

## Megacode 1— Out-of-Hospital Unstable Bradycardia (Unstable Bradycardia > pVT > PEA > PCAC)

**Lead-in:** You are a paramedic treating a man who had a syncopal episode.

### Vital Signs

**Heart rate:**

**Blood pressure:** 78/42 mm Hg

**Respiratory rate:**

**SpO<sub>2</sub>:**

**Temperature:**

**Weight:**

**Age:** 62 years

### Initial Assessment

- The patient is conscious and alert.

#### What are your initial actions?

- His skin is pale, and he is diaphoretic.
- The patient is not following commands.
- There is no radial pulse, but the carotid pulse is weak and slow.

### Adult Bradycardia Algorithm

**Instructor notes:** The ECG monitor shows a **sinus bradycardia** with occasional PVC.

The student should follow the Adult Bradycardia Algorithm and be prepared to administer a single dose of atropine while preparing for transcutaneous pacing.

### Adult Cardiac Arrest Algorithm (pVT)

**Instructor notes:** With the introduction of the pacing impulse, the ECG monitor displays VT. There is no pulse.

The student should immediately discontinue pacing and defibrillate the patient. The student will follow the VF/pVT pathway of the Adult Cardiac Arrest Algorithm.

The student should assign team functions and monitor for high-quality CPR. The case should continue through safe defibrillation and administration of epinephrine and amiodarone.

### Adult Cardiac Arrest Algorithm (PEA)

**Instructor notes:** After the third shock, the patient develops an **organized rhythm that is slow**. There is no pulse. The patient is now in PEA.

The student continues to monitor high-quality CPR and follows the PEA pathway of the Adult Cardiac Arrest Algorithm.

The student should consider reversible causes.

### Post-Cardiac Arrest Care Algorithm

**Instructor notes:** After ensuring effective ventilation, the student can now detect a carotid pulse. The patient has ROSC.

The student should initiate the Post-Cardiac Arrest Care Algorithm.

## Megacode Testing Checklist: Scenarios 1/3/8 Bradycardia → Pulseless VT → PEA → PCAC

Student Name \_\_\_\_\_ Date of Test \_\_\_\_\_

| Critical Performance Steps  |  |  |   |   |  | Check if done correctly |
|---|--|--|---|---|--|-------------------------|
| <b>Team Leader</b>  |  |  |   |   |  |                         |
| Assigns team member roles   |  |  |   |   |  |                         |
| Ensures high-quality CPR at all times   | Compression rate 100-120/min<br><input type="checkbox"/> | Compression depth of ≥2 inches<br><input type="checkbox"/> | Chest compression fraction >80%<br><input type="checkbox"/> | Chest recoil (optional)<br><input type="checkbox"/> | Ventilation (optional)<br><input type="checkbox"/> |                         |
| Ensures that team members communicate well  |  |  |   |   |  |                         |
| <b>Bradycardia Management</b>   |  |  |   |   |  |                         |
| Starts oxygen if needed, places monitor, starts IV  |  |  |   |   |  |                         |
| Places monitor leads in proper position   |  |  |   |   |  |                         |
| Recognizes symptomatic bradycardia  |  |  |   |   |  |                         |
| Administers correct dose of atropine  |  |  |   |   |  |                         |
| Prepares for second-line treatment  |  |  |   |   |  |                         |
| <b>Pulseless VT Management</b>  |  |  |   |   |  |                         |
| Recognizes pVT  |  |  |   |   |  |                         |
| Clears before analyze and shock   |  |  |   |   |  |                         |
| Immediately resumes CPR after shocks  |  |  |   |   |  |                         |
| Appropriate airway management   |  |  |   |   |  |                         |
| Appropriate cycles of drug-rhythm check/shock-CPR   |  |  |   |   |  |                         |
| Administers appropriate drug(s) and doses   |  |  |   |   |  |                         |
| <b>PEA Management</b>   |  |  |   |   |  |                         |
| Recognizes PEA  |  |  |   |   |  |                         |
| Verbalizes potential reversible causes of PEA (H's and T's)   |  |  |   |   |  |                         |
| Administers appropriate drug(s) and doses   |  |  |   |   |  |                         |
| Immediately resumes CPR after rhythm checks   |  |  |   |   |  |                         |
| <b>Post-Cardiac Arrest Care</b>   |  |  |   |   |  |                         |
| Identifies ROSC   |  |  |   |   |  |                         |
| Ensures BP and 12-lead ECG are performed, O <sub>2</sub> saturation is monitored, verbalizes need for endotracheal intubation and waveform capnography, and orders laboratory tests |  |  |   |   |  |                         |
| Considers targeted temperature management   |  |  |   |   |  |                         |

### STOP TEST

| Test Results  | Circle PASS or NR to indicate pass or needs remediation: | PASS       | NR |
|---|--|------------|----|
| Instructor Initials _____   | Instructor Number _____                                  | Date _____ |    |
| <b>Learning Station Competency</b>  |  |            |    |
| <input type="checkbox"/> Bradycardia <input type="checkbox"/> Tachycardia <input type="checkbox"/> Cardiac Arrest/Post-Cardiac Arrest Care <input type="checkbox"/> Megacode Practice |  |            |    |

## Megacode 2—Out-of-Hospital Unstable Bradycardia (Unstable Bradycardia > VF > Asystole > PCAC)

**Lead-in:** You are called to a restaurant for a man who suddenly became unresponsive, vomited, and then stopped breathing. You have a 4-minute response to the scene in your ALS ambulance.

### Vital Signs

**Heart rate:** 44/min and very strong

**Blood pressure:** 84/50 mm Hg

**Respiratory rate:** 3/min

**SpO<sub>2</sub>:**

**Temperature:**

**Weight:**

**Age:**

### Initial Assessment

- You arrive at the scene to find 3 firefighters assisting the patient.
- One is maintaining an open airway, another is suctioning the patient, and the third is getting vital signs.
- Witnesses state that the patient had a normal day but seemed irritated.

### Adult Bradycardia Algorithm

**Instructor notes:** The patient is in **sinus bradycardia** when the limb leads are applied, and the 12-lead ECG is not suspicious for injury or ischemia.

An IV is being initiated when the patient has a 5-second episode of grand mal seizures and then remains unresponsive. Bag-mask ventilation is initiated with oxygen.

Shortly after that, the patient has no respirations and no pulse. The monitor shows **VF**.

### Adult Cardiac Arrest Algorithm (VF)

**Instructor notes:** Defibrillation is attempted, and then CPR is provided for 2 minutes. During this time, his wife says that he is normally healthy and takes only vitamin supplements but that he's been under extreme stress at work lately.

After the first 2 minutes of CPR, the rhythm is still VF. Another shock is given, followed by more CPR. Epinephrine is given, and an advanced airway is placed, with an ETCO<sub>2</sub> reading of 22 mm Hg noted. Two minutes later, the rhythm is asystole, confirmed in 2 leads.

### Adult Cardiac Arrest Algorithm (Asystole)

**Instructor notes:** CPR continues, and treatable causes are considered.

After 2 minutes of CPR, the monitor shows a borderline wide-complex organized rhythm with a rate of 56/min, and there are pulses present.

### Post-Cardiac Arrest Care Algorithm

**Instructor notes:** Blood pressure is 180/108 mm Hg. The patient is still apneic with a capnography reading of 50 mm Hg.

A finger-stick glucose reading (**if asked for by Team Leader**) is 187 mg/dL (10.4 mmol/L), and he remains unresponsive.

For transport considerations, the nearest emergency department is 4 minutes from the scene, a comprehensive stroke center is 12 minutes from the scene, and a cardiac arrest receiving center is 16 minutes from the scene.

## Megacode Testing Checklist: Scenarios 2/5 Bradycardia → VF → Asystole → PCAC

Student Name \_\_\_\_\_ Date of Test \_\_\_\_\_

| Critical Performance Steps  |  |  |   |   |  | Check if done correctly |
|---|--|--|---|---|--|-------------------------|
| <b>Team Leader</b>  |  |  |   |   |  |                         |
| Assigns team member roles   |  |  |   |   |  |                         |
| Ensures high-quality CPR at all times   | Compression rate 100-120/min<br><input type="checkbox"/> | Compression depth of ≥2 inches<br><input type="checkbox"/> | Chest compression fraction >80%<br><input type="checkbox"/> | Chest recoil (optional)<br><input type="checkbox"/> | Ventilation (optional)<br><input type="checkbox"/> |                         |
| Ensures that team members communicate well  |  |  |   |   |  |                         |
| <b>Bradycardia Management</b>   |  |  |   |   |  |                         |
| Starts oxygen if needed, places monitor, starts IV  |  |  |   |   |  |                         |
| Places monitor leads in proper position   |  |  |   |   |  |                         |
| Recognizes symptomatic bradycardia  |  |  |   |   |  |                         |
| Administers correct dose of atropine  |  |  |   |   |  |                         |
| Prepares for second-line treatment  |  |  |   |   |  |                         |
| <b>VF Management</b>  |  |  |   |   |  |                         |
| Recognizes VF   |  |  |   |   |  |                         |
| Clears before analyze and shock   |  |  |   |   |  |                         |
| Immediately resumes CPR after shocks  |  |  |   |   |  |                         |
| Appropriate airway management   |  |  |   |   |  |                         |
| Appropriate cycles of drug-rhythm check/shock-CPR   |  |  |   |   |  |                         |
| Administers appropriate drug(s) and doses   |  |  |   |   |  |                         |
| <b>Asystole Management</b>  |  |  |   |   |  |                         |
| Recognizes asystole   |  |  |   |   |  |                         |
| Verbalizes potential reversible causes of asystole (H's and T's)  |  |  |   |   |  |                         |
| Administers appropriate drug(s) and doses   |  |  |   |   |  |                         |
| Immediately resumes CPR after rhythm checks   |  |  |   |   |  |                         |
| <b>Post-Cardiac Arrest Care</b>   |  |  |   |   |  |                         |
| Identifies ROSC   |  |  |   |   |  |                         |
| Ensures BP and 12-lead ECG are performed, O <sub>2</sub> saturation is monitored, verbalizes need for endotracheal intubation and waveform capnography, and orders laboratory tests |  |  |   |   |  |                         |
| Considers targeted temperature management   |  |  |   |   |  |                         |

### STOP TEST

| Test Results  | Circle <b>PASS</b> or <b>NR</b> to indicate pass or needs remediation: | PASS       | NR |
|---|--|------------|----|
| Instructor Initials _____   | Instructor Number _____  | Date _____ |    |
| <b>Learning Station Competency</b>  |  |            |    |
| <input type="checkbox"/> Bradycardia <input type="checkbox"/> Tachycardia <input type="checkbox"/> Cardiac Arrest/Post-Cardiac Arrest Care <input type="checkbox"/> Megacode Practice |  |            |    |

## Megacode 3—Out-of-Hospital Unstable Bradycardia (Unstable Bradycardia > pVT > PEA > PCAC)

**Lead-in:** Your ALS ambulance is dispatched to help an elderly man having chest pain. A BLS engine is also responding. You arrive to find the firefighters placing a nonrebreathing oxygen mask on the patient.

### Vital Signs

**Heart rate:**  
**Blood pressure:** 86/48 mm Hg by Doppler  
**Respiratory rate:** 18/min and nonlabored  
**SpO<sub>2</sub>:**

**Temperature:**  
**Weight:**  
**Age:**

### Initial Assessment

- The patient is sitting with his back against a wall, alert and talking with firefighters.
- He says his chest feels heavy and he might need to vomit; this started abruptly while he waited in line at the bank.
- He has had cardiac problems in the past, and he received a heart transplant 2 years ago.

### What are your initial actions?

**Instructor notes:** His pulse is slow and weak, and he is grossly diaphoretic and pale and gray. The monitor displays a **third-degree AV block** with wider QRS complexes and a rate of 32/min.

He takes multiple medications, but they are at his home. He is allergic to sulfa. The 12-lead ECG is suspicious for injury in leads II, III, and aVF, and lead V<sub>4</sub>R is flat.

### Adult Bradycardia Algorithm

**Instructor notes:** If students try to give atropine, it will have no effect because of heart denervation.

The transcutaneous pacemaker is applied, but before it acquires capture, the patient becomes unresponsive, the rhythm changes to **VT**, and he becomes apneic. There is no pulse.

### Adult Cardiac Arrest Algorithm (pVT)

**Instructor notes:** Defibrillation is attempted, and then high-quality CPR is given for 2 minutes, during which peripheral IVs are established in each arm. After 2 minutes, the rhythm is still VT.

Defibrillation is attempted again, with CPR and epinephrine administered.

Bag-mask ventilation is performed without difficulty, so an advanced airway isn't necessary unless the Team Leader feels it's indicated.

After 2 minutes, the rhythm is **sinus bradycardia** with marginally wide QRS complexes. A pulse is not present.

### Adult Cardiac Arrest Algorithm (PEA)

**Instructor notes:** CPR is continued, an advanced airway is now placed, and capnography is connected, with a reading of 22 mm Hg.

After 2 minutes of CPR, the rhythm is nearly the same, and the QRS complexes aren't as wide, but the rate is the same.

A carotid pulse is present, but a radial pulse can't be felt. The ETCO<sub>2</sub> reading is now 48 mm Hg.

### Post-Cardiac Arrest Care Algorithm

**Instructor notes:** The patient will bat his eyes to loud voices, and he begins breathing at 8 breaths per minute. His blood pressure by Doppler is 68/40 mm Hg.

The Team Leader should consider dopamine infusion for blood pressure support and/or epinephrine infusion to support perfusion.

The closest emergency department is 3 minutes from the scene, and a STEMI receiving center is 12 minutes from the scene.

## Megacode Testing Checklist: Scenarios 1/3/8 Bradycardia → Pulseless VT → PEA → PCAC

Student Name \_\_\_\_\_ Date of Test \_\_\_\_\_

| Critical Performance Steps  |  |  |   |   |  | Check if done correctly |
|---|--|--|---|---|--|-------------------------|
| <b>Team Leader</b>  |  |  |   |   |  |                         |
| Assigns team member roles   |  |  |   |   |  |                         |
| Ensures high-quality CPR at all times   | Compression rate 100-120/min<br><input type="checkbox"/> | Compression depth of ≥2 inches<br><input type="checkbox"/> | Chest compression fraction >80%<br><input type="checkbox"/> | Chest recoil (optional)<br><input type="checkbox"/> | Ventilation (optional)<br><input type="checkbox"/> |                         |
| Ensures that team members communicate well  |  |  |   |   |  |                         |
| <b>Bradycardia Management</b>   |  |  |   |   |  |                         |
| Starts oxygen if needed, places monitor, starts IV  |  |  |   |   |  |                         |
| Places monitor leads in proper position   |  |  |   |   |  |                         |
| Recognizes symptomatic bradycardia  |  |  |   |   |  |                         |
| Administers correct dose of atropine  |  |  |   |   |  |                         |
| Prepares for second-line treatment  |  |  |   |   |  |                         |
| <b>Pulseless VT Management</b>  |  |  |   |   |  |                         |
| Recognizes pVT  |  |  |   |   |  |                         |
| Clears before analyze and shock   |  |  |   |   |  |                         |
| Immediately resumes CPR after shocks  |  |  |   |   |  |                         |
| Appropriate airway management   |  |  |   |   |  |                         |
| Appropriate cycles of drug-rhythm check/shock-CPR   |  |  |   |   |  |                         |
| Administers appropriate drug(s) and doses   |  |  |   |   |  |                         |
| <b>PEA Management</b>   |  |  |   |   |  |                         |
| Recognizes PEA  |  |  |   |   |  |                         |
| Verbalizes potential reversible causes of PEA (H's and T's)   |  |  |   |   |  |                         |
| Administers appropriate drug(s) and doses   |  |  |   |   |  |                         |
| Immediately resumes CPR after rhythm checks   |  |  |   |   |  |                         |
| <b>Post-Cardiac Arrest Care</b>   |  |  |   |   |  |                         |
| Identifies ROSC   |  |  |   |   |  |                         |
| Ensures BP and 12-lead ECG are performed, O <sub>2</sub> saturation is monitored, verbalizes need for endotracheal intubation and waveform capnography, and orders laboratory tests |  |  |   |   |  |                         |
| Considers targeted temperature management   |  |  |   |   |  |                         |

### STOP TEST

| Test Results  | Circle PASS or NR to indicate pass or needs remediation: | PASS       | NR |
|---|--|------------|----|
| Instructor Initials _____   | Instructor Number _____                                  | Date _____ |    |
| <b>Learning Station Competency</b>  |  |            |    |
| <input type="checkbox"/> Bradycardia <input type="checkbox"/> Tachycardia <input type="checkbox"/> Cardiac Arrest/Post-Cardiac Arrest Care <input type="checkbox"/> Megacode Practice |  |            |    |

## Megacode 4—Out-of-Hospital Unstable Ventricular Tachycardia (Unstable Tachycardia > VF > PEA > PCAC)

**Lead-in:** Your ALS ambulance is dispatched to a car that has pulled to the side of the highway. The caller was driving the patient to an appointment, but she was sick and needed to stop. She reports shortness of breath and weakness.

### Vital Signs

**Heart rate:** 150/min

**Blood pressure:** 84/54 mm Hg

**Respiratory rate:** 20/min with mildly labored breathing

**SpO<sub>2</sub>:** 94% on 15 L/min of oxygen

**Temperature:**

**Weight:**

**Age:** 65 years

### Initial Assessment

- Your unit arrives to the scene to find the patient in the passenger seat of an SUV, awake and talking in 2- to 3-word sentences.
- Her lungs have fine crackles in both bases.
- There are palpable carotid and radial pulses.

**What are your initial actions?**

### Adult Tachycardia With a Pulse Algorithm

**Instructor notes:** The student's partner attaches the cardiac monitor, and the initial rhythm is **monomorphic wide-complex tachycardia**.

Due to the overall patient condition, the Team Leader should consider cardioversion. A peripheral IV is attempted without success. Cardioversion is performed without a change in condition.

While the student prepares to increase the energy to cardiovert again, the patient's head slumps, and she stops breathing. The monitor now shows **VF**.

### Adult Cardiac Arrest Algorithm (VF)

**Instructor notes:** The patient is rapidly moved from the car to the stretcher. CPR is initiated, defibrillation is quickly delivered, and CPR is continued.

The stretcher (with CPR in progress) is moved to the ambulance to access equipment. During CPR, an IO access is achieved, and bag-mask ventilation is performed with mild difficulty.

After 2 minutes, the rhythm is still VF, defibrillation is performed, and CPR continues. Epinephrine is given, and an advanced airway is placed, with a capnography reading of 25 mm Hg.

After 2 minutes, the rhythm is an **organized wide-complex rhythm** at a rate of 70/min, but no pulses are present.

### Adult Cardiac Arrest Algorithm (PEA)

**Instructor notes:** CPR is continued, and capnography readings continue to hover between 22 and 27 mm Hg during CPR.

Treatable causes are considered, and the person driving the vehicle states, "I was taking her to dialysis because she missed her appointment 2 days ago."

Calcium chloride or gluconate and sodium bicarbonate should be considered for this patient to offset hyperkalemia.

After this, at the next rhythm check, the monitor shows a **marginally wide-complex rhythm**, with severely peaked T waves, and a rate of 100/min. The patient now has a pulse at the carotid.

### Post-Cardiac Arrest Care Algorithm

**Instructor notes:** The patient is starting to have spontaneous respirations (disorganized) with a capnography reading of 60 mm Hg and SpO<sub>2</sub> of 100% with oxygen. Her blood pressure is 94/56 mm Hg. A finger-stick glucose reading of 330 mg/dL (18.3 mmol/L) is obtained.

The nearest emergency department is 7 minutes away; a tertiary care center is 14 minutes away.

## Megacode Testing Checklist: Scenarios 4/7/10 Tachycardia → VF → PEA → PCAC

Student Name \_\_\_\_\_ Date of Test \_\_\_\_\_

| Critical Performance Steps  |  |  |   |   |  | Check if done correctly |
|---|--|--|---|---|--|-------------------------|
| <b>Team Leader</b>  |  |  |   |   |  |                         |
| Assigns team member roles   |  |  |   |   |  |                         |
| Ensures high-quality CPR at all times   | Compression rate 100-120/min<br><input type="checkbox"/> | Compression depth of ≥2 inches<br><input type="checkbox"/> | Chest compression fraction >80%<br><input type="checkbox"/> | Chest recoil (optional)<br><input type="checkbox"/> | Ventilation (optional)<br><input type="checkbox"/> |                         |
| Ensures that team members communicate well  |  |  |   |   |  |                         |
| <b>Tachycardia Management</b>   |  |  |   |   |  |                         |
| Starts oxygen if needed, places monitor, starts IV  |  |  |   |   |  |                         |
| Places monitor leads in proper position   |  |  |   |   |  |                         |
| Recognizes unstable tachycardia   |  |  |   |   |  |                         |
| Recognizes symptoms due to tachycardia  |  |  |   |   |  |                         |
| Performs immediate synchronized cardioversion   |  |  |   |   |  |                         |
| <b>VF Management</b>  |  |  |   |   |  |                         |
| Recognizes VF   |  |  |   |   |  |                         |
| Clears before analyze and shock   |  |  |   |   |  |                         |
| Immediately resumes CPR after shocks  |  |  |   |   |  |                         |
| Appropriate airway management   |  |  |   |   |  |                         |
| Appropriate cycles of drug-rhythm check/shock-CPR   |  |  |   |   |  |                         |
| Administers appropriate drug(s) and doses   |  |  |   |   |  |                         |
| <b>PEA Management</b>   |  |  |   |   |  |                         |
| Recognizes PEA  |  |  |   |   |  |                         |
| Verbalizes potential reversible causes of PEA (H's and T's)   |  |  |   |   |  |                         |
| Administers appropriate drug(s) and doses   |  |  |   |   |  |                         |
| Immediately resumes CPR after rhythm checks   |  |  |   |   |  |                         |
| <b>Post-Cardiac Arrest Care</b>   |  |  |   |   |  |                         |
| Identifies ROSC   |  |  |   |   |  |                         |
| Ensures BP and 12-lead ECG are performed, O <sub>2</sub> saturation is monitored, verbalizes need for endotracheal intubation and waveform capnography, and orders laboratory tests |  |  |   |   |  |                         |
| Considers targeted temperature management   |  |  |   |   |  |                         |

### STOP TEST

| Test Results  | Circle PASS or NR to indicate pass or needs remediation: | PASS       | NR |
|---|--|------------|----|
| Instructor Initials _____   | Instructor Number _____                                  | Date _____ |    |
| <b>Learning Station Competency</b>  |  |            |    |
| <input type="checkbox"/> Bradycardia <input type="checkbox"/> Tachycardia <input type="checkbox"/> Cardiac Arrest/Post-Cardiac Arrest Care <input type="checkbox"/> Megacode Practice |  |            |    |

## Megacode 5—Emergency Department Unstable Bradycardia (Unstable Bradycardia > VF > Asystole > PCAC)

**Lead-in:** You are working in the emergency department when paramedics bring in a drowsy man. They are concerned about a drug overdose.

### Vital Signs

**Heart rate:**

**Blood pressure:**

**Respiratory rate:**

**SpO<sub>2</sub>:**

**Temperature:**

**Weight:**

**Age:** 28 years

### Initial Assessment

- Paramedics say that the patient has a history of depression and also takes diltiazem for an unknown reason.
- A family member on scene said that the patient has had a very low mood lately and threatened suicide earlier in the day.
- An empty bottle of diltiazem was found beside the patient when the paramedics arrived.

### What are your initial actions?

- Assessing the patient on the paramedic stretcher, you find the patient very drowsy and slurring his words.
- You cannot get any useful information from the patient on his history.

### Adult Bradycardia Algorithm

**Instructor notes:** His vital signs include heart rate 30/min, respiratory rate 16/min, blood pressure 80/48 mm Hg, SpO<sub>2</sub> 98% on 3 L by nasal prongs, temperature 36.5°C, and blood glucose 195 mg/dL (10.8 mmol/L).

A rhythm strip shows **wide QRS ventricular escape rhythm** at 30, with a long QT.

His heart rate continues to drop, and then the patient suddenly becomes unresponsive and loses his pulse. The monitor shows **VF**.

### Adult Cardiac Arrest Algorithm (VF)

**Instructor notes:** Students should follow the VF pathway of the Adult Cardiac Arrest Algorithm.

Advanced students may consider discussing intravenous lipid emulsion therapy and extracorporeal CPR.

### Adult Cardiac Arrest Algorithm (Asystole)

**Instructor notes:** After the second shock, the patient's rhythm changes to asystole. The student should follow the asystole pathway of the Adult Cardiac Arrest Algorithm with special attention given to high-quality CPR and good team communication.

### Post-Cardiac Arrest Care Algorithm

**Instructor notes:** After several rounds of CPR and ACLS, the patient has ROSC. The rhythm on the monitor is a ventricular escape bradycardia with hypotension. The student should consider the toxicological aspects of the case as well as the differential diagnosis.

A discussion around the treatment of calcium channel blocker overdose and available treatment options may be included for advanced learners.

## Megacode Testing Checklist: Scenarios 2/5 Bradycardia → VF → Asystole → PCAC

Student Name \_\_\_\_\_ Date of Test \_\_\_\_\_

| Critical Performance Steps  |                              |                                |                                 |                          |                          | Check if done correctly |
|---|------------------------------|--------------------------------|---------------------------------|--------------------------|--------------------------|-------------------------|
| <b>Team Leader</b>  |                              |                                |                                 |                          |                          |                         |
| Assigns team member roles   |                              |                                |                                 |                          |                          |                         |
| Ensures high-quality CPR at all times   | Compression rate 100-120/min | Compression depth of ≥2 inches | Chest compression fraction >80% | Chest recoil (optional)  | Ventilation (optional)   |                         |
|   | <input type="checkbox"/>     | <input type="checkbox"/>       | <input type="checkbox"/>        | <input type="checkbox"/> | <input type="checkbox"/> |                         |
| Ensures that team members communicate well  |                              |                                |                                 |                          |                          |                         |
| <b>Bradycardia Management</b>   |                              |                                |                                 |                          |                          |                         |
| Starts oxygen if needed, places monitor, starts IV  |                              |                                |                                 |                          |                          |                         |
| Places monitor leads in proper position   |                              |                                |                                 |                          |                          |                         |
| Recognizes symptomatic bradycardia  |                              |                                |                                 |                          |                          |                         |
| Administers correct dose of atropine  |                              |                                |                                 |                          |                          |                         |
| Prepares for second-line treatment  |                              |                                |                                 |                          |                          |                         |
| <b>VF Management</b>  |                              |                                |                                 |                          |                          |                         |
| Recognizes VF   |                              |                                |                                 |                          |                          |                         |
| Clears before analyze and shock   |                              |                                |                                 |                          |                          |                         |
| Immediately resumes CPR after shocks  |                              |                                |                                 |                          |                          |                         |
| Appropriate airway management   |                              |                                |                                 |                          |                          |                         |
| Appropriate cycles of drug-rhythm check/shock-CPR   |                              |                                |                                 |                          |                          |                         |
| Administers appropriate drug(s) and doses   |                              |                                |                                 |                          |                          |                         |
| <b>Asystole Management</b>  |                              |                                |                                 |                          |                          |                         |
| Recognizes asystole   |                              |                                |                                 |                          |                          |                         |
| Verbalizes potential reversible causes of asystole (H's and T's)  |                              |                                |                                 |                          |                          |                         |
| Administers appropriate drug(s) and doses   |                              |                                |                                 |                          |                          |                         |
| Immediately resumes CPR after rhythm checks   |                              |                                |                                 |                          |                          |                         |
| <b>Post-Cardiac Arrest Care</b>   |                              |                                |                                 |                          |                          |                         |
| Identifies ROSC   |                              |                                |                                 |                          |                          |                         |
| Ensures BP and 12-lead ECG are performed, O <sub>2</sub> saturation is monitored, verbalizes need for endotracheal intubation and waveform capnography, and orders laboratory tests |                              |                                |                                 |                          |                          |                         |
| Considers targeted temperature management   |                              |                                |                                 |                          |                          |                         |

### STOP TEST

| Test Results  | Circle PASS or NR to indicate pass or needs remediation: | PASS       | NR |
|---|--|------------|----|
| Instructor Initials _____   | Instructor Number _____                                  | Date _____ |    |
| <b>Learning Station Competency</b>  |  |            |    |
| <input type="checkbox"/> Bradycardia <input type="checkbox"/> Tachycardia <input type="checkbox"/> Cardiac Arrest/Post-Cardiac Arrest Care <input type="checkbox"/> Megacode Practice |  |            |    |

## Megacode 6—In-Hospital Unstable Bradycardia (Unstable Bradycardia > VF > PEA > PCAC)

**Lead-in:** A man admitted to the hospital with pneumonia has chest pain on the second day of his hospital course. You are called to evaluate him.

### Vital Signs

**Heart rate:** \_\_\_\_\_ **Temperature:** \_\_\_\_\_  
**Blood pressure:** \_\_\_\_\_ **Weight:** \_\_\_\_\_  
**Respiratory rate:** \_\_\_\_\_ **Age:** 58 years  
**SpO<sub>2</sub>:** \_\_\_\_\_

|   |
|---|
| <p><b>Initial Assessment</b><br/>What are your initial actions?</p>   |
| <p><b>Adult Bradycardia Algorithm</b><br/> <b>Instructor notes:</b> The patient's vital signs are heart rate 35/min, respiratory rate 18/min, and blood pressure 88/49 mm Hg.<br/>           The monitor shows a <b>third-degree heart block</b>. The initial dose of atropine will not have much effect, and pacing should be initiated.<br/>           With pacing, the patient's blood pressure will also improve such that the patient can now go to the cardiac cath lab.</p>  |
| <p><b>Adult Cardiac Arrest Algorithm (VF)</b><br/> <b>Instructor notes:</b> Just after completing cardiac catheterization (with findings of 100% right coronary artery occlusion), the patient will develop VF.<br/>           The patient will be refractory to at least 3 shocks, thus allowing the student to progress through the algorithm. Chest compressions should be initiated with high-quality CPR and the airway managed initially with bag-mask ventilation and, ultimately, probably intubation and epinephrine/amiodarone.<br/>           Errors would be to provide epinephrine before at least 2 shocks. After the third shock, the patient will go into a <b>sinus tachycardia</b> with no pulse (PEA).<br/>           Of note, if the student chose to relook at the coronary arteries, this would be an appropriate step and they would be patent (ie, the underlying cause could be arterial reocclusion, but this advanced reasoning is beyond the expectations of the scenario).</p> |
| <p><b>Adult Cardiac Arrest Algorithm (PEA)</b><br/> <b>Instructor notes:</b> The patient is now in PEA. The student continues to monitor high-quality CPR, and epinephrine should be provided.<br/>           After a dose of epinephrine, the student will notice that the continuous ETCO<sub>2</sub> rises to 40 mm Hg. The student should recognize that ROSC is likely and stop CPR, even if the full 2 minutes is not performed, because the ETCO<sub>2</sub> is indicating ROSC (a good opportunity for this teaching point).<br/>           Underlying causes during this event that could be considered include cardiac tamponade, and, if an ultrasound is performed, there would be no fluid present.</p>  |
| <p><b>Post-Cardiac Arrest Care Algorithm</b><br/> <b>Instructor notes:</b> After the student recognizes ROSC (ETCO<sub>2</sub> rises to 40 mm Hg) and checks a pulse, the patient will be found to be hemodynamically unstable, with heart rate 110/min and blood pressure 70/30 mm Hg.<br/>           The student should ask for the vital signs, not state them. The patient should receive a fluid bolus, and a vasopressor infusion should be initiated (blood pressure will not improve with fluids alone).<br/>           The patient will not follow commands and is a candidate for targeted temperature management.</p>  |

## Megacode Testing Checklist: Scenarios 6/11 Bradycardia → VF → PEA → PCAC

Student Name \_\_\_\_\_ Date of Test \_\_\_\_\_

| Critical Performance Steps  |   |   |  |  |   | Check if done correctly |
|---|---|---|--|--|---|-------------------------|
| <b>Team Leader</b>  |   |   |  |  |   |                         |
| Assigns team member roles   |   |   |  |  |   |                         |
| Ensures high-quality CPR at all times   | Compression rate 100-120/min <input type="checkbox"/> | Compression depth of ≥2 inches <input type="checkbox"/> | Chest compression fraction >80% <input type="checkbox"/> | Chest recoil (optional) <input type="checkbox"/> | Ventilation (optional) <input type="checkbox"/> |                         |
| Ensures that team members communicate well  |   |   |  |  |   |                         |
| <b>Bradycardia Management</b>   |   |   |  |  |   |                         |
| Starts oxygen if needed, places monitor, starts IV  |   |   |  |  |   |                         |
| Places monitor leads in proper position   |   |   |  |  |   |                         |
| Recognizes symptomatic bradycardia  |   |   |  |  |   |                         |
| Administers correct dose of atropine  |   |   |  |  |   |                         |
| Prepares for second-line treatment  |   |   |  |  |   |                         |
| <b>VF Management</b>  |   |   |  |  |   |                         |
| Recognizes VF   |   |   |  |  |   |                         |
| Clears before analyze and shock   |   |   |  |  |   |                         |
| Immediately resumes CPR after shocks  |   |   |  |  |   |                         |
| Appropriate airway management   |   |   |  |  |   |                         |
| Appropriate cycles of drug-rhythm check/shock-CPR   |   |   |  |  |   |                         |
| Administers appropriate drug(s) and doses   |   |   |  |  |   |                         |
| <b>PEA Management</b>   |   |   |  |  |   |                         |
| Recognizes PEA  |   |   |  |  |   |                         |
| Verbalizes potential reversible causes of PEA (H's and T's)   |   |   |  |  |   |                         |
| Administers appropriate drug(s) and doses   |   |   |  |  |   |                         |
| Immediately resumes CPR after rhythm checks   |   |   |  |  |   |                         |
| <b>Post-Cardiac Arrest Care</b>   |   |   |  |  |   |                         |
| Identifies ROSC   |   |   |  |  |   |                         |
| Ensures BP and 12-lead ECG are performed, O <sub>2</sub> saturation is monitored, verbalizes need for endotracheal intubation and waveform capnography, and orders laboratory tests |   |   |  |  |   |                         |
| Considers targeted temperature management   |   |   |  |  |   |                         |

### STOP TEST

|   |  |             |           |
|---|--|-------------|-----------|
| <b>Test Results</b>   | Circle <b>PASS</b> or <b>NR</b> to indicate pass or needs remediation: | <b>PASS</b> | <b>NR</b> |
| Instructor Initials _____   | Instructor Number _____  | Date _____  |           |
| <b>Learning Station Competency</b>  |  |             |           |
| <input type="checkbox"/> Bradycardia <input type="checkbox"/> Tachycardia <input type="checkbox"/> Cardiac Arrest/Post-Cardiac Arrest Care <input type="checkbox"/> Megacode Practice |  |             |           |

## Megacode 7—In-Hospital Unstable Ventricular Tachycardia (Unstable Tachycardia > VF > PEA > PCAC)

**Lead-in:** You are a healthcare provider caring for a patient who was admitted for chest pain, and you rule out myocardial infarction. He was diagnosed with stable angina 10 years ago, but over the past few months, his pain has been increasing in duration and intensity.

### Vital Signs

**Heart rate:** 82/min  
**Blood pressure:** 124/74 mm Hg  
**Respiratory rate:** 16/min  
**SpO<sub>2</sub>:** 98%

**Temperature:**  
**Weight:**  
**Age:**

|  |
|--|
| <p><b>Initial Assessment</b></p> <p><b>What are your initial actions?</b></p> <p><b>Instructor notes:</b> At the change of shift, the patient denied chest pain. The student leaves the room and is soon called back by the patient's son.</p> <p>The student enters the room and assesses that the patient is clutching his chest, stating he has chest pain, and displaying diaphoresis. His vital signs are now heart rate 160/min, respiratory rate 22/min, blood pressure 156/92 mm Hg, and SpO<sub>2</sub> 93%.</p> <p>His bedside monitor shows a <b>monomorphic, wide, and rapid rhythm</b>, which is different from previously recorded rhythms. The patient may have an acute coronary syndrome. Because of the patient's history, the student will initially focus on the tachycardia rhythm.</p> <p>The student will question the patient on his current symptoms and ensure IV line patency and cardiac monitoring. Nitroglycerin may be initiated as long as the blood pressure is greater than 90 mm Hg systolic and the patient continues to have chest pain. Administration of aspirin is appropriate as long as the patient is responsive.</p> |
| <p><b>Adult Tachycardia With a Pulse Algorithm</b></p> <p><b>Instructor notes:</b> The symptoms of the patient's tachycardia require management and treatment. The student can differentiate that the patient is in VT and is symptomatic. The treatment for this is immediate cardioversion, and drug therapy should not delay the cardioversion.</p>   |
| <p><b>Adult Cardiac Arrest Algorithm (VF)</b></p> <p><b>Instructor notes:</b> Upon delivery of the cardioversion shock, the patient develops a different rhythm, which is identified as <b>VF</b>. Now, the student will follow the VF/pVT pathway of the Adult Cardiac Arrest Algorithm.</p> <p>The Team Leader assigns team functions and monitors for high-quality CPR. The case continues through safe defibrillation, administering a vasopressor, and considering an antiarrhythmic drug.</p>  |
| <p><b>Adult Cardiac Arrest Algorithm (PEA)</b></p> <p><b>Instructor notes:</b> Despite the student's actions, the patient is now showing <b>second-degree AV block</b> on the monitor with no pulse (PEA).</p> <p>The Team Leader should continue to monitor high-quality CPR and follow the PEA pathway of the Adult Cardiac Arrest Algorithm.</p> <p>The patient may be in cardiogenic shock, so the student must be able to differentiate and discuss potential causes of PEA.</p>  |
| <p><b>Post-Cardiac Arrest Care Algorithm</b></p> <p><b>Instructor notes:</b> The team continues high-quality chest compressions, and the patient has ROSC. At this point, you should initiate the Post-Cardiac Arrest Care Algorithm.</p>  |

## Megacode Testing Checklist: Scenarios 4/7/10 Tachycardia → VF → PEA → PCAC

Student Name \_\_\_\_\_ Date of Test \_\_\_\_\_

| Critical Performance Steps  |   |   |  |  |   | Check if done correctly |
|---|---|---|--|--|---|-------------------------|
| <b>Team Leader</b>  |   |   |  |  |   |                         |
| Assigns team member roles   |   |   |  |  |   |                         |
| Ensures high-quality CPR at all times   | Compression rate 100-120/min <input type="checkbox"/> | Compression depth of ≥2 inches <input type="checkbox"/> | Chest compression fraction >80% <input type="checkbox"/> | Chest recoil (optional) <input type="checkbox"/> | Ventilation (optional) <input type="checkbox"/> |                         |
| Ensures that team members communicate well  |   |   |  |  |   |                         |
| <b>Tachycardia Management</b>   |   |   |  |  |   |                         |
| Starts oxygen if needed, places monitor, starts IV  |   |   |  |  |   |                         |
| Places monitor leads in proper position   |   |   |  |  |   |                         |
| Recognizes unstable tachycardia   |   |   |  |  |   |                         |
| Recognizes symptoms due to tachycardia  |   |   |  |  |   |                         |
| Performs immediate synchronized cardioversion   |   |   |  |  |   |                         |
| <b>VF Management</b>  |   |   |  |  |   |                         |
| Recognizes VF   |   |   |  |  |   |                         |
| Clears before analyze and shock   |   |   |  |  |   |                         |
| Immediately resumes CPR after shocks  |   |   |  |  |   |                         |
| Appropriate airway management   |   |   |  |  |   |                         |
| Appropriate cycles of drug-rhythm check/shock-CPR   |   |   |  |  |   |                         |
| Administers appropriate drug(s) and doses   |   |   |  |  |   |                         |
| <b>PEA Management</b>   |   |   |  |  |   |                         |
| Recognizes PEA  |   |   |  |  |   |                         |
| Verbalizes potential reversible causes of PEA (H's and T's)   |   |   |  |  |   |                         |
| Administers appropriate drug(s) and doses   |   |   |  |  |   |                         |
| Immediately resumes CPR after rhythm checks   |   |   |  |  |   |                         |
| <b>Post-Cardiac Arrest Care</b>   |   |   |  |  |   |                         |
| Identifies ROSC   |   |   |  |  |   |                         |
| Ensures BP and 12-lead ECG are performed, O <sub>2</sub> saturation is monitored, verbalizes need for endotracheal intubation and waveform capnography, and orders laboratory tests |   |   |  |  |   |                         |
| Considers targeted temperature management   |   |   |  |  |   |                         |

### STOP TEST

|   |  |             |           |
|---|--|-------------|-----------|
| <b>Test Results</b>   | Circle <b>PASS</b> or <b>NR</b> to indicate pass or needs remediation: | <b>PASS</b> | <b>NR</b> |
| Instructor Initials _____ Instructor Number _____ Date _____  |  |             |           |
| <b>Learning Station Competency</b>  |  |             |           |
| <input type="checkbox"/> Bradycardia <input type="checkbox"/> Tachycardia <input type="checkbox"/> Cardiac Arrest/Post-Cardiac Arrest Care <input type="checkbox"/> Megacode Practice |  |             |           |

## Megacode 8—In-Hospital Unstable Bradycardia (Unstable Bradycardia > pVT > PEA > PCAC)

**Lead-in:** A man who was admitted to the hospital with palpitations now reports chest discomfort, and you are called to evaluate him.

### Vital Signs

**Heart rate:** 50/min  
**Blood pressure:** 150/70 mm Hg  
**Respiratory rate:** 24/min  
**SpO<sub>2</sub>:** 90% on room air  
**Temperature:**  
**Weight:**  
**Age:** 72 years

### Initial Assessment

#### What are your initial actions?

- A 12-lead ECG reveals an acute inferior STEMI.

### Adult Bradycardia Algorithm

**Instructor notes:** The patient has a STEMI, bradycardia, and hypoxia. The patient should be placed on supplemental oxygen because of the hypoxia, the cath lab should be activated, and aspirin should be given.

The patient's heart rate is 50/min and the monitor shows **sinus bradycardia**. Because the blood pressure is stable, no intervention is necessary.

If the student chooses to give atropine, the side effects of this drug in acute myocardial infarction (when not clinically indicated) can be discussed.

Other interventions, such as anticoagulation, could be considered while preparing for the cath lab, although nitroglycerin should be avoided because of the inferior myocardial infarction.

### Adult Cardiac Arrest Algorithm (pVT)

**Instructor notes:** While waiting to go to the cath lab, the patient becomes unresponsive, is pulseless, and has **VT** on the monitor.

One correct action would be immediate defibrillation (one could also have done precordial thump as a witnessed event) simultaneously with good CPR.

VT will persist despite a defibrillation attempt, and the patient will need high-quality CPR, bag-mask ventilation with or without intubation, and reevaluation of the rhythm after 2 minutes of CPR.

After a second defibrillation attempt, the patient's rhythm will change to PEA.

### Adult Cardiac Arrest Algorithm (PEA)

**Instructor notes:** After epinephrine is given for PEA, the rhythm will go **back to VF**.

After another defibrillation attempt, the ETCO<sub>2</sub> will rise to 40 mm Hg after about 1 minute of CPR.

The student should recognize that ROSC is obtained, and CPR should be stopped rather than continue for an additional minute.

### Post-Cardiac Arrest Care Algorithm

**Instructor notes:** After ROSC, the patient should have his vital signs checked (heart rate 108/min, blood pressure 80/60 mm Hg, SpO<sub>2</sub> 95%).

He should be given a fluid bolus for hypotension and rapidly transported to the cath lab for revascularization.

He is unresponsive, so plans can be made to initiate targeted temperature management, ideally simultaneously with revascularization in the cath lab.

## Megacode Testing Checklist: Scenarios 1/3/8 Bradycardia → Pulseless VT → PEA → PCAC

Student Name \_\_\_\_\_ Date of Test \_\_\_\_\_

| Critical Performance Steps  |  |  |   |   |  | Check if done correctly |
|---|--|--|---|---|--|-------------------------|
| <b>Team Leader</b>  |  |  |   |   |  |                         |
| Assigns team member roles   |  |  |   |   |  |                         |
| Ensures high-quality CPR at all times   | Compression rate 100-120/min<br><input type="checkbox"/> | Compression depth of ≥2 inches<br><input type="checkbox"/> | Chest compression fraction >80%<br><input type="checkbox"/> | Chest recoil (optional)<br><input type="checkbox"/> | Ventilation (optional)<br><input type="checkbox"/> |                         |
| Ensures that team members communicate well  |  |  |   |   |  |                         |
| <b>Bradycardia Management</b>   |  |  |   |   |  |                         |
| Starts oxygen if needed, places monitor, starts IV  |  |  |   |   |  |                         |
| Places monitor leads in proper position   |  |  |   |   |  |                         |
| Recognizes symptomatic bradycardia  |  |  |   |   |  |                         |
| Administers correct dose of atropine  |  |  |   |   |  |                         |
| Prepares for second-line treatment  |  |  |   |   |  |                         |
| <b>Pulseless VT Management</b>  |  |  |   |   |  |                         |
| Recognizes pVT  |  |  |   |   |  |                         |
| Clears before analyze and shock   |  |  |   |   |  |                         |
| Immediately resumes CPR after shocks  |  |  |   |   |  |                         |
| Appropriate airway management   |  |  |   |   |  |                         |
| Appropriate cycles of drug-rhythm check/shock-CPR   |  |  |   |   |  |                         |
| Administers appropriate drug(s) and doses   |  |  |   |   |  |                         |
| <b>PEA Management</b>   |  |  |   |   |  |                         |
| Recognizes PEA  |  |  |   |   |  |                         |
| Verbalizes potential reversible causes of PEA (H's and T's)   |  |  |   |   |  |                         |
| Administers appropriate drug(s) and doses   |  |  |   |   |  |                         |
| Immediately resumes CPR after rhythm checks   |  |  |   |   |  |                         |
| <b>Post-Cardiac Arrest Care</b>   |  |  |   |   |  |                         |
| Identifies ROSC   |  |  |   |   |  |                         |
| Ensures BP and 12-lead ECG are performed, O <sub>2</sub> saturation is monitored, verbalizes need for endotracheal intubation and waveform capnography, and orders laboratory tests |  |  |   |   |  |                         |
| Considers targeted temperature management   |  |  |   |   |  |                         |

### STOP TEST

| Test Results  | Circle PASS or NR to indicate pass or needs remediation: | PASS       | NR |
|---|--|------------|----|
| Instructor Initials _____   | Instructor Number _____                                  | Date _____ |    |
| <b>Learning Station Competency</b>  |  |            |    |
| <input type="checkbox"/> Bradycardia <input type="checkbox"/> Tachycardia <input type="checkbox"/> Cardiac Arrest/Post-Cardiac Arrest Care <input type="checkbox"/> Megacode Practice |  |            |    |

**Megacode 9—In-Hospital Stable Tachycardia (SVT)  
(Stable Tachycardia > PEA > VF > PCAC)**

**Lead-in:** A woman with a history of lupus and asthma was admitted with pneumonia. She is doing well initially but develops tachycardia while receiving albuterol for ongoing wheezing.

**Vital Signs**

**Heart rate:** 160/min, and the monitor shows SVT  
**Blood pressure:** 140/70 mm Hg  
**Respiratory rate:**  
**SpO<sub>2</sub>:**

**Temperature:**  
**Weight:**  
**Age:** 42 years

|  |
|--|
| <p><b>Initial Assessment</b><br/> <b>What are your initial actions?</b></p>  |
| <p><b>Adult Tachycardia With a Pulse Algorithm</b><br/> <b>Instructor notes:</b> If the student gives adenosine in this scenario, the rhythm will change from SVT to sinus, but the patient will progress to severe respiratory distress with marked wheezing. Adenosine is relatively contraindicated in asthma exacerbation because of the effects on the adenosine receptors, and it will worsen the underlying asthma exacerbation, leading to respiratory distress. If the student recognizes this and chooses an alternative for SVT, that should be positively noted, but for the scenario, the patient will progress to respiratory failure anyway.<br/>         The patient is in profound respiratory distress with wheezing and will be refractory to any attempts at albuterol. The patient will clearly either need immediate intubation or her condition will progress to complete respiratory failure requiring bag-mask ventilation. After intubation, the patient's condition will progress to PEA. The student should recognize this by evaluating for pulse and blood pressure after the intubation. Also, the PEA theoretically could be caused or contributed to by excessive ventilation (ie, auto-PEEP) immediately after intubation.</p> |
| <p><b>Adult Cardiac Arrest Algorithm (PEA)</b><br/> <b>Instructor notes:</b> The patient is in PEA after intubation with contributions from auto-PEEP given the severe asthma. The ventilation rate should be low, and the student should consider disconnecting the bag to allow full exhalation.<br/>         After the student attends to the ventilation rate and provision of epinephrine, the patient will have a rhythm change to <b>VF</b>.</p>  |
| <p><b>Adult Cardiac Arrest Algorithm (VF)</b><br/> <b>Instructor notes:</b> The patient is in VF, and immediate defibrillation is required. After attempting defibrillation, chest compressions can be initiated. After about 1 minute of chest compressions, ETCO<sub>2</sub> will rise from 12 mm Hg to 38 mm Hg.<br/>         The student should recognize ROSC, discontinue CPR, confirm pulse and blood pressure, and move to the Post-Cardiac Arrest Care Algorithm.</p>   |
| <p><b>Post-Cardiac Arrest Care Algorithm</b><br/> <b>Instructor notes:</b> After ROSC, the patient will have substantial auto-PEEP, and one immediate strategy will need to be avoiding excessive ventilation. The blood pressure will be relatively low (89/70 mm Hg) but responsive to fluids, and vasopressors are not necessarily needed, although they could be prepared in case the patient's condition worsens.<br/>         Because the causes of arrest are pneumonia and asthma, there should not be consideration for cardiac catheterization (if performed, a 12-lead ECG will show sinus tachycardia at rate of 110/min but otherwise normal).<br/>         The patient will not be following commands and thus would be a candidate for targeted temperature management. Oxygenation will be marginal, so the principle of avoiding hypoxia (as opposed to hyperoxia) will be in play.</p>   |

**Megacode Testing Checklist: Scenario 9  
Tachycardia → PEA → VF → PCAC**

Student Name \_\_\_\_\_ Date of Test \_\_\_\_\_

| <b>Critical Performance Steps</b>   |  |  |   |   |  | <b>Check if done correctly</b> |
|---|--|--|---|---|--|--------------------------------|
| <b>Team Leader</b>  |  |  |   |   |  |                                |
| Assigns team member roles   |  |  |   |   |  |                                |
| Ensures high-quality CPR at all times   | Compression rate 100-120/min<br><input type="checkbox"/> | Compression depth of ≥2 inches<br><input type="checkbox"/> | Chest compression fraction >80%<br><input type="checkbox"/> | Chest recoil (optional)<br><input type="checkbox"/> | Ventilation (optional)<br><input type="checkbox"/> |                                |
| Ensures that team members communicate well  |  |  |   |   |  |                                |
| <b>Tachycardia Management</b>   |  |  |   |   |  |                                |
| Starts oxygen if needed, places monitor, starts IV  |  |  |   |   |  |                                |
| Places monitor leads in proper position   |  |  |   |   |  |                                |
| Recognizes tachycardia (specific diagnosis)   |  |  |   |   |  |                                |
| Recognizes no symptoms due to tachycardia   |  |  |   |   |  |                                |
| Considers appropriate initial drug therapy  |  |  |   |   |  |                                |
| <b>PEA Management</b>   |  |  |   |   |  |                                |
| Recognizes PEA  |  |  |   |   |  |                                |
| Verbalizes potential reversible causes of PEA (H's and T's)   |  |  |   |   |  |                                |
| Administers appropriate drug(s) and doses   |  |  |   |   |  |                                |
| Immediately resumes CPR after rhythm check and pulse checks   |  |  |   |   |  |                                |
| <b>VF Management</b>  |  |  |   |   |  |                                |
| Recognizes VF   |  |  |   |   |  |                                |
| Clears before analyze and shock   |  |  |   |   |  |                                |
| Immediately resumes CPR after shocks  |  |  |   |   |  |                                |
| Appropriate airway management   |  |  |   |   |  |                                |
| Appropriate cycles of drug-rhythm check/shock-CPR   |  |  |   |   |  |                                |
| Administers appropriate drug(s) and doses   |  |  |   |   |  |                                |
| <b>Post-Cardiac Arrest Care</b>   |  |  |   |   |  |                                |
| Identifies ROSC   |  |  |   |   |  |                                |
| Ensures BP and 12-lead ECG are performed, O <sub>2</sub> saturation is monitored, verbalizes need for endotracheal intubation and waveform capnography, and orders laboratory tests |  |  |   |   |  |                                |
| Considers targeted temperature management   |  |  |   |   |  |                                |

**STOP TEST**

|   |  |             |           |
|---|--|-------------|-----------|
| <b>Test Results</b>   | Circle <b>PASS</b> or <b>NR</b> to indicate pass or needs remediation: | <b>PASS</b> | <b>NR</b> |
| Instructor Initials _____   | Instructor Number _____  | Date _____  |           |
| <b>Learning Station Competency</b>  |  |             |           |
| <input type="checkbox"/> Bradycardia <input type="checkbox"/> Tachycardia <input type="checkbox"/> Cardiac Arrest/Post-Cardiac Arrest Care <input type="checkbox"/> Megacode Practice |  |             |           |

## Megacode 10—In-Hospital Unstable Ventricular Tachycardia (Unstable Tachycardia > VF > PEA > PCAC)

**Lead-in:** You are working in the cardiac care unit of your hospital. A woman who underwent PCI 3 hours ago is reporting heavy central chest pressure and nausea.

### Vital Signs

**Heart rate:** 130/min  
**Blood pressure:** 72/40 mm Hg  
**Respiratory rate:** 20/min  
**SpO<sub>2</sub>:**

**Temperature:** 37°C  
**Weight:**  
**Age:** 51 years

|  |
|--|
| <p><b>Initial Assessment</b></p> <p><b>What are your initial actions?</b></p> <ul style="list-style-type: none"> <li>On initial assessment, the patient reports feeling light-headed and nauseated, with severe central crushing chest pain.</li> <li>She appears drowsy, pale, and diaphoretic. The SpO<sub>2</sub> monitor is not showing a waveform and giving no reading.</li> <li>The rhythm strip shows a <b>regular wide-complex tachycardia</b> at 130/min.</li> </ul>   |
| <p><b>Adult Tachycardia With a Pulse Algorithm</b></p> <p><b>Instructor notes:</b> A 12-lead ECG shows <b>VT</b> at 130/min. A previous ECG done before the procedure shows a normal sinus tachycardia with narrow complex. The goals of this section will be for the student to recognize unstable VT and follow the algorithm, assess ABCs, provide supplemental O<sub>2</sub>, ensure adequate IV access, discuss the pros and cons of analgesia and sedation, demonstrate safe synchronized cardioversion, and consider treatment for acute ischemia and acute coronary syndromes in this setting.</p> |
| <p><b>Adult Cardiac Arrest Algorithm (VF)</b></p> <p><b>Instructor notes:</b> After 2 failed synchronized cardioversions, the patient loses pulses and becomes apneic and unresponsive. The monitor shows <b>VF</b>. Focus on safe defibrillation, high-quality compressions, and a consideration of differential diagnoses.</p>   |
| <p><b>Adult Cardiac Arrest Algorithm (PEA)</b></p> <p><b>Instructor notes:</b> After the second defibrillation attempt, the patient's rhythm changes to a <b>wide-complex regular rhythm</b> (with P waves) at 70/min. The patient still has no pulses. The student should follow the PEA pathway of the Adult Cardiac Arrest Algorithm. Students should focus on high-quality chest compressions and may consider advanced airway and underlying causes, including pulmonary embolism and myocardial infarction hemorrhage, among other things.</p>   |
| <p><b>Post-Cardiac Arrest Care Algorithm</b></p> <p><b>Instructor notes:</b> The team continues high-quality chest compressions, the patient has ROSC, and the team initiates the Post-Cardiac Arrest Care Algorithm. The students may consider myocardial ischemia and involvement of the interventional cardiologist (question acute stent obstruction). If the patient cannot follow commands, targeted temperature management should be started.</p>   |

## Megacode Testing Checklist: Scenarios 4/7/10 Tachycardia → VF → PEA → PCAC

Student Name \_\_\_\_\_ Date of Test \_\_\_\_\_

| Critical Performance Steps  |   |   |  |  |   | Check if done correctly |
|---|---|---|--|--|---|-------------------------|
| <b>Team Leader</b>  |   |   |  |  |   |                         |
| Assigns team member roles   |   |   |  |  |   |                         |
| Ensures high-quality CPR at all times   | Compression rate 100-120/min <input type="checkbox"/> | Compression depth of ≥2 inches <input type="checkbox"/> | Chest compression fraction >80% <input type="checkbox"/> | Chest recoil (optional) <input type="checkbox"/> | Ventilation (optional) <input type="checkbox"/> |                         |
| Ensures that team members communicate well  |   |   |  |  |   |                         |
| <b>Tachycardia Management</b>   |   |   |  |  |   |                         |
| Starts oxygen if needed, places monitor, starts IV  |   |   |  |  |   |                         |
| Places monitor leads in proper position   |   |   |  |  |   |                         |
| Recognizes unstable tachycardia   |   |   |  |  |   |                         |
| Recognizes symptoms due to tachycardia  |   |   |  |  |   |                         |
| Performs immediate synchronized cardioversion   |   |   |  |  |   |                         |
| <b>VF Management</b>  |   |   |  |  |   |                         |
| Recognizes VF   |   |   |  |  |   |                         |
| Clears before analyze and shock   |   |   |  |  |   |                         |
| Immediately resumes CPR after shocks  |   |   |  |  |   |                         |
| Appropriate airway management   |   |   |  |  |   |                         |
| Appropriate cycles of drug-rhythm check/shock-CPR   |   |   |  |  |   |                         |
| Administers appropriate drug(s) and doses   |   |   |  |  |   |                         |
| <b>PEA Management</b>   |   |   |  |  |   |                         |
| Recognizes PEA  |   |   |  |  |   |                         |
| Verbalizes potential reversible causes of PEA (H's and T's)   |   |   |  |  |   |                         |
| Administers appropriate drug(s) and doses   |   |   |  |  |   |                         |
| Immediately resumes CPR after rhythm checks   |   |   |  |  |   |                         |
| <b>Post-Cardiac Arrest Care</b>   |   |   |  |  |   |                         |
| Identifies ROSC   |   |   |  |  |   |                         |
| Ensures BP and 12-lead ECG are performed, O <sub>2</sub> saturation is monitored, verbalizes need for endotracheal intubation and waveform capnography, and orders laboratory tests |   |   |  |  |   |                         |
| Considers targeted temperature management   |   |   |  |  |   |                         |

### STOP TEST

|   |  |             |           |
|---|--|-------------|-----------|
| <b>Test Results</b>   | Circle <b>PASS</b> or <b>NR</b> to indicate pass or needs remediation: | <b>PASS</b> | <b>NR</b> |
| Instructor Initials _____   | Instructor Number _____  | Date _____  |           |
| <b>Learning Station Competency</b>  |  |             |           |
| <input type="checkbox"/> Bradycardia <input type="checkbox"/> Tachycardia <input type="checkbox"/> Cardiac Arrest/Post-Cardiac Arrest Care <input type="checkbox"/> Megacode Practice |  |             |           |

**Megacode 11—In-Hospital Colonoscopy Suite Unstable Bradycardia (Unstable Bradycardia > VF > PEA > PCAC)**

**Lead-in:** A patient is undergoing his initial colon screening. Fifteen minutes into the procedure, under conscious sedation, the patient’s respiratory rate drops to 4 and ETCO<sub>2</sub> is 55 mm Hg.

**Vital Signs**

**Heart rate:**  
**Blood pressure:**  
**Respiratory rate:**  
**SpO<sub>2</sub>:**  
**Temperature:**  
**Weight:**  
**Age:** 51 years

|  |
|--|
| <p><b>Initial Assessment</b></p> <p><b>What are your initial actions?</b></p> <ul style="list-style-type: none"> <li>This healthy man with a family history of colon cancer (maternal grandfather and uncle) is undergoing an initial screening colonoscopy.</li> <li>He has no significant past medical history except daily alcohol use (3 to 4 drinks per day).</li> <li>The patient had received a combination of fentanyl and midazolam for conscious sedation.</li> <li>It is noted that as the ETCO<sub>2</sub> rises, the patient becomes less arousable and then apneic.</li> <li>The Code Team is activated.</li> </ul> <p><b>What are the next steps?</b></p> <p><b>Instructor notes:</b> IV reversal agents are ordered. Bag-mask ventilation is initiated. His vital signs are heart rate 30/min, respiratory rate 3/min, blood pressure 70/P mm Hg, and SpO<sub>2</sub> 82% on 4 L/min via nasal cannula.</p> <p>Students should recognize the impending respiratory failure and consider reversal agents. The patient is placed on 100% oxygen, and flumazenil and naloxone are provided with improved oxygen saturations, but there is no change in respiratory rate. A supraglottic airway is placed.</p> |
| <p><b>Adult Bradycardia Algorithm</b></p> <p><b>Instructor notes:</b> The patient’s respiratory status has been stabilized.</p> <p>The student should note the abnormal heart rate and hypotension. The bradycardia is <b>slow and narrow complex</b> without ST changes. The patient is unstable and given IV atropine (0.5 mg) twice without change in heart rate or blood pressure.</p> <p>While the dopamine infusion is being prepared, the patient becomes unresponsive.</p> <p><b>What is the next action?</b></p>  |
| <p><b>Adult Cardiac Arrest Algorithm (VF)</b></p> <p><b>Instructor notes:</b> The monitor demonstrates <b>VF</b>.</p> <p><b>What is the action?</b></p> <p><b>Instructor notes:</b> The patient has no pulse. CPR is started. The VF/pVT pathway should be followed. Shocks are delivered. Epinephrine and amiodarone are given.</p> <p>An advanced airway is placed. A rhythm check shows SVT. No pulse or spontaneous respirations are confirmed.</p>  |
| <p><b>Adult Cardiac Arrest Algorithm (PEA)</b></p> <p><b>Instructor notes:</b> CPR is continued. Bag-mask ventilation at 100% is continued. A second dose of epinephrine is given with no change in condition.</p> <p>During the rhythm check, the monitor reveals a <b>narrow-complex tachycardia</b> and no pulse. The PEA pathway of the Adult Cardiac Arrest Algorithm is followed.</p>  |
| <p><b>Post-Cardiac Arrest Care Algorithm</b></p> <p><b>Instructor notes:</b> The team continues high-quality chest compressions, the patient has ROSC, and the team initiates the Post-Cardiac Arrest Care Algorithm.</p>  |

**Megacode Testing Checklist: Scenarios 6/11 Bradycardia → VF → PEA → PCAC**

Student Name \_\_\_\_\_ Date of Test \_\_\_\_\_

| <b>Critical Performance Steps</b>   |   |   |  |  |   | <b>Check if done correctly</b> |
|---|---|---|--|--|---|--------------------------------|
| <b>Team Leader</b>  |   |   |  |  |   |                                |
| Assigns team member roles   |   |   |  |  |   |                                |
| Ensures high-quality CPR at all times   | Compression rate 100-120/min <input type="checkbox"/> | Compression depth of ≥2 inches <input type="checkbox"/> | Chest compression fraction >80% <input type="checkbox"/> | Chest recoil (optional) <input type="checkbox"/> | Ventilation (optional) <input type="checkbox"/> |                                |
| Ensures that team members communicate well  |   |   |  |  |   |                                |
| <b>Bradycardia Management</b>   |   |   |  |  |   |                                |
| Starts oxygen if needed, places monitor, starts IV  |   |   |  |  |   |                                |
| Places monitor leads in proper position   |   |   |  |  |   |                                |
| Recognizes symptomatic bradycardia  |   |   |  |  |   |                                |
| Administers correct dose of atropine  |   |   |  |  |   |                                |
| Prepares for second-line treatment  |   |   |  |  |   |                                |
| <b>VF Management</b>  |   |   |  |  |   |                                |
| Recognizes VF   |   |   |  |  |   |                                |
| Clears before analyze and shock   |   |   |  |  |   |                                |
| Immediately resumes CPR after shocks  |   |   |  |  |   |                                |
| Appropriate airway management   |   |   |  |  |   |                                |
| Appropriate cycles of drug-rhythm check/shock-CPR   |   |   |  |  |   |                                |
| Administers appropriate drug(s) and doses   |   |   |  |  |   |                                |
| <b>PEA Management</b>   |   |   |  |  |   |                                |
| Recognizes PEA  |   |   |  |  |   |                                |
| Verbalizes potential reversible causes of PEA (H's and T's)   |   |   |  |  |   |                                |
| Administers appropriate drug(s) and doses   |   |   |  |  |   |                                |
| Immediately resumes CPR after rhythm checks   |   |   |  |  |   |                                |
| <b>Post-Cardiac Arrest Care</b>   |   |   |  |  |   |                                |
| Identifies ROSC   |   |   |  |  |   |                                |
| Ensures BP and 12-lead ECG are performed, O <sub>2</sub> saturation is monitored, verbalizes need for endotracheal intubation and waveform capnography, and orders laboratory tests |   |   |  |  |   |                                |
| Considers targeted temperature management   |   |   |  |  |   |                                |

**STOP TEST**

|   |  |             |           |
|---|--|-------------|-----------|
| <b>Test Results</b>   | Circle <b>PASS</b> or <b>NR</b> to indicate pass or needs remediation: | <b>PASS</b> | <b>NR</b> |
| Instructor Initials _____   | Instructor Number _____  | Date _____  |           |
| <b>Learning Station Competency</b>  |  |             |           |
| <input type="checkbox"/> Bradycardia <input type="checkbox"/> Tachycardia <input type="checkbox"/> Cardiac Arrest/Post-Cardiac Arrest Care <input type="checkbox"/> Megacode Practice |  |             |           |

## Megacode 12—In-Hospital Surgical Waiting Room Unstable Bradycardia (Unstable Bradycardia > VF > Asystole/PEA > PCAC)

**Lead-in:** A woman sits in the surgical waiting room, awaiting news about her husband's surgery, when she suddenly becomes light-headed and dizzy and nearly passes out.

### Vital Signs

**Heart rate:**  
**Blood pressure:**  
**Respiratory rate:**  
**SpO<sub>2</sub>:**

**Temperature:**  
**Weight:**  
**Age:** 67 years

### Initial Assessment

- The patient has a past medical history of breast cancer (in remission) and diabetes.
- She is lying on the floor.
- You respond as a member of the medical emergency team that was activated.

### What are your initial steps?

**Instructor notes:** She admits that she forgot to eat breakfast today. The rest of the team arrives. Her vital signs are heart rate 28/min, respiratory rate 18/min, blood pressure 68/P mm Hg, 96% SpO<sub>2</sub> on room air, and blood sugar 90 mg/dL (5 mmol/L). The patient is moved to a stretcher. The monitor shows a second-degree type II AV block.

### Adult Bradycardia Algorithm

**Instructor notes:** The student should note the abnormal heart rate and hypotension. The bradycardia is narrow complex without ST changes. The patient is unstable and given IV atropine (0.5 mg) twice without a change in heart rate or blood pressure.

### What is the next action?

The patient is wheeled urgently to the hospital emergency department.

### Adult Cardiac Arrest Algorithm (VF)

**Instructor notes:** The monitor demonstrates VF.

### What is the action?

The patient has no pulse. CPR is started. The student should follow the VF/pVT pathway. Shocks are delivered twice, and epinephrine and amiodarone are given. An advanced airway is placed. A monitor check demonstrates asystole. No pulse or spontaneous respirations are confirmed.

### Adult Cardiac Arrest Algorithm (Asystole and PEA)

**Instructor notes:** CPR is continued. Bag-mask ventilation with 100% oxygen is continued. Epinephrine is given (third dose). There is no change in her condition. During the rhythm check, the monitor reveals a **narrow-complex tachycardia** with no pulse. The PEA pathway of the Adult Cardiac Arrest Algorithm is followed.

### Post-Cardiac Arrest Care Algorithm

**Instructor notes:** The team continues high-quality chest compressions, the patient has ROSC, and the team initiates the Post-Cardiac Arrest Care Algorithm.

## Megacode Testing Checklist: Scenario 12 Bradycardia → VF → Asystole/PEA → PCAC

Student Name \_\_\_\_\_ Date of Test \_\_\_\_\_

| Critical Performance Steps  |  |  |   |   |  | Check if done correctly |
|---|--|--|---|---|--|-------------------------|
| <b>Team Leader</b>  |  |  |   |   |  |                         |
| Assigns team member roles   |  |  |   |   |  |                         |
| Ensures high-quality CPR at all times   | Compression rate 100-120/min<br><input type="checkbox"/> | Compression depth of ≥2 inches<br><input type="checkbox"/> | Chest compression fraction >80%<br><input type="checkbox"/> | Chest recoil (optional)<br><input type="checkbox"/> | Ventilation (optional)<br><input type="checkbox"/> |                         |
| Ensures that team members communicate well  |  |  |   |   |  |                         |
| <b>Bradycardia Management</b>   |  |  |   |   |  |                         |
| Starts oxygen if needed, places monitor, starts IV  |  |  |   |   |  |                         |
| Places monitor leads in proper position   |  |  |   |   |  |                         |
| Recognizes symptomatic bradycardia  |  |  |   |   |  |                         |
| Administers correct dose of atropine  |  |  |   |   |  |                         |
| Prepares for second-line treatment  |  |  |   |   |  |                         |
| <b>VF Management</b>  |  |  |   |   |  |                         |
| Recognizes VF   |  |  |   |   |  |                         |
| Clears before analyze and shock   |  |  |   |   |  |                         |
| Immediately resumes CPR after shocks  |  |  |   |   |  |                         |
| Appropriate airway management   |  |  |   |   |  |                         |
| Appropriate cycles of drug-rhythm check/shock-CPR   |  |  |   |   |  |                         |
| Administers appropriate drug(s) and doses   |  |  |   |   |  |                         |
| <b>Asystole and PEA Management</b>  |  |  |   |   |  |                         |
| Recognizes asystole and PEA   |  |  |   |   |  |                         |
| Verbalizes potential reversible causes of asystole and PEA (H's and T's)  |  |  |   |   |  |                         |
| Administers appropriate drug(s) and doses   |  |  |   |   |  |                         |
| Immediately resumes CPR after rhythm checks   |  |  |   |   |  |                         |
| <b>Post-Cardiac Arrest Care</b>   |  |  |   |   |  |                         |
| Identifies ROSC   |  |  |   |   |  |                         |
| Ensures BP and 12-lead ECG are performed, O <sub>2</sub> saturation is monitored, verbalizes need for endotracheal intubation and waveform capnography, and orders laboratory tests |  |  |   |   |  |                         |
| Considers targeted temperature management   |  |  |   |   |  |                         |

### STOP TEST

|   |  |             |           |
|---|--|-------------|-----------|
| <b>Test Results</b>   | Circle <b>PASS</b> or <b>NR</b> to indicate pass or needs remediation: | <b>PASS</b> | <b>NR</b> |
| Instructor Initials _____ Instructor Number _____ Date _____  |  |             |           |
| <b>Learning Station Competency</b>  |  |             |           |
| <input type="checkbox"/> Bradycardia <input type="checkbox"/> Tachycardia <input type="checkbox"/> Cardiac Arrest/Post-Cardiac Arrest Care <input type="checkbox"/> Megacode Practice |  |             |           |