CHAPTER 35
Vital Signs

CHAPTER OUTLINE

General review of the chapter:

Interviewing the Patient
Correct Documentation
Measuring Weight and Height
Vital Signs
Temperature
Pulse
Respiration
Blood Pressure
Pain
Body Fat Measurement

STUDENT STUDY GUIDE

Use the following guide to assist in your learning of the concepts from the chapter.

I. Documentation of Patient Information

1. Reasons for Maintaining the Patient’s Medical Record
   i. Accuracy in testing
   ii. Clear Documentation
   iii. Timely charting
   iv. Promoting patient care
   v. Gathering research data
   vi. Educating future health care provider
   vii. Analyzing health care

2. Contents of the Patient’s Medical Record
   i. Medical History
   ii. Test results
   iii. Hospital Discharge Summary
   iv. Birth consent form
   v. Diagnosis and detailed treatment plan
   vi. Intake or registration information
   vii. Operative reports
   viii. Record from other physician or facilities
   ix. Correspondence

3. Types of Diagnosis (Explain each of the following types.)
   A. Final or medical diagnosis: Arrive after all examinations, testing, procedures are made complete.
   B. Clinical diagnosis or working diagnosis:
   C. Differential diagnosis: Determination of which one of multiple possibilities is the cause of a problem.
4. Steps for Gathering Information to Ensure Proper Charting
   A. Before a patient has a physical examination or is seen by the physician, a Medical History must be obtained.
   B. The initial patient interview is conducted by the medical assistant and the information gathered becomes part of the Permanent Medical History.
   C. After the initial data have been gathered, the patient's vital signs, weight, and height are measured.
   D. The physician then examines the patient and records the information obtained.

5. The Initial Patient Interview
   A. Performed to obtain information on the patient's current and past illnesses and treatments.
   B. It is important to ensure the patient's privacy during the interview.

6. Considerations When Interviewing a Patient
   A. Review the Patient's Chart before the interview.
   B. Ask the patient's permission to interview him or her.
   C. Use an "Icebreaker" comment to put the patient at ease.
   D. Provide privacy during the interview.
   E. Be aware of verbal and nonverbal cues.
   F. Avoid making judgemental statements.
   G. Avoid providing medical assurances.
   H. Treat sensitive topics with respect.
   I. Document according to facility policy.

7. Charting Guidelines
   i. Record the date and time of every entry.
   ii. Write clearly.
   iii. Use Medical terminology and accepted abbreviations.
   iv. Use correct spelling.
   v. Sign every entry.
   vi. Accurately document information.
   vii. Do not erase.
   viii. Use permanent dark ink on the incorrect entry and initializing it.

8. The Six Cs of Charting
   A. Client: Own words must be used exactly and be in quotes.
   B. Clarity: Must be used when recording information.
   C. Completeness: is essential.
   D. Correctness: Order of entries saves time and chart space.
   E. Conciseness: Order of information is critical.
   F. Consistency: Patient information is mandatory.

9. Weighing a Patient
   A. Frequent weight monitoring is particularly important for certain patients (List patients who would benefit from such monitoring.)
      i. Diabetic patients
      ii. Pregnant women
      iii. Cardiac patients
      iv. Patients suffering from eating disorders.
10. Obtaining a Patient's Weight
   A. Typically done with clothing ___ON__.
   B. Shoes should be ___OFF__.
   C. Patients who cannot stand may be weighed on a ___Chair__ or a ___Bed__.

11. Measuring a Patient's Height
   A. Measured ___WITHOUT___ shoes.
   B. Heel, buttocks, and the back of the head should be touching the measuring ___STICK__ or bar.
   C. Convert inches and feet to ___CENTIMETERS_ by multiplying by 2.5.
   D. Convert from centimeters to ___INCHES_ by dividing by 2.5.

II. Temperature
1. Vital Signs (List what is considered to be a vital sign.)
   i. Temperature
   ii. Pulse
   iii. Respiration
   iv. Blood Pressure
   v. Weight + Height

2. Factors That Affect Body Temperature
   i. Time of Day
   ii. Age
   iii. Gender
   iv. Physical exercise
   v. Emotions
   vi. Pregnancy
   vii. Environmental changes
   viii. Infection
   ix. Drugs
   x. Food

3. Fever
   A. A fever is also known as ___PYREXIA__.
   B. A fever is a temperature that is above ___100.4°F_ (38°C).
   C. Indicates that the body is producing greater ___heat__ than what is being ___lost__.
   D. Indicates that the body is ___sick__.
   E. ___Hyperthermia__ or ___pyrexia__ develops if the body temperature exceeds 105.8°F (41°C).
   F. A temperature above ___109.4°F_ (43°C) is typically fatal.

4. Common Types of Fevers
   i. Intermittent fever
   ii. Miliary fever
   iii. Reemerging fever
   iv. Constant fever

5. Signs of a Fever
   i. ___Increased heart rate__
   ii. ___Shivering__
   iii. ___Chills__
   iv. ___Sweating__
   v. ___Increased respiratory rate__

6. Hypothermia
   A. Hypothermia is indicated by a temperature that is below ___97°F_ (36°C).
   B. A temperature below ___93.2°F_ (34°C) is typically fatal.

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C. Clinical signs of hypothermia
   i. Pale
   ii. Waxy
   iii. Cool skin
   iv. Lack of muscle coordination

7. Sites for Measuring Body Temperature (Explain why each site might be selected.)
   A. Oral: \( 98.6^\circ F (37^\circ C) \)
   B. Rectal: \( 98.6^\circ F (37^\circ C) \)
   C. Axillary: \( 98.6^\circ F (37^\circ C) \)
   D. Tympanic (aural): \( 98.6^\circ F (37^\circ C) \)

8. Normal Temperature Values
   A. Oral: \( 98.6^\circ F (37^\circ C) \)
   B. Rectal: \( 98.0^\circ F (37.0^\circ C) \)
   C. Axillary: \( 98.6^\circ F (37.0^\circ C) \)
   D. Ear (aural): \( 98.6^\circ F (37^\circ C) \)
   E. Temporal artery: \( 98.6^\circ F (37^\circ C) \)

9. Considerations When Taking an Oral Temperature
   A. Make sure that the patient closes his or her mouth when around the thermometer.
   B. Some facilities do not require the use of the degree symbol (°) when documenting this measurement.
   C. The thermometer is inserted under the tongue on either side of the frenulum linguae.
   D. For an accurate measurement, the patient must be advised not to talk during the procedure.
   E. Oral temperature should only be measured if 15 minutes have elapsed since the patient has taken fluids or smoked.

10. Considerations When Taking an Axillary Temperature
    A. Axillary temperatures register \( (0.6^\circ C) \) lower than oral temperatures.
    B. The axillary method is the least accurate of the temperature measurements, but it is recommended for small children or patients who have had oral surgery.
    C. This method is affected by perspiration, therefore, the underarm area should be dry in order to obtain an accurate reading.

11. Considerations When Taking an Aural Temperature
    A. This method uses the tympanic membrane area at the end of the external auditory canal.
    B. Tympanic thermometers are able to detect heat waves in the ear canal and calculate body temperature from this data.

12. Considerations When Taking a Temporal Artery Temperature
    A. This method is a new, noninvasive procedure involving a device that measures the temperature over the temporal artery located close to the skin surface on the forehead and the temple area.
    B. When the probe/scanner is passed over the surface of the forehead toward the temple, it can read the peak temperature.

13. Types of Thermometers
    i. Non-mercury glass
    ii. Electronic
    iii. Tympanic membrane
    iv. Temporal artery and chemical disposable

14. Steps for Measuring a Rectal Temperature
    A. If the patient is a child, explain the procedure to both the parent and the child.
B. Instruct the patient to lie on his or her left side with the top leg bent (this is called the "sims’s position").
C. Place a small amount of lubricant on a tissue and dip the probe into the lubricant.
D. With one hand, raise the upper buttock to expose the anus, or anal opening.
E. With the other hand, gently insert the lubricated thermometer 1/2 inch into the anal canal.
F. Hold the thermometer in place until the result is signaled, and then withdraw the thermometer.
G. Dispose of the probe cover in a biohazard waste container.
H. Wipe the anus from front to back to remove excess lubricant.

15. Steps for Accurately Using the Tympanic Thermometer
A. Remove the thermometer from its base. The display will read "Ready".
B. Attach the disposable probe cover to the earpiece.
C. With one hand, gently pull upward on the patient’s outer ear if the patient is an adult or pull back and downward if the patient is an infant or a child who is 3 years of age or younger.
D. Gently insert the plastic covered tip of the probe into the ear canal.
E. Press the scan button, which activates the thermometer.
F. Observe the temperature reading in the display window.

16. Steps for Accurately Obtaining an Axillary Temperature
A. Ask the patient to expose the axilla.
B. Using a tissue, pat the area dry of perspiration.
C. Place the covered probe into the axillary space.
D. When the thermometer beeps, remove the thermometer and discard the probe cover in a waste container.

17. Steps for Using a Chemical Disposable Thermometer
A. Identify the patient, explain the procedure, and dry the patient’s forehead.
B. Place the thermometer strip on the patient’s forehead.
C. Read the correct temperature by reading the color change.
D. The reading is taken by noting the highest reading among the dots that changed color.
E. The strip is kept in place for about 15 seconds and is read by the color change on the strip.

18. Steps for Using a Temporal Artery Thermometer
A. Identify the patient, explain the procedure, and brush the patient’s hair aside.
B. Place the probe flush on the center of the forehead and depress the med button.
C. Keep the button depressed and slowly slide the probe on the midline across the forehead to the hairline.
D. Lift the probe from the forehead and place it on the neck just behind the earlobe.
E. Release the button and read the temperature.

III. Pulse and Respiration

1. The Pulse
A. The pulse is the number of times that the heart beats per minute (bpm).
B. A wave of blood is created each time the left ventricle of the heart contracts.
C. Each pulse beat is one cardiac cycle, or one heartbeat.
D. A normal heartbeat is about 70 times per minute.
E. Increased oxygen results in a faster pulse rate.
2. Factors That Influence the Pulse Rate
   i. **Volume**
   ii. **Bounding pulse**
   iii. **Thready pulse**
   iv. **Rhythm**
   v. **Dysrhythmia**
   vi. **Arrhythmia**
   vii. **Intermittent pulse**
   viii. **Exercise**
   ix. **Medication**

3. Average Pulse Rates by Age
   A. Less than 1 year: **160–180 bpm**
   B. 2–6 years: **80–120 bpm**
   C. 6–10 years: **80–100 bpm**
   D. 11–16 years: **70–90 bpm**
   E. Adult: **60–80 bpm**
   F. Older adult: **50–65 bpm**

4. Characteristics of the Pulse
   i. **Volume**
   ii. **Rhythm**
   iii. **Tone**
   iv. **Compliance of the arterial wall**

5. Rate and Volume of the Pulse
   A. The **rate** describes the number of pulse beats per minute.
   B. The **volume** refers to the strength of the pulse.
   C. The volume is influenced by the forcefulness of the heartbeat, the condition of the arterial walls, and the intensity of the pulse. A variance in the intensity of the pulse may indicate heart disease.

6. Rhythm
   A. Refers to the **regularity or equal spacing** of beats.
   B. Normally, the intervals between each heartbeat are of the same **duration**.
   C. A pulse with an irregular rhythm is known as a **Dysrhythmia** or **Arrhythmia**.
   D. It is not considered abnormal if the heart occasionally **skips** a beat. This is referred to as an **Intermittent** pulse.

7. Common Pulse Sites
   i. **Radial**
   ii. **Buccal**
   iii. **Carotid**
   iv. **Temporal**
   v. **Femoral**
   vi. **Popliteal**
   vii. **Intercostal**
   viii. **Dorsal pedis**
   ix. **Atrial**

8. Steps for Measuring a Radial Pulse Rate
   A. Explain the procedure to the patient and ask the patient about any recent **physical activity** or **smoking**.
   B. Place your fingertips on the **Radial artery** on the thumb side of the wrist.
   C. Check the **quality** of the pulse.
D. Start counting the pulse beats when the second hand on your watch is at 3, 6, 9, or 12.
E. Count the pulse for __________ full minute.
F. Immediately write down the number of pulse beats per minute.

9. Steps for Taking an Apical-Radial Pulse
A. The first person places the ear pieces of the stethoscope in his or her ears, with the opening in the __________ facing forward.
B. Locate the Apex of the patient’s heart by palpating to the left __________ intercostal space at the midclavicular line.
C. The second person locates the __________ pulse on the thumb side of the wrist 1 inch below the base of the thumb.
D. The first person places the __________ piece of the stethoscope at the Apex of the heart.
E. When the heart __________ is heard, a nod is made to the second person and counting begins. Ideally, the count should begin when the __________ range of a watch is at the 3, 6, 9, or 12.
F. Count for __________ full minute.
G. Record the rate and quality of the heartbeat. Include both __________ and __________ rates, using the designation AP.
H. Calculate the pulse deficit by __________ the radial pulse rate from the __________ pulse rate.

10. Respiration
A. Respiration is the exchange of __________ and __________.
B. It consists of one __________ and one __________.
C. Each __________ and __________ of a patient’s chest equals one respiration.
D. Taken typically at the same time as a __________.

11. The Characteristics of Respiration
i. __________
ii. __________
iii. __________
iv. __________

12. Respiratory Rate Ranges by Age Group
A. Newborn: __________
B. 1 year old: __________
C. 2-10 years: __________
D. 11-18 years: __________
E. Adult: __________

13. Circumstances That Alter Respiration
i. __________
ii. __________
iii. __________
iv. __________
v. __________
vi. __________
vii. __________
viii. __________
ix. __________

x. __________

14. Terms for Describing Breathing Sounds
i. __________
ii. __________
iv. Crackles
v. Crackles or rales
vi. Wheezes
vii. Bronch"h

IV. Blood Pressure

1. Symptoms of Hypertension and Hypotension
   A. Symptoms of Hypertension
      i. Headache
      ii. Blurred vision
      iii. Chest pain
   B. Symptoms of Hypotension
      i. Dizziness
      ii. Syncope (fainting)

2. Blood Pressure Readings (Briefly explain each.)
   A. Systolic pressure: Highest pressure that occurs as the left ventricle of the heart
      contracts.
   B. Diastolic pressure: Lowest pressure level that occurs when heart is relaxed.
   C. Pulse pressure: Difference between systolic and diastolic readings.

3. The Five Phases of the Korotkoff Sounds
   A. The first distant sound is heard.
   B. The sound becomes a Distant_Sushing
   C. The sound becomes less Muffled and develops a tapping sound.
   D. The sound begins to fade.
   E. The sound disappears.

4. Blood Pressure Guidelines (List what the readings would be for each of the following.)
   A. Hypertension: 140/90 or above
   B. Prehypertension: 120/80 to 139/89
   C. Normal: 119/79 or below
   D. Optimal: 120/80 or below

5. Average Normal Blood Pressure Readings
   A. Newborn: 75/55
   B. 6–9 years: 90/55
   C. 10–15 years: 100/65
   D. 16 years to adulthood: 118/76
   E. Adulthood: 120/80

6. Physiological Factors Affecting Blood Pressure
   i. Volume of blood
   ii. Peripherical resistance
   iii. Condition of heart muscle
   iv. Elasticity of vessels

7. Other Factors Affecting Blood Pressure
   i. Anger
   ii. Certain drug therapies, nicotine, caffeine
   iii. Endocrine disorders (hyper-thyroidism)
   iv. Exercise
   v. Fear, excitement
   vi. Heart and liver disease
   vii. Increased arterial BP
   viii. Late pregnancy

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8. Other Terms Related to Abnormal Readings
A. Benign: **slow-onset** of elevated blood pressure without symptoms.
B. Essential: Primary hypertension of unknown cause. May be **determined**.
C. Secondary: Elevated blood pressure associated with other conditions such as **disease**, **pregnancy**, **antihypertensive** and obesity.
D. Malignant: Rapidly developing elevated blood pressure that may become **fatal** if not treated immediately.
E. Renal: Elevated blood pressure as a result of **disease**.
F. Orthostatic: A **temporary fall** in blood pressure that occurs when a patient rapidly moves from a lying to a standing position.
G. Postural: A temporary fall in blood pressure from **standing motionless** for extended periods of time.

9. Conditions That Require Blood Pressure to Be Monitored Regularly
i. **Drugs**
ii. **Heart conditions**
iii. **Hypertension**
iv. **Stroke**
v. **Hyper tension**
vi. **Complete physical exam**
vii. **Heart disease**
viii. **Pregnancy**
ix. **Before and after an operation**
x. **Allergic reaction**
xii. **Shock**
xiii. **Bleeding**

10. Equipment for Measuring Blood Pressure
i. **Sphygmomanometer**
ii. **Stethoscope**

11. The Components of the Stethoscope
i. **Chest piece**
ii. **Diaphragm**
iii. **Bell**
iv. **Flexible tubing**
v. **Binaurals**
vi. **Spring mechanism**
vii. **Earpieces**

12. Causes of Errors in Blood Pressure Readings
A. Equipment: The cuff is the **improper size**, or air leaks around the **valve** or **cuff bladder**.
B. Procedure: The patient's arm is **not uncovered**, or the medical assistant is too far from the **manometer** to accurately read the gauge.
C. Patient: The patient's arm is **too large** to obtain an accurate reading.

V. Pain
1. Pain—The Fifth Vital Sign
A. Pain is highly **subjective** and personal.
B. It is important to document a **description** of the pain.
C. It is important to observe the **non-verbal** signs of pain when talking with the patient.
D. Use of a numerical pain measurement scale can be useful.
E. Assessment is necessary to establish a treatment plan.

2. Characteristics of Pain (Briefly explain each type.)
   A. Acute pain:
      Expected pain associated with trauma or surgery.
   B. Chronic pain:
      Long-term pain that persists for months, with functions.
      Spreads out from an area.
   C. Radiating pain:
      Pain that is felt at a site away from injured or diseased.
      Overwhelming, difficult to relieve, and all-consuming.
   D. Referred pain:
      Sensation felt in a missing body part after it has been removed.
   E. Intractable pain:
   F. Phantom pain:

3. Other Terms Used to Describe Pain
   i. Excruciating
   ii. Horrifying
   iii. Penetrating
   iv. Aching
   v. Fleeting

VI. Body Fat Measurement
1. Steps for Using Calipers to Measure Skin-Fold Fat
   A. Grasp the Triceps in the upper arm with your thumb and index finger.
   B. Place the calipers over the fold and measure.
   C. Grasp the subscapular region beneath the shoulder blade and obtain the caliper reading and record it.
   D. Determine the total percentage of body fat, using a table provided by the manufacturer.

2. Steps for Accurately Calculating the Body Mass Index
   A. Insert the patient’s height and weight into the formula; use pounds and inches or kilograms and meters according to facility policy.
   B. Formula BMI = \( \text{weight in pounds} \div (\text{height in inches} \times 703) \)

**KEY TERMINOLOGY REVIEW**

Without using your textbook, write a sentence using the selected key terms in the correct context.

1. Afebrile:
   Absence of a fever

2. Apical:
   Heart rate is counted at the apex of the heart.

3. Asymptomatic:
   The condition of high blood pressure known as hypertension is often without any symptoms.

4. Basal metabolism:
   Rate of metabolism when the body is awake and at rest.
5. Baseline: A known value with which follow-up values would compare.

6. Cyanosis: Blueish discoloration of the skin and nail bed due to lack of oxygen of the tissues.

7. Dysrhythmia: Pulse with an irregular rhythm.

8. Febrile: The body is producing greater heat than it is.

9. Frenulum linguae: Longitudinal fold of mucous membrane under the tongue.

10. Hypertension (HTN): Condition in which blood pressure is consistently higher than 140/90 mmHg.

11. Hyperthermia: When the body temperature exceeds 105.8°F (41°C), a serious condition.

12. Hyperventilation: Deep, rapid respirations

13. Hypoventilation: Shallow respirations

14. Manometer: Part of sphygmomanometer, a scale that registers the actual pressure reading.

15. Metabolism: Sum of all biochemical and physiological processes that take place in the body.

16. Palpatory method: Feeling the radial pulse while the blood pressure cuff is deflating.

17. Phantom pain: Sensation felt in a missing body part after it has been removed.

18. Pulse deficit: Difference in readings between the apical and radial pulses.
19. **Radiating pain:**

Pain that spreads out from an area

20. **Referred pain:**

Pain that is felt at a site other than the injured or diseased body part

21. **Subjective symptom:**

Unmeasurable symptom felt by the patient but not apparent to an observer

22. **Syncope:**

Fainting

Symptoms of hypotension are dizziness

23. **Tachycardia:**

Abnormally rapid heart rate

<table>
<thead>
<tr>
<th>HR</th>
<th>Heart Rate above 100 bpm</th>
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24. **Thready pulse:**

Weak, or barely perceptible force or blood volume

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**APPLIED PRACTICE**

Follow the directions as instructed with each question below.

1. A patient, who has a normal baseline temperature of 98.6°F has had the following average body temperatures over the last 5 days: Day 1: 101.2°F, Day 2: 100.1°F, Day 3: 98.6°F, Day 4: 99.0°F, Day 5: 101.3°F. How would you describe this fever? Explain your answer.

2. Your patient is a 43-year-old female. Her blood pressure is 157/92. What is the patient’s pulse pressure? Is the pulse pressure normal? Explain your answer.

   Pulse pressure is calculated as the difference between the systolic and diastolic pressures. In this case, it is 157 - 92 = 65. A normal pulse pressure is generally considered to be between 30 and 50 mmHg. Since 65 is above this range, it is considered abnormal.

3. You are preparing a new patient for a physical examination. Because the patient has recently moved from a European country, he would like the medical assistant to tell him his body temperature in Celsius rather than Fahrenheit. When obtaining his temperature, the thermometer reads 99.0°F. How does this convert to Celsius? What is the conversion formula?

   The conversion formula from Fahrenheit to Celsius is: $C = (F - 32) \times \frac{5}{9}$.

   Using the formula: $C = (99.0 - 32) \times \frac{5}{9} = 37.2$°C.

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LEARNING ACTIVITY: FILL IN THE BLANK

Using words from the list below, fill in the blanks to complete the following statements.

Note: Some terms are used in more than one statement.

Anthropometric  
Anthropometry  
Apnea  
Atrial  
Blood pressure  
Bradynea  
Core  
Eupnea  
Heat waves  
Korotkoff sounds  
Movement  
Orthostatic hypotension  
Pulse  
Rate  
Rectal  
Respirations  
Rhythm  
Sphygmomanometer  
Symptom  
Tachypnea  
Tympanic membrane thermometer  
Volume  
Walls  

1. Oral and _____ temperatures measure the body's _____ temperature.

2. _____ are counted by watching, listening, or feeling the _____ inspiration and expiration on the patient's back, stomach, or chest.

3. The three aspects to note when taking a pulse are _____, _____, and _____.

4. The _____ are the sounds actually heard as the _____ wall distends during the compression of the blood pressure cuff.

5. Orthostatic _____ refers to the lowered _____ that occurs when a patient moves from lying down to an erect position.

6. The _____ is the instrument used for measuring the pressure that the blood exerts against the _____ of the artery.

7. The _____ or aural thermometer is so named because it is able to detect _____ within the ear canal and near the eardrum.

8. A respiratory rate of below 12 (called _____) or above 40 (called _____) in an adult should be considered a serious symptom.

9. _____ means the absence of breathing for longer than 19 seconds, and _____ means normal breathing.

10. Weight and height are _____ measurements since they relate to the science of size, proportion, weight, and height.

CRITICAL THINKING

Answer the following questions to the best of your ability. Utilize the textbook as a reference.

1. Why might you take vitals while a patient is receiving a treatment?

2. If a patient walks in without an appointment and presents as extremely short of breath (SOB) and appears weak, do you think that you should spend the time doing weight, height,