PRENATAL CARE FOR THE FAMILY PHYSICIAN: PART 1

Preconception and early pregnancy care

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Optimal prenatal care begins before conception by reviewing the patient's immunization status, identifying high-risk conditions, and screening for genetic risk factors. Essential elements of the first prenatal visit are establishing the diagnosis of pregnancy, history taking with risk assessment, estimating gestational age, performing a physical examination with Papanicolaou smear, blood and urine testing, providing vitamins and other needed medications, and educating patients. Prenatal care during return visits should include careful monitoring of the health of the mother and her fetus and answering patient questions.

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The goal of prenatal care—a challenging and crucial part of health care—is to maximize the health and well-being of expectant mothers and their babies. Early, regular prenatal care is clearly associated with improved maternal and fetal outcomes.[1] During the 20th century, maternal death rates have fallen by almost 99% and infant mortality by 82%.[2] The association with better outcomes is partially related to causation and partially to the lower-risk demographics of women who seek early prenatal care.

Most women in the United States receive adequate prenatal care, averaging about 12 prenatal visits.[3] In 1998, 83% began prenatal care within the first 12 weeks of pregnancy,[4] and only 4% had very late or no prenatal care.[3] Factors associated with late or no prenatal care include drug use, inadequate health insurance, physical violence, transportation problems, and poor social support.[5,6]

Preconception care: The first step

• *High-risk patients* Ideally, prenatal care begins before conception. Some women have serious health conditions (such as a preexisting medical illness or evidence of maternal undernutrition) that require evaluation and treatment before conception or, less optimally, as early as possible during pregnancy[3] (Table 1, page 38). Those with prior significant obstetric complications also require obstetric referral preferably before pregnancy.

Many patients routinely managed by primary care physicians must achieve good, nonteratogenic control of conditions such as mild or moderate asthma, hypothyroidism, and inflammatory bowel disease before pregnancy.

Table 1

High-risk patients requiring specialist referral

Medical conditions
Cardiac or pulmonary disease, if significant
Chronic hypertension
Diabetes
Epilepsy
Hyperthyroidism, current
Phenylketonuria (PKU) history
Renal disease
Rheumatologic diseases (particularly lupus or if teratogenic medications are required)
Thromboembolic disease history
Transplant history
Any other significant health condition
Obstetric history
Cervical incompetence
Preeclampsia
Unexplained repetitive fetal losses
Any known high-risk condition (such as antiphospholipid antibody syndrome)
Some patients with a history of preterm labor

• *History and physical examination* All healthy women contemplating pregnancy (and many women in general, since up to 50% of pregnancies in the United States are unplanned[6]) can improve their chances of a healthy pregnancy by ensuring they are free of high-risk or other problem conditions before becoming pregnant. A history, physical examination, Papanicolaou (Pap) smear, and laboratory tests are reasonable screening measures. Laboratory tests for anemia, hypothyroidism, diabetes, and other significant conditions may be indicated in those with a family history or symptoms suggestive of risk. Tests for sexually transmitted diseases (STDs) are indicated for those younger than 25 or those with a history of an STD or high-risk behaviors such as needlestick injury or needle sharing, blood transfusion, multiple or new sexual partners, a sexual partner with high-risk behavior now or in the past, or significant drug use that may have impaired judgment.[7]

• *Genetic risk assessment* Identifying a personal or family history for genetic disease[8] (Table 2) before pregnancy allows timely testing and, if necessary, early fetal diagnosis.

Ethnicity is becoming an important reason for genetic screening. For Ashkenazi Jews, the risk of Tay-Sachs disease, a universally fatal disorder, is high enough (1 out of 27 individuals is a carrier) that universal screening of mothers is recommended.[8] If the woman is positive, the man is checked. If both are positive, the fetus is at a 1:4 risk of the disease, and the couple should receive genetic counseling. Most couples choose prenatal diagnosis when given the option.

African-Americans are at risk for transmitting sickle cell disease, and the mother should be screened for the trait. If positive, the father is checked. If he is positive, the baby would be at 1:4 risk, and genetic counseling is indicated.

A complete blood cell (CBC) count screens for thalassemia risk in African-Americans and those of Asian, Middle-Eastern, and Mediterranean origin.[7,9] A normal CBC count with a normal mean corpuscular volume (MCV) rules out thalassemia. An MCV below 80 mm^3/cell requires further eval-

Table 2

High-risk conditions for consideration of genetic screening

Personal or family history
Canavan's disease
Cystic fibrosis
Down's syndrome
Hemophilia
Huntington's disease (chorea)
Mental retardation, especially fragile X syndrome
Muscular dystrophy
Neural tube defect
Other inherited disorders, birth defects, or congenital anomalies
Risk factors
Age older than 35
African-American, Southeast Asian, Middle-Eastern, and Mediterranean ancestry (thalassemia)
African-Americans (sickle cell anemia or trait)
Ashkenazi Jews (Tay-Sachs disease)
Ashkenazi Jews, whites, and Native Americans (cystic fibrosis)*
Significant medication or street drug use since last menstrual period

*Recommendation as of 1999.

uation. Although the primary concern is a mother who has β-thalassemia minor (indicated by elevated values on hemoglobin A_2 quantitative fluorescent polymerase chain reaction assay), some risk is also associated with α-thalassemia because of the very high frequency of α-subunit deletions in some populations. If the mother has thalassemia, checking the father is probably prudent, with counseling as indicated.

The National Institutes of Health Consensus Conference guidelines recommend offering a cystic fibrosis screening test to anyone who is pregnant or planning conception.[10] Cystic fibrosis is the most common recessive anomaly in whites; 1 out of 29 whites, Ashkenazi Jews, and some Native American populations (i.e., Pueblos, Zunis) are carriers. Carriage is rarer in Hispanics and even rarer in Asians and African-Americans. The screening test is 90% sensitive in American whites and 95% sensitive in Ashkenazi Jews, Celtic Bretons, French Canadians, and some Native Americans. The test is only 75% sensitive in African-Americans, 57% in Hispanics, and 30% in Asians[10] and is thus less useful in these populations.

• *Immunizations* should be reviewed and updated if necessary before conception, including routine childhood immunizations, particularly hepatitis B, varicella, and rubella. Women who are seronegative for hepatitis B surface antigen (HBsAg) and those who are at risk for hepatitis because they work in a health care profession, have a positive partner, use intravenous drugs, or live with someone at risk should be immunized.

Women who are unsure of previous chicken pox infection or who have a negative immune status (90% of American women of childbearing age have had chicken pox[7]) are at risk for varicella virus infection. Varicella vaccine is contraindicated in pregnancy and should not be given if the woman is planning immediate pregnancy. Measles-mumps-rubella or simple rubella vaccine should be given before conception if the rubella status is negative. This vaccine is contraindicated in pregnancy and should not be given if pregnancy is planned within 3 months. There are no documented cases of congenital rubella syndrome from the vaccine, however, and inadvertent pregnancy within 3 months is not considered to pose a high enough risk to recommend termination of the pregnancy.

Since influenza vaccine is recommended to avoid an increased risk of complications during the second or third trimester of pregnancy, it would be reasonable to immunize women before conception (or in the first trimester) to coincide with the flu season.

• *General recommendations* Many women do not immediately realize they are pregnant. Because crucial organ formation occurs very early[11] (Table 3), a preconception visit is important, and women who are trying to conceive should behave as though they are pregnant. The few recommendations for those who are planning pregnancy or are currently pregnant are summarized in Table 4 (page 40).[2,7,12]

Beginning pregnancy with an appropriate body weight and a sound nutritional status is ideal. Counseling can encourage a healthy diet, good exercise routine, and ideal weight and help prepare the patient to dedicate herself to these goals when she becomes pregnant.

• *Fertility issues* A preconception visit can be used to educate patients on how to maximize fertility and address infertility problems.

Table 3

Critical stages of organogenesis

Organ	Gestational age*	
	Begun	Completed
Central nervous system	4 wk, 4 d	7 wk, 3 d
Heart	4 wk, 4 d	9 wk
Ears	5 wk, 1 d	10 wk, 3 d
Limbs	5 wk, 3 d	9 wk
Eyes	5 wk, 3 d	7 wk, 5 d
Gonads	7 wk, 2 d	8 wk, 4 d
Palate	7 wk, 6 d	10 wk, 2 d
External genitalia	8 wk, 2 d	10 wk, 6 d

*Weeks from actual or inferred last menstrual period.

Table 4

Dos and don'ts for pregnant women

Do	Don't
Avoid all street drugs	Drink alcohol
Avoid exposure to cat excrement and raw meat (toxoplasmosis risk)	Smoke
Avoid exposure to environmental hazards such as lead, mercury, pesticides, paint, organic solvents, chemotherapy, oven cleaners, bleach, wood-finishing products	Use any prescription or OTC drugs that your doctor has not approved (acetaminophen is OK)
Engage in normal physical activity	Drink more than 1 cup of coffee a day
Strive for good nutrition	Use a hot tub or let a fever go untreated until after 7.5 weeks' gestation (a high body temperature increases the risk of neural tube defect)
Take a prenatal vitamin every day	

The first prenatal visit

The first prenatal visit is a significant step for every patient. Many women are excited, some are ambivalent, and others may be frightened. The first priority is to establish the diagnosis of pregnancy and support the woman's decisions about it. Since up to half of all pregnancies in the United States are unplanned, some may be unsure of their reaction to the news.[6] Many women are delighted, some immediately elect to have an abortion, and others must consider the situation.

Establishing the diagnosis is relatively easy with urine human chorionic gonadotropin (hCG) testing, and many patients have already tested themselves at home. When done correctly, positive test results are almost 100% accurate. A negative result is also usually accurate, providing that it truly has been at least 2 weeks since conception was attempted, and the fetus is not among those relatively rare ones with unusually low hCG levels.[13,14] If pregnancy seems likely and the test result is negative, retesting in a few days is reasonable.

• *Vaginal bleeding or pelvic pain* during early pregnancy can be a sign of life-threatening conditions. Severe hemorrhage caused by ruptured ectopic pregnancies or, in rare cases, spontaneous abortions may be fatal.[14,15] A seriously hemorrhaging patient requires emergent treatment.

As many as 20%-25% of women with normal pregnancies have some bleeding.[14-16] Aggressive workup is indicated even in the absence of acute severe hemorrhaging. Vaginal bleeding (a "threatened abortion") carries an approximately 50% chance of the baby being born healthy and an approximately 50% chance of the pregnancy ending in a spontaneous abortion or ectopic pregnancy.[14,15] In two studies, ectopic pregnancy was ultimately diagnosed in 8% of patients with positive hCG tests who were treated in emergency departments for vaginal bleeding.[17,18] Fewer than 50% of such patients have physical examination findings consistent with ectopic pregnancy such as adnexal tenderness or a palpable mass.[19] Inevitable abortions are accompanied by an open internal cervical os.

The traditional approach to diagnosis is obtaining serial quantitative hCG levels and possibly progesterone measurements.[13-16] The hCG level normally doubles every 48 hours through 6 weeks' gestational age[19]; anything short of a 66% increase within this period suggests an ectopic pregnancy or inevitable spontaneous abortion. Progesterone levels higher than 25 ng/mL are virtually always consistent with a normal gestation; 60% of pregnancies in women with levels below 25 ng/mL are abnormal.[13] A progesterone value below 10 ng/mL is incompatible with a live intrauterine pregnancy. If serial laboratory testing suggests an abnormal pregnancy or if there is any suspicion of an ectopic pregnancy, immediate ultrasound examination is mandatory.

Vaginal ultrasonography has transformed the diagnosis of early bleeding during pregnancy. When combined with quantitative hCG measurements, it provides the most rapid and accurate diagnostic and prognostic picture. For the relation-

ship between vaginal ultrasound findings, hCG levels, and gestational age, see Table 5. The following are key discriminatory points.[13-16,20]

- At an hCG level of 1,000 mIU/mL, virtually all intrauterine pregnancies demonstrate a gestational sac; without an appropriate sac, ectopic pregnancy is likely.
- A gestational sac larger than 20 mm must demonstrate a fetal pole to be consistent with a viable pregnancy.
- A gestational sac larger than 25 mm and an embryo of 4-5 mm must show fetal cardiac activity to be consistent with a viable pregnancy.

Once fetal cardiac activity is detected, the risk of spontaneous abortion drops from 50% to below 20%. After 8-12 weeks, the risk is only 2%-4%,[21] unless the heart rate is abnormally low.[13] Since a threatened abortion is a sad and frightening prospect for most women, reassurance with ultrasound findings is welcome.

The risk of spontaneous abortion varies by maternal age. Most early losses are due to chromosomal abnormalities or a failure to implant properly. The overall risk of spontaneous abortion in diagnosed pregnancies is approximately 10%-15%,[13,15] but it increases two- to fourfold in mothers in their 40s compared with those in their 20s. One study found that even after sonography detected a normal fetus, the rate of spontaneous abortion in women older than 35 was about 4%, three times higher than in those younger than 30.[22]

Traditionally, women with a threatened abortion have been instructed to try bed rest and "pelvic rest," or no intercourse. (Sexual intercourse is not contraindicated during normal low-risk pregnancies.) No firm data support the effectiveness of these measures, and first trimester losses are probably inevitable regardless of the woman's normal activities. Nevertheless, information on traditional techniques should be offered.

Many women facing an inevitable abortion choose an elective dilation and curettage for emotional closure and certainty, even if it is not required. Prolonged retention (more than 1 month) of the dead fetus may occasionally result in coagulopathies, usually when the patient has reached the second trimester before fetal death.[15] In these cases, dilation and evacuation are eventually required. The majority who spontaneously abort during the first trimester require no medical assistance. Hemorrhage is uncommon, and most experience only a late and unpleasant menstrual period.

Routine prenatal blood testing should include blood typing; if bleeding occurs, blood type and Rh factor must be known. Aside from any need for transfusion, Rh-negative women with bleeding must be given Rho(D) immune serum globulin (Gamulin Rh, HypRho-D, RhoGAM) within 72 hours for the optimal prevention of Rh sensitization.[23,24] And Rho(D) immune globulin should be administered to Rh-negative women whenever procedures are performed or bleeding occurs during pregnancy.

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• *The comprehensive evaluation* Fortunately, most patients do not have any pain or bleeding beyond slight "implantation" bleeding at the time of the missed menses, and the purpose of their first visit is to begin normal prenatal care. Many of the issues that should be addressed are the same as those covered at the preconception visit. Physicians may consider using the forms supplied by the American College of Obstetricians and Gynecologists to help remember pertinent questions and organize the patient's data throughout pregnancy. High-risk patients (Table 1, page 38) should be referred to specialists after any urgent care is provided.

• *History* should include current smoking status, alcohol intake, and any drugs taken since concep-

Table 5

Ultrasound findings by gestational age and hCG levels

Approximate gestational age*	hCG level (mIU/mL)	Crown-rump length (mIU)	Ultrasound finding
4 wk, 2 d to 4 wk, 4 d	1,000	—	Gestational sac (normally grows 1.0-1.2 mm/d)
5-6 wk	3,100-4,400	2-4	Yolk sac (84% positive predictive value for normal pregnancy); fetal pole
5 wk, 6 d to 6 wk, 4 d	11,000-> 21,000	4-5	Fetal cardiac activity

Key: hCG = human chorionic gonadotropin.

*Weeks since actual or inferred last normal menstrual period.

tion (prescription and over-the-counter medications and street drugs). Women who use street drugs or significant amounts of alcohol are considered high risk. Since domestic violence rates increase during pregnancy, the slightest concern should prompt screening.

Personal and family histories are essential, particularly of diabetes and obstetric problems, to optimize treatment. Current infections in the expectant mother can have a substantial impact on the health of the pregnancy. She should be screened for risk of exposure to STDs, such as chlamydia, gonorrhea, syphilis, and HIV and hepatitis B infection (including current or past needle sharing and the sexual history of the patient and her current and former partners). She should also be screened for exposure to tuberculosis and asked about any illnesses she has had since conception. Herpesvirus status should also be ascertained.

Genetic risk assessment is summarized in Table 2 (page 38). The primary difference between this and the preconception visit is the need for haste to maximize the patient's choices about screening options. For example, chorionic villus sampling is generally performed between 10 and 12 weeks' gestation.[25]

• *Establishing gestational age* is one of the urgent issues during the first prenatal visit because accuracy is highest in the first trimester. The standardized calculation of pregnancy length begins with the first day of the patient's last normal menstrual period. Conception is normally 2 weeks after the last normal menstrual period, assuming a 28-day cycle.[26] Since many women do not have a 28-day cycle, the inferred date of conception must often be estimated. Most women ovulate about 14 days before menses, and for a woman with a regular 32-day cycle, pregnancy would probably begin 4 days later than anticipated, and the patient's expected date of delivery and gestational age should be adjusted accordingly.[4] If her menstrual cycle is irregular or she has just discontinued oral contraceptive pills, determining a gestational age based on her last period may be quite inaccurate.

A patient's due date is standardized as 40 weeks after her last menstrual period (adjusted as necessary). Her gestational age at any point in the pregnancy is completed menstrual weeks (meaning that she is at 2 weeks' gestational age when she conceives and 4 weeks when she misses her period and can be diagnosed as pregnant).

A quick estimate of the due date can be made by adding 7 days to the first day of the last menstrual period and then subtracting 3 months.[25] Thus if the last menses began on May 1, the due date would be 05 01 + 7 (days) - 3 (months) = 02 08 of the following year.[26]

The expected gestational age (if there is one) must be confirmed by physical examination or sonography (Table 5).[13,20] To be consistent with expected gestational age, uterine size on pelvic examination must be up to 6-7 cm (about the size of a large egg) at up to 7 weeks. Thereafter, the uterus enlarges about 1 cm per week, yielding a uterine size of about 10 cm (the size of an orange)

Table 6

Initial prenatal visit laboratory tests

Test	For
CBC count with hemoglobin or hematocrit	Anemia
Urinalysis (including microscopic analysis)	Proteinuria, glycosuria, hematuria
Urine culture	Asymptomatic bacteriuria, avoid pyelonephritis
ABO and Rh factor typing	Potential for sensitization
Blood antibody screen	Current sensitization
Rubella immunity (if unknown)	Rubella risk
VDRL or RPR test	Syphilis
Hepatitis B surface antigen	Hepatitis transmission risk
HIV antibody (with consent)	HIV infection (prevents potential vertical transmission)
Also consider	
Cervical swab or urine probe for gonorrhea and chlamydia	Any patient at risk of STD
Tuberculin skin test (with reading at 48-72 h)	Patients at high risk for tuberculosis*
Varicella immunity	Patients at high risk of infection without a history of disease (or can wait until possible exposure)
Thyroid-stimulating hormone	Patients with known or possible thyroid disease
Oral glucose tolerance test or fasting glucose	Patients at risk for diabetes mellitus (such as persona history of gestational diabetes or strong family history)
Genetic screening	Based on personal or family history and ethnic group (Table 2, page 38)

Key: CBC = complete blood cell; RPR = rapid plasma reagin; STD = sexually transmitted disease; VDRL = Venereal Disease Research Laboratory.

*Includes those with known contacts; immigrants from places with high prevalence; alcoholics and street drug users; cities with especially high prevalence; low-income, high-risk populations (Native American, African-American, Hispanic); immunocompromised patients; and health care personnel.

at 10 weeks. By 12 weeks, the uterus is emerging from the pelvis and can often be felt above the symphysis pubis. It should be 12 cm (about the size of a grapefruit) at 12 weeks.[2]

Ultrasound evaluation of crown-rump length in the first trimester is accurate within (plus or minus) 5-7 days.[27] Thus, if initial calculations disagree with ultrasound findings by more than 1 week, optimal dating and gestational age should be based on sonography. If no relatively accurate menstrual date is available, gestational age is based solely on ultrasonography. The clinician should keep in mind that the accuracy of ultrasound in determining gestational age before 16 weeks is within (plus or minus) 7 days; from 16-24 weeks, it is within 1.5 weeks; and after 28 weeks, only within 2.5-3.0 weeks.[27] A woman who initiates prenatal care late and is unsure of the date of her last menstrual period will have a very uncertain estimated gestational age.

• *The physical examination and Pap smear* evaluate the woman's overall health, assess for any high-risk conditions, and rule out cervical dysplasia. If the patient has had a recent complete physical examination and Pap smear, they need not be repeated. But at a minimum, the first prenatal visit should include a pelvic examination to date the pregnancy, weight measurement, and a blood pressure reading.

• *Patient education* As in the preconception visit, the patient should be instructed on how she can maximize her chances of having a healthy pregnancy (Table 4, page 40). Good nutrition throughout pregnancy is the ideal, but nausea often interferes in the early weeks. As pregnancy progresses, nutrition becomes more critical.

In the absence of unusual risks—such as cervical incompetence or the development of preterm labor or hypertension—patients should be encouraged to maintain their prepregnancy level of exercise and activity, at least early on.[7] While continuing her usual routines, she should be sensitive

Table 7

Recommended weight gain during pregnancy

Maternal classification (body mass index*)	Total	Weight gain per week second and third trimester
Underweight (BMI < 19.8)	28-40 lb (12.6-18.0 kg)	1.25 lb (0.6 kg)
Normal weight (BMI 19.8–28)	25-35 lb (11.3-15.8 kg)	0.5-1.0 lb (0.2-0.5 kg)
Overweight (BMI 28–29)	16-25 lb (7.2-11.3 kg)	0.65 lb (0.3 kg)
Obese (BMI > 29)	15 lb (6.8 kg)	0.5 lb (0.2 kg)

*Weight in kilograms divided by the square of height in meters.

Note: There are about 26 weeks in the second and third trimesters combined. To gain at the low end of the desired range, weight gain may be less than the expected rate. Most weight gains in women of normal weight will be around 1 lb (0.45 kg) per week, for example, but only 20-23 total pounds (9.0-10.35 kg) may be gained, depending on weight gain during the first trimester.

to her body's signals of excessive fatigue and avoid significant hyperthermia during the time of neural tube formation (4.5-7.5 weeks). As pregnancy progresses, activity may need to be modified to accommodate changing body mechanics. Strenuous physical work and prolonged standing (more than 5 hours a day) may contribute to adverse outcomes.[28] Although exercise and daily activity are safe, gestation is not the time for dangerous sports or acquiring new athletic skills.[1]

Patients should also be encouraged to make use of the many pregnancy educational aids available, including books, compact discs, and video- and audiotapes.

• *Standard initial testing* includes blood and urine measurements, ultrasonography, and tuberculin skin testing if needed (Table 6, page 52).

• *Vitamins and prescriptions* All pregnant women should be encouraged to take a prenatal vitamin. If nausea is significant, vitamins can be delayed until patients are able to tolerate these agents. Other than folic acid, data are equivocal on nutritional supplementation in early pregnancy for well-nourished women with healthy diets.[4,29-32]

Supplemental iron is indicated if the patient is anemic. For healthy women, supplementation continues to be controversial. Fairly good information suggests that dietary iron is inadequate later in pregnancy when the fetus requires more substantial amounts, but supplementation has not been proven beneficial.[33] Taking normal prenatal vitamins, which provide 30 mg of iron per day, is reasonable.

Patients with mild medical conditions such as asthma and thyroid disease should receive the prescriptions needed to stay healthy, adjusted to minimize teratogenicity risk.

Return prenatal visits

Traditionally, subsequent visits have been scheduled every 4 weeks until 30-32 weeks of gestation, every 2 weeks until 36 weeks, and then every week until delivery. An expert government panel indicated that low-risk patients may be seen less frequently,[34] but this schedule has not been widely accepted, despite supportive evidence from a randomized controlled study involving 2,764 low-risk pregnant women.[35] In part, repeat visits provide an opportunity to help patients adhere to an optimal nutrition and health regimen.

At a minimum, standard evaluation at each return visit consists of eight elements:

• *Determining current gestational age* (based on the optimal dates initially established).

• *Assessing uterine size* The distance from the top of the symphysis pubis to the top of the uterine fundus in centimeters should be approximately the same as gestational age in weeks. (This relationship does not hold true until partially through

the second trimester.) The fundus should be roughly at the umbilicus at 20 weeks. Measurements that exceed 2 cm (plus or minus) require further evaluation. If the fetus is of appropriate size on ultrasound despite an abnormal fundal height, the growth rate should be 1 cm per week thereafter.

• *Blood pressure monitoring* This is the best way to detect preeclampsia, one of the most common and significant complications of pregnancy.

• *Monitoring weight and weight change* On average, patients should gain 2-5 lb (1-2 kg) during the first trimester, then 0.5-1.0 lb (0.25-0.5 kg) per week. But appropriate gains depend on prepregnancy body habitus[30,32] (Table 7, page 55).

• *Evaluating symptoms and discussing any that are bothersome* Throughout pregnancy, the patient should be instructed to report immediately any vaginal bleeding, pain, or (after quickening) decreased fetal movement.

Nausea and vomiting are prominent during the first trimester. Later, preeclamptic symptoms such as headache, visual disturbances (dimness or blurring), and right upper quadrant pain become potentially important and should also be reported.[4]

• *Listening to fetal heart tones* The fetal heartbeat can be heard with a Doppler device in virtually all pregnancies at 12 weeks' gestation.[16] Beginning at this stage, 120-160 beats per minute is considered normal,[16] although it is sometimes higher in early gestation.

• *Urinalysis* Many practitioners use dipstick urine testing at every visit, but such routine screening may not be warranted.[4,36]

• *Answering patient questions* Showing concern and establishing rapport are critical to excellent prenatal care.

Specific recommendations for prenatal care by pregnancy trimester and a discussion of current controversies will be discussed in the second part of this article.

Conclusion

Prenatal care is one of the greatest joys in medicine, but it is also a considerable responsibility. For family physicians, in particular, prenatal care can be the beginning of a long and rewarding relationship in which the entire family is known and cared for in a uniquely intimate way. Poor prenatal care can be worse than none at all; physicians must be familiar with normal and pathological changes that may occur during pregnancy.[4]

Before conception, women should be evaluated for medical conditions and genetic risk factors that could imperil the health of the pregnancy. Her immunization status should also be reviewed. At the first prenatal visit, the diagnosis of pregnancy is established with urine hCG testing. Early symptoms of spontaneous abortion or ectopic pregnancy must be evaluated and managed. The comprehensive evaluation includes a history with risk assessment, physical examination with Pap smear, and blood and urine testing. Physicians must establish the gestational age, provide prenatal vitamins, and educate patients and answer their questions. Return prenatal visits are scheduled to monitor the ongoing health of the mother and fetus. ■

Part 2 of this two-part series, which deals with prenatal care and counseling by pregnancy trimester, starts on page 61.

SELF-EXAMINATION

1. Which of the following groups is not at high risk for the stated genetic disease?

   a) Ashkenazi Jews and Tay-Sachs disease
   b) Hispanics and sickle cell anemia
   c) Whites and cystic fibrosis
   d) Asians and thalassemia

2 hCG urine testing is up to 80% accurate for the diagnosis of pregnancy.

   a) true
   b) false

3. Which of the following statements about diagnostic ultrasound findings is not true?

   a) A gestational sac is detectable in all intrauterine pregnancies at an hCG level of 1,000 mIU/mL.

b) A fetal pole must be detectable in gestational sacs larger than 20 mm to be consistent with a viable pregnancy.

c) Fetal cardiac activity must be detectable in gestational sacs larger than 25 mm to be consistent with a viable pregnancy.

d) Embryos of 2-4 mm should demonstrate fetal cardiac activity to be consistent with a viable pregnancy.

4. The fundus should be approximately at the umbilicus at 20 weeks' gestational age.

a) true

b) false

5. Which of the following statements about early prenatal care is not true?

a) Follow-up visits should be scheduled every 4 weeks until 30-32 weeks.

b) The average patient's weight gain is 2-5 lb in the first trimester.

c) Routine urinalysis is rarely warranted.

d) At 19 weeks, the fetal heart rate should be 100-120 beats per minute.

Answers at end of reference list.

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■ *Answers: 1)b, 2)b, 3)d, 4)a, 5)d*