



Module	Maine Emergency Medical Services Emergency Medical Technician (EMT) Scope of Practice Skills Practicum
Lab	12-Lead Acquisition

Goals & Objectives

At the completion of this lab the EMT will be able to:

1. Demonstrate proper patient skin preparation technique
2. Demonstrate how to place the limb and chest leads on an adult patient
 - a. Identify positions for the proper placement of leads on the patient
 - b. Identify the landmarks for lead placement
3. Describe the demographic information that should be entered into the ECG monitor for patient identification purposes and demonstrate its input into the ECG monitor
4. Demonstrate proper technique for acquisition of the 12-Lead by the ECG monitor
5. Demonstrate how to print and/or transmit the 12-Lead
6. Identify and describe EMT best practices regarding local receiving hospital STEMI programs, and transmission of ECGs.
 - a. Identify and describe best practices for communication with the hospital and transmission of 12-lead ECGs by the EMT
 - b. Identify and describe best practices for assisting an ALS provider who is on scene, with acquisition of the 12-lead ECG.
 - c. Identify and describe best practices for coordinating care with an ALS provider who will rendezvous with the EMT level unit, and in a case where the EMT has the ability to or has already acquired a 12-lead ECG.

Reference Materials

Texts

American Academy of Orthopaedic Surgeons, Pollak, A.N., Elling, B., & Aehlert, B. (2021). *Nancy Caroline's Emergency Care in the Streets, 12th Edition*, Burlington, MA: Jones & Bartlett Learning.

Maine Community College System EMS Programs Resource Manual for **Psychomotor Standards – Assessment Standards: 12-Lead**

ECG Monitor Manufacturer's User's guide/Operation Manual and Technical Specifications

- Instructors should reference these materials for the specific ECG monitor(s) they will use in their classes.



Protocols & EMS Guidelines

- 2021 Maine EMS Pre-Hospital Care Protocols:
<https://www.maine.gov/ems/sites/maine.gov.ems/files/inline-files/Final-2021-Protocol-ALL-compressed.pdf>
- National Association of State EMS Officials, *National EMS Scope of Practice Model 2019* (Report No. DOT HS 812-666). Washington, DC: National Highway Traffic Safety Administration
- NASEMSO Model EMS Clinical Guidelines: <https://nasmso.org/projects/model-ems-clinical-guidelines/>
- Local STEMI Program Policies
 - Instructors should reference policies regarding STEMI activation and ECG transmission for hospitals local to EMT clinician EMS service catchment areas.

Terminology

- | | | |
|---------------------------|-----------------------|-----------|
| • 12-Lead ECG | • Lead | • V2 lead |
| • AVF lead | • Lead I | • V3 lead |
| • AVL lead | • Lead II | • V4 lead |
| • AVR Lead | • Lead III | • V5 lead |
| • Chest lead | • Limb lead | • V6 lead |
| • Electrocardiogram (ECG) | • Monitoring lead ECG | |
| • Electrode | • V1 lead | |

Equipment Needed

- | | |
|---|---|
| 1. 12-Lead ECG cardiac monitor | 6. Goggles, safety glasses, and/or face shields
(1 unit/ student and instructor) |
| 2. Clippers | 7. Handwashing sink and soap or hand sanitizer |
| 3. Draping | 8. Trash receptacle |
| 4. Electrodes | 9. Secure environment |
| 5. Examination gloves (<i>Box of X-small, small, medium, large, x-large, and 2x large if available and/or needed</i>) | |

Laboratory Skill Sheet(s)

- 12-Lead Acquisition



Notice for Instructors, Training Officers and Service Chiefs

ATTENTION:

- Performance of this skill in the field involves a degree of physical patient contact that requires the EMS clinician to conduct themselves with the utmost professionalism.
- All instructors ***MUST*** have a plan in place to ensure that all students are treated with dignity, respect, and protect their body during this exercise. Instructors must ensure the following is made clear to the students participating in this lab:
 - ***No student is required under any circumstance to volunteer, or to otherwise be a simulated patient for this lab.*** Instructors are strongly encouraged to have volunteer patients who are *not* students in this course.
 - The instructor must have expressed consent from all students who volunteer to be a “live” patient for the application of 12-leads ECGs.
 - Students or other persons who have volunteered to be a “live patient” for this class must be allowed to “opt out” at any time.
 - Students groups should not typically broken up by gender. The professional expectation is that healthcare providers treat all people with respect and dignity and applies to students, instructors and any other personnel participating in the class.
 - Instructors should also make it clear that any behavior that is less than professional is cause for ejection from the training. Any such incident should be thoroughly documented by the instructor and made part of the course file.
 - ***No one under 18 years old shall be allowed to participate as a live patient for the application of 12-lead ECGs.***

Operational Note:

- Both the ability to transmit, and the effectiveness of doing so depends greatly upon a number of factors that both EMTs (in this course) and Service Chiefs should review and discuss with local hospitals in their catchment areas:
 - The availability of 12-lead acquisition equipment resources for any given EMS service
 - Transport times to hospitals with STEMI activation programs and/or
 - Receiving hospital-specific policies regarding transmission and interpretation of field acquired 12-lead ECGs. This may include specific windows such as “door-to-balloon time” or “EMS contact-to-balloon time” or other metrics which are time limited.

Laboratory Plan

1. Have each student don gloves and eye protection in accordance with current PPE standards.
2. Instruct the students on:
 - a. Functions of the 12-Lead monitor
 - i. On/off



- ii. Input of patient demographic information into the monitor
 1. Name
 2. Age
 3. Sex
 4. Date of birth
 - iii. 12-Lead ECG acquisition
 - iv. Printing copies of the 12-lead
 1. Immediately after acquisition
 2. How to access the archive record and print at a later time, either while still on the incident or afterwards.
 - v. Transmission of the 12-Lead
 - b. How to communicate with the patient regarding the placement of the chest leads, and assist the patient with disrobing (if necessary, to place the chest leads) while ensuring that dignity is maintained
 - i. Use of draping
 - c. Techniques for patient skin preparation prior to placing chest and limb leads
 - i. Cleaning dirty areas
 - ii. Dealing with diaphoresis
 - d. Appropriate placement of electrodes in accordance with manufacturers guidelines (*see ECG monitor instruction manual and assessment standards for 12-Lead*)
 - i. Appropriate techniques for placement of the chest leads for female patients
 - ii. Ensuring all connections are in place prior to analysis
 - e. Acquisition of the 12-Lead ECG
 - i. Criteria for quality tracings which are usable for interpretation and transmission
 1. Patient positioning and movement
 2. Ensuring proper placement of leads
 3. Electrode contact
 - f. Techniques for communicating to the hospital/OLMC
 - i. EMS unit level of licensure. OLMC needs to know if they are speaking with an ALS or BLS unit, as well as which level of care to expect upon arrival at destination facility.
 - ii. Coordinating ECG transmission
 - g. Techniques for proper documentation of 12-lead acquisition in their patient care reports and in their narratives.
 3. Under guided instruction (*with immediate corrections*), have the students practice the acquisition of a 12-Lead ECG.
 - a. Monitor operations
 - i. Turning the monitor on
 - ii. Ensuring monitor is in 12-lead mode
 - iii. Programming patient demographic information
 - b. Communication with the patient regarding
 - i. Placement of the chest lead
 - ii. Draping (if necessary)



- iii. Protection of the patient's body
 - c. Patient skin preparation
 - d. Lead placement
 - i. Identifying the correct areas for lead placement
 - ii. Palpating and locating landmarks
 - iii. Attaching the limb and chest leads
 - e. Acquisition of the 12-lead ECG tracing
 - i. Patient movement
 - f. Printing the 12-lead tracing
 - i. If patient demographic information was not put into the ECG monitor, students should practice annotation of the paper 12-lead tracing with this information
 - g. Explain techniques for proper documentation of 12-lead acquisition in their patient care reports and in their narratives.
 - i. At the EMT level, the focus of documentation is on recording that the BLS unit performed the skill, and not on the interpretation, as that is outside EMT scope of practice.
 - ii. Maine EMS recommends the following information regarding skill performance should be contained either in the checkboxes/drop down menus in MEFIRS, or in the clinician's narrative in the report:
 1. BLS Provider who performed the skill
 2. Time skill was performed
 3. Whether or not the ECG was transmitted by the BLS unit, and to which facility.
 4. Whether or not a copy was handed off to ALS (if so, identify the unit number)
 - iii. A copy of the 12-lead should be uploaded and included with the BLS clinician's MEFIRS report, as with AEMT/ALS practice.
 - iv. Follow your service's SOPs regarding documentation of 12-lead ECG acquisition.
4. Have the student demonstrate proper hand hygiene
 - a. In areas with no sinks, please utilize hand sanitizer
5. Have the student reflect on their performance and discuss successes and opportunities for improvement.

Laboratory Exercises

1. Instructors may use manikins or "live patient" volunteers as resources allow.
 - a. Manikins:
 - i. 12-lead ECG training manikins with separate or integrated ECG signal generator simulators are ideal
 - ii. Should be "full body," not simply torso manikins
 - iii. Must have chest landmarks that are palpable for locating chest lead positions
2. All instructors must brief students, at the beginning of the class, on the requirements and restrictions stated above, regarding participation as a "live patient" for this course.



3. The context in which the acquisition of 12-lead ECGs will be performed by the EMT is important. It should be emphasized by the instructor that performance of this skill is not benign. The EMT must understand that improper application of this skill can have untoward effects for the patient, if attention is not paid to detail, and that ALS should be requested (if not enroute), and not be cancelled simply because these skills are now within the EMT scope of practice.
4. It is also important to emphasize that the EMT may be performing this skill independently, and possibly without an AEMT/Paramedic to rely on for guidance at the time the skill is being performed.
5. Instructors should emphasize that policies and procedures of local hospitals with regard to STEMI programs, STEMI activation and transmission of 12-lead ECGs should be reviewed by each EMS clinician, service training officers and service chiefs. These policies may have significant effect upon the viability of ECG transmission by the EMT. OLMC is always recommended where the EMT may have questions on-scene.
6. Instructors should also emphasize the importance of communication between the EMT level unit who has the training and equipment to perform 12 lead acquisition, and the ALS provider who may be enroute, if not already on scene.
7. Students will be provided time to practice patient assessment skills with a verification form and an instructor sign off.

Assessment of Objectives

Formative

1. Affective assessments
2. Psychomotor skills practice
3. Peer review

Summative

1. Summative affective assessment
2. Final complaint and injury scenarios

Credits

Maine EMS gratefully acknowledges the EMS programs of the Maine Community College System, for their collaboration and for allowing use of their program materials in the development of these EMT Scope of Practice Skills Practicum written lab and skills sheet materials: Southern Maine, Kennebec Valley, Eastern Maine, and Northern Maine Community Colleges.