Megacode 1—Unstable Bradycardia
Scenario Location: Out-of-Hospital

(Unstable Bradycardia → pVT → PEA → PCAC)

Lead-in: You are a paramedic treating a 62-year-old man who had a syncopal episode.

Case Development

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. The blood pressure is 78/42 mm Hg.
Bradycardia Algorithm	The ECG monitor shows a **sinus bradycardia** with occasional PVC. The student should follow the Bradycardia Algorithm and be prepared to administer a single dose of atropine while preparing for transcutaneous pacing.
Cardiac Arrest Algorithm (Pulseless VT)	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 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.
Cardiac Arrest Algorithm (PEA)	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 Cardiac Arrest Algorithm. The student should consider reversible causes.
Immediate Post–Cardiac Arrest Algorithm	After ensuring effective ventilation, the student can now detect a carotid pulse. The patient has ROSC. The student should initiate the Immediate 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	✓ if done correctly
Team Leader	
Ensures high-quality CPR at all times	
Assigns team member roles	
Ensures that team members perform well	
Bradycardia Management	
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	
Pulseless VT Management	
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	
PEA Management	
Recognizes PEA	
Verbalizes potential reversible causes of PEA (H's and T's)	
Administers appropriate drug(s) and doses	
Immediately resumes CPR after rhythm and pulse checks	
Post–Cardiac Arrest Care	
Identifies ROSC	
Ensures BP and 12-lead ECG are performed, O_2 saturation is monitored, verbalizes need for endotracheal intubation and waveform capnography, and orders laboratory tests	
Considers targeted temperature management	

STOP TEST

Instructor Notes

- Place a ✓ in the box next to each step the student completes successfully.
- If the student does not complete all steps successfully (as indicated by at least 1 blank check box), the student must receive remediation. Make a note here of which skills require remediation (refer to Instructor Manual for information about remediation).

Test Results Circle **PASS** or **NR** to indicate pass or needs remediation:	**PASS**	**NR**

Instructor Initials _____

Instructor Number _____ Date _____

Megacode 2—Unstable Bradycardia Scenario Location: Out-of-Hospital

(Unstable Bradycardia → VF → Asystole → PCAC)

Lead-in: You are called to a restaurant for a man who was waiting to be seated for dinner with a group. According to witnesses, he suddenly became unresponsive, vomited, and then stopped breathing. You have a 4-minute response to the scene in your ALS ambulance.

Case Development

Initial Assessment	You arrive at the scene to find 3 firefighters assisting the patient. One is maintaining an open airway while another is suctioning the patient. The third is getting vital signs and reports that his pulse is 44/min and very strong, respirations are 3/min, and blood pressure is 200/120 mm Hg. Bystanders state that the patient had a normal day but seemed irritated by the wait for a table.
Bradycardia Algorithm	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 ventilations are initiated with oxygen. Shortly after that, the patient has no respirations and no pulse. The monitor shows **VF.**
Cardiac Arrest Algorithm (VF)	Defibrillation is carried out and then CPR for 2 minutes. During this time, his wife says that he is healthy normally, and taking 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. Defibrillation with more CPR is given. Epinephrine is given, and an advanced airway is placed with an $ETCO_2$ reading of 22 mm Hg noted. Two minutes later, the rhythm is asystole, confirmed in 2 leads.
Cardiac Arrest Algorithm (Asystole)	CPR is initiated, and treatable causes are considered. After 2 cycles of CPR, the monitor shows a borderline wide-complex organized rhythm with a rate of 56/min, and there are pulses present.
Immediate Post–Cardiac Arrest Algorithm	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. 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 for transport considerations.

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

Student Name _____ Date of Test _____

Critical Performance Steps	✓ if done correctly
Team Leader	
Ensures high-quality CPR at all times	
Assigns team member roles	
Ensures that team members perform well	
Bradycardia Management	
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	
VF Management	
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	
Asystole Management	
Recognizes asystole	
Verbalizes potential reversible causes of asystole (H's and T's)	
Administers appropriate drug(s) and doses	
Immediately resumes CPR after rhythm and pulse checks	
Post–Cardiac Arrest Care	
Identifies ROSC	
Ensures BP and 12-lead ECG are performed, O_2 saturation is monitored, verbalizes need for endotracheal intubation and waveform capnography, and orders laboratory tests	
Considers targeted temperature management	

STOP TEST

Instructor Notes

- Place a ✓ in the box next to each step the student completes successfully.
- If the student does not complete all steps successfully (as indicated by at least 1 blank check box), the student must receive remediation. Make a note here of which skills require remediation (refer to Instructor Manual for information about remediation).

Test Results	Circle **PASS** or **NR** to indicate pass or needs remediation:	**PASS**	**NR**

Instructor Initials _____

Instructor Number _____ Date _____

Megacode 3—Unstable Bradycardia Scenario Location: Out-of-Hospital

(Unstable Bradycardia → pVT → PEA → PCAC)

Lead-in: Your ALS ambulance is dispatched to help an elderly man having chest pain in the lobby of the local bank. A BLS engine is also responding. You arrive to find the scene is safe and firefighters are placing a nonrebreathing oxygen mask on the patient.

Case Development

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 waiting in line to see a teller. He has had cardiac problems in the past, and he received a heart transplant 2 years ago. What are your initial actions? His pulse is slow and weak, his respirations are 18/min and nonlabored, and his blood pressure is 86/48 mm Hg by Doppler (due to not being able to hear it with a stethoscope). He is grossly diaphoretic and pale/gray in color. 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 V4R is flat.
Bradycardia Algorithm	If students try to give atropine, it will not have any effect due to heart denervation. The transcutaneous pacemaker is applied, but before it acquires capture, the patient goes unresponsive, the rhythm changes to **VT,** and he becomes apneic. There is no pulse.
Cardiac Arrest Algorithm (Pulseless VT)	Defibrillation occurs, and then high-quality CPR is given for 2 minutes, during which time peripheral IVs are established in each arm. After 2 minutes, the rhythm is still VT. Defibrillation occurs again, with CPR, and epinephrine is administered. A bag-mask device is being 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.
Cardiac Arrest Algorithm (PEA)	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 $ETCO_2$ reading is now 48 mm Hg.
Immediate Post–Cardiac Arrest Algorithm	The patient will bat his eyes to loud voices, and he begins breathing at 8/min. 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	✓ if done correctly
Team Leader	
Ensures high-quality CPR at all times	
Assigns team member roles	
Ensures that team members perform well	
Bradycardia Management	
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	
Pulseless VT Management	
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	
PEA Management	
Recognizes PEA	
Verbalizes potential reversible causes of PEA (H's and T's)	
Administers appropriate drug(s) and doses	
Immediately resumes CPR after rhythm and pulse checks	
Post–Cardiac Arrest Care	
Identifies ROSC	
Ensures BP and 12-lead ECG are performed, O_2 saturation is monitored, verbalizes need for endotracheal intubation and waveform capnography, and orders laboratory tests	
Considers targeted temperature management	

STOP TEST

Instructor Notes

- Place a ✓ in the box next to each step the student completes successfully.
- If the student does not complete all steps successfully (as indicated by at least 1 blank check box), the student must receive remediation. Make a note here of which skills require remediation (refer to Instructor Manual for information about remediation).

Test Results	Circle **PASS** or **NR** to indicate pass or needs remediation:	**PASS**	**NR**

Instructor Initials _____

Instructor Number _____ Date _____

Megacode 4—Unstable Ventricular Tachycardia Scenario Location: Out-of-Hospital

(Unstable Tachycardia → VF → PEA → PCAC)

Lead-in: Your ALS ambulance is dispatched to the beltway (the highway around your city) to a car that has pulled to the side of the highway. The caller states that she was driving the patient (a 65-year-old woman) to an appointment, but the patient was getting really sick and didn't think they could make it 15 more miles to the appointment. She is reporting shortness of breath and weakness.

Case Development

Initial Assessment	Your unit arrives to the scene to find the police controlling traffic (the scene is safe). The patient is sitting in the passenger seat of an SUV, awake and talking in 2- to 3-word sentences. What are your initial actions? Her vital signs include a respiratory rate of 20/min with mildly labored breathing; her lungs have fine crackles in both bases. Her SpO_2 is 94% on 15 L/min of oxygen provided by firefighters. There are palpable carotid and radial pulses with a rate of 150/min. Her blood pressure is 84/54 mm Hg.
Tachycardia Algorithm	Your 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 you are preparing to increase the energy to cardiovert again, the patient's head slumps, and she stops breathing. The monitor now shows **VF.**
Cardiac Arrest Algorithm (VF)	The patient is rapidly removed from the car to the stretcher. CPR is initiated, the defibrillation is quickly delivered, and CPR is continued. The stretcher (with CPR in progress) is moved to the back of the ambulance for better access to equipment. During this cycle of CPR, an IO access is achieved, and bag-mask ventilations are performed with mild difficulty. After 2 minutes, the rhythm is still VF, defibrillation is performed, and CPR is continued. 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.
Cardiac Arrest Algorithm (PEA)	CPR is continued, and capnography readings continue to hover between 22 mm Hg 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.
Immediate Post–Cardiac Arrest Algorithm	The patient is starting to have spontaneous respirations (disorganized) with a capnography reading of 60 mm Hg and SpO_2 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, and a tertiary care center is 14 minutes from the scene.

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

Student Name _____ Date of Test _____

Critical Performance Steps	✓ if done correctly
Team Leader	
Ensures high-quality CPR at all times	
Assigns team member roles	
Ensures that team members perform well	
Tachycardia Management	
Starts oxygen if needed, places monitor, starts IV	
Places monitor leads in proper position	
Recognizes unstable tachycardia	
Recognizes symptoms due to gunshot wound	
VF Management	
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	
PEA Management	
Recognizes PEA	
Verbalizes potential reversible causes of PEA (H's and T's)	
Administers appropriate drug(s) and doses	
Immediately resumes CPR after rhythm and pulse checks	
Post–Cardiac Arrest Care	
Identifies ROSC	
Ensures BP and 12-lead ECG are performed, O_2 saturation is monitored, verbalizes need for endotracheal intubation and waveform capnography, and orders laboratory tests	
Considers targeted temperature management	

STOP TEST

Instructor Notes

- Place a ✓ in the box next to each step the student completes successfully.
- If the student does not complete all steps successfully (as indicated by at least 1 blank check box), the student must receive remediation. Make a note here of which skills require remediation (refer to Instructor Manual for information about remediation).

Test Results	Circle **PASS** or **NR** to indicate pass or needs remediation:	**PASS**	**NR**

Instructor Initials _____

Instructor Number _____ Date _____

Megacode 5—Unstable Bradycardia Scenario Location: Emergency Department

(Unstable Bradycardia → VF → Asystole → PCAC)

Lead-in: You are working in the emergency department when a drowsy 28-year-old man is brought in by paramedics, who are concerned about a drug overdose.

Case Development

Initial Assessment	They tell you that the patient has a history of depression and also takes diltiazem for an unknown reason. A family member on scene told paramedics that the patient has had a very low mood lately and threated 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 that the patient is very drowsy and slurring his words. You are unable to get any useful information on his history from the patient.
Bradycardia Algorithm	His vital signs include heart rate 30/min, respiratory rate 16/min, blood pressure 100/55 mm Hg, SpO_2 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.**
Cardiac Arrest Algorithm (VF)	Students should follow the VF pathway of the Cardiac Arrest Algorithm. Advanced students may consider discussing intravenous lipid emulsion therapy and extracorporeal CPR.
Cardiac Arrest Algorithm (Asystole)	After the second shock, the patient's rhythm changes to asystole. The student should follow the asystole pathway of the Cardiac Arrest Algorithm with special attention given to high-quality CPR and good team communication.
Immediate Post–Cardiac Arrest Algorithm	After several rounds of CPR and ACLS, the patient has ROSC. The rhythm on the monitor is a ventricular escape bradycardia with hypotension. Consider the toxicological aspects of the case as well as the differential diagnosis. A discussion around the treatment of Ca2+ 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	✓ if done correctly
Team Leader	
Ensures high-quality CPR at all times	
Assigns team member roles	
Ensures that team members perform well	
Bradycardia Management	
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	
VF Management	
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	
Asystole Management	
Recognizes asystole	
Verbalizes potential reversible causes of asystole (H's and T's)	
Administers appropriate drug(s) and doses	
Immediately resumes CPR after rhythm and pulse checks	
Post–Cardiac Arrest Care	
Identifies ROSC	
Ensures BP and 12-lead ECG are performed, O_2 saturation is monitored, verbalizes need for endotracheal intubation and waveform capnography, and orders laboratory tests	
Considers targeted temperature management	

STOP TEST

Instructor Notes

- Place a ✓ in the box next to each step the student completes successfully.
- If the student does not complete all steps successfully (as indicated by at least 1 blank check box), the student must receive remediation. Make a note here of which skills require remediation (refer to Instructor Manual for information about remediation).

Test Results	Circle **PASS** or **NR** to indicate pass or needs remediation:	**PASS**	**NR**

Instructor Initials _____

Instructor Number _____ Date _____

Megacode 6—Unstable Bradycardia Scenario Location: In-Hospital

(Unstable Bradycardia → VF → PEA → PCAC)

Lead-in: A 58-year-old man was admitted to the hospital with pneumonia. On the second day of his hospital course, he says he has chest pain, and you are called to evaluate him.

Case Development

Initial Assessment	What are your initial actions?
Bradycardia Algorithm	The patient's vital signs are heart rate 35/min, respiratory rate 18/min, and blood pressure 88/49 mm Hg. The monitor shows a **third-degree heart block.** The initial dose of atropine will not have much effect, and pacing should be initiated. With pacing, the patient's blood pressure will also improve such that the patient can now go to the cardiac cath lab.
Cardiac Arrest Algorithm (VF)	Just after completion of cardiac catheterization (with findings of 100% right coronary artery occlusion), the patient will develop VF. 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. Errors would be to provide epinephrine before at least 2 shocks. After the third shock, the patient will go into a **sinus tachycardia** with no pulse (PEA). Of note, if the student chose to relook at the coronary arteries, this would be an appropriate step and would be patent (ie, the underlying cause could be arterial reocclusion, but this advanced reasoning is beyond the expectations of the scenario).
Cardiac Arrest Algorithm (PEA)	The patient is now in PEA. The student continues to monitor high-quality CPR, and epinephrine should be provided. Shortly after a dose of epinephrine, the student will notice that the continuous $ETCO_2$ rises to 40 mm Hg. The student should recognize that ROSC is likely present and stop CPR, even if the full 2 minutes is not performed, because the $ETCO_2$ is identifying ROSC (a good opportunity for this teaching point). Underlying causes during this event that could be considered include cardiac tamponade, and, if an ultrasound is performed, there would be no fluid present.
Immediate Post–Cardiac Arrest Algorithm	After the student recognizes ROSC ($ETCO_2$ 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 of 70/30 mm Hg. The student should ask for the vital signs as opposed to just stating them. The patient should be given a fluid bolus, and a vasopressor infusion should be initiated as blood pressure will not improve with fluids alone. The patient will not be following commands and would be a candidate for targeted temperature management.

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

Student Name _____ Date of Test _____

Critical Performance Steps	✓ if done correctly
Team Leader	
Ensures high-quality CPR at all times	
Assigns team member roles	
Ensures that team members perform well	
Bradycardia Management	
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	
VF Management	
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	
PEA Management	
Recognizes PEA	
Verbalizes potential reversible causes of PEA (H's and T's)	
Administers appropriate drug(s) and doses	
Immediately resumes CPR after rhythm and pulse checks	
Post–Cardiac Arrest Care	
Identifies ROSC	
Ensures BP and 12-lead ECG are performed, O_2 saturation is monitored, verbalizes need for endotracheal intubation and waveform capnography, and orders laboratory tests	
Considers targeted temperature management	

STOP TEST

Instructor Notes

- Place a ✓ in the box next to each step the student completes successfully.
- If the student does not complete all steps successfully (as indicated by at least 1 blank check box), the student must receive remediation. Make a note here of which skills require remediation (refer to Instructor Manual for information about remediation).

Test Results	Circle **PASS** or **NR** to indicate pass or needs remediation:	**PASS**	**NR**

Instructor Initials _____

Instructor Number _____ Date _____

Megacode 7—Unstable Ventricular Tachycardia Scenario Location: In-Hospital

(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.

Case Development

Initial Assessment	The patient has a supportive family and wife who remain at his bedside consistently. What are your initial actions? At the change of shift, the patient's vital signs were heart rate 82/min, respiratory rate 16/min, blood pressure 124/74 mm Hg, and SpO_2 of 98%. He denied chest pain on assessment. You leave the room and are shortly summoned to return by your patient's son. As you enter the room, you assess that your patient is clutching his chest, stating he has chest pain, and displaying diaphoresis. His vital signs are heart rate 160/min, respiratory rate 22/min, blood pressure 156/92 mm Hg, and SpO_2 of 93%. His bedside monitor shows a **monomorphic, wide, and rapid rhythm,** which is different from previously recorded rhythms. Your patient may have an acute coronary syndrome. Due to his history, you will initially focus on the tachycardia rhythm. You will question your 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.
Tachycardia Algorithm	The symptoms of your patient's tachycardia require management and treatment. You are able to differentiate that not only is your patient in VT, he is also symptomatic. The treatment for this is immediate cardioversion, noting that drug therapy should not delay the cardioversion.
Cardiac Arrest Algorithm (VF)	Upon delivery of the cardioversion shock, your patient develops a different rhythm, which you identify as **VF.** Now, you will follow the VF/pVT pathway of the Cardiac Arrest Algorithm. As Team Leader, you will assign team functions and monitor for high-quality CPR. The case should continue through safe defibrillation, administration of a vasopressor, and consideration of an anti-arrhythmic drug.
Cardiac Arrest Algorithm (PEA)	Despite your actions, your patient is now showing **second-degree AV block** on the monitor with no pulse (PEA). As Team Leader, you continue to monitor high-quality CPR and follow the PEA pathway of the Cardiac Arrest Algorithm. Your patient may be in cardiogenic shock, so you must be able to differentiate and discuss potential causes of PEA.
Immediate Post–Cardiac Arrest Algorithm	Your team continues high-quality chest compressions, and your patient has ROSC. At this point, you should initiate the Immediate Post–Cardiac Arrest Care Algorithm.

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

Student Name _____ Date of Test _____

Critical Performance Steps	✓ if done correctly
Team Leader	
Ensures high-quality CPR at all times	
Assigns team member roles	
Ensures that team members perform well	
Tachycardia Management	
Starts oxygen if needed, places monitor, starts IV	
Places monitor leads in proper position	
Recognizes unstable tachycardia	
Recognizes symptoms due to gunshot wound	
VF Management	
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	
PEA Management	
Recognizes PEA	
Verbalizes potential reversible causes of PEA (H's and T's)	
Administers appropriate drug(s) and doses	
Immediately resumes CPR after rhythm and pulse checks	
Post–Cardiac Arrest Care	
Identifies ROSC	
Ensures BP and 12-lead ECG are performed, O_2 saturation is monitored, verbalizes need for endotracheal intubation and waveform capnography, and orders laboratory tests	
Considers targeted temperature management	

STOP TEST

Instructor Notes

- Place a ✓ in the box next to each step the student completes successfully.
- If the student does not complete all steps successfully (as indicated by at least 1 blank check box), the student must receive remediation. Make a note here of which skills require remediation (refer to Instructor Manual for information about remediation).

Test Results	Circle **PASS** or **NR** to indicate pass or needs remediation:	**PASS**	**NR**

Instructor Initials _____

Instructor Number _____ Date _____

Megacode 8—Unstable Bradycardia
Scenario Location: In-Hospital

(Unstable Bradycardia → pVT → PEA → PCAC)

Lead-in: A 72-year-old man was admitted to the hospital with palpitations. He is now reporting chest discomfort, and you are called to evaluate him.

Case Development

Initial Assessment	What are your initial actions? The patient's vital signs are heart rate of 50/min, respirations of 24/min, blood pressure of 150/70 mm Hg, and SpO_2 of 90% on room air. A 12-lead ECG reveals an acute inferior STEMI.
Bradycardia Algorithm	The patient has a STEMI, bradycardia, and hypoxia. The patient should be placed on supplementary 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 cath lab, though nitroglycerin should be avoided because of the inferior myocardial infarction.
Cardiac Arrest Algorithm (Pulseless VT)	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 defibrillation, 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, the patient's rhythm will change to PEA.
Cardiac Arrest Algorithm (PEA)	After epinephrine is given for PEA, the rhythm will go **back to VF.** After another defibrillation, the $ETCO_2$ 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.
Immediate Post–Cardiac Arrest Algorithm	After ROSC, the patient should have his vital signs checked (heart rate 108/min, blood pressure 80/60 mm Hg, SpO_2 of 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	✓ if done correctly
Team Leader	
Ensures high-quality CPR at all times	
Assigns team member roles	
Ensures that team members perform well	
Bradycardia Management	
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	
Pulseless VT Management	
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	
PEA Management	
Recognizes PEA	
Verbalizes potential reversible causes of PEA (H's and T's)	
Administers appropriate drug(s) and doses	
Immediately resumes CPR after rhythm and pulse checks	
Post–Cardiac Arrest Care	
Identifies ROSC	
Ensures BP and 12-lead ECG are performed, O_2 saturation is monitored, verbalizes need for endotracheal intubation and waveform capnography, and orders laboratory tests	
Considers targeted temperature management	

STOP TEST

Instructor Notes

- Place a ✓ in the box next to each step the student completes successfully.
- If the student does not complete all steps successfully (as indicated by at least 1 blank check box), the student must receive remediation. Make a note here of which skills require remediation (refer to Instructor Manual for information about remediation).

Test Results	Circle **PASS** or **NR** to indicate pass or needs remediation:	**PASS**	**NR**

Instructor Initials _____

Instructor Number _____ Date _____

Megacode 9—Unstable Tachycardia (SVT) Scenario Location: In-Hospital

(Unstable Tachycardia → PEA → VF → PCAC)

Lead-in: A 42-year-old woman with a history of lupus and asthma was admitted with pneumonia. She is doing well initially but then develops tachycardia while receiving albuterol for ongoing wheezing.

Case Development

Initial Assessment	What are your initial actions? The patient has a heart rate of 160/min and the monitor shows SVT. The blood pressure is 140/70 mm Hg.
Tachycardia Algorithm	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 option for SVT, then that should be positively noted, but for the sake of the scenario, the patient will progress to respiratory failure anyway. 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 progress to complete respiratory failure requiring bag-mask ventilation. After intubation, the patient will progress to PEA. The student should recognize this by evaluating for pulse/blood pressure after the intubation. Also, the PEA could theoretically be caused or contributed to by excessive ventilations (ie, auto-PEEP) immediately after intubation.
Cardiac Arrest Algorithm (PEA)	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 may or should consider disconnecting the bag to allow full exhalation. After the student attends to the ventilation rate and provision of epinephrine, the patient will have rhythm change to **VF.**
Cardiac Arrest Algorithm (VF)	The patient is in VF and immediate defibrillation is required. After defibrillation, chest compressions can be initiated. After about 1 minute of chest compressions, $ETCO_2$ will rise from 12 mm Hg to 38 mm Hg. The student should recognize ROSC, discontinue CPR, confirm pulse and blood pressure, and move to the Immediate Post–Cardiac Arrest Care Algorithm.
Immediate Post–Cardiac Arrest Algorithm	After ROSC, the patient will have substantial auto-PEEP, and one immediate strategy will need to be avoidance of excessive ventilations. 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 of worsening. Because the cause of arrest is pneumonia/asthma, there should not really be consideration for cardiac catheterization (if performed, a 12-lead ECG will show sinus tachycardia at rate of 110/min but otherwise normal). 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 avoidance of hypoxia (as opposed to hyperoxia) will be in play.

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

Student Name _____ Date of Test _____

Critical Performance Steps	✓ if done correctly
Team Leader	
Ensures high-quality CPR at all times	
Assigns team member roles	
Ensures that team members perform well	
Tachycardia Management	
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	
PEA Management	
Recognizes PEA	
Verbalizes potential reversible causes of PEA (H's and T's)	
Administers appropriate drug(s) and doses	
Immediately resumes CPR after rhythm and pulse checks	
VF Management	
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	
Post–Cardiac Arrest Care	
Identifies ROSC	
Ensures BP and 12-lead ECG are performed, O_2 saturation is monitored, verbalizes need for endotracheal intubation and waveform capnography, and orders laboratory tests	
Considers targeted temperature management	

STOP TEST

Instructor Notes

- Place a ✓ in the box next to each step the student completes successfully.
- If the student does not complete all steps successfully (as indicated by at least 1 blank check box), the student must receive remediation. Make a note here of which skills require remediation (refer to Instructor Manual for information about remediation).

Test Results	Circle **PASS** or **NR** to indicate pass or needs remediation:	**PASS**	**NR**

Instructor Initials _____

Instructor Number _____ Date _____

Megacode 10—Unstable Ventricular Tachycardia Scenario Location: In-Hospital

(Unstable Tachycardia → VF → PEA → PCAC)

Lead-in: You are working in the cardiac care unit of your hospital. A 51-year-old woman who underwent PCI 3 hours ago is reporting heavy central chest pressure and nausea.

Case Development

Initial Assessment	What are your initial actions? On initial assessment, the patient reports feeling light-headed and nauseated, with severe central crushing chest pain. She appears drowsy, pale, and diaphoretic. Her vital signs are heart rate 130/min, respiratory rate 20/min, and blood pressure 72/40 mm Hg. The SpO_2 monitor is not showing a waveform and giving no reading, and her temperature is 37°C. The rhythm strip shows a **regular wide-complex tachycardia** at 130/min.
Tachycardia Algorithm	A 12-lead ECG shows VT 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 supplementary O_2, ensure adequate IV access, discuss the pros and cons of analgesia and sedation, demonstrate safe synchronized cardioversion, and consider treatment for acute ischemia/acute coronary syndromes in this setting.
Cardiac Arrest Algorithm (VF)	After 2 failed synchronized cardioversions, the patient loses pulses and becomes apneic and unresponsive. The monitor shows **VF.** Focus on safe defibrillation, high-quality compressions, and a consideration of differential diagnoses.
Cardiac Arrest Algorithm (PEA)	After the second defibrillation attempt, the patient's rhythm changes to a **wide-complex regular rhythm** (with P-waves) at 70/min. The patient still has no pulses. The student should follow the PEA pathway of the Cardiac Arrest Algorithm. Students should focus on high-quality chest compressions and may consider advanced airway and underlying causes, including PE and myocardial infarction hemorrhage among other things.
Immediate Post–Cardiac Arrest Algorithm	The team continues high-quality chest compressions, the patient has ROSC, and the team initiates the Immediate 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.

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

Student Name _____ Date of Test _____

Critical Performance Steps	✓ if done correctly
Team Leader	
Ensures high-quality CPR at all times	
Assigns team member roles	
Ensures that team members perform well	
Tachycardia Management	
Starts oxygen if needed, places monitor, starts IV	
Places monitor leads in proper position	
Recognizes unstable tachycardia	
Recognizes symptoms due to gunshot wound	
VF Management	
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	
PEA Management	
Recognizes PEA	
Verbalizes potential reversible causes of PEA (H's and T's)	
Administers appropriate drug(s) and doses	
Immediately resumes CPR after rhythm and pulse checks	
Post–Cardiac Arrest Care	
Identifies ROSC	
Ensures BP and 12-lead ECG are performed, O_2 saturation is monitored, verbalizes need for endotracheal intubation and waveform capnography, and orders laboratory tests	
Considers targeted temperature management	

STOP TEST

Instructor Notes

- Place a ✓ in the box next to each step the student completes successfully.
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Test Results	Circle **PASS** or **NR** to indicate pass or needs remediation:	**PASS**	**NR**

Instructor Initials _____

Instructor Number _____ Date _____

Megacode 11—Unstable Bradycardia Scenario Location: In-Hospital—Colonoscopy Suite

(Unstable Bradycardia → VF → PEA → PCAC)

Lead-in: A 51-year-old patient is undergoing his initial colon screening. Fifteen minutes into the procedure, under conscious sedation, the patient's respiratory rate drops to 4 and $ETCO_2$ is 55 mm Hg.

Case Development

Initial Assessment	What are your initial actions? This healthy 51-year-old man with a family history of colon cancer (maternal grandfather and uncle) is undergoing an initial screening colonoscopy. The patient has no significant past medical history except daily alcohol use (3 to 4 drinks per day). The patient had received a combination of fentanyl and midazolam for conscious sedation. It is noted that as the $ETCO_2$ rises, the patient becomes less arousable and then apneic. The Code Team is activated. What are the next steps? IV reversal agents are ordered. Bag-mask ventilations are initiated. His vital signs are heart rate 30/min, respiratory rate 3/min, blood pressure 70/P mm Hg, and SpO_2 82% on 4 L via nasal cannula. 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 O_2 saturations, but there is no change in respiratory rate. A supraglottic airway is placed.
Bradycardia Algorithm	The patient's respiratory status has been stabilized. The student should note the abnormal heart rate and hypotension. The bradycardia is **slow and narrow-complex** without ST changes. The patient is unstable and given IV atropine (0.5 mg) twice without change in heart rate or blood pressure. While the dopamine infusion is being prepared, the patient becomes unresponsive. What is the next action?
Cardiac Arrest Algorithm (VF)	The monitor demonstrates **VF.** What is the action? The patient has no pulse. CPR is started. The VF/pVT pathway should be followed. Shocks are delivered. Epinephrine and amiodarone are given. An advanced airway is placed. A rhythm check demonstrates asystole. No pulse or spontaneous respirations are confirmed.
Cardiac Arrest Algorithm (PEA)	CPR is continued. Bag-mask ventilation at 100% is continued. A second dose of epinephrine is given with no change in condition. During the rhythm check, the monitor reveals a **narrow-complex tachycardia** and no pulse. The PEA pathway of the Cardiac Arrest Algorithm is followed.
Immediate Post–Cardiac Arrest Algorithm	The team continues high-quality chest compressions, the patient has ROSC, and the team initiates the Immediate Post–Cardiac Arrest Care Algorithm.

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

Student Name _____ Date of Test _____

Critical Performance Steps	✓ if done correctly
Team Leader	
Ensures high-quality CPR at all times	
Assigns team member roles	
Ensures that team members perform well	
Bradycardia Management	
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	
VF Management	
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	
PEA Management	
Recognizes PEA	
Verbalizes potential reversible causes of PEA (H's and T's)	
Administers appropriate drug(s) and doses	
Immediately resumes CPR after rhythm and pulse checks	
Post–Cardiac Arrest Care	
Identifies ROSC	
Ensures BP and 12-lead ECG are performed, O_2 saturation is monitored, verbalizes need for endotracheal intubation and waveform capnography, and orders laboratory tests	
Considers targeted temperature management	

STOP TEST

Instructor Notes

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Test Results	Circle **PASS** or **NR** to indicate pass or needs remediation:	**PASS**	**NR**

Instructor Initials _____

Instructor Number _____ Date _____

Megacode 12—Unstable Bradycardia Scenario Location: In-Hospital—Surgical Waiting Room

(Unstable Bradycardia → VF → Asystole/PEA → PCAC)

Lead-in: A 67-year-old woman is sitting in the surgical waiting room awaiting news about her husband's surgery. While on her way to the bathroom, she becomes light-headed and dizzy and nearly passes out.

Case Development

Initial Assessment	The patient has a past medical history of breast cancer (in remission) and diabetes. She was waiting for her husband in the surgical waiting room and became light-headed while walking to bathroom. She is lying on the floor. You respond as a member of the medical emergency team that was activated. What are your initial steps? 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_2 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.**
Bradycardia Algorithm	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 emergently to the hospital emergency department.
Cardiac Arrest Algorithm (VF)	The monitor demonstrates **VF.** What is the action? The patient has no pulse. CPR is started. The VF/pVT pathway should be followed. 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.
Cardiac Arrest Algorithm (Asystole and PEA)	CPR is continued. Bag-mask ventilation with 100% O_2 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 Cardiac Arrest Algorithm is followed.
Immediate Post–Cardiac Arrest Algorithm	The team continues high-quality chest compressions, the patient has ROSC, and the team initiates the Immediate Post–Cardiac Arrest Care Algorithm.

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

Student Name _____ Date of Test _____

Critical Performance Steps	✓ if done correctly
Team Leader	
Ensures high-quality CPR at all times	
Assigns team member roles	
Ensures that team members perform well	
Bradycardia Management	
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	
VF Management	
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	
Asystole and PEA Management	
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 and pulse checks	
Post–Cardiac Arrest Care	
Identifies ROSC	
Ensures BP and 12-lead ECG are performed, O_2 saturation is monitored, verbalizes need for endotracheal intubation and waveform capnography, and orders laboratory tests	
Considers targeted temperature management	

STOP TEST

Instructor Notes

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Test Results	Circle **PASS** or **NR** to indicate pass or needs remediation:	**PASS**	**NR**

Instructor Initials _____

Instructor Number _____ Date _____