Prenatal care

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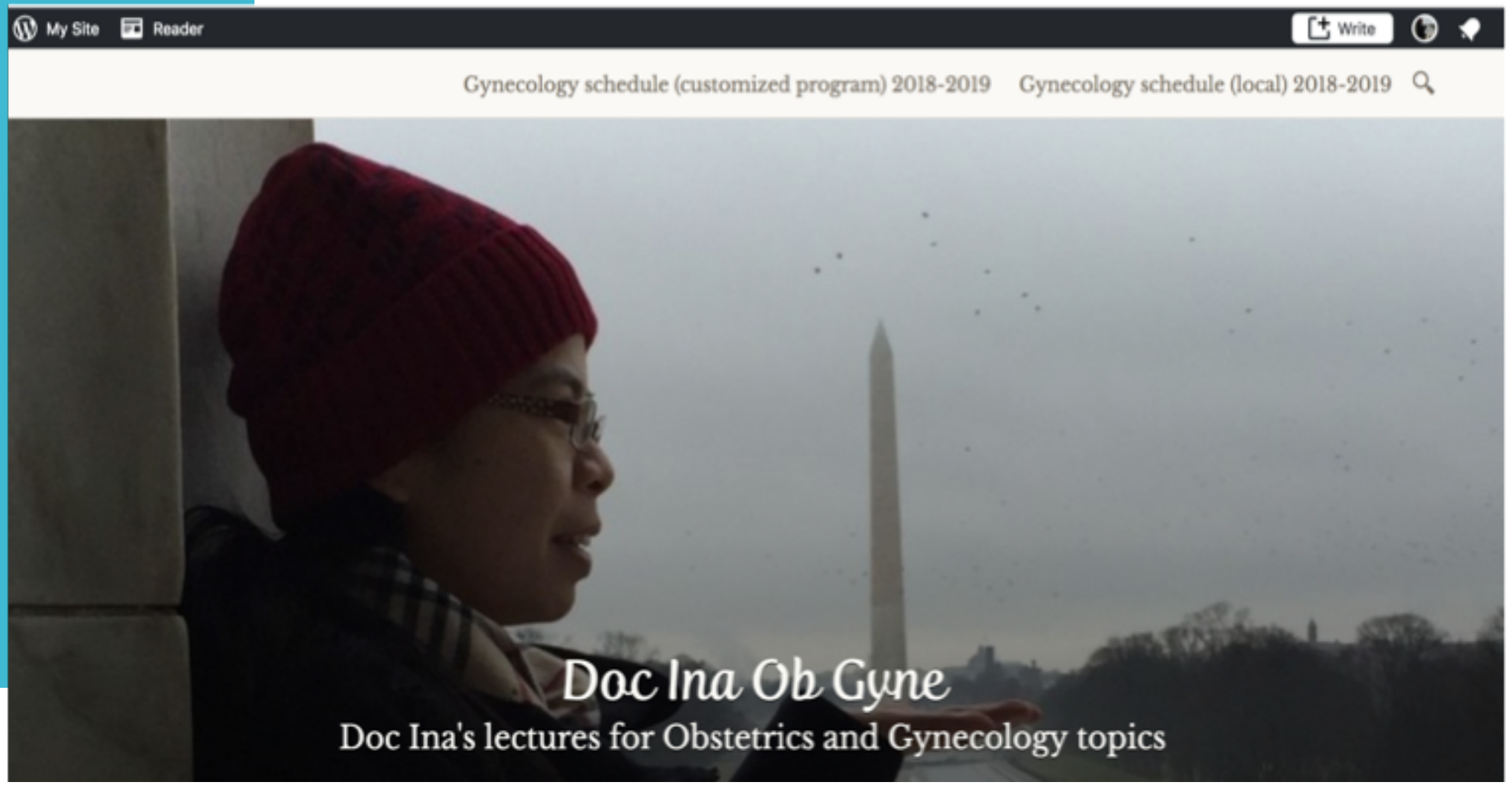

Reference

- Cunningham FG, Leveno KJ, Bloom SL, Spong CY, Dashe JS, Hoffman BL, Casey BM, Sheffield JS (eds).William's Obstetrics 24th edition; 2014; chapter 9 Prenatal Care

Outline

- INITIAL PRENATAL EVALUATION
- SUBSEQUENT PRENATAL VISITS
- NUTRITIONAL COUNSELING

Initial Prenatal evaluation

- Prenatal care should be initiated as soon as there is a reasonable likelihood of pregnancy.
- Major goals:
  - (1) define the health status of the mother and fetus
  - (2) estimate the fetal gestational age
  - (3) initiate a plan for continuing obstetrical care.

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Definition of Terms

- 1. Nulligravida—a woman who currently is not pregnant nor has ever been pregnant.
- 2. Gravida—a woman who currently is pregnant or has been in the past, irrespective of the pregnancy outcome.
  - Primigravida- woman on her first pregnancy
  - Multigravida – woman on her subsequent pregnancies
- 3. Nullipara—a woman who has never completed a pregnancy beyond 20 weeks' gestation.
  - She may may have had a spontaneous or elective abortion(s) or an ectopic pregnancy.

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Definition of Terms

- 4. Primipara—a woman who has been delivered only once of a fetus or fetuses born alive or dead with an estimated length of gestation of 20 or more weeks.
- 5. Multipara—a woman who has completed two or more pregnancies to 20 weeks' gestation or more.
  - Parity is determined by the number of pregnancies reaching 20 weeks. It is not

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Routine Prenatal Care

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TABLE 9-2. Typical Components of Routine Prenatal Care

	Text Referral	First Visit	Weeks 15–20	Weeks 24–28	Weeks 29–41
History					
Complete	Chap. 9, p. 172	•			
Updated			•	•	•
Physical examination					
Complete	Chap. 9, p. 174	•			
Blood pressure	Chap. 40, p. 729	•	•	•	•
Maternal weight	Chap. 9, p. 177	•	•	•	•
Pelvic/cervical examination	Chap. 9, p. 174	•			
Fundal height	Chap. 9, p. 176	•	•	•	•
Fetal heart rate/fetal position	Chap. 9, p. 176	•	•	•	•
Laboratory tests					
Hematocrit or hemoglobin	Chap. 56, p. 1101	•		•	
Blood type and Rh factor	Chap. 15, p. 307	•			
Antibody screen	Chap. 15, p. 307	•		A	
Pap smear screening	Chap. 63, p. 1221	•			
Glucose tolerance test	Chap. 57, p. 1137			•	
Fetal aneuploidy screening	Chap. 14, p. 288	B[a] and/or	B		
Neural-tube defect screening	Chap. 14, p. 283		B		
Cystic fibrosis screening	Chap. 14, p. 295	B or	B		
Urine protein assessment	Chap. 4, p. 65	•			
Urine culture	Chap. 53, p. 1053	•			
Rubella serology	Chap. 64, p. 1243	•			
Syphilis serology	Chap. 65, p. 1265	•			C
Gonococcal screening	Chap. 65, p. 1269	D			D
Chlamydial screening	Chap. 65, p. 1270	•			C
Hepatitis B serology	Chap. 55, p. 1090	•			D
HIV serology	Chap. 65, p. 1276	B			D
Group B streptococcus culture	Chap. 64, p. 1249				E
Tuberculosis screening[b]	Chap. 51, p. 1020				

Normal Pregnancy Duration

- mean duration of pregnancy calculated from the first day of the last normal menstrual period is very close to 280 days or 40 weeks.
- Naegele rule- estimate the expected delivery date by adding 7 days to the date of the first day of the last normal menstrual period and counting back 3 months
  - For example:
    - LMP September 10, 2017 → EDD is expected date of delivery is June 17, 2019

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Trimesters

- It has become customary to divide pregnancy into three parts of approximately 3 calendar months.
- first trimester: 1 to 14 weeks
- 2nd trimester: 15 to 28 weeks
- 3rd trimester: 29 to 42 weeks

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Psychosocial Screening

- The American Academy of Pediatrics and the American College of Obstetricians and Gynecologists (2012) define psychosocial issues as nonbiomedical factors that affect mental and physical well-being.
- Women should be screened for: barriers to care, communication obstacles, nutritional status, unstable housing, desire for pregnancy, safety concerns that include intimate partner violence, depression, stress, and use of substances such as tobacco, alcohol, and illicit drugs.
- This screening should be performed on a regular basis, at least once per trimester, to identify important issues and reduce adverse pregnancy outcomes.

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Cigarette Smoking

- Numerous adverse outcomes have been linked to smoking during pregnancy.
- Potential teratogenic effects
- twofold risk of placenta previa, placental abruption, and premature membrane rupture
- neonates born to women who smoke are more likely to be preterm, have lower birth- weights, and are more likely to die of sudden infant death syndrome (SIDS) than infants born to nonsmokers
- **Pathophysiology:** fetal hypoxia from increased carboxyhemoglobin, reduced uteroplacental blood flow, and direct toxic effects of nicotine and other compounds in smoke

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Alcohol

- Ethyl alcohol or ethanol is a potent teratogen that causes a fetal syndrome characterized by growth restriction, facial abnormalities, and central nervous system dysfunction
- Women who are pregnant or considering pregnancy should abstain from using any alcoholic beverages.

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Illicit drugs

- Chronic use of large quantities is harmful to the fetus
- Sequelae include fetal-growth restriction, low birthweight, and drug withdrawal soon after birth.

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Intimate Partner Violence

- refers to a pattern of assaultive and coercive behaviors that may include physical injury, psychological abuse, sexual assault, progressive isolation, stalking, deprivation, intimidation, and reproductive coercion
- associated with an increased risk of several adverse perinatal outcomes including preterm delivery, fetal-growth restriction, and perinatal death.
- Screen at the first prenatal visit, then again at least once per trimester, and again at the postpartum visit.

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Prenatal Visit

Frequency:

- Advise office visit at 8-10 weeks of pregnancy (or earlier if the patient is at risk for ectopic pregnancy)
- *Every 4 weeks for first 28 weeks.*
- *Every 2 – 3 weeks until 36 weeks gestation.*
- *Every week after 36 weeks gestation.*

Frequency of visits is determined by individual needs and assessed risk factors.

Goal: Coordination of care for detected medical and psychosocial risk factors.

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Clinical Evaluation

Gestational Age Assessment

1. Based on uterine size:

- 0 to 12 weeks AOG: uterus is a pelvic organ
- 12 weeks AOG: uterus at symphysis pubis
- 16 weeks AOG: midway between symphysis pubis and umbilicus
- 20 weeks AOG: umbilical level

- Linear measurement from the symphysis pubis to the uterine fundus on an empty bladder correlates with AOG at **16-32** weeks.
  - example: 20 weeks AOG = 20 cm

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Clinical Evaluation

Gestational Age Assessment

2. Based on ultrasound

- first-trimester crown-rump length is the most accurate tool for gestational age assignment

- Ultrasound done during 2nd and 3rd trimesters can also provide an estimated gestational age, but with declining accuracy.

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Clinical Evaluation

Laboratory tests

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Maternal weight	Chap. 9, p. 177	•	•	•	•
Pelvic/cervical examination	Chap. 9, p. 174	•			
Fundal height	Chap. 9, p. 176	•	•	•	•
Fetal heart rate/fetal position	Chap. 9, p. 176	•	•	•	•
Laboratory tests					
Hematocrit or hemoglobin	Chap. 56, p. 1101	•		•	
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Urine culture	Chap. 53, p. 1053	•			
Rubella serology	Chap. 64, p. 1243	•			
Syphilis serology	Chap. 65, p. 1265	•			C
Gonococcal screening	Chap. 65, p. 1269	D			D
Chlamydial screening	Chap. 65, p. 1270	•			C
Hepatitis B serology	Chap. 55, p. 1090	•			D
HIV serology	Chap. 65, p. 1276	B			D
Group B streptococcus culture	Chap. 64, p. 1249				E
Tuberculosis screening[b]	Chap. 51, p. 1020				

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Clinical Evaluation

Cervical Infections

- American Academy of Pediatrics and the American College of Obstetricians and Gynecologists (2012) recommend that *all women be screened for chlamydia during the first prenatal visit*, with additional third-trimester testing for those at increased risk.
- Following treatment, a second test—a so-called test of cure—is recommended in pregnancy 3 to 4 weeks after treatment completion
- American Academy of Pediatrics and the American College of Obstetricians and Gynecologists (2012) recommend that *pregnant women with risk factors for Neisseria gonorrhea infection or those living in an area of high N gonorrhoeae prevalence be screened at the initial prenatal visit and again in the third trimester*.

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Clinical Evaluation

Identification of High Risk Pregnancy

TABLE 9-4. Conditions for Which Maternal-Fetal Medicine Consultation May Be Beneficial

Medical History and Conditions
Cardiac disease—including cyanotic, prior myocardial infarction, moderate to severe valvular stenosis or regurgitation, Marfan syndrome, prosthetic valve, American Heart Association class II or greater
Diabetes mellitus with evidence of end-organ damage or uncontrolled hyperglycemia
Family or personal history of genetic abnormalities
Hemoglobinopathy
Chronic hypertension if uncontrolled or associated with renal or cardiac disease
Renal insufficiency if associated with significant proteinuria (≥ 500 mg/24 hour), serum creatinine ≥ 1.5 mg/dL, or hypertension
Pulmonary disease if severe restrictive or obstructive, including severe asthma
Human immunodeficiency virus infection
Prior pulmonary embolus or deep-vein thrombosis
Severe systemic disease, including autoimmune conditions
Bariatric surgery
Epilepsy if poorly controlled or requires more than one anticonvulsant
Cancer, especially if treatment is indicated in pregnancy

Obstetrical History and Conditions
CDE (Rh) or other blood group alloimmunization (excluding ABO, Lewis)
Prior or current fetal structural or chromosomal abnormality
Desire or need for prenatal diagnosis or fetal therapy
Periconceptional exposure to known teratogens
Infection with or exposure to organisms that cause congenital infection
Higher-order multifetal gestation
Severe disorders of amnionic fluid volume

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Subsequent Prenatal Visits

- Subsequent prenatal visits have been traditionally scheduled at *4 week intervals until 28 weeks, then every 2 weeks until 36 weeks, and weekly thereafter.*
- Women with complicated pregnancies often require return visits at 1- to 2-week intervals.

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Prenatal Surveillance

1. Fundal /fundic Height

- Between 20 and 34 weeks, the height of the uterine fundus measured in centimeters correlates closely with gestational age in weeks
- measurement is used to monitor fetal growth and amnionic fluid volume.
- It is measured as the distance along the abdominal wall from the top of the symphysis pubis to the top of the fundus.
- Obesity or the presence of uterine masses such as leiomyomata may limit fundal height accuracy. In such cases, sonography may be necessary for assessment.

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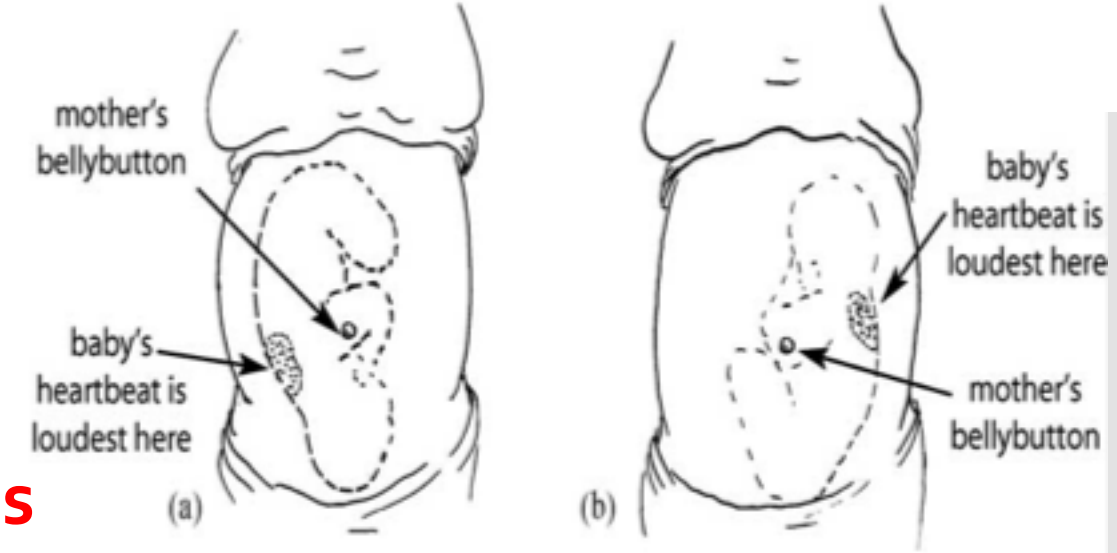
Prenatal Surveillance



2. Fetal Heart Sounds

- detectable by:
  - 10 weeks AOG using fetal doppler
  - 16 weeks AOG by stethoscope
- fetal heart rate ranges from 110 to 160 beats per minute and is typically heard as a double sound.
- Best heard along the fetal back

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Prenatal Surveillance

3. Ultrasound

- sonography provides invaluable information regarding fetal anatomy, growth
- American College of Obstetricians and Gynecologists (2011b) recommends that repeated sonography should be performed only when there is a valid medical indication under the lowest possible ultrasound exposure setting.

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Subsequent Lab Tests

1. Group B Strep (GBS) Infection

- Centers for Disease Control and Prevention (2010b) recommend that vaginal and rectal group B streptococcal (GBS) cultures be obtained in all women *between 35 and 37 weeks' gestation*
- Intrapartum antimicrobial prophylaxis is given for those whose cultures are positive.
- Women with GBS bacteriuria or a previous infant with invasive disease are given empirical intrapartum prophylaxis.

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Subsequent Lab Tests

2. Gestational Diabetes

- All pregnant women should be screened for gestational diabetes mellitus, whether by history, clinical factors, or routine laboratory testing.
- Done between 24 and 28 weeks' age of gestation
- Can be done during the first trimester check-up for high risk women.

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Nutritional Counseling

Weight Gain Recommendations

TABLE 9-5. Recommendations for Total and Rate of Weight Gain During Pregnancy, by Prepregnancy BMI[a]

Category (BMI)	Total Weight Gain Range (lb)	Weight Gain in 2nd and 3rd Trimesters Mean in lb/wk (range)
Underweight (< 18.5)	28–40	1 (1–1.3)
Normal weight (18.5–24.9)	25–35	1 (0.8–1)
Overweight (25.0–29.9)	15–25	0.6 (0.5–0.7)
Obese (≥ 30.0)	11–20	0.5 (0.4–0.6)

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Recommended Dietary Allowance

TABLE 9-6. Recommended Daily Dietary Allowances for Adolescent and Adult Pregnant and Lactating Women

	Pregnant		Lactating	
Age (years)	**14–18**	**19–50**	**14–18**	**19–50**
Fat-Soluble Vitamins				
Vitamin A	750 µg	770 µg	1200 µg	1300 µg
Vitamin D[a]	15 µg	15 µg	15 µg	15 µg
Vitamin E	15 mg	15 mg	19 mg	19 mg
Vitamin K[a]	75 µg	90 µg	75 µg	90 µg
Water-Soluble Vitamins				
Vitamin C	80 mg	85 mg	115 mg	120 mg
Thiamin	1.4 mg	1.4 mg	1.4 mg	1.4 mg
Riboflavin	1.4 mg	1.4 mg	1.6 mg	1.6 mg
Niacin	18 mg	18 mg	17 mg	17 mg
Vitamin B_6	1.9 mg	1.9 mg	2 mg	2 mg
Folate	600 µg	600 µg	500 µg	500 µg
Vitamin B_{12}	2.6 µg	2.6 µg	2.8 µg	2.8 µg
Minerals				
Calcium[a]	1300 mg	1000 mg	1300 mg	1000 mg
Sodium[a]	1.5 g	1.5 g	1.5 g	1.5 g
Potassium[a]	4.7 g	4.7 g	5.1 g	5.1 g
Iron	27 mg	27 mg	10 mg	9 mg
Zinc	12 mg	11 mg	13 mg	12 mg
Iodine	220 µg	220 µg	290 µg	290 µg
Selenium	60 µg	60 µg	70 µg	70 µg
Other				
Protein	71 g	71 g	71 g	71 g
Carbohydrate	175 g	175 g	210 g	210 g
Fiber[a]	28 g	28 g	29 g	29 g

[a]Recommendations measured as adequate intake.
From the Institute of Medicine, 2006, 2011.

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Recommended Dietary Allowance

1. Calories

- Pregnancy requires an additional 80,000 kcal, mostly during the last 20 weeks.
- To meet this demand, a caloric increase of 100 to 300 kcal per day is recommended during pregnancy
- Institute of Medicine (2006) recommends adding 0, 340, and 452 kcal/day to the estimated nonpregnant energy requirements in the first, second, and third trimesters, respectively.

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Recommended Dietary Allowance

2. Protein

- Needed for the demands for growth and remodeling of the fetus, placenta, uterus, and breasts, as well as increased maternal blood volume
- During the second half of pregnancy, approximately 1000 g of protein are deposited, amounting to 5 to 6 g/day
- Preferably, most protein should be supplied from animal sources, such as meat, milk, eggs, cheese, poultry, and fish.

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Recommended Dietary Allowance

3. Iron

- at least 27 mg of elemental iron supplement be given daily to pregnant women. This amount is contained in most prenatal vitamins.
- As little as 30 mg of elemental iron, supplied as ferrous gluconate, sulfate, or fumarate and taken daily throughout the latter half of pregnancy, provides sufficient iron to meet pregnancy requirements and to protect preexisting iron stores
- the pregnant woman may benefit from 60 to 100 mg of elemental iron per day if she is large, has twin fetuses, begins supplementation late in pregnancy, takes iron irregularly, or has a somewhat depressed hemoglobin level.

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Recommended Dietary Allowance

- **4. Iodine**
  - recommended daily iodine allowance is 220 µg
  - use of iodized salt and bread products is recommended during pregnancy to offset the increased fetal requirements and maternal renal losses of iodine.
  - Severe maternal iodine deficiency predisposes offspring to endemic cretinism, characterized by multiple severe neurological defects.

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Recommended Dietary Allowance

4. Calcium

- the pregnant woman retains approximately 30 g of calcium. Most of this is deposited in the fetus late in pregnancy

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Vitamins

1. Folic Acid

- Neural-tube defects can be prevented with daily intake of *400 µg of folic acid throughout the periconceptional period.*
- Because nutritional sources alone are insufficient, folic acid supplementation is recommended
- All women planning or capable of pregnancy take a daily supplement containing *0.4 to 0.8 mg of folic acid.*
- A woman with a prior child with a neural-tube defect can reduce the recurrence risk with *daily 4-mg folic acid* supplements the month before conception and during the first trimester.

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Vitamins

2. Vitamin A

- this vitamin has been associated with congenital malformations when taken in higher doses (> 10,000 IU per day) during pregnancy.
- Beta-carotene, the precursor of vitamin A found in fruits and vegetables, has not been shown to produce vitamin A toxicity.
- Most prenatal vitamins contain vitamin A in doses considerably below the teratogenic threshold.
- Vitamin A deficiency, whether overt or subclinical, was associated with an increased risk of maternal anemia and spontaneous preterm birth.

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Vitamins

3. Vitamin B12

- Vitamin B12 occurs naturally only in foods of animal origin, and strict vegetarians may give birth to infants whose B12 stores are low.
- Excessive ingestion of vitamin C also can lead to a functional deficiency of vitamin B12.
- Although its role is still controversial, low levels of vitamin B12 preconceptionally, similar to folate, may increase the risk of neural-tube defects

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Vitamins

4. Vitamin B6 (Pyridoxine)

- For women at high risk for inadequate nutrition—for example, substance abusers, adolescents, and those with multifetal gestations—a daily 2-mg supplement is recommended.
- when combined with the antihistamine doxylamine, is helpful in many cases of nausea and vomiting of pregnancy

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Vitamins

5. Vitamin C

- recommended dietary allowance for vitamin C during pregnancy is *80 to 85 mg/day*—approximately 20 percent more than when nonpregnant

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Pragmatic Nutritional Surveillance

1. In general, advise the pregnant woman to eat what she wants in amounts she desires and salted to taste.
2. Ensure that food is amply available for socioeconomically deprived women.
3. Monitor weight gain, with a goal of approximately 25 to 35 lb in women with a normal BMI.
4. Explore food intake by dietary recall periodically to discover the occasional nutritionally errant diet.
5. Give tablets of simple iron salts that provide at least 27 mg of elemental iron daily. Give folate supplementation before and in the early weeks of pregnancy. Provide iodine supplementation in areas of known dietary insufficiency.
6. Recheck the hematocrit or hemoglobin concentration at 28 to 32 weeks' gestation to detect significant decreases.

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Thank you!

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