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Update on Prenatal Care

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Many elements of routine prenatal care are based on tradition and lack a firm evidence base; however, some elements are supported by more rigorous studies. Correct dating of the pregnancy is critical to prevent unnecessary inductions and to allow for accurate treatment of preterm labor. Physicians should recommend folic acid supplementation to all women as early as possible, preferably before conception, to reduce the risk of neural tube defects. Administration of Rh_o(D) immune globulin markedly decreases the risk of alloimmunization in an RhD-negative woman carrying an RhD-positive fetus. Screening and treatment for iron deficiency anemia can reduce the risks of preterm labor, intrauterine growth retardation, and perinatal depression. Testing for aneuploidy and neural tube defects should be offered to all pregnant women with a discussion of the risks and benefits. Specific genetic testing should be based on the family histories of the patient and her partner. Physicians should recommend that pregnant women receive a vaccination for influenza, be screened for asymptomatic bacteriuria, and be tested for sexually transmitted infections. Testing for group B streptococcus should be performed between 35 and 37 weeks' gestation. If test results are positive or the patient has a history of group B streptococcus bacteriuria during pregnancy, intrapartum antibiotic prophylaxis should be administered to reduce the risk of infection in the infant. Intramuscular or vaginal progesterone should be considered in women with a history of spontaneous preterm labor, preterm premature rupture of membranes, or shortened cervical length (less than 2.5 cm). Screening for diabetes should be offered to all pregnant women between 24 and 28 weeks' gestation. Women at risk of preeclampsia should be offered low-dose aspirin prophylaxis, as well as calcium supplementation if dietary calcium intake is low. Induction of labor may be considered between 41 and 42 weeks' gestation.

Over the past 75 years, the number of U.S. women receiving prenatal care has steadily increased.[1] Family physicians provide integrated prenatal care, including evidence-based screening, counseling, medical care, and psychosocial support. There is uncertainty about the critical elements of prenatal care and education, but inadequate care is associated with increased complications.[2–4]

Although women in developed countries often have seven to 12 prenatal visits, a multinational trial showed that decreasing the visits to a minimum of four did not increase adverse outcomes, although it slightly decreased patient satisfaction with care.[5] Prenatal care that is provided by a small team; is coordinated; and follows an evidence-based, informed process results in fewer prenatal admissions, improved prenatal education, and greater satisfaction with care.[6,7]

SORT: KEY RECOMMENDATIONS FOR PRACTICE

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CLINICAL RECOMMENDATION	*EVIDENCE RATING*	*REFERENCES*
Physicians should attempt to obtain the most accurate dating of the pregnancy to assist in management of preterm labor and postterm pregnancy.	C	6, 8, 9
RhD-negative women carrying an RhD-positive fetus should be given Rh_o(D) immune globulin (RhoGam) to decrease the risk of alloimmunization.	C	6, 11, 24
Pregnant women with iron deficiency anemia should be offered treatment.	B	6, 9, 26
Folic acid supplementation should be recommended before conception.	A	6, 9, 11, 16
Women should be screened for rubella immunity during the first prenatal visit.	C	6, 9, 11
Pregnant women should be screened for asymptomatic bacteriuria between 11 and 16 weeks' gestation.	A	6, 9, 11, 38
Pregnant women should be offered inactivated influenza vaccination during influenza season.	C	9, 11, 39
Pregnant women should be offered group B streptococcus screening.	C	9, 11, 41
Pregnant women should be offered a glucose challenge test to screen for gestational diabetes between 24 and 28 weeks' gestation.	C	9, 11, 54, 55, 56
Women at risk of preterm birth should be offered intramuscular (preferred) or vaginal progesterone.	A	11, 62, 63

CLINICAL RECOMMENDATION	EVIDENCE RATING	REFERENCES
Breastfeeding should be recommended to pregnant women as the best feeding method for most infants.	A	9–11

Physical Examination and Counseling

Standard elements of prenatal care include a routine physical examination (including pelvic examination) at the initial visit, maternal weight and blood pressure at all visits, fetal heart rate auscultation after 10 to 12 weeks with a Doppler monitor or after 20 weeks with a fetoscope, fundal height after 20 weeks, and fetal lie by 36 weeks.[8,9] *Table 1* includes components of routine prenatal visits.[6,9–11]

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Table 1.

Components of Routine Prenatal Examinations

COMPONENT	COMMENTS
Abdominal palpation[6,9,10]	Abdominal palpation (Leopold maneuvers) can be used to assess fetal presentation beginning at 36 weeks' gestation; it is less accurate earlier in pregnancy
Blood pressure measurement[6,9–11]	Although most guidelines recommend blood pressure measurement at each prenatal visit, further research is required to determine the optimal frequency
Evaluation for edema[6,10]	Edema is defined as greater than 1+ pitting edema after 12 hours of bed rest, or weight gain of 2.3 kg (5 lb) in one week
	Edema occurs in 80% of pregnant women and lacks specificity and sensitivity for diagnosing preeclampsia
Fetal heart rate[6,9–11]	Auscultation for fetal heart rate is recommended at each prenatal visit to confirm a viable fetus, although there is no evidence of other clinical or predictive value
Fundal height measurement[6,9–11]	Measurement of fundal height is recommended at each prenatal visit beginning at 20 weeks and should be plotted for monitoring purposes
	Measurement is subject to inter- and intraobserver error
Urinalysis[6,10]	Some guidelines recommend routine dipstick urinalysis at each prenatal visit, whereas others no longer recommend it
	Testing does not reliably detect proteinuria in patients with early preeclampsia; trace glycosuria is unreliable for the detection of gestational diabetes
Weight measurement[6,9–11]	Maternal height and weight should be measured at the first prenatal visit to determine body mass index, and weight should be measured at all subsequent visits
	Patients who are underweight or overweight have known risks, such as anemia and gestational diabetes, and counseling should be provided to guide optimal weight gain

A pelvic examination at the initial visit is useful in detecting reproductive tract abnormalities and to screen for sexually transmitted infections. Routine pelvimetry is not useful.[11] Papanicolaou smears should be offered during prenatal care at recommended intervals based on age and Papanicolaou smear history, but do not need to be repeated during pregnancy.[12] Although promotion of breastfeeding is critical, there is no clear evidence to support clinical breast examinations. However, breast examinations may help to proactively address breastfeeding concerns or problems.[13] Although assessment of fundal height and fetal heart tones at every visit is recommended in multiple guidelines, the effect on outcomes is not clear.[6,9,10]

Early body mass index measurement, using prepregnancy height and weight, is important to guide further nutritional counseling and to address the risks of obesity and diabetes.[14] Measurement of blood pressure at each prenatal visit will identify chronic hypertension and hypertensive disorders that may develop during pregnancy, such as preeclampsia and gestational hypertension.[6] These disorders are often asymptomatic.

Periodontal disease is associated with increased risk of preterm birth, and an oral examination is often included in the first prenatal visit. However, treatment does not change outcomes.[15]

Pregnant women should be counseled about proper diet, as well as folic acid supplementation. *Table 2* summarizes dietary guidelines for pregnant women.[6,9,10,16] *Table 3* includes other counseling topics during prenatal care.[6,9–11,17,18]

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Table 2.

General Dietary Guidelines for Pregnant Women

COMPONENT	GUIDELINES	COMMENTS
Artificial sweeteners[10]	Minimize intake of food and drinks containing saccharin	Saccharin is known to cross the placenta and may remain in fetal tissue
		Aspartame, sucralose, and acesulfame-K are probably safe

COMPONENT	GUIDELINES	COMMENTS
Caffeine[6,10]	Limit consumption to 150 to 300 mg per day; moderate amounts are probably safe	Observational studies show an association between high caffeine consumption and spontaneous abortion and low birth weight Studies may be limited by confounding exposures that were unobserved
Calorie intake[9,10]	Most pregnant women require an additional 300 to 400 calories per day	Weight gain guidelines have varied and are based on limited data
Dairy[6,10]	Avoid unpasteurized dairy products and soft cheeses (e.g., feta, Brie, Camembert, blue-veined cheeses, Mexican queso fresco)	Risk of *Toxoplasma* and *Listeria* contamination, based on case reports
Delicatessen foods[6,10]	Avoid delicatessen foods, pâté, and meat spreads	Risk of *Listeria* contamination, based on case reports
Eggs[10]	Avoid raw eggs (e.g., in Caesar salad, eggnog, and raw cookie dough)	Risk of salmonella contamination, based on case reports
Folic acid[6,10,16]	Folic acid supplementation (400 mcg daily) should be initiated as soon as possible, preferably four weeks before conception	Helps prevent neural tube defects

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Table 3.

Counseling Topics in Pregnancy

TOPIC	COMMENTS
Air travel[6,10]	Air travel generally is safe for pregnant women up to four weeks before the due date; however, long flights are associated with an increased risk of venous thrombosis
	Availability of medical resources at the destination should be considered
	The Centers for Disease Control and Prevention provides information for pregnant travelers at http://wwwnc.cdc.gov/travel/yellowbook/2012/chapter-8-advising-travelers-with-specific-needs/pregnant-travelers.htm (http://wwwnc.cdc.gov/travel/yellowbook/2012/chapter-8-advising-travelers-with-specific-needs/pregnant-travelers.htm)
Breastfeeding[9–11]	Breastfeeding should be recommended as the best feeding method for most infants
	Breastfeeding contraindications include maternal human immunodeficiency virus infection, chemical dependency, and use of certain medications
	Structured behavior counseling, one-on-one needs-based counseling, and breastfeeding education programs increase breastfeeding success
Childbirth education[6,9–11]	Childbirth education is a common part of prenatal care in the United States
	Although it may increase confidence, it does not change the experience of labor or birth outcomes
Exercise[6,10]	At least 30 minutes of moderate exercise on most days of the week is a reasonable activity level for most pregnant women
	Pregnant women should avoid activities that put them at risk of falls or abdominal injuries
Fetal movement counts[6,9–11]	Routine counting of fetal movements should not be performed
	This has been shown to increase the patient's anxiety and results in more triage evaluations, prenatal testing, and interventions without improving outcomes

Dating of Pregnancy and Routine Ultrasonography

Accurate dating as early as possible in the pregnancy is important for scheduling screening tests and planning for delivery.[6–9] Estimated date of confinement is based on the first day of the last menstrual period plus 280 days. Urine pregnancy tests qualitatively test for beta subunit of human chorionic gonadotropin and are usually positive within one week of missed menses.[19]

Early ultrasonography should be performed if the patient has irregular cycles or bleeding, if the patient is uncertain of the timing of her last menstrual period, or if there is a discrepancy in the size of her uterus compared with the gestational age. Ultrasonography can accurately date the pregnancy, evaluate for multiple gestation, and reduce the likelihood of unnecessary labor induction for postterm pregnancy.[20,21] Ultrasound dating is considered accurate to within four to seven days in the first trimester, 10 to 14 days in the second trimester, and 21 days in the third trimester.[9,21] Pregnancy dating should be confirmed with auscultation of fetal heart tones between 10 and 12 weeks, and with fetal quickening between 16 and 18 weeks in women who have been pregnant before or between 18 and 19 weeks in first pregnancies.

A randomized trial comparing routine screening ultrasonography (between 15 and 22 weeks and again at 31 to 35 weeks) performed only for medical indications showed no difference in perinatal outcomes (e.g., fetal or neonatal death, neonatal morbidity).[22] A recent Cochrane review, however, showed that ultrasonography before 24 weeks reduces missed multiple gestation and inductions for postterm pregnancies.[21] There is no other scientific support for routine ultrasonography in uncomplicated pregnancies. It is the standard of care in most U.S. communities to offer a single ultrasound examination at 18 to 20 weeks' gestation, even if dating confirmation is not needed.[11] This is the optimal time for fetal anatomic screening,[23] although the sensitivity of ultrasonography for structural anomalies is poor (overall sensitivity from 11 studies = 24.1%, range = 13.5% to 85.7%).[6]

Alloimmunization

The risk of developing alloimmunization for an RhD-negative woman carrying an RhD-positive fetus is approximately 1.5%. This risk can be reduced to 0.2% with Rh_o(D) immune globulin (RhoGam).[6,11,24] Testing for ABO blood group and RhD antibodies should be performed early in pregnancy. Rh_o(D) immune globulin, 300 mcg, is recommended for nonsensitized women at 28 weeks' gestation, and again within 72 hours of delivery if the infant has RhD-positive blood.[25]

Rh_o(D) immune globulin should also be administered if the risk of fetal-to-maternal transfusion is increased (e.g., with chorionic villus sampling, amniocentesis, external cephalic version, abdominal trauma, or bleeding in the second or third trimester). Although alloimmunization is uncommon before 12 weeks' gestation, women with a threatened early spontaneous abortion may be offered Rh_o(D) immune globulin, 50 mcg.[25]

Anemia

Iron deficiency anemia is associated with an increased risk of preterm labor, intrauterine growth retardation, and perinatal depression.[26] All pregnant women should be screened for anemia early in pregnancy and treated with supplemental iron if indicated.[6,9,26]

The U.S. Preventive Services Task Force has found insufficient evidence to recommend for or against routine iron supplementation.[27] Multivitamins alone have demonstrated no benefit over iron and folate supplementation.[28] Pregnant women with anemia other than iron deficiency or who do not respond to iron supplementation within four to six weeks should be evaluated for other conditions, including malabsorption, ongoing blood loss, thalassemia, or other chronic diseases.

Genetic Testing and Neural Tube Defects

Down syndrome (trisomy 21 syndrome) occurs in one per 1,440 births in women 20 years of age and one per 32 births in women 45 years of age.[29] Most organizations recommend that all pregnant women be offered aneuploidy screening. Traditional serum screening for Down syndrome is complicated by high false-positive rates (90% to 95% of positive results are false). False-negative results are also possible. Patients should be given sufficient information to make an informed decision.[30]

Invasive genetic testing (amniocentesis or chorionic villous sampling) should be offered to women who are 35 years or older. At 35 years of age, the risk of Down syndrome (one per 338 births) is similar to that of fetal loss due to amniocentesis.[29] It is common to offer invasive testing to women 35 years and older without first performing screening tests; however, screening tests can be used for risk stratification to help a woman decide if she wants invasive testing.[6,11] Options for aneuploidy screening include nuchal translucency testing with serum testing (nine to 11 weeks' gestation) and later serum testing alone (15 to 19 weeks' gestation). There are a variety of combinations of such tests, and results are generally reported as the risk of aneuploidy. All screening tests have a positive rate of approximately 5% (most of which are false positives) and a detection rate of 69% to 87%.[6,11] *Table 4* compares screening tests for Down syndrome.[29]

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Table 4.

Prenatal Screening Tests for Down Syndrome

TEST	*MARKERS*	*TERM RISK CUTOFF*	*SENSITIVITY (%)*	*SPECIFICITY (%)*	*POSITIVE PREDICTIVE VALUE (%)*
First trimester screening	Nuchal translucency, free β-hCG, PAPPA, maternal age	1 in 325	83	95	4
Quadruple screening (second trimester)	Unconjugated estriol, α-fetoprotein, free β-hCG, inhibin A, maternal age	1 in 385	77	95	2
Integrated screening (first and second trimesters)	Nuchal translucency, PAPPA, α-fetoprotein, unconjugated estriol, free β-hCG/total hCG, inhibin A, maternal age	1 in 200	87	98	10

hCG = human chorionic gonadotropin; PAPPA = pregnancy-associated plasma protein A.

Adapted with permission from Chitayat D, Langlois S, Wilson RD; Genetics Committee of the Society of Obstetricians and Gynaecologists of Canada; Prenatal Diagnosis Committee of the Canadian College of Medical Geneticists. Prenatal screening for fetal aneuploidy in singleton pregnancies. J Obstet Gynaecol Can. *2011;33(7):741.*

If a screening test is positive for Down syndrome, the woman should be offered amniocentesis (15 weeks' gestation or later) or chorionic villous sampling (11 to 13 weeks). The rates of excess fetal loss with these two procedures are similar.[29] In centers where both procedures are available, women can consider earlier genetic testing options.[6,11]

A combination of serum and nuchal translucency testing can also screen for other trisomy syndromes, such as 13 and 18. Most laboratories can report the risk of trisomy 18 syndrome using serum testing. Protocols for the detection of other trisomies can detect a large portion of these anomalies. These protocols have lower sensitivities (60%) and higher specificities (99%), but similar positive predictive values or rates of false positives, compared with protocols for trisomy 21 screening, because these conditions are much more rare.[29]

A new technology, noninvasive prenatal diagnosis, offers the possibility of screening for aneuploidies and other conditions by identifying fragments of fetal DNA in maternal circulation. Early studies have shown a sensitivity for Down syndrome of 100% and a specificity of 99.3%.[31] Currently, cost is high and insurance coverage variable, but this may represent an emerging step in sequential genetic testing.

Other genetic screening should be based on the family histories of the patient and her partner. Genetic risk considerations include cystic fibrosis in whites; Tay-Sachs disease in Ashkenazi Jews, Cajuns, and French Canadians; Canavan disease in Ashkenazi Jews; sickle cell disease in Africans; and thalassemias in Africans, East Indians, Hispanics, Mediterraneans, Middle Easterners, and Southeast Asians.[6,10,11]

Neural tube defects affect 1.5 per 1,000 pregnancies and can be detected by testing maternal serum α-fetoprotein levels (sensitivity = 85.7%, specificity = 97.6%).[6] Folic acid supplementation should be recommended early, preferably before conception.[6,9,11,16] Folic acid, 400 mcg daily, started before pregnancy and continued until six to 12 weeks' gestation reduces the rate of neural tube defects by nearly 75%.[6] Women taking folic acid antagonists or who have a history of carrying a fetus with a neural tube defect should take 4 mg of folic acid daily.[16]

Thyroid Testing

Thyroid-stimulating hormone levels should be measured in women with a history of thyroid disease or symptoms of disease in pregnancy, although there is no evidence that universal testing during pregnancy improves outcomes.[32] There is concern that subclinical hypothyroidism in pregnant women may increase the risk of neurodevelopmental delays in infants, but the effectiveness of levothyroxine therapy has not been demonstrated.[33] A large randomized trial comparing thyroid-stimulating hormone measurement before 16 weeks' gestation and after birth found no differences in children's IQ scores at three years of age.[34] If the thyroid-stimulating hormone level is abnormal, a free thyroxine test may be useful.

Women with overt hypothyroidism, which complicates one to three per 1,000 pregnancies, are at increased risk of pregnancy loss, preeclampsia, low birth weight, and fetal demise or stillbirth. Hyperthyroidism occurs in two per 1,000 pregnancies and is associated with pregnancy loss, preeclampsia, low birth weight, thyroid storm, prematurity, and congestive heart failure.[32]

Infectious Diseases

BACTERIAL VAGINOSIS

Universal screening for bacterial vaginosis is not supported by current evidence. A recent systematic review found that screening and subsequent treatment of infection does not prevent delivery before 37 weeks' gestation, but decreases the risk of low birth weight and premature rupture of membranes.[35]

RUBELLA

Women should be screened for rubella immunity during the first prenatal visit, ideally before conception when vaccination is safe. All women who are nonimmune should be offered vaccination postpartum to prevent congenital rubella syndrome in subsequent pregnancies. Vaccination should not be given during pregnancy, but may be given during lactation.[6,9,11]

VARICELLA

Maternal varicella (chickenpox) can have significant fetal effects, including congenital varicella syndrome (low birth weight and limb, ophthalmologic, and neurologic abnormalities) and neonatal varicella; infection can occur from approximately five days before to two days after birth. Maternal shingles is not a risk for the infant because of passive maternal immunity. There is some evidence to support assessing the mother's varicella history at the first prenatal visit, with serologic testing for those with a negative history. Women who test negative for immunoglobulin G should avoid exposure to varicella during pregnancy and be offered vaccination postpartum.[36] After a significant exposure, varicella-zoster immune globulin therapy may be considered if available.[37]

ASYMPTOMATIC BACTERIURIA

Asymptomatic bacteriuria complicates 2% to 7% of pregnancies. All pregnant women should be screened between 11 and 16 weeks' gestation and treated, if positive, to reduce the risk of recurrent urinary tract infection, pyelonephritis, and preterm labor.[6,9,11,38]

INFLUENZA

Physicians should recommend that all pregnant women receive vaccination for influenza.[9,11,39] Pregnant women may be at higher risk of influenza complications than the general population.[40] Household contacts of pregnant women should also be offered vaccination.

TETANUS AND PERTUSSIS

Women should receive a diphtheria, tetanus, and pertussis (Tdap) vaccine during each pregnancy. The best time for vaccination is between 27 and 36 weeks' gestation for antibody response and passive immunity to the fetus; however, the vaccine may be given any time during pregnancy.[39]

GROUP B STREPTOCOCCUS

Group B streptococcus causes significant neonatal morbidity and mortality, particularly among premature infants, and all pregnant women should be offered screening.[9,11,41] Increased screening at 35 to 37 weeks' gestation and treatment with intrapartum antibiotic prophylaxis (penicillin, or clindamycin if allergic) for those who are positive (10% to 30%) have decreased neonatal mortality in the past decade.[41] Intrapartum treatment is also recommended for women with group B streptococcus bacteriuria occurring at any stage of pregnancy, and for women with unknown group B streptococcus status and risk factors (e.g., preterm birth before 37 weeks' gestation, rupture of membranes more than 18 hours before delivery, or intrapartum fever), and for women with a history of group B streptococcus bacteriuria during pregnancy.[41]

SEXUALLY TRANSMITTED INFECTIONS

Many sexually transmitted infections can affect a fetus, warranting routine screening in pregnancy. *Table 5* summarizes sexually transmitted infections in pregnancy.[42–46]

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Table 5.

Sexually Transmitted Infections During Pregnancy

INFECTION	*TESTING*	*TREATMENT*	*COMPLICATIONS/RISKS*
Chlamydia[42–44]	Universal (Centers for Disease Control and Prevention)	Azithromycin (Zithromax), erythromycin, amoxicillin, clindamycin	Congenital eye infections and pneumonia, preterm birth

INFECTION	TESTING	TREATMENT	COMPLICATIONS/RISKS
	Targeted (U.S. Preventive Services Task Force)		
Condylomata[42]	Screening not indicated, diagnosis is clinical	Consider cryotherapy or trichloroacetic acid	Vertical transmission, self-limited and usually minor; treatment may not affect transmission
Gonorrhea[42]	Based on personal or geographic risk	Ceftriaxone (Rocephin)	Chorioamnionitis, preterm birth, low birth weight, congenital eye infections
Hepatitis B[42]	Universal	Active and passive immunization of the infant	Vertical transmission
Herpes[42,45]	Screening not indicated Consider culture or polymerase chain reaction testing of lesions	Acyclovir (Zovirax) or famciclovir (Famvir) prophylaxis starting at 36 weeks' gestation for women with a history of herpes infection	Vertical transmission (consider cesarean delivery for women with active lesions at delivery)
Human immunodeficiency virus[42]	Universal (patient may opt out) Consider repeat screening in the third trimester	Antiretroviral therapy	Vertical transmission
Syphilis[42,46]	Universal rapid plasma reagin or	Penicillin G benzathine	Congenital syphilis

OTHER INFECTIONS

Routine screening for other infections, including toxoplasmosis, cytomegalovirus, and parvovirus, is not recommended during pregnancy.[47] Women should be counseled on decreasing risk of exposure to parvovirus B19, and antibody testing should be considered if there is a significant exposure.[48]

Psychosocial Issues

DOMESTIC VIOLENCE

Domestic violence during pregnancy increases the risk of complications, such as spontaneous abortion, placental abruption, premature rupture of membranes, low birth weight, and prematurity.[49] Domestic violence–related homicide is the leading cause of death among pregnant women in the United States.[49]

The U.S. Preventive Services Task Force (USPSTF) recommends that clinicians screen women of childbearing age for intimate partner violence, such as domestic violence, and provide intervention services or a referral if a woman screens positive.[50] Family physicians should be aware of the signs of abuse in pregnant women, the effect of violence on health, and the increased risk of child abuse after delivery.[51]

DEPRESSION SCREENING

The American College of Obstetricians and Gynecologists (ACOG) supports depression screening during pregnancy.[52] Perinatal depression is underdiagnosed and complicates 10% to 15% of pregnancies, resulting in significant morbidity for the mother and infant. Complications include prematurity, low birth weight, neurodevelopmental delays, and issues with maternal/infant bonding.

A number of screening tools are available with similar validity and sensitivity. Untreated depression may result in poor prenatal care; inadequate nutrition; and increased alcohol, drug, and tobacco use.[53]

Complications of Pregnancy

GESTATIONAL DIABETES

Gestational diabetes complicates 2% to 5% of pregnancies and is associated with hypertensive disorders, macrosomia, shoulder dystocia, and cesarean deliveries.[9,11] In addition, the increasing prevalence of undiagnosed type 2 diabetes mellitus and insulin resistance in the general population means many women will first show signs of diabetes during pregnancy. Screening protocols, diagnostic criteria, and treatment criteria are controversial, but diagnosing diabetes earlier in pregnancy and decreasing hyperglycemia improves some pregnancy outcomes.[54] ACOG, in collaboration with the USPSTF, recommends screening for overt diabetes early in pregnancy in those who are at risk (i.e., previous history of gestational diabetes, obesity, or known glucose intolerance) using A1C or fasting blood glucose levels, and screening in all pregnant women at 24 to 28 weeks' gestation with a 50-g glucose load. An abnormal one-hour test result should be followed by confirmatory testing with a three-hour glucose tolerance test.[55,56] In contrast, the National Institute for Health and Clinical Excellence has found insufficient evidence to recommend for or against screening for gestational diabetes.[6] In the United States, most women are screened one hour after a 50-g glucose challenge.[57] Selective screening has been shown to miss gestational diabetes in up to one-half of women.[55]

HYPERTENSION IN PREGNANCY

Blood pressure is generally monitored at each prenatal visit, and women should be counseled on warning signs of preeclampsia. For women who had chronic or severe hypertension in a previous pregnancy, baseline urine protein and preeclampsia laboratory testing may be helpful.[58] Preeclampsia in a previous pregnancy, chronic hypertension, and low dietary calcium (less than 700 mg) increase the risk of preeclampsia. Calcium supplementation for women with low dietary calcium reduces the risk of preeclampsia by 30% to 50%.[59] Low-dose aspirin from 12 to 36 weeks' gestation reduces preeclampsia by 20% in women with a history of preeclampsia, chronic hypertension, diabetes, autoimmune disease, or renal disease, or in women with current gestational hypertension.[60]

PRETERM BIRTH

Preterm birth (before 37 weeks' gestation) is a significant cause of neonatal morbidity and mortality, with more than 500,000 preterm births annually in the United States.[61] Progesterone (preferably weekly injections administered from 16 to 37 weeks' gestation; daily vaginal suppositories are an alternative) reduces preterm birth by approximately 35% in women with a history of spontaneous preterm labor or premature rupture of membranes.[11,62,63] Cervical cerclage may reduce the risk of preterm birth in women with a previous preterm birth and a short cervix, although the evidence is mixed.[64] Recent studies have shown a significant reduction in preterm birth with vaginal progesterone among women with an asymptomatic short cervix identified on ultrasonography.[65] Smoking cessation and

treatment of genital infections may also reduce the risk of preterm birth.

POSTTERM PREGNANCY

A Cochrane review of induction at 41 weeks' gestation versus expectant management to 42 weeks' gestation concluded that perinatal death was less common among women induced at 41 weeks, although it was rare in both groups.[66] The rate of perinatal death was 1.7 per 1,000 in the expectant management group versus 0.5 per 1,000 in the induction group (the number needed to treat with induction to prevent one perinatal death was 410 women).[66] The rate of meconium aspiration syndrome and cesarean delivery were lower with induction. Operative vaginal delivery was slightly more common among women induced at 41 weeks. Women should be counseled about the risks and benefits of both approaches.

Although there is no evidence that prenatal testing decreases perinatal death with postterm pregnancy, the standard of care is twice-weekly nonstress testing and weekly assessment of amniotic fluid volume beginning at 41 weeks' gestation.[6] Physicians should recommend induction of labor for oligohydramnios (amniotic fluid index less than 5 mL or maximum vertical pocket less than 2 cm at term). A nonreactive, nonstress test is usually followed by a biophysical profile, a contraction stress test, or umbilical artery Doppler.[67] If these tests are not reassuring after 41 weeks' gestation, physicians should recommend induction of labor.[9]

Data Sources: We identified guidelines/studies from PubMed, Cochrane Database of Systematic Reviews, Institute for Clinical Systems Improvement, USPSTF, ACOG, Society of Obstetricians and Gynaecologists of Canada, and Royal College of Obstetricians and Gynaecologists. We searched prenatal care with randomized controlled trial, evidence-based review, meta-analysis, and systematic review. We also searched pregnancy with physical exam, ultrasound, dating, alloimmunization, anemia, genetic testing, trisomy 21, and thyroid. Search dates: November 1, 2011, and December 2, 2013.

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