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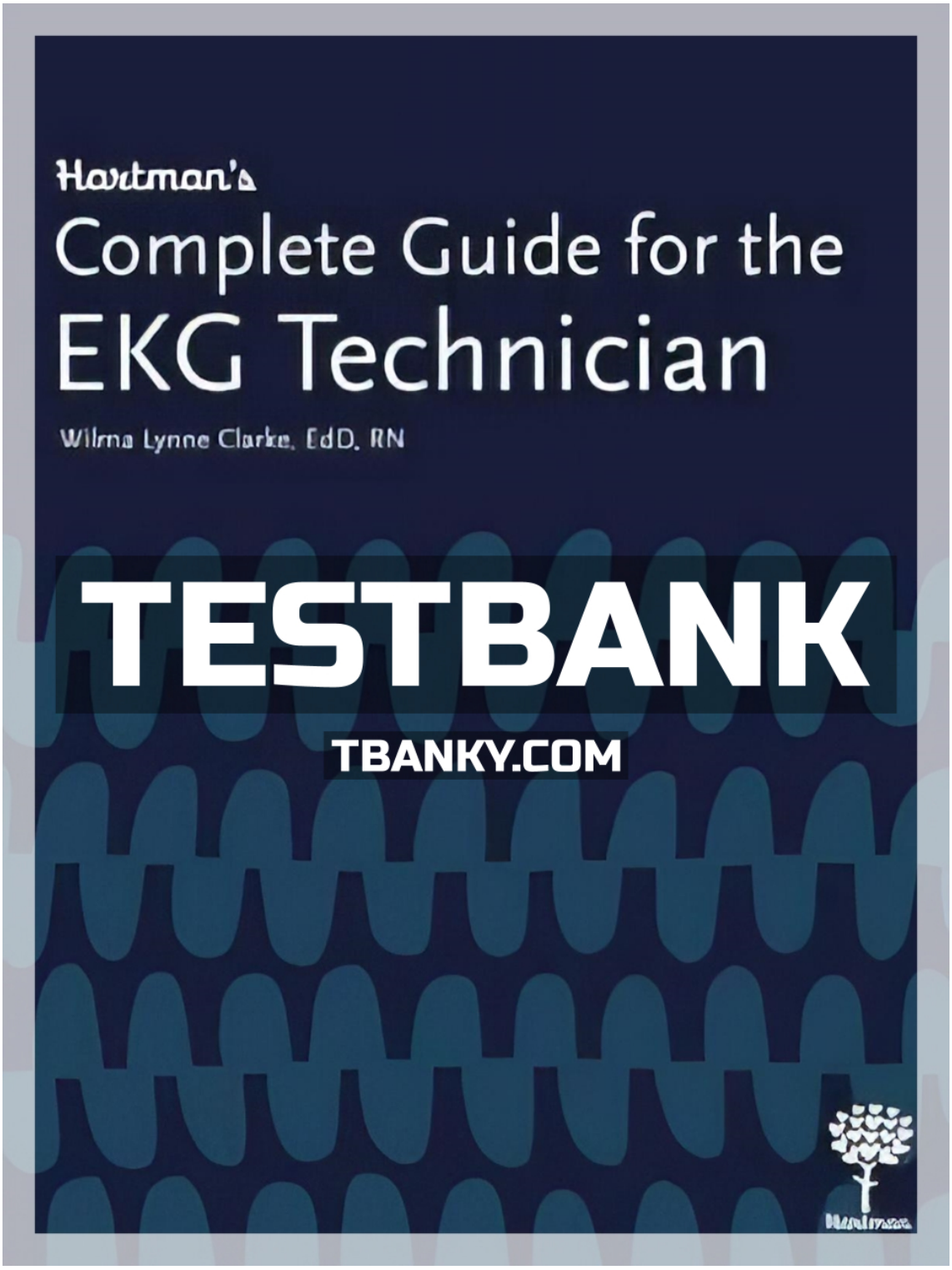

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Instructor's Guide for Hartman's Complete Guide for the EKG Technician

by Hartman Publishing, Inc.

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Notice to Readers

Though the guidelines and procedures contained in this text are based on consultations with healthcare professionals, they should not be considered absolute recommendations. The instructor and readers should follow employer, local, state, and federal guidelines concerning healthcare practices. These guidelines change, and it is the reader's responsibility to be aware of these changes and of the policies and procedures of her or his healthcare facility.

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Preface

Welcome to the instructor's guide for *Hartman's Complete Guide for the EKG Technician*! We want to be your teaching partner, and we have tried to make this the most useful instructor's guide we have ever written. If you have suggestions for improving it, please let us know. If you teach topics not covered in the book, call us and we will do something about it!

In response to feedback we have received from instructors we are emphasizing material that develops students' critical thinking skills. Within each chapter's lesson plans you will see several exercises with headings that begin C*ritical Thinking*. These exercises, ranging from conversation starters to research projects, are designed to get students thinking critically about the material they are studying: analyzing problems, generating new ideas, and applying the principles they learn to a broad range of situations.

Like the textbook, the instructor's guide is organized around learning objectives, which should make teaching the material much simpler. We have included the textbook page numbers to make it easier for you to assign readings to your students.

Appendix A contains all of the key material masters that we have created for this course, and Appendix B contains the handouts, beginning with Handout QR-1, a compilation of all of the book's Quick Reference (QR) charts. Together these QR charts can function as a brief booklet covering the essentials of the EKG technician's job. Lesson plans will note when material being discussed may be viewed in the students' QR chart printouts. Appendix B also includes several handouts with additional EKG strips for rhythm interpretation practice. Answers to the in-text exercises and additional rhythm strip handouts can be found in Appendix C. Appendices D and E contain end-of-chapter review questions and answers, respectively. Appendices F and G contain the chapter exams and their answer keys. Appendix H is a sample exam based on test plans from various certifying agencies and Appendix I is the key to that sample exam.

The PowerPoint presentations based on this instructor's guide include all of the key material masters, along with critical thinking activities and chapter review questions. The EKG rhythm identification exercises are included in the PowerPoint presentations for in-class review, and the answers are revealed with a click. There are two separate PowerPoint files containing the sample certification exam: one that simply presents the exam and answer choices, and a second one that includes the answers, revealed with a click.

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We hope you find this guide helpful, thorough, and engaging. Call us with your feedback and suggestions! We would love to hear from you.

Happy teaching!

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1
The Role of the EKG Technician

1. Describe the role of the EKG technician and identify healthcare settings in which EKG technicians work
2. Identify soft skills and personal traits needed for success as an EKG technician
3. Describe the certification process for the EKG technician
4. Describe the importance of continuing education and recertification
5. Demonstrate proper communication with other members of the healthcare team
6. Discuss the chain of command and understand the importance of following a facility's policies and procedures
7. Discuss outside organizations important to the function of healthcare facilities

Supplemental Tools

KEY MATERIAL 1-1 FACILITIES WHERE EKGS ARE CONDUCTED

KEY MATERIAL 1-2 QUALITIES OF GREAT EKG TECHNICIANS

KEY MATERIAL 1-3 POSITIVE AND NEGATIVE NONVERBAL COMMUNICATION

KEY MATERIAL 1-4 CHAIN OF COMMAND

KEY MATERIAL 1-5 PROTECTED HEALTH INFORMATION (PHI)

HANDOUT 1-1 PREFIXES, ROOTS, AND SUFFIXES

Assignments

TEXTBOOK READING: PP. 1–12

Overview of Teaching Strategies

The purpose of this chapter is to provide an overview of the job of the EKG technician. This chapter introduces the functions the EKG technician will be expected to perform, the different healthcare settings where EKG technicians work, and the skills and personal qualities necessary for success in the job. Certification and continuing education are addressed, and this is an opportunity for sharing information about any assistance available to students in registering for certification exams. EKG technicians are expected to behave in ethical and legal ways, which are specifically explained in this chapter. The students should be made aware of their responsibilities regarding legal and ethical issues. Information about HIPAA is included in this chapter and should be emphasized. It is important that students know that there are serious repercussions for breaches of confidentiality.

1. Describe the role of the EKG technician and identify healthcare settings in which EKG technicians work

Meeting the Learning Objective

TEXTBOOK READING: PP. 1–3

Lecture and Discussion

Define the following terms:

- Electrocardiogram (EKG)
- Diagnosis
- Cardiologist
- EKG technician
- Ambulatory care
- Outpatient treatment
- Acute care
- Inpatient treatment
- Myocardial infarction
- Scope of practice

Discuss the tasks EKG technicians perform, including taking clinical history, measuring vital signs, and conducting a range of EKG tests, including continuous monitoring, setting up ambulatory monitoring or telemetry, 12-lead EKGs, and stress tests.

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Display Key Material

KEY MATERIAL 1-1 FACILITIES WHERE EKGS ARE CONDUCTED

Discuss the types of healthcare facilities where EKGs are conducted:

Ambulatory care settings

- Doctor's office
- Urgent care center
- Free-standing emergency department
- Occupational health clinic
- Primary care clinic
- Cardiology specialty clinic
- Outpatient surgery center
- Rehabilitation or physical therapy clinic

Inpatient care settings

- Hospital
- Specialty hospital (e.g., heart hospital or children's hospital)
- Long-term care facility
- Inpatient rehabilitation facility

Critical Thinking: Conversation Starter

Ask students how the day-to-day tasks of an EKG technician might be different at different types of facilities. What do students see as the advantages and disadvantages of each setting?

2. Identify soft skills and personal traits needed for success as an EKG technician

Meeting the Learning Objective

TEXTBOOK READING: PP 3–6

Lecture and Discussion

Define the following terms:

- Soft skills
- Hard skills
- Prejudice
- Empathy
- Sympathy
- Code of ethics

Discuss the difference between hard skills and soft skills required to perform the job of an EKG technician, and why soft skills are important in finding and keeping a job.

Display Key Material

KEY MATERIAL 1-2 QUALITIES OF GREAT EKG TECHNICIANS

Describe these soft skills/qualities and how they relate to the EKG technician's job:

- Acceptance of constructive feedback
- Care for personal appearance
- Reliable attendance
- Attention to detail
- Communication skills
- Acceptance of cultural diversity
- Compassion
- Flexibility
- Initiative
- Integrity
- Problem solving ability
- Timeliness
- Tact
- Understanding of teamwork

Critical Thinking: Conversation Starter

Ask students if they can think of any other soft skills that would benefit an EKG technician. Ask for examples of situations when specific soft skills would be used on the job and why they would be important in those situations.

Remind students that good communication skills involve being mindful of both verbal and nonverbal communication, and that body language—like words—can communicate negative messages.

Display Key Material

KEY MATERIAL 1-3 POSITIVE AND NEGATIVE NONVERBAL COMMUNICATION

Discuss the types of nonverbal communication that are generally considered to send a positive message:

- Standing up straight with arms relaxed
- Leaning toward speaker
- Making eye contact
- Nodding or smiling
- Offering handshake or greeting

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- Taking notes
- Using a cheerful tone of voice
- Smiling

Discuss the types of nonverbal communication that are generally considered to send a negative message:

- Slouching or resting head in hands
- Leaning back from the speaker
- Crossing arms over chest
- Avoiding eye contact, looking down
- Checking the time
- Not acknowledging the other person
- Picking at or playing with something
- Using an angry tone of voice
- Frowning, wincing, rolling eyes

Critical Thinking: Conversation Starter
Ask students whether they think nonverbal communication and acceptance of cultural diversity are connected topics. Why or why not?

3. Describe the certification process for the EKG technician

Meeting the Learning Objective

TEXTBOOK READING: PP. 6–7

Lecture
Define the following terms:

- Certification
- Licensure
- Clinical experience

Clarify the difference between certification and licensure. Describe the process of becoming certified as an EKG technician and the different certifying agencies familiar to your school or facility. Emphasize the ways in which students must take responsibility for managing their path to certification (e.g. being aware of the requirements of the agency they are using, understanding the test plan and preparing for the exam, etc.).

Describe these typical requirements for certification:

- Complete a recognized training course
- Provide proof of hands-on clinical or laboratory experience
- Pass an exam (usually computer-based)
- Pay a certification fee

Note that authentic certifying agencies will likely be members of organizations like the Institute for Credentialing Excellence (ICE) or the National Commission for Certifying Agencies (NCCA) and that seeing these logos on an agency's website is a good sign that the agency offers a genuine certificate.

4. Describe the importance of continuing education and recertification

Meeting the Learning Objective

TEXTBOOK READING: PP. 7–8

Lecture
Define the following term:

- Cardiopulmonary resuscitation (CPR)

Describe the types of continuing education courses relevant to EKG technicians, including AHA Basic Life Support certification and any continuing education required for recertification by agencies your school or facility works with.

Review the general recertification requirements of most certification programs:

- Renew certification at a regular interval (e.g., every two years)
- Provide proof of active practice
- Provide proof of appropriate continuing education
- Pay a fee

5. Demonstrate proper communication with other members of the healthcare team

Meeting the Learning Objective

TEXTBOOK READING: PP. 8–9

Lecture and Discussion
Discuss the variety of other healthcare workers EKG technicians communicate with while doing their jobs:

- Doctors
- Mid-level providers such as physician assistants and nurse practitioners
- Nurses
- Physical therapists

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- Pharmacists
- Emergency medical technicians
- Volunteer ambulance crews

Distribute Handouts

HANDOUT 1-1 PREFIXES, ROOTS, AND SUFFIXES

This optional handout provides students the tools to understand how medical terminology is constructed and may enhance their ability to communicate with other healthcare workers.

Critical Thinking: Conversation Starter
Direct students to the common abbreviations listed in their QR chart printouts. Why could medical terms and abbreviations like these make communication between healthcare workers more accurate? In what situations should they *not* use these abbreviations?

6. Discuss the chain of command and understand the importance of following a facility's policies and procedures

Meeting the Learning Objective

TEXTBOOK READING: PP. 9–10

Lecture and Discussion
Define the following terms:

- Chain of command
- Liability
- Policy
- Procedure
- Confidentiality

Describe the importance and value of a facility's chain of command:

- Helps employees know who will give them assignments and where to go with needs or concerns
- Makes clear the limits of liability—or responsibility for actions that harm someone
- Helps both the employee and the facility by clarifying roles

Display Key Material

KEY MATERIAL 1-4 CHAIN OF COMMAND

The chain of command shown in the key material slide is a general example. Discuss possible variations at different types of facilities.

Define and give examples of *policies* and *procedures*.

Critical Thinking: Group Activity
Divide the class into small groups and assign each a topic, such as employee attendance (including tardiness) or dress code. Each group should develop a policy about the assigned topic and then share with the class and discuss.

7. Discuss outside organizations important to the function of healthcare facilities

Meeting the Learning Objective

TEXTBOOK READING: PP. 10–11

Lecture and Discussion
Define the following terms:

- Protected health information (PHI)

Describe the federal government's involvement in the protection of patient privacy after the passage of the Health Insurance Portability and Accountability Act (HIPAA), and what the law means for healthcare workers:

- Penalties for mishandling or misusing patients' PHI
- Civil charges with monetary fines
- Criminal charges with monetary fines and/or jail time
- Possible loss of certification or license if convicted

Display Key Material

KEY MATERIAL 1-5 PROTECTED HEALTH INFORMATION (PHI)

Review the types of information considered to be PHI:

- Name
- Postal address
- All elements of dates associated with an individual (birth date, hospital admission date, etc.) except year
- Telephone number
- Fax number
- Email address

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- URL (website) address
- IP address (a number that identifies a device connected to a computer network)
- Social security number
- Account numbers of any kind
- License or certificate numbers of any kind
- Medical records number
- Health plan beneficiary number
- Device identifiers and their serial numbers
- Vehicle identifiers such as license plate numbers and serial numbers
- Biometric identifiers (fingerprints, voiceprints, etc.)
- Full-face photos and other comparable images
- Any other unique identifying number, code, password, or characteristic

Critical Thinking: Conversation Starter
HIPAA violations may be intentional or unintentional. Ask students to think of ways in which PHI might be *unintentionally* compromised. Ask them if they think it is fair for unintentional violations to carry penalties. Why or why not?

Introduce the Health Information Technology for Economic and Clinical Health (HITECH) Act and describe the use of electronic health records. Discuss the benefits of using electronic records:

- Makes it easier to coordinate care between healthcare providers
- Can make patient records more secure if system security is maintained

Critical Thinking: Conversation Starter
Ask students to discuss whether electronic health records make patients' protected health information more or less secure. Ask that they justify their opinions by describing specific situations that might occur.

Discuss the nongovernmental agencies described in this LO:

- The Joint Commission, which evaluates and accredits healthcare facilities on a voluntary basis
- The American Heart Association (AHA), which sets the standards of treatment for Basic Life Support and Advanced Cardiovascular Life Support certification

Chapter Review

End-of-Chapter Review Questions
Distribute or display Chapter 1 review questions, then check and discuss answers.

Critical Thinking: Role Play
Divide students into small groups and ask them to develop a short skit illustrating one of the soft skills from Key Material 1-2 (pp. 3–6 of the text). Skills can be assigned to reduce duplication. The skit should demonstrate what happens when the soft skill is not being displayed and then repeat the situation showing the proper actions.

Critical Thinking: Research Projects
Students, individually or in groups, can choose one of these topics to research. The information they gather can be presented in poster format, as a written paper, or in a presentation to the rest of the class.

Research topics:
Research the story of Lewis Blackman and the Lewis Blackman Act. Consider the story especially as it relates to the issues of staff identification, communication, and chain of command.

Research a government or non-profit organization that plays a role in healthcare. Important information to gather includes the following:

- Purpose/mission of agency
- Funding source of agency
- Who is served by the agency
- Recent agency actions/developments
- At least two vocabulary words associated with the agency

Suggested agencies:

- Centers for Disease Control and Prevention
- World Health Organization
- US Department of Veterans Affairs
- Your state's health department
- US Public Health Service
- Occupational Safety and Health Administration
- Joint Commission

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2
Basic Patient Care Skills

1. Explain the importance of monitoring vital signs
2. Discuss the role of the EKG technician in infection prevention and control
3. List guidelines for measuring body temperature and observing skin condition
4. Define *pulse* and list guidelines for measuring pulse
5. Define *respirations* and list guidelines for measuring respirations
6. Define *blood pressure* and list guidelines for measuring blood pressure
7. Describe normal vital sign ranges for pediatric patients
8. Perform procedure for obtaining pulse oximetry readings and identify normal ranges for pulse oximetry readings
9. Describe the importance of assessing and reporting pain and level of consciousness
10. Describe patient body positions commonly used during EKG testing

Supplemental Tools

KEY MATERIAL 2-1 COMMON TEMPERATURE SITES

KEY MATERIAL 2-2 COMMON PULSE POINTS

KEY MATERIAL 2-3 PAIN MEASUREMENT SCALE

KEY MATERIAL 2-4 BODY POSITIONS

HANDOUT 2-1 CLINICAL HISTORY

HANDOUT 2-2 SAMPLE PATIENT ASSESSMENT

Assignments

TEXTBOOK READING: PP. 13–32

Overview of Teaching Strategies

This chapter presents the non-EKG-related patient care skills EKG technicians may use on the job. It includes an overview of infection prevention (Standard and Transmission-Based Precautions) and the measures the students will need to employ in all patient interactions, as well as step-by-step procedures for the fundamental infection prevention skills of handwashing and applying/removing personal protective equipment. The chapter defines and describes the importance of measuring vital signs, as well as emphasizing the importance of monitoring blood oxygen saturation, pain level, and level of consciousness. Adult and pediatric ranges are discussed. Step-by-step procedures for vital sign and oxygen saturation measurement may be practiced in class if desired, and a handout describing how to take clinical history can be used as a basis for in-class role-playing.

1. Explain the importance of monitoring vital signs

Meeting the Learning Objective

TEXTBOOK READING: P. 13

Lecture and Discussion

Define the following terms:

- Vital signs
- Baseline
- Objective information
- Subjective information

Describe the reasons for measuring vital signs and for monitoring blood oxygen saturation, pain levels, and level of consciousness. Remind students that they must identify themselves by name and position during every patient interaction.

Students have ranges for adult vital signs in their QR chart printouts.

Distribute Handouts

HANDOUT 2-1 CLINICAL HISTORY

HANDOUT 2-2 SAMPLE PATIENT ASSESSMENT

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Read through Handout 2-1 together and answer any student questions regarding clinical history.

Critical Thinking: Role Play

Divide students into two groups: technicians and patients. Students will practice taking clinical history, using the information in Handout 2-1 and filling out the form in Handout 2-2. Give the groups time to consider their roles, including, for patients, what signs and symptoms they are experiencing and, for technicians, what questions they plan to ask. After one round of interviews, the roles may be reversed. Encourage students acting as patients to be creative and to attempt to pose some of the same challenges real patients may pose (e.g., giving incomplete answers or not understanding questions).

Critical Thinking: Game

Ask students to all think of either an objective or subjective piece of information a patient might present. Call on students in turn to share their information and the class can shout "Sign!" or "Symptom!" as appropriate (e.g., a student says "Fever of 102" and the appropriate response is "Sign!").

2. Discuss the role of the EKG technician in infection prevention and control

Meeting the Learning Objective

TEXTBOOK READING: PP. 14–20

Lecture and Discussion

Define the following terms:

- Microorganism
- Pathogen
- Infection prevention
- Occupational Safety and Health Administration (OSHA)
- Centers for Disease Control and Prevention (CDC)
- Standard Precautions
- Transmission-Based Precautions
- Hand hygiene
- Personal protective equipment
- Methicillin-resistant *Staphylococcus aureus* (MRSA)

Inform students that:

- Infections are spread when a pathogen from an infected individual is able to invade and multiply within a new host.
- Infection prevention measures attempt to stop pathogens at some point along this path, breaking the chain of infection and controlling the spread of disease.
- Healthcare workers have a duty to protect themselves and the people in their care from the spread of infection.
- Standard Precautions must be used with every patient for every interaction.

Discuss the requirements of Standard Precautions:

- Wash hands before and after providing care.
- Use personal protective equipment (PPE) when contact with body fluids or nonintact skin is likely.
- Treat all blood, body fluids, nonintact skin, and mucous membranes as if infected.
- Properly clean and disinfect patient care equipment and instruments/devices.

Remind students that frequent handwashing is the most important/effective way to prevent the spread of pathogens.

Demonstration

Demonstrate or review the steps for the procedure *Washing hands (hand hygiene)*. Have the students return the demonstration if possible.

Describe times when handwashing is necessary (information also included in their QR chart printouts):

- At the beginning of a shift
- Whenever hands are visibly soiled
- Before and after any patient contact
- After contact with any body fluids
- Before and after wearing personal protective equipment (PPE)
- Before and after eating or smoking
- Before and after using the toilet
- After touching garbage or trash
- Before and after applying makeup
- After any contact with pets
- At the end of a shift

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Demonstration
Demonstrate or review the steps for the procedures *Putting on (donning) gloves* and *Removing (doffing) gloves*. Have the students return the demonstration if possible.

Describe situations in which students will need to wear gloves during patient care (e.g., when applying and removing electrodes on patients with open skin wounds or rashes).

Demonstration
Demonstrate or review the steps for the procedures *Donning a full set of PPE* and D*offing a full set of PPE*. Have the students return the demonstration if possible.

Describe situations in which students might use full PPE.

Remind students that Standard Precautions are used with every patient for every interaction and that Transmission-Based Precautions are used *in addition* to Standard Precautions.

Review facts about Airborne Precautions:

- Used for patients with diseases or suspected diseased that are spread through the air
- Airborne pathogens can remain floating for some time after a person coughs or sneezes.
- N95 respirators, which are designed to filter out at least 95% of airborne pathogens, must be worn when entering the patient's room/providing care.
- Handwashing should be performed before and after donning respirator.
- The patient's door should be kept closed.
- Common airborne diseases include tuberculosis, measles, and chickenpox.

Review facts about Droplet Precautions:

- Used for patients with diseases or suspected diseases that are spread by droplets when a person coughs, sneezes, or is suctioned
- Droplet pathogens can travel up to six feet from the infected person.
- A regular facemask is used to care for patients under Droplet Precautions.
- Handwashing should be performed before and after donning the mask.
- The patient should wear a mask when being moved from room to room.
- Influenza is a droplet disease.

Review facts about Contact Precautions:

- Used for patients with diseases or suspected diseases that are spread by touch
- Contact pathogens can be spread by directly touching an infected person or by touching an object touched by an infected person.
- Gown, gloves, mask, and eye protection are used to avoid direct contact.
- Common contact diseases include MRSA, pink eye, and *C. diff*.
- These illnesses spread quickly and can be hard to control, especially in healthcare settings.

Describe OSHA's Bloodborne Pathogens Standard and what employers must do to protect healthcare workers from exposure:

- Have a written exposure control plan
- Provide appropriate PPE
- Provide appropriate biohazard disposal containers
- Give healthcare workers free Hepatitis B vaccination
- Maintain a log of contaminated sharps injuries

Remind students that healthcare workers must immediately report injuries or incidents on the job so they can be treated as directed in the facility's exposure control plan.

Discuss general infection prevention guidelines healthcare workers should follow on the job:

- Don any necessary PPE outside a patient's room and remove it before exiting the room.
- Do not reuse disposable equipment or share it between patients.
- Clean and disinfect reusable equipment (such as lead wires and electrode clips) after use, following facility policy/manufacturer's instructions.
- Never place patient equipment on contaminated surfaces.
- Be familiar with available PPE.
- Follow directions stated on any signs on the patient's door.

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Critical Thinking: Game

Divide class into pairs or small groups. Each group should create a patient health scenario to present to the rest of the class, e.g., *You are taking vital signs on a patient with a suspected case of influenza* or *You are performing an EKG on a patient with MRSA*. The class must describe what level of precautions is required, what PPE must be used, and when hand hygiene or any other infection prevention measure should be performed.

3. List guidelines for measuring body temperature and observing skin condition

Meeting the Learning Objective

TEXTBOOK READING: PP. 20–22

Lecture

Define the following terms:

- Diaphoresis
- Cyanosis

Discuss the importance of body temperature as a vital sign:

- Reflects a balance between heat created by the body and heat lost to the environment
- Varies throughout the day
- Can be affected by age, illness, exercise, and the environment
- Fever is often a sign that the body is fighting infection

Display Key Material

KEY MATERIAL 2-1 COMMON TEMPERATURE SITES

Review indications for each temperature site, as shown in key material slide:

Oral

- Taken under the tongue
- For alert/cooperative patients over 5
- Patient must not have eaten, smoked, drunk fluids, chewed gum, or exercised recently

Tympanic

- Taken in the ear
- For infants over 6 months, children, and adults
- Earwax buildup can prevent accurate reading

Axillary

- Taken under the arm
- Used in situations in which no other method is possible
- Least accurate method

Temporal

- Swiped across the forehead (temporal artery)
- For infants over 3 months old, children, and adults

Demonstration

Demonstrate or review the steps for the procedure *Measuring and recording an oral temperature*. Have the students return the demonstration if possible.

Demonstration

Demonstrate or review the steps for the procedure *Measuring and recording a temporal temperature*. Have the students return the demonstration if possible.

Be sure students are aware that the different temperature sites have different normal ranges:

- Normal range for oral temperature is 97.7°F–99°F (36.5°C–37.2°C).
- Temporal and tympanic readings are slightly higher.
- Axillary readings are lower.
- Rectal temperature is most accurate, but EKG technicians are unlikely to be asked to use this method.

Discuss observations of skin condition important for EKG technicians to note (also in QR chart printout):

- Hot and dry skin may indicate fever or heat-related emergency
- Diaphoresis can be due to fever, pain, or an environment that is too hot, but can also be a sign of heart attack
- Cyanosis indicates decreased oxygen in the blood
- Pallor (pale skin) can be due to decreased circulation
- Flushing (reddened skin) can be due to fever, pain, or an environment that is too hot
- Cyanosis and pallor in patients with dark complexions can be observed in nail beds or lining of the mouth and nose

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4. Define *pulse* and list guidelines for measuring pulse

Meeting the Learning Objective

TEXTBOOK READING: PP. 22–25

Lecture

Define the following terms:

- Pulse
- Palpation
- Auscultation
- Radial pulse
- Carotid pulse
- Brachial pulse
- Apex
- Apical pulse

Display Key Material

KEY MATERIAL 2-2 COMMON PULSE POINTS

As students view the key material slide, discuss the different pulse points and their typical use:

- Radial pulse most commonly used for adults/children
- Carotid pulse used in emergency situations
- Brachial artery most commonly used for infants

Describe situations that indicate possible cause for concern when measuring pulse:

- Pulse rate outside normal range (60–100 BPM for adults)
  - Slow rate may be normal in some people, such as athletes
  - Rates over 100 can be normal in children
  - In adults, rate over 100 can indicate dehydration, blood loss, stress, or fever
- Very rapid rates require immediate attention as they may result from cardiac muscle disease
- Pulse should be regular and easily palpated or auscultated

Remind students that patient condition should be observed along with pulse rate.

Demonstration

Demonstrate or review the steps for the procedure *Measuring and recording pulse rate by palpation*. Have the students return the demonstration if possible.

Demonstration

Demonstrate or review the steps for the procedure *Measuring and recording pulse rate by auscultation (apical pulse)*. Have the students return the demonstration if possible.

5. Define *respirations* and list guidelines for measuring respirations

Meeting the Learning Objective

TEXTBOOK READING: PP. 25–26

Lecture

Define the following terms:

- Respiration
- Apnea
- Dyspnea
- Orthopnea
- Tachypnea
- Cheyne-Stokes

Describe breathing changes that should be reported to a nurse or doctor:

- Labored breathing (patient requires effort to breathe or makes noises with each breath)
- Abnormal breathing of any kind (apnea or periods of apnea, dyspnea, orthopnea, tachypnea, Cheyne-Stokes)

Remind students that counting a patient's respirations after measuring pulse, without informing the patient that respirations are being counted, can result in a more accurate measurement.

Demonstration

Demonstrate or review the steps for the procedure *Measuring and recording pulse and respiratory rate*. Have the students return the demonstration if possible.

6. Define *blood pressure* and list guidelines for measuring blood pressure

Meeting the Learning Objective

TEXTBOOK READING: PP. 26–29

Lecture and Discussion

Define the following terms:

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- Blood pressure
- Systolic
- Diastolic
- Sphygmomanometer

Discuss requirements for accurate blood pressure measurement:

- Cuffs are marked with ranges and when the cuff is applied the range should be checked for accuracy and changed for a smaller or larger cuff if necessary.
- The patient should be seated or lying down with arm level with the heart.
- The patient's legs should be uncrossed.
- Blood pressure should not be measured on side affected by mastectomy, paralysis, IV, dialysis, etc.

Demonstration
Demonstrate or review the steps for the procedure *Measuring and recording blood pressure manually*. Have the students return the demonstration if possible.

Demonstration
Demonstrate or review the steps for the procedure *Measuring and recording blood pressure electronically*. Have the students return the demonstration if possible.

Describe situations that can cause low or high blood pressure readings:

- Low readings (hypotension) can be caused by dehydration or excessive bleeding, but can also be normal in some people.
- Notify doctor or nurse if a patient with hypotension reports weakness, dizziness, recent bleeding, nausea, vomiting, or diarrhea, or has tachycardia (rapid pulse).
- High readings (hypertension) can be caused by stress, smoking, a diet high in sodium or fat, kidney disease, or heredity.
- Abnormal readings should be double-checked with a manual sphygmomanometer.

Critical Thinking: Conversation Starter
Tell students that some patients experience something known as *white coat hypertension*. Can the students guess what this means? Can they think of any ideas for addressing it/putting patients at ease?

7. Describe normal vital sign ranges for pediatric patients

Meeting the Learning Objective

TEXTBOOK READING: P. 29

Lecture
Note differences between adult and pediatric vital sign ranges. In general

- Pulse and respiratory rates decrease with age.
- Blood pressure increases with age.
- Body temperature does not change.

Specific values are listed in the students' QR chart printouts.

8. Perform procedure for obtaining pulse oximetry readings and identify normal ranges for pulse oximetry readings

Meeting the Learning Objective

TEXTBOOK READING: PP. 29–30

Lecture
Define the following terms:

- Pulse oximeter
- Oxygen saturation
- Hypoxia

Describe situations in which it may be difficult to obtain an oxygen saturation reading:

- The patient's blood oxygen has dramatically decreased (hypoxia)
- Patient's extremities are cold
- Patient has poor circulation
- Patient is wearing dark nail polish

Note that the normal pulse oximetry reading for adult and pediatric patients is 95–100%. Lower readings should be reported.

Demonstration
Demonstrate or review the steps for the procedure *Measuring and recording a pulse oximetry reading*. Have the students return the demonstration if possible.

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9. Describe the importance of assessing and reporting pain and level of consciousness

Meeting the Learning Objective

TEXTBOOK READING: PP. 30–31

Lecture and Discussion

Share the following information about pain and pain assessment:

- Pain is often referred to as the fifth vital sign.
- Presence of pain can influence other vital signs.
- Assessment of pain is an important part of patient care, but is difficult because pain is a subjective experience.

Review questions EKG technicians can use when assessing pain:

- Where is the pain?
- When did it start?
- What were you doing when the pain started?
- What makes the pain better or worse?
- Can you describe the pain?
  - Sharp or dull?
  - Constant or comes and goes?
  - Radiates or moves to any other body part?
- Can you rate the pain on a scale from 0 (no pain) to 10 (worst pain imaginable)?

Display Key Material

KEY MATERIAL 2-3 PAIN MEASUREMENT SCALE

Critical Thinking: Conversation Starter

Tell students that the textbook mentions using the pain measurement scale with pediatric patients and ask them if they can think of any other situations when it might be useful. Ask the students if there are situations when they think a scale like this would *not* be useful, and if they have any other ideas for assessing patients' pain levels.

Describe signs and symptoms that might be related to pain:

- Increased pulse, respirations, blood pressure
- Sweating
- Nausea, vomiting
- Tightening of the jaw
- Squeezing the eyes shut
- Holding or guarding a body part
- Frowning
- Grinding teeth
- Increased restlessness
- Agitation or irritability
- Change in behavior
- Crying
- Groaning, sighing
- Pacing
- Repetitive movements

Note that repositioning may reduce or relieve pain. Remind students that patient reports of pain must be documented and taken seriously, and never ignored or dismissed.

Describe these terms associated with level of consciousness:

- Alert: patient's eyes are open and he responds to questions readily
- Oriented: patient is able to state his name, the date, and where he is

Remind students that a patient's baseline level of consciousness is important to note so that any changes can be detected.

Critical Thinking: Conversation Starter

Describe this scenario to the students: You are taking history and measuring vital signs for a patient with Alzheimer's disease. She is not oriented to place or time. Ask the students what should be noted about this patient's level of consciousness and why.

10. Describe patient body positions commonly used during EKG testing

Meeting the Learning Objective

TEXTBOOK READING: PP. 31–32

Lecture

Define the following terms:

- Supine
- Fowler's position

Display Key Material

KEY MATERIAL 2-4 BODY POSITIONS

Inform students that supine and Fowler's (or semi-Fowler's) positions are the positions they are most likely to use when conducting EKG tests. Adapta-

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tions to these positions may be necessary in some circumstances (described in Ch. 7).

Chapter Review

End-of-Chapter Review Questions
Distribute or display Chapter 2 review questions, then check and discuss answers.

Critical Thinking: Research Project
Assign individuals or small groups a specific communicable disease they may encounter in patients during their work. After researching the illness they should create a fact sheet or poster including the following information:

- Signs and symptoms
- Incubation period
- How the disease is diagnosed
- How the disease is spread
- Vulnerable populations
- Treatment
- Prevention
- Areas where the disease is active at this time
- Current research
- Other interesting information

If time permits, students can present their research in class. The students in the audience should take notes and the activity could be concluded with an open-note quiz.

Critical Thinking: Creative Application
Divide students into groups and ask them to choose either Standard Precautions or a level of Transmission-Based Precautions and create signs about those precautions that would be appropriate for use in a children's hospital.