

1  **Electrocardiography for Healthcare Professionals**

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2  **Learning Outcomes**

1.1 Explain what an ECG is and its importance in medicine.

1.2 Discuss the history of obtaining and using the ECG.

1.3 Describe career opportunities for an electrocardiographer.

1.4 Compare the uses of the ECG in the hospital, in the doctor's office or ambulatory clinic, or outside of a health care facility.

3  **Learning Outcomes (Cont'd)**

1.5 Identify the skills and knowledge needed to perform an ECG.

1.6 Define troubleshooting and explain its importance to you as a health care professional.

4  **1.1 The Electrocardiogram**

- Cardiovascular disease
- Coronary artery disease (CAD)
- Electrocardiograph
- Electrocardiogram

5  **1.1 What Is an Electrocardiograph?**

■ Electrodes

■ Lead wires

□ Chest

□ Limb

■ arms

■ legs

6  **1.1 Apply Your Knowledge**

What is the name of the instrument which allows the electrical activity of the heart to be studied?

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8 **1.2 History of the ECG**

- 1676
-
- 1887
-
- 1903
-
- 1918

9 **1.2 Apply Your Knowledge**

Who was credited with the development of the first electrocardiograph?

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11 **1.3 Professionals Trained to Record and Monitor the Heart**

- Physicians
- Physician assistants
- Nurse practitioners
- Nurses
- Medical assistants
- Specially trained nursing assistants
- Emergency medical personnel

12 **1.3 Electrocardiography Specialties**

- ECG Technician
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- ECG Monitoring Technician
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- Cardiovascular Technologist

13 **1.3 Apply Your Knowledge**

Where are most ECG technicians employed?

14 **1.3 Apply Your Knowledge**

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15 **1.4 How ECG's Are Used**

- To identify any changes from the normal ECG tracing
-
- To provide a baseline for comparison of further ECGs
-
- Part of a complete physical for people over 40
-
- By emergency personnel during emergencies
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16 **1.4 Where Are ECGs Used**

- In the hospital
-
- In the doctor's office and ambulatory care facilities

- Outside a health care facility

-

17 **1.4 In the Hospital**

- 12-lead ECG is most often used
 - For routine or emergency
 - Before surgery

18 **1.4 In the Hospital**

- Continuous monitoring
 - ICU, CCU, SICU, ER, or OR
 -
- Telemetry monitoring
 - Tracing transmitted to a central location

19 **1.4 In Doctor's Offices and Ambulatory Care Facilities**

- 12-lead ECG
- Treadmill stress testing
- Ambulatory (Holter) monitor
 -

20 **1.4 12-Lead ECGs**

- Routinely performed
- May be part of a general or routine examination

21 **1.4 Treadmill Stress Testing**

- Exercise electrocardiography
-
- Monitors blood flow during stress or exercise

22 **1.4 Treadmill Stress Testing**

- Performed in the presence of a physician
-
- Safe, non-invasive, inexpensive, and reliable

23 **1.4 Ambulatory (Holter) Monitor**

- Small box attached to the patient's waist or shoulder monitors the heart for 24 to 48 hours

24 **1.4 Ambulatory (Holter) Monitor**

- Patient returns to the office to have the monitor removed.
- Tape recorder or digital form

25 **1.4 Outside a Health Care Facility**

- Portable ECG machines are used by emergency care personnel

26 **1.4 Automatic External Defibrillator-AED**

- Used by lay rescuers
-

- Lightweight, portable
-
- Only used on unresponsive patients
-
- Automatically analyzes the rhythm for possible defibrillation
-

27 **1.4 Transtelephonic Monitoring**

- Telephone or digital technology transmits data to a health care facility
- Two types
 - Continuous monitors
 - Symptom-based monitors
- Used to evaluate pacemakers
- Cost-efficient

28 **1.4 Apply Your Knowledge**

What is the most commonly used ECG in the hospital setting?

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30 **1.4 Apply Your Knowledge**

True or False: A physician should always be present when performing a treadmill stress test.

31 **1.4 Apply Your Knowledge**

True or False: A physician should always be present when performing a treadmill stress test.

32 **1.5 What You Need to Know to Perform an ECG**

- Become familiar with the procedure and the ECG machine
 - Be able to lift and move the patient, if necessary
 - Be able to transport and operate the machine

33 **1.5 What You Need to Know to Perform an ECG**

- Become familiar with the procedure and the ECG machine (cont.)
 - Understand basic principles of safety, infection control, patient education and communication, and law and ethics
 - Troubleshoot problems that arise

34 **1.5 Performing an ECG**

- Equipment
- Safety and infection control
- Patient education and communication
- Legal and ethical issues
- Troubleshooting

35 **1.5 Equipment**

- Storage
- Operation
- Maintenance
-

36 **1.5 Safety and Infection Control**

- Standard and isolation precautions

- Prevent the spread of infection
- Based on recommendations from CDC
- Used on all patients
-

37 **1.5 Safety and Infection Control (Cont'd)**

- Standard precautions (cont.)
 - Used on patients with known/suspected infections
 - Apply to blood, all body fluids except sweat, non-intact skin, and mucous membranes

38 **1.5 Safety and Infection Control (Cont'd)**

- Standard precautions (cont.)
 - Include use of gloves, gown, mask, and eye protection
 - Reduce the risk of transmission of microorganisms

39 **1.5 Safety and Infection Control (Cont'd)**

- Isolation precautions
 - Based on how the infectious agent is transmitted
 - Airborne
 - Droplet
 - Contact

40 **1.5 Patient Education and Communication**

- Explain the procedure clearly
- Answer questions
- Use simple terms
- Speak slowly and distinctly
-

41 **1.5 Legal and Ethical Considerations**

- Practicing ethics
 - Enforced by profession or place of employment
 - The practice of confidentiality is essential
 - Treat patients with respect and dignity
 - Maintain professionalism
 - Unethical acts can result in loss of job

42 **1.5 Legal and Ethical Considerations**

- Legal issues
 - Medical professional liability
 - Slander
 - Libel
 - Consent
 - Implied
 - Informed

43 **1.5 Apply Your Knowledge**

True or False: The practice of confidentiality is essential to the practice of ethics in medicine.

44 **1.5 Apply Your Knowledge**

True or False: The practice of confidentiality is essential to the practice of ethics in medicine.

45 **1.6 Troubleshooting**

- Handling problems
 - patient's condition
 - patient communication
 - equipment failure
- Requires critical thinking
- Making decisions based on facts
-

46 **1.6 Apply Your Knowledge**

Who should sign a consent form if a patient cannot read or write?

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48 **CHAPTER SUMMARY**

- An ECG is
 - A tracing of the heart's electrical activity
 - Used in the diagnosis of cardiovascular disease
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- Einthoven was the first to develop the electrocardiograph

49 **CHAPTER SUMMARY (Cont'd)**

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- Careers specializing in electrocardiography are expanding
 - ECGs can be used In the hospital or as a part of a routine exam
 - As part of a stress test or Holter monitor
 - In emergencies
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-
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50 **Chapter Summary (Cont'd)**

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- Troubleshooting and the process of critical thinking are necessary functions when performing ECGs