the sources that were searched, it was unclear whether that searching was done in a systematic fashion for 4 of the guidelines.2,7,8,10 One guideline9 adequately described the criteria for selecting the evidence and the methods for formulating the recommendations, whereas in the other 9 guidelines it was unclear from the authors reporting how the evidence was selected and how recommendations were developed. In addition, 6 guidelines2,7,8,10-12 did not include discussion of the strengths and weaknesses of the body of evidence used to formulate the recommendations. It was also unclear in 7 of the guidelines2,7,8,10,12-14 whether the recommendations had been externally reviewed by experts before publication. None of the included guidelines provided details of a procedure for updating the guideline. These limitations may limit the certainty of the recommendations provided.None of the included guidelines2,7-15 discussed barriers or facilitators to the application of recommendations, provided advice or tools that could be put into practice, considered resource implications of applying the recommendations, or presented auditing or monitoring criteria. These limitations may further limit the applicability of the included recommendations. Finally, while each of the included guidelines2,7-15 indicated that competing interests of members of its guideline development group had been recorded, limited information was reported regarding the nature of any competing interests. In addition, the funder for each of the included guidelines2,7-15 was not clearly reported; thus, no comments can be made about potential conflicts of interest concerning the development of the guidelines.Additional details regarding the strengths and limitations of included publications are provided in Appendix 3.Appendix 4 presents the main study findings and authors conclusions.No relevant evidence was identified regarding the safety of frequent obstetrical ultrasounds during pregnancy compared to the routine use of obstetrical ultrasound during pregnancy; therefore, no summary can be provided.This review identified 10 evidence-based guidelines2,7-15 that provided recommendations regarding various clinical indications for obstetrical ultrasound, as well as for the frequency of obstetrical ultrasound during pregnancy.Van den Hof and colleagues (2019)8 made several recommendations regarding circumstances for when first trimester ultrasound would be warranted. The authors made 4 recommendations for first trimester ultrasound based on evidence that was assessed as good quality: 1) during diagnostic or therapeutic procedures requiring visual guidance (e.g., chorionic villus sampling) and before prophylactic cervical cerclage placement, 2) for suspected multiple gestation, 3) for suspected ectopic pregnancy, molar pregnancy, and suspected pelvic masses, and 4) as a component of the screening protocol for preeclampsia among pregnant people. The guideline development group made an additional 2 recommendations for first trimester ultrasound based on evidence assessed as fair quality: 1) for assessment of threatened abortion, and 2) before pregnancy termination.The U.S. Department of Veterans Affairs and the U.S. Department of Defense management of pregnancy working group (2018)9 recommended first trimester ultrasound for 3 reasons: to establish gestational age and estimated birth date, to identify multiple pregnancies, and to confirm the presence of cardiac activity. Among those who present with pregnancy after the first trimester, this guideline development group recommends that a dating and anatomical ultrasound be performed at the earliest opportunity and preferably before 22 weeks.9 According to the groups ranking system, this recommendation was strong and based on moderate-quality evidence.9Morin and Lim (2017)11 reported specific recommendations for obstetrical ultrasound among people pregnant with twins, stating that a first trimester ultrasound is recommended if a twin pregnancy is suspected at the first physical examination or if the individual is at risk (e.g., those who have used assisted reproductive technologies). The authors made this recommendation based on evidence that was assessed as good quality.11These recommendations align with the previously mentioned guidelines by Van den Hof and colleagues (2019)8 and the U.S. Department of Veterans Affairs and U.S. Department of Defense management of pregnancy working group (2018).9Cargill and Morin (2017)10 recommended that people who are pregnant be offered a routine second trimester ultrasound between 18 and 22 weeks gestation. This recommendation was based on evidence that was assessed by the authors as fair quality.10 Similarly, Morin and Lim (2017)11 recommended that, for people who are pregnant with twins, a detailed ultrasound should be offered and preferably between 18 and 22 weeks gestation. Their recommendation was also based on evidence that was assesses to be of fair quality.11 The American College of Obstetricians and Gynecologists (2016)13 also recommended that without other specific indications, the best time for a single ultrasound examination is between 18 and 22 weeks gestation. This recommendation was based primarily on consensus and expert opinion.9Four of the guidelines7,12,14,15 reviewed in this report provided recommendations for specific patient populations for whom increased frequency of obstetrical ultrasound may be warranted.Khalil and colleagues (2020)7 recommended that serial ultrasound monitoring should be done for the management of maternal and fetal parvovirus B19 infection based on moderate-quality evidence. The authors also recommend that serial ultrasound monitoring be performed for the management of maternal and fetal varicella-zoster virus infection based on low- to moderate-quality evidence, and for maternal and fetal Zika virus infection. However, this recommendation is based on the clinical experience of the guideline development group and is considered a good practice point. In addition, Khalil and colleagues (2020)7 recommended that, for those with a Zika virus infection, a third trimester ultrasound should be considered if the baseline scan is normal. However, this recommendation is based on the clinical experience of the guideline development group and is considered a good practice point.Khalil and colleagues (2016)14 recommended that people who have uncomplicated dichorionic twin pregnancies should have a first trimester scan, a detailed second trimester scan, and scans every 4 weeks thereafter. This recommendation was based on the clinical experience of the guideline development group and is considered a good practice point. In addition, the authors noted that individuals with complicated pregnancies of dichorionic twins should be scanned more frequently, depending on the condition of the individual and the severity of the complications.14 The authors also recommended that people who are pregnant with monochorionic twins in uncomplicated pregnancies should have a first trimester scan and be scanned every 2 weeks after 16 weeks gestation and that complicated cases should be scanned more frequently, depending on the condition and severity of the case.14 These 2 recommendations were based on evidence that the authors assessed as low- to moderate-quality.14Fleming and colleagues (2015)15 recommended that pregnant adolescents should have a first trimester ultrasound, an anatomical ultrasound at 16 to 20 weeks gestation, and an ultrasound to assess fetal well-being and fetal weight at 32 to 34 weeks gestation. These recommendations were based on evidence that the guideline development group assessed as good quality.15Nevo and colleagues (2017)12 recommended that pregnant individuals who have a higher risk for fetal anomalies or for whom a mid-trimester transabdominal ultrasound may be challenging should be offered an early comprehensive fetal anatomic ultrasound at 13 to 16 weeks gestation. This ultrasound would not replace the routine 18- to 22-week anatomy scan.12 The recommendation was not graded, but the quality of evidence was rated high (i.e., very confident that the true effect lies close to that of the estimate of the effect).12 It was unclear from the reporting which evidence was used to develop the recommendation.One guideline2 provided recommendations regarding mitigating the potential harms of obstetrical ultrasound. Van den Hof (2018)2 recommended that ultrasound only be used when the potential medical benefit outweighs any potential risk. According to the ranking system used, this recommendation was based on good-quality evidence.2 In addition, Van den Hof (2018)2 recommended against the use of obstetrical ultrasound for non-medical reasons (e.g., sex determination, non-medical photos, commercial purposes). This recommendation was based on evidence that was assessed by the guideline development group as fair quality.2 The author does make reference to supporting evidence for these recommendations, discussing potential adverse effects of repeat ultrasound exposure during pregnancy.2 Van den Hof (2018)2 also made 2 further recommendations for mitigating the potential harms of obstetrical ultrasound use: ultrasound exposure should be as low as reasonably achievable given the potential for tissue heating if the thermal index exceeds 1 (based on good-quality evidence); and spectral power and colour Doppler should be avoided for imaging in the first trimester, except if the pregnancy is at high risk for trisomy syndromes or anomalies (based on expert opinion of the guideline development group).No relevant evidence was identified regarding the safety of frequent obstetrical ultrasounds compared to the routine use of obstetrical ultrasound during pregnancy.Two of the guidelines included in this report were broader in scope than the research question posed by this review (e.g., recommendations for management of pregnancy in specific populations);9,15 thus, the applicability of recommendations may be limited in their generalizability to other populations. Four of the identified guidelines were not developed for the Canadian context and therefore may limit the applicability of recommendations to the Canadian health care system.7,9,13,14Important methodological limitations were identified in the critical appraisal conducted for the included guidelines, limiting the confidence with which the recommendations can be applied to various clinical settings. In addition, very few of the recommendations were based on high-quality evidence, as reported by the guideline authors. Consequently, the findings of this review should be interpreted with caution.No relevant studies describing the safety of frequent obstetrical ultrasounds compared to routine versus more frequent use of obstetrical ultrasound were identified; therefore, no summary can be provided. However, this review did identify 10 evidence-based guidelines that included recommendations about various aspects of obstetrical ultrasound use, including clinical indication for obstetrical ultrasound, specific patient populations that may require more frequent obstetrical ultrasound examinations, and strategies to mitigate potential harms of obstetrical ultrasound overuse.Regarding routine obstetrical ultrasound use, 3 guidelines made recommendations for the use of first trimester ultrasound8,9,11 and 3 guidelines made recommendations regarding the use of second trimester ultrasound, preferably between 18 and 22 weeks gestation.10,11,13 Specific patient populations for whom recommendations were made for more frequent obstetrical ultrasound examinations included those with pregnancies who are affected by certain congenital infections,7 people who are pregnant with twins,14 pregnant adolescents,15 and people who are pregnant and at high risk for fetal anomalies or for whom mid-trimester transabdominal ultrasound would be challenging.12 Finally, Van den Hof (2018)2 recommended against obstetrical ultrasound for non-medical purposes (e.g., sex determination, non-medical photos, and so forth) and recommended that ultrasound exposure be as low as possible. Decision-makers should take these recommendations into consideration when developing various care pathways and policies regarding the use and misuse of obstetrical ultrasound.There is a moderate level of uncertainty regarding the recommendations discussed in this review. Given the important methodological limitations discussed for many of these recommendations, particularly those related to the rigour of guideline development and guideline applicability, and the lack of high-quality supporting evidence available for several of the recommendations, the findings of this review should be interpreted with caution. Better transparency in reporting the methodologies used for guideline development would improve the ability to conduct quality assessment and reduce uncertainties in guideline development.No evidence regarding the safety of frequent obstetrical ultrasounds compared to the routine use of obstetrical ultrasound were identified. Future research to address this question may help to reduce uncertainty in the frequency of obstetrical ultrasound use during pregnancy and provide decision-makers with better evidence upon which to base their decisions.1.2.Van den HofMC. No. 359-Obstetric Ultrasound Biological Effects and Safety. J Obstet Gynaecol Can.2018;40(5):627-632. [PubMed: 29731208]3.4.5.6.LiberatiA, AltmanDG, TetzlaffJ, et al.The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: explanation and elaboration. J Clin Epidemiol.2009;62(10):e1-e34. [PubMed: 19631507]7.KhalilA, SotiriadisA, ChaouiR, et al.ISUOG Practice Guidelines: role of ultrasound in congenital infection. Ultrasound Obstet Gynecol.2020;56(1):128-151. [PubMed: 32400006]8.Van den HofMC, SmithiesM, NevoO, OulletA. No. 375-Clinical Practice Guideline on the Use of First Trimester Ultrasound. J Obstet Gynaecol Can.2019;41(3):388-395. [PubMed: 30784569]9.10.CargillY, MorinL.No. 223-Content of a Complete Routine Second Trimester Obstetrical Ultrasound Examination and Report. J Obstet Gynaecol Can.2017;39(8):e144-e149. [PubMed: 28729106]11.MorinL, LimK.No. 260-Ultrasound in Twin Pregnancies. J Obstet Gynaecol Can.2017;39(10):e398-e411. [PubMed: 28935062]12.NevoO, BrownR, GlancP, LimK.No. 352-Technical Update: The Role of Early Comprehensive Fetal Anatomy Ultrasound Examination. J Obstet Gynaecol Can.2017;39(12):1203-1211. [PubMed: 29197487]13.Committee on Practice B-O, the American Institute of Ultrasound in M. Practice Bulletin No. 175: Ultrasound in Pregnancy. Obstet Gynecol.2016;128(6):e241-e256. [PubMed: 27875472]14.KhalilA, RodgersM, BaschatA, et al.ISUOG Practice Guidelines: role of ultrasound in twin pregnancy. Ultrasound Obstet Gynecol.2016;47(2):247-263. [PubMed: 26577371]15.FlemingN, O'DriscollT, BeckerG, SpitzerRF, CanpagoC. Adolescent Pregnancy Guidelines. J Obstet Gynaecol Can.2015;37(8):740-756. [PubMed: 26474231]16.WoolfS, BattistaR, AngersonG, LoganA, EelW.Canadian Task Force on Preventive Health Care: New grades for recommendations from the Canadian Task Force on Preventive Health Care. CMAJ.2003;169:207-208. [PMC free article: PMC167122] [PubMed: 12900479]Note that this appendix has not been copy-edited.About CADTH: CADTH is an independent, not-for-profit organization responsible for providing Canadas health care decision-makers with objective evidence to help make informed decisions about the optimal use of drugs, medical devices, diagnostics, and procedures in our health care system.Funding: CADTH receives funding from Canadas federal, provincial, and territorial governments, with the exception of Quebec.Questions or requests for information about this report can be directed to Requests@CADTH.ca Number 723 (Replaces Committee Opinion Number 656, February 2016. Reaffirmed 2021)Committee on Obstetric PracticeThis document is endorsed by the American College of Radiology and the American Institute of Ultrasound in Medicine. This Committee Opinion was developed by the American College of Obstetricians and Gynecologists Committee on Obstetric Practice. Member contributors included Joshua Copel, MD; Yasser El-Sayed, MD; R. Phillips Heine, MD; and Kurt R. Wharton, MD. This document reflects emerging clinical and scientific advances as of the date issued and is subject to change. The information should not be construed as dictating an exclusive course of treatment or procedure to be followed.INTERIM UPDATE: This Committee Opinion is updated as highlighted to reflect a limited, focused change in the language and supporting evidence regarding exposure to magnetic resonance imaging and gadolinium during pregnancy. ABSTRACT: Imaging studies are important adjuncts in the diagnostic evaluation of acute and chronic conditions. However, confusion about the safety of these modalities for pregnant and lactating women and their infants often results in unnecessary avoidance of useful diagnostic tests or the unnecessary interruption of breastfeeding. Ultrasonography and magnetic resonance imaging are not associated with risk and are the imaging techniques of choice for the pregnant patient, but they should be used prudently and only when use is expected to answer a relevant clinical question or otherwise provide medical benefit to the patient. With few exceptions, radiation exposure through radiography, computed tomography scan, or nuclear medicine imaging techniques is at a dose much lower than the exposure associated with fetal harm. If these techniques are necessary in addition to ultrasonography or magnetic resonance imaging or are more readily available for the diagnosis in question, they should not be withheld from a pregnant patient. Breastfeeding should not be interrupted after gadolinium administration. The American College of Obstetricians and Gynecologists Committee on Obstetric Practice makes the following recommendations regarding diagnostic imaging procedures during pregnancy and lactation:Ultrasonography and magnetic resonance imaging (MRI) are not associated with risk and are the imaging techniques of choice for the pregnant patient, but they should be used prudently and only when use is expected to answer a relevant clinical question or otherwise provide medical benefit to the patient.With few exceptions, radiation exposure through radiography, computed tomography (CT) scan, or nuclear medicine imaging techniques is at a dose much lower than the exposure associated with fetal harm. If these techniques are necessary in addition to ultrasonography or MRI or are more readily available for the diagnosis in question, they should not be withheld from a pregnant patient.The use of gadolinium contrast with MRI should be limited; it may be used as a contrast agent in a pregnant woman only if it significantly improves diagnostic performance and is expected to improve fetal or maternal outcome.Breastfeeding should not be interrupted after gadolinium administration.Imaging studies are important adjuncts in the diagnostic evaluation of acute and chronic conditions. The use of X-ray, ultrasonography, CT, nuclear medicine, and MRI has become so ingrained in the culture of medicine, and their applications are so diverse, that women with recognized or unrecognized pregnancy are likely to be evaluated with any one of these modalities 1. However, confusion about the safety of these modalities for pregnant and lactating women and their infants often results in unnecessary avoidance of useful diagnostic tests or the unnecessary interruption of breastfeeding. This document reviews the available literature on diagnostic imaging in pregnancy and lactation. Obstetrician gynecologists and other health care providers caring for pregnant and breastfeeding women in need of diagnostic imaging should weigh the risks of exposure to radiation and contrast agents with the risk of nondiagnosis and worsening of disease. Planning and coordination with a radiologist often is helpful in modifying technique so as to decrease total radiation dose when ionizing radiation studies are indicated Table 1.Ultrasound imaging should be performed efficiently and only when clinically indicated to minimize fetal exposure risk using the keeping acoustic output levels As Low As Reasonably Achievable (commonly known as ALARA) principle. Ultrasonography involves the use of sound waves and is not a form of ionizing radiation. There have been no reports of documented adverse fetal effects for diagnostic ultrasonography procedures, including duplex Doppler imaging. The U.S. Food and Drug Administration limits the spatial-peak temporal average intensity of ultrasound transducers to 720 mW/cm2. At this intensity, the theoretical increase in temperature elevation for the fetus may be as high as 2C (35.6F) 2 3. However, it is highly unlikely that any sustained temperature elevation will occur at any single fetal anatomic site 3. The risk of temperature elevation is lowest with B-mode imaging and is higher with color Doppler and spectral Doppler applications 4.Ultrasound machines are configured differently for different indications. Those configured for use in obstetrics do not produce the higher temperatures delivered by machines using nonobstetric transducers and settings. Similarly, although color Doppler in particular has the highest potential to raise tissue temperature, when used appropriately for obstetric indications, it does not produce changes that would risk the health of the pregnancy. However, the potential for risk shows that ultrasonography should be used prudently and only when its use is expected to answer a relevant clinical question or otherwise provide medical benefit to the patient 5. When used in this manner and with machines that are configured correctly, ultrasonography does not pose a risk to the fetus or the pregnancy.The principal advantage of MRI over ultrasonography and computed tomography is the ability to image deep soft tissue structures in a manner that is not operator dependent and does not use ionizing radiation. There are no precautions or contraindications specific to the pregnant woman. Magnetic resonance imaging is similar to ultrasonography in the diagnosis of appendicitis, but when MRI is readily available, it is preferred because of its lower rates of nonvisualization 6. Although there are theoretical concerns for the fetus, including teratogenesis, tissue heating, and acoustic damage, there exists no evidence of actual harm. With regard to teratogenesis, there are no published human studies documenting harm, and the preponderance of animal studies do not demonstrate risk 1. Tissue heating is proportional to the tissues proximity to the scanner and, therefore, is negligible near the uterus 1 7. Finally, available studies in humans have documented no acoustic injuries to fetuses during prenatal MRI 1. In considering available data and risk of teratogenicity, the American College of Radiology concludes that no special consideration is recommended for the first (versus any other) trimester in pregnancy 8.Unlike CT, MRI adequately images most soft tissue structures without the use of contrast. However, there are diagnostic situations in which contrast enhancement is of benefit. Two types of MRI contrast are available: 1) gadolinium-based agents and 2) superparamagnetic iron oxide particles. Gadolinium-based agents are useful in imaging of the nervous system because they cross the bloodbrain barrier when this barrier has been disrupted, such as in the presence of a tumor, abscess, or demyelination 9. Although gadolinium-based contrast can help define tissue margins and invasion in the setting of placental implantation abnormalities, noncontrast MRI still can provide useful diagnostic information regarding placental implantation and is sufficient in most cases 7.Even though it can increase the specificity of MRI, the use of gadolinium-based contrast enhancement during pregnancy is controversial. Uncertainty surrounds the risk of possible fetal effects because gadolinium is water soluble and can cross the placenta into the fetal circulation and amniotic fluid. Free gadolinium is toxic and, therefore, is only administered in a chelated (bound) form. In animal studies, gadolinium agents have been found to be teratogenic at high and repeated doses 1, presumably because this allows for gadolinium to dissociate from the chelation agent. In humans, the principal concern with gadolinium-based agents is that the duration of fetal exposure is not known because the contrast present in the amniotic fluid is swallowed by the fetus and reenters the fetal circulation. The longer gadolinium-based products remain in the amniotic fluid, the

greater the potential for dissociation from the chelate and, thus, the risk of causing harm to the fetus 8. The only prospective study evaluating the effect of antepartum gadolinium administration reported no adverse perinatal or neonatal outcomes among 26 pregnant women who received gadolinium in the first trimester 10. More recently, a large retrospective study evaluated the long-term safety after exposure to MRI in the first trimester of pregnancy or to gadolinium at any time during pregnancy 11. This study interrogated a universal health care data-base in the province of Ontario, Canada to identify all births of more than 20 weeks of gestation, from 2003 to 2015. Comparing first-trimester MRI (n=1,737) to no MRI (n=1,418,451), there were 19 stillbirths or deaths versus 9,844 in the unexposed cohort (adjusted relative risk [RR], 1.68; 95% CI, 0.972.90). The risk also was not significantly higher for congenital anomalies, neoplasm, or vision or hearing loss. However, comparing gadolinium MRI (n=397) with no MRI (n=1,418,451), the outcome of any rheumatologic, inflammatory, or infiltrative skin condition occurred in 123 versus 384,180 births (adjusted hazard ratio, 1.36; 95% CI, 1.091.69). Stillbirths and neonatal deaths also occurred more frequently among 7 gadolinium MRI-exposed versus 9,844 MRI unexposed pregnancies (adjusted RR, 3.70; 95% CI, 1.558.85). Limitations of the study assessing the effect of gadolinium during pregnancy include using a control group who did not undergo MRI (rather than patients who underwent MRI without gadolinium) and the rarity of detecting rheumatologic, inflammatory, or infiltrative skin conditions 12. Given these findings, as well as ongoing theoretical concerns and animal data, gadolinium use should be limited to situations in which the benefits clearly outweigh the possible risks 8 12.To date, there have been no animal or human fetal studies to evaluate the safety of superparamagnetic iron oxide contrast, and there is no information on its use during pregnancy or lactation. Therefore, if contrast is to be used, gadolinium is recommended.The water solubility of gadolinium-based agents limits their excretion into breast milk. Less than 0.04% of an intravascular dose of gadolinium contrast is excreted into the breast milk within the first 24 hours. Of this amount, the infant will absorb less than 1% from his or her gastrointestinal tract. Although theoretically any unchelated gadolinium excreted into breast milk could reach the infant, there have been no reports of harm. Therefore, breastfeeding should not be interrupted after gadolinium administration 13 14.Commonly used for the evaluation of significant medical problems or trauma, X-ray procedures are indicated during pregnancy or may occur inadvertently before the diagnosis of pregnancy. In addition, it is estimated that a fetus will be exposed to 1 mGy of background radiation during pregnancy 2. Various units used to measure X-ray radiation are summarized in Table 1.Concerns about the use of X-ray procedures during pregnancy stem from the risks associated with fetal exposure to ionizing radiation. The risk to a fetus from ionizing radiation is dependent on the gestational age at the time of exposure and the dose of radiation 15. If extremely high-dose exposure (in excess of 1 Gy) occurs during early embryogenesis, it most likely will be lethal to the embryo Table 2 15 16. However, these dose levels are not used in diagnostic imaging.In humans, growth restriction, microcephaly, and intellectual disability are the most common adverse effects from high-dose radiation exposure Table 2 2 17. With regard to intellectual disability, based on data from atomic bomb survivors, it appears that the risk of central nervous system effects is greatest with exposure at 815 weeks of gestation. It has been suggested that a minimal threshold for this adverse effect may be in the range of 60310 mGy 2 18; however, the lowest clinically documented dose to produce severe intellectual disability is 610 mGy 14 19. Even multiple diagnostic X-ray procedures rarely result in ionizing radiation exposure to this degree. Fetal risk of anomalies, growth restriction, or abortion have not been reported with radiation exposure of less than 50 mGy, a level above the range of exposure for diagnostic procedures 20. In rare cases in which there are exposures above this level, patients should be counseled about associated concerns and individualized prenatal diagnostic imaging for structural anomalies and fetal growth restriction Table 3 16.The risk of carcinogenesis as a result of in-utero exposure to ionizing radiation is unclear but is probably very small. A 1020 mGy fetal exposure may increase the risk of leukemia by a factor of 1.52.0 over a background rate of approximately 1 in 3,000 7 20. Thus, pregnancy termination should not be recommended solely on the basis of exposure to diagnostic radiation. Should a pregnant woman undergo multiple imaging studies using ionizing radiation, it is prudent to consult with a radiation physicist to calculate the total dose received by the fetus. The Health Physics Society maintains a website with an ask-the-expert feature: www.hps.org/publicinformation/ate/cat4.html. There is no risk to lactation from external sources of ionizing radiation (diagnostic X-rays) 21.Computed tomography is a specific use of ionizing radiation that plays an important diagnostic role in pregnancy, and its use increased by 25% per year from 1997 to 2006 1. Use of CT and associated contrast material should not be withheld if clinically indicated, but a thorough discussion of risks and benefits should take place 8. In the evaluation for acute processes such as appendicitis or small-bowel obstruction, the maternal benefit from early and accurate diagnosis may out-weigh the theoretical fetal risks. If accessible in a timely manner, MRI should be considered as a safer alternative to CT imaging during pregnancy in cases in which they are equivalent for the diagnosis in question. Radiation exposure from CT procedures varies depending on the number and spacing of adjacent image sections Table 2. For example, CT pelvimetry exposure can be as high as 50 mGy but can be reduced to approximately 2.5 mGy (including fetal gonad exposure) by using a low-exposure technique that is adequate for diagnosis. In the case of suspected pulmonary embolism, CT evaluation of the chest results in a lower dose of fetal exposure to radiation compared with ventilation-perfusion scanning 2. With typical use, the radiation exposure to the fetus from spiral CT is comparable with conventional CT.Oral contrast agents are not absorbed by the patient and do not cause real or theoretical harm. The use of intravenous contrast media aids in CT diagnosis by providing for enhancement of soft tissues and vascular structures. The contrast most commonly used for CT is iodinated media, which carries a low risk of adverse effects (eg, nausea, vomiting, flushing, pain at injection site) and anaphylactoid reactions 9. Although iodinated contrast media can cross the placenta and either enter the fetal circulation or pass directly into the amniotic fluid 22, animal studies have reported no teratogenic or mutagenic effects from its use 8 22. Additionally, theoretical concerns about the potential adverse effects of free iodide on the fetal thyroid gland have not been borne out in human studies 17. Despite this lack of known harm, it generally is recommended that contrast only be used if absolutely required to obtain additional diagnostic information that will affect the care of the fetus or woman during the pregnancy.Traditionally, lactating women who receive intravascular iodinated contrast have been advised to discontinue breastfeeding for 24 hours. However, because of its water solubility, less than 1% of iodinated contrast administered to a lactating woman is excreted into the breast milk, and less than 1% of this amount of contrast will be absorbed through the infants gastrointestinal tract. Therefore, breastfeeding can be continued without interruption after the use of iodinated contrast 1 9 13 16 23.Nuclear studies such as pulmonary ventilation-perfusion, thyroid, bone, and renal scans are performed by tagging a chemical agent with a radioisotope. This type of imaging is used to determine physiologic organ function or dysfunction rather than to delineate anatomy. Hybrid systems, which combine the function of nuclear imaging devices with computed tomography, improve the quality of information acquired and can help to correct artifacts produced by nuclear medicine imaging alone 9.In pregnancy, fetal exposure during nuclear medicine studies depends on the physical and biochemical properties of the radioisotope. Technetium 99m is one of the most commonly used isotopes and is used for brain, bone, renal, and cardiovascular scans. Its most common use in pregnancy is in ventilation-perfusion lung scanning for detection of pulmonary embolism. In general, these procedures result in an embryonic or fetal exposure of less than 5 mGy, which is considered a safe dose in pregnancy. The half-life of this radioisotope is 6 hours, and it is a pure gamma ray emitter, which minimizes the dose of radiation without compromising the image 9. All these facts support the safety of technetium 99m at 5 mGy when indicated during pregnancy.Not all radioisotopes can be used safely during pregnancy. Radioactive iodine (iodine 131) readily crosses the placenta, has a half-life of 8 days, and can adversely affect the fetal thyroid, especially if used after 1012 weeks of gestation 9. Whether for diagnostic or therapeutic treatment purposes, iodine 131 should not be used during pregnancy. If a diagnostic scan of the thyroid is essential, technetium 99m is the isotope of choice.Radionuclide compounds are excreted into breast milk in varying concentrations and for varying periods of time. In addition, rates of excretion of the same compound can vary between patients. Because some specific nuclear materials excreted into breast milk can have deleterious effects, consultation with experts on breast-feeding and nuclear medicine are recommended when these compounds are used in lactating women. Chen MM, Coakley FV, Kaimal A, Laros RKJr. Guidelines for computed tomography and magnetic resonance imaging use during pregnancy and lactation. Obstet Gynecol 2008;112:33340. [PubMed] [Obstetrics & Gynecology]Article Locations:Patel SJ, Reede DL, Katz DS, Subramaniam R, Amorosa JK. Imaging the pregnant patient for nonobstetric conditions: algorithms and radiation dose considerations. Radiographics 2007;27:170522. [PubMed] [Full Text]Article Locations:American Institute of Ultrasound in Medicine. Statement on mammalian biological effects of heat . Laurel (MD): AIUM; 2015. Available at: Statements/17. Retrieved October 5, 2015.Article Locations:American Institute of Ultrasound in Medicine. Statement on the safe use of Doppler ultrasound during 11-14 week scans (or earlier in pregnancy) . Laurel (MD): AIUM; 2011. Available at: . Retrieved October 5, 2015.Article Locations:Ultrasonography in pregnancy. ACOG Practice Bulletin No. 101. American College of Obstetricians and Gynecologists. Obstet Gynecol 2009;113:45161. [PubMed] [Obstetrics & Gynecology]Article Locations:Theilen LH, Mellnick VM, Longman RE, Tuuli MG, Odibo AO, Macones GA, et al. Utility of magnetic resonance imaging for suspected appendicitis in pregnant women. Am J Obstet Gynecol 2015;212:345.e16. [PubMed] [Full Text]Article Locations:Leyendecker JR, Gorengaut V, Brown JJ. MR imaging of maternal diseases of the abdomen and pelvis during pregnancy and the immediate postpartum period. Radiographics 2004;24:130116. [PubMed] [Full Text]Article Locations:Kanal E, Barkovich AJ, Bell C, Borgstede JP, Bradley WG Jr, Froelich JW, et al. ACR guidance document on MR safe practices: 2013. Expert Panel on MR Safety. J Magn Reson Imaging 2013;37:50130. [PubMed]Article Locations:Adam A, Dixon AK, Gillard JH, Schaefer-Prokop CM, editors. Grainger & Allisons diagnostic radiology: a textbook of medical imaging . 6th ed. New York (NY): Churchill Livingstone/Elsevier; 2015.Article Locations:De Santis M, Straface G, Cavaliere AF, Carducci B, Caruso A. Gadolinium periconceptional exposure: pregnancy and neonatal outcome. Acta Obstet Gynecol Scand 2007;86: 99101. [PubMed] [Full Text]Ray JG, Vermeulen MJ, Bharatha A, Montanera WJ, Park AL. Association between MRI exposure during pregnancy and fetal and childhood outcomes. JAMA 2016;316: 95261.Article Locations:American College of Radiology. ACR manual on contrast media. Version 10.3. Reston (VA): ACR; 2017. Available at: 7E/media/37D84428BF1D4E1B9A3A2918DA9E27A3.pdf. Retrieved July 28, 2017Article Locations:Sachs HC. The transfer of drugs and therapeutics into human breast milk: an update on selected topics. Committee on Drugs. Pediatrics 2013;132:e796809. [PubMed] [Full Text]Article Locations:National Library of Medicine. Gadopentetate. In: Drugs and Lactation Database (LactMed) . Available at: . Retrieved October 6, 2015.Article Locations:American College of Radiology. ACRSPR practice parameter for imaging pregnant or potentially pregnant adolescents and women with ionizing radiation. Resolution 39 . Reston (VA): ACR; 2014. Available at: /media/9e2ed55531fc4b4fa53ef3b6d3b25df8.pdf. Retrieved October 27, 2015.Article Locations:Tremblay E, Therasse E, Thomassin-Naggara I, Trop I. Quality initiatives: guidelines for use of medical imaging during pregnancy and lactation. Radiographics 2012;32:897911. [PubMed] [Full Text]Article Locations:Atwell TD, Lteif AN, Brown DL, McCann M, Townsend JE, Leroy AJ. Neonatal thyroid function after administration of IV iodinated contrast agent to 21 pregnant patients. AJR Am J Roentgenol 2008;191:26871. [PubMed] [Full Text]Article Locations:Blot WJ, Miller RW. Mental retardation following in utero exposure to the atomic bombs of Hiroshima and Nagasaki. Radiology 1973;106:6179. [PubMed]Article Locations:Miller RW. Discussion: severe mental retardation and cancer among atomic bomb survivors exposed in utero. Teratology 1999;59:2345. [PubMed]Article Locations:Gjelsteen AC, Ching BH, Meyermann MW, Prager DA, Murphy TF, Berkey BD, et al. CT, MRI, PET, PET/CT, and ultrasound in the evaluation of obstetric and gynecologic patients. Surg Clin North Am 2008;88:36190. [PubMed]Article Locations:Groen RS, Bae JY, Lim KJ. Fear of the unknown: ionizing radiation exposure during pregnancy. Am J Obstet Gynecol 2012;206:45662. [PubMed] [Full Text]Article Locations:Webb JA, Thomsen HS, Morcos SK. The use of iodinated and gadolinium contrast media during pregnancy and lactation. Members of Contrast Media Safety Committee of European Society of Urogenital Radiology (ESUR). Eur Radiol 2005;15:123440. [PubMed]Article Locations:American College of Radiology. Administration of contrast media to pregnant or potentially pregnant patients. In: ACR manual on contrast media. Version 10.1 . Reston (VA): ACR; 2015. p. 958.Article Locations:Copyright October 2017 by the American College of Obstetricians and Gynecologists. All rights reserved. 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This information should not be considered as inclusive of all proper treatments or methods of care or as a statement of the standard of care. It is not intended to substitute for the independent professional judgment of the treating clinician. Variations in practice may be warranted when, in the reasonable judgment of the treating clinician, such course of action is indicated by the condition of the patient, limitations of available resources, or advances in knowledge or technology. The American College of Obstetricians and Gynecologists reviews its publications regularly; however, its publications may not reflect the most recent evidence. Any updates to this document can be found on www.acog.org or by calling the ACOG Resource Center.While ACOG makes every effort to present accurate and reliable information, this publication is provided as is without any warranty of accuracy, reliability, or otherwise, either express or implied. ACOG does not guarantee, warrant, or endorse the products or services of any firm, organization, or person. Neither ACOG nor its officers, directors, members, employees, or agents will be liable for any loss, damage, or claim with respect to any liabilities, including direct, special, indirect, or consequential damages, incurred in connection with this publication or reliance on the information presented.Ultrasounds during pregnancy provide important medical information and help you plan your pregnancy. The American College of Gynecologists recommends that everyone get at least one ultrasound during pregnancy.Most women get at least two ultrasounds, one in the first trimester and one in the second trimester. If your doctor has concerns about the babys growth or a pregnancy complication, they may order more ultrasounds in the third trimester.Around 36 weeks of pregnancy, your provider will do a quick ultrasound in the office to make sure the baby is head down and in position for delivery. Whats the Typical Pregnancy Ultrasound Schedule?Most women get their first ultrasound at around 12 weeks and the second around 20 weeks in the pregnancy. But you may get an ultrasound earlier, especially if there is a concern about possible miscarriage or ectopic pregnancy. (Ectopic pregnancy is a dangerous condition when the embryo implants outside the womb).First ultrasound: Around 12 weeksMost women get their first ultrasound between 10 and 13 weeks of pregnancy. This ultrasound shows the number of fetuses, the fetal heartbeat, and size of the fetus(es). This helps your doctor predict your due date.If you are 11 weeks or more along, your ultrasound technician can also perform a nuchal translucency test. This test measures the thickness of the fetuss neck. A buildup of fluid between the spine and the skin can be a sign of Down syndrome or another genetic condition.If you opt for a nuchal translucency test, you will also need a blood test. The health provider interprets the two tests together to determine the risk of Down syndrome and another genetic condition called Trisomy 18.Second ultrasound: Around 20 weeksThe next ultrasound is usually performed between 18 and 22 weeks of pregnancy. This is also called the anatomy scan. In addition to looking at the babys organs, it also looks for any problems with the amniotic fluid or placenta.Because babys organs are visible at this time, this ultrasound can reveal problems with the heart, lungs, kidneys, and other organs. This scan also shows the amount of amniotic fluid in the uterus, as high or low amounts can pose problems. The location of the placenta is also examined to make sure a vaginal delivery is safe.The anatomy scan may not be 100% conclusive (a structure that looks abnormal in a scan may actually be normal, and vice versa). The doctor may recommend additional ultrasounds or an amniocentesis, which involves testing the babys DNA found in the amniotic fluid. Your doctor will discuss the risks and benefits of amniocentesis based on your age, ultrasound findings, and other factors.For most women, however, the anatomy ultrasound reveals a healthy baby and is a reassuring milestone in the pregnancy. It is also a chance to find out the babys sex, for those who wish to know.It isnt always possible to tell the sex with certainty, due to babys position in the uterus. However, the technicians assessment during this ultrasound is accurate 95% of the time.Additional ultrasounds in the third trimesterSome clinics perform at least one routine additional ultrasound in the third trimester for all pregnancies. But many clinics only perform third-trimester ultrasounds if theres a specific concern or if you have or develop a medical condition such as high blood pressure or diabetes.For example, a doctor may order a third-trimester ultrasound for women who have bleeding. This could be a sign the placenta has grown close to the cervix, for example.A common reason for a third-trimester ultrasound is a belly measurement that is lower or higher than expected. This could suggest that amniotic fluid levels are too high or too low or the babys growth is slowing.If the third-trimester ultrasound shows a potential problem with the pregnancy, the doctor can take a number of steps. They may wish to monitor the issue over time, with more ultrasounds, to see if it improves or worsens. They may also recommend an earlier birth via a planned C-section or induced vaginal delivery.What Should I Expect During an Ultrasound?A typical pregnancy ultrasound is around 20 minutes. But an anatomy scan at around 20 weeks can take up to 45 minutes.For your ultrasound, you will recline back on the examining table. The technician will apply gel to the ultrasound wand and rub the wand over your belly.The ultrasound wand sends sound waves that are not harmful to you or your baby. Based on how these sound waves bounce back from tissues, the computer generates a moving image of the baby.Sometimes, the ultrasound technician is not able to get all views of the babys organs. This does not mean that there is a problem with the pregnancy but is likely due to the way the baby was positioned at the time of the ultrasound. If this happens, they can try repeating the ultrasound again in a few weeks.The best part of the ultrasound is being able to see your future babys nose, fingers, and toes on the screen. The ultrasound technician can describe what you are seeing, and you are welcome to ask questions. The images from the ultrasound will be sent to your account. After the ultrasound, the doctor will explain any medical findings and next steps.American College of Obstetricians and Gynecologists. Ultrasounds. LinkColleen de Bellefonds. The 20-week anatomy scan. What To Expect. LinkTricia O'Brien. Pregnancy ultrasounds week by week. Parents. LinkDr. Cayla Ulrich and Dr. Olga Dewald. Pregnancy ultrasound evaluation. StatPearls. LinkBuilt upon our flagship, UPMC Magee-Womens Hospital in Pittsburgh, and its century-plus history of providing high-quality medical care for people at all stages of life, UPMC Magee-Womens is nationally renowned for its outstanding care for women and their families.Our Magee-Womens network from womens imaging centers and specialty care to outpatient and hospital-based services provides care throughout Pennsylvania, so the help you need is always close to home. More than 25,000 babies are born at our network hospitals each year, with 10,000 of those babies born at UPMC Magee in Pittsburgh, home to one of the largest NICUs in the country. The Department of Health and Human Services recognizes Magee in Pittsburgh as a National Center of Excellence in Womens Health; U.S. News & World Report ranks Magee nationally in gynecology. The Magee-Womens Research Institute was the first and is the largest research institute in the U.S. devoted exclusively to womens health and reproductive biology, with locations in Pittsburgh and Erie. ABSTRACT: Obstetric ultrasonography is an important and common part of obstetric care in the United States. The purpose of this document is to present information and evidence regarding the methodology of, indications for, benefits of, and risks associated with obstetric ultrasonography in specific clinical situations. Portions of this Practice Bulletin were developed from collaborative documents with the American College of Radiology and the American Institute of Ultrasound in Medicine 1 2. This content is only available to members and subscribers. Log In Nonmembers: Subscribe now to access exclusive ACOG Clinical content, including: ACOG Clinical is designed for easy and convenient access to the latest clinical guidance for patient care. Developed with members, physicians, and womens health care professionals needs in mind, user-friendly features include: Easy, advanced search function to find the most relevant guidance Enhanced document presentation Advanced features and functionalityYoull find clinical content written and peer reviewed by experts and valuable information that spans guidance on the diagnosis and management of the full spectrum of obstetric and gynecological conditions and clinical management issues.Note for Life Fellows: Annual membership dues are waived but there is a discounted annual subscription fee of $95 for access to publications such as the Green Journal, Practice Bulletins, and Committee Opinions. Individual subscriptions include print and online access. Subscribe today. Subscribe Amniocentesis: A procedure in which a needle is used to withdraw and test a small amount of amniotic fluid and cells from the sac surrounding the fetus. Amniotic Fluid: Water in the sac surrounding the fetus in the mothers uterus. Biopsy: A minor surgical procedure to remove a small piece of tissue that is then examined under a microscope in a laboratory.Chorionic Villus Sampling: A procedure in which a small sample of cells is taken from the placenta and tested. Congenital Anomalies: Changes in a body structure or function from what is normally expected that are present from birth. Cyst: A sac or pouch filled with fluid.Ectopic Pregnancy: A pregnancy in which the fertilized egg begins to grow in a place other than inside the uterus, usually in one of the fallopian tubes. Fetus: The stage of prenatal development that starts 8 weeks after fertilization and lasts until the end of pregnancy. Fibroid: A growth, usually benign, that forms in the muscle of the uterus. Genetic Disorders: Disorders caused by a change in genes or chromosomes. Gestational Age: The age of a pregnancy, usually calculated from the number of weeks that have elapsed from the first day of the last normal menstrual period and often using findings from an ultrasound examination performed in the first or second trimester of pregnancy.Intrauterine Device (IUD): A small device that is inserted and left inside the uterus to prevent pregnancy.Mammography: An imaging technique in which X-rays of the breast are used to detect breast cancer. The image that is created is called a mammogram. ObstetricianGynecologist (Ob-Gyn): A physician with special skills, training, and education in womens health. Placenta: Tissue that provides nourishment to and takes waste away from the fetus. Transducer: A device that emits sound waves and translates the echoes into electrical signals. Trimester: Any of the three 3-month periods into which pregnancy is divided. Ultrasound: Sound waves that can be used to examine internal structures or as a treatment for certain conditions. Ultrasound Exam: A test in which sound wave are used to examine internal structures. During pregnancy, it can be used to examine the fetus.Uterus: A muscular organ located in the female pelvis that contains and nourishes the developing fetus during pregnancy. An imaging ultrasound scan is widely used to estimate gestational age, investigate suspected pregnancy complications and monitor complicated pregnancies when they occur. In 2016, the World Health Organization (WHO) added a single ultrasound scan before 24 weeks of pregnancy to its list of recommended interventions for routine antenatal care (ANC) (1). In most high-income countries, routine antenatal ultrasound screening has been standard practice for some time, often being conducted in both the first and second trimesters (2). When conducted in the first trimester (up to and including 13 weeks and 6 days of gestation), an imaging ultrasound scan is aimed at confirming fetal viability, identifying the location of the gestational sac, establishing gestational age, determining the number of fetuses and, in the presence of a multiple pregnancy, assessing chorionicity and amnionicity; also, towards the end of the first trimester, nuchal translucency thickness is commonly measured in settings that offer screening for fetal chromosomal abnormalities (3). Second-trimester ultrasound scans conducted between 18 and 24 weeks allow for more detailed examination of fetal anatomy and detection of fetal anomalies, provide information on the number of fetuses present, identify the location of the placenta and enable an estimate of gestational age (4).A 2015 systematic review on ultrasound scans before 24 weeks of pregnancy (5) and a qualitative review on womens views and experiences of pregnancy (6) informed the 2016 WHO recommendations on antenatal care for a positive pregnancy experience (1). The ultrasound recommendation (B2.4) is: One ultrasound scan before 24 weeks of gestation (early ultrasound) is recommended for pregnant women to estimate gestational age, improve detection of fetal anomalies and multiple pregnancies, reduce induction of labour for post-term pregnancy, and improve a womans pregnancy experience. In the context of a new cluster-randomized randomized controlled trial (RCT) evaluating the impact of routine ultrasound scans in low-resource settings (7), an independent Executive Guideline Steering Group (GSG) prioritized updating the 2016 recommendation. A new systematic review on routine ultrasound before 24 weeks of pregnancy has since been conducted (8).As part of WHOs normative work on supporting evidence-informed policies and practices and its living guidelines approach, the Department of Sexual and Reproductive Health and Research (SRH) and the Department of Maternal, Newborn, Child and Adolescent Health and Ageing (MCA) undertook the updating of this recommendation. As the focus of the guideline is on routine antenatal ultrasound scan before 24 weeks of pregnancy, the guideline does not include evidence on the use of Doppler ultrasound as a fetal surveillance technique for a growth-restricted fetus.The recommendations in this global guideline are intended to inform the development of relevant national- and local-level health policies and clinical protocols. Therefore, the target audience of this guideline includes national and local public health policy-makers, implementers and managers of national and local maternal and child health programmes, concerned nongovernmental and other organizations, professional societies involved in the planning and management of maternal and child health services, health workers (including obstetricians, paediatricians, midwives, nurses and general medical practitioners), and academic staff involved in training health workers. (The recommendations are also to guide future research and assess existing practice.)This updated recommendation is relevant to all pregnant women and adolescent girls receiving ANC in any health-care facility or community-based setting, and to their fetuses and newborns. The guideline question was prioritized during the WHO 2016 ANC guideline development process. In 2019, the recommendation was prioritized for updating in the context of WHOs living guideline commitment. The outcomes of interests are, therefore, the same as those prioritized for the ANC guideline relevant to ultrasound scan interventions (Box 1).

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