Mock Code Training Guide

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Introduction

In-hospital cardiac arrest is a high-risk event among hospitalized patients of all ages worldwide that is associated with significant morbidity and mortality. Estimates of its incidence vary across industrialized countries, with rates in adults between 1.2 and 10 per 1000 hospital admissions.[1] Approximately 292 000 people experience in-hospital cardiac arrest each year, according to extrapolation of Get With The Guidelines® data, with 23.6% survival to hospital discharge in adults and 45.2% survival to hospital discharge in pediatric patients.[2]

"Ten Steps Toward Improving In-Hospital Cardiac Arrest Quality of Care and Outcomes"[1] outlines a critical component to improving in-hospital cardiac arrest outcomes—Step 3: implement effective education and training for resuscitation. Create and maintain resuscitation education and training programs for resuscitation, including

- Standardized, in-person resuscitation courses
- Low-dose, high-frequency in-situ training
- Team-based training and simulations
- Debriefing to learn from resuscitation events

According to the *2025 American Heart Association Guidelines for Cardiopulmonary Resuscitation* (CPR) *and Emergency Cardiovascular Care*, effective resuscitation education for lay rescuers and health care professionals is an essential component of the formula for survival from cardiac arrest.[3] The guidelines also recommended that life support training for health care professionals includes a specific emphasis on teamwork competencies.[3]

Our goal with this resource is to offer practical guidance to champion and implement mock code training.

Mock code training refers to a team-based, simulated, emergency-response training exercise designed to replicate real-life medical emergencies and critical situations, such as cardiac arrest. In these simulations, teams who routinely work together can practice and refine their skills in a controlled, safe environment without risk to patients. The exercise aims to enhance teamwork, communication, and technical skills and prepare participants to respond effectively and efficiently in actual emergency situations. For the purposes of this guide, mock code training uses cardiac arrest simulations in situ to educate, evaluate, and maximize cardiac arrest teams by systematically assessing and capturing opportunities for improvement, latent safety threats, and key challenges.

Objectives of This Mock Code Training Guide

1. Outline a clear roadmap for setting up a mock code training program from initial planning to implementation.
2. Identify customizable mock code scenarios, checklists, and evaluation tools to streamline the process.
3. Identify strategies to maximize the impact of mock codes.
4. Identify tools to gather feedback and data for continuous quality improvement.
5. Identify potential barriers and strategies to implement an effective mock code program.

Aspects of Mock Code Training

The need for adequate resources, coupled with a strong commitment from the administration, is integral to nurturing a culture that values continuous improvement, patient-centered care, and interdisciplinary teamwork. Factors for successful implementation include rigorous program evaluation, a growth mindset culture, buy-in by care team members and leadership, ensuring sufficient resource allocation, and prioritization of goals.[1]

When you are creating or enhancing mock code training, it is crucial to start small and focus on 1 or 2 objectives. This may mean choosing to focus on a specific unit, discipline, or care team. To begin, consider the following several key factors in detail:

What Is a Facilitator or Moderator?

A *facilitator* or *moderator* serves to champion and facilitate implementation of mock code training efforts. A clinical educator, house supervisor, quality improvement specialist with a clinical background, or another team member identified by clinical leadership could serve in this role. It may also be beneficial to have the support of an observer to help with monitoring and evaluation.

A facilitator or moderator possesses the core skills of basic life support, at a minimum, and it is reasonable that they also be competent in advanced cardiovascular life support and/or pediatric advanced life support.

Facilitators and participants need training that aligns with the mock code training objectives. Roles assigned for the mock code training must reflect what that individual may perform in a real-life situation.

Who Should Be Involved?

Anyone who participates in a real-life in-hospital cardiac arrest event can take part in mock code training. This includes those in clinical roles and nonclinical roles (eg, doctors, pharmacists, nurses, respiratory therapists, residents, chaplains, language interpreters). Working together and practicing in a safe, controlled environment can help teams prepare to respond in real emergencies.[3] It is vital that each participating clinical team member be trained in basic life support. Rotate roles among team members who may perform multiple roles in resuscitations (eg, a registered nurse may administer medication, provide chest compressions, act as a CPR coach, or record the events of resuscitation) in different scenarios to ensure that everyone gains experience in various positions. This helps build versatility and a deeper understanding of each role's importance.

Where Can Mock Code Training Take Place?

Mock code training should be conducted across all patient care areas to ensure that clinical care teams—especially those who are not trained in advanced life support, such as in lower-acuity areas—can practice skills, strengthen situational awareness, and prepare to respond effectively in actual emergency situations. Mock code training can take place in a number of settings, including in situ simulation, which involves training activities in actual patient care areas. This type of simulation provides a realistic environment for training individual and team-based skills like communication, leadership, role allocation, and situational awareness. Compared with no intervention, in situ training added to other educational strategies has a positive impact on learning outcomes (eg, improved team performance, improved time to critical tasks), performance change in the real clinical environment (eg, improved team

performance, recognition of deteriorating patients), and patient outcomes (eg, improved survival, neurological outcomes).[3] However, the advantages of in situ training should be weighed against the potential risks, including the logistical challenges of conducting training in clinical spaces and the risks of mixing training resources with real clinical resources (eg, simulated versus real medications or fluids).

Mock code training may also take place in standard classrooms or in designated simulation facilities at an institution.

When Should Mock Code Training Occur?

The frequency of training will depend on organizational characteristics and goals for training. Collaborative administrative, clinical, and educational leadership can guide the establishment of training frequency and support continued competence.

When deciding the frequency of mock code training, consider organizational priorities that affect whether the frequency is realistic, use training schedules that support all shifts (eg, night, weekend, and holiday shifts), and include both scheduled and unscheduled sessions to better replicate real-life scenarios. Some sources indicate that training should occur more frequently than the standard annual competency sessions.[3] While regular mock code training is ideal, it is important to be realistic with the number of events aimed for upon beginning.

What Equipment Should Be Included?

Mock code training may involve the use of manikins or other simulation tools to create realistic scenarios that challenge participants to collaborate, apply their clinical knowledge, make quick decisions, and execute lifesaving interventions under pressure. Mock code training can be performed with any manikin that is available. Manikins of varying sizes and features are available and can be used to enhance the training experience. Tailoring manikin selection (eg, physical features) to the needs of the scenario and the scope of trainees' practice ensures that required physical features are present to maximize learner engagement.

While the most-advanced manikins equipped with realistic physiological responses and feedback systems are ideal, they are not required for effective, high-quality mock code training. The use of lower-fidelity manikins during basic and advanced life support training may be considered in training settings where higher-fidelity manikins cannot be used for any reason (eg, high costs, availability of personnel and infrastructure to operate and maintain them, limitations to manikin design).[3] Feedback devices, however, are recommended for use during CPR training for health care professionals and lay rescuers.[3]

To make practice realistic, if possible, use a dedicated education-only crash cart with defibrillator, and stock training equipment and simulated medications in the same way as the actual crash carts used in the facility. Ensure that all supplies are clearly labeled “Not for Human Use: Education Only.” It is important to avoid unintended harm from using simulated supplies and equipment. Therefore, at the close of the mock code training session, it is reasonable to conduct a safety check in which participants are asked to return all simulated supplies and equipment.

Example script: “Please check your pockets before leaving today’s session. It is important that supplies and equipment from the mock code training stay in the training environment and do not end up in patient care areas. All of the supplies in the training environment are labeled ‘Not for Human Use: Education Only.’”

How Long Should Mock Code Training Take?

Efficiency with training is advantageous for both learners and hospitals because it reduces the amount of time away from clinical duties while maintaining the appropriate balance of time needed for education. Consider making mock code training sessions concise and focused. Research indicates that short, frequent training sessions yield the best results in terms of technical skill retention.[4] By keeping mock code training sessions short and frequent, health care facilities can maximize the effectiveness of their training programs and ensure that care teams remain well prepared and confident in their ability to respond to real-life emergencies. Consider keeping sessions to no more than 30 minutes when running in situ training. If care teams have dedicated time for the simulation, then more time can be taken.

What Should Mock Code Training Consist of?

Mock code training should be conducted in a contextualized manner with regard to learning objectives and team composition. At a minimum, training should emphasize team competencies and recognition of cardiac arrest and incorporate the hands-on practice of psychomotor skills to deliver high-quality CPR with early defibrillation, if indicated.[1] Training can be conducted individually to hone specific skills or in groups to foster teamwork and communication. It is recommended that life support training for health care professionals include a specific emphasis on teamwork competencies. As part of basic or advanced life support training for health care personnel, it may even be reasonable to incorporate rapid-cycle deliberate practice, where there is rapid cycling between deliberate practice and directed feedback until skill mastery is achieved.[3]

Consider breaking down mock code training into targeted training opportunities that focus on gaps in care identified during actual events. For example, focus on actions and skills of local

responders who would respond in the first 5 minutes of a cardiopulmonary emergency in a specific care area. Training can focus on specific components such as communication, airway management, high-quality chest compressions, defibrillation, medication administration, or other skills.

Each mock code training may be overseen by a dedicated facilitator who is responsible for conducting the prebriefing, moderating the training, and leading the debriefing. During the mock code training, the facilitator may want to limit their interaction with participants and provide only key clinical information as needed to keep the situation realistic.

Prebriefing

Before the training begins, the facilitator conducts a prebriefing session. This prepares the participants for the training session by providing an overview of the training and key performance goals. Highlight any specific learning points or skills to be focused on. The prebriefing also allows the facilitator to create a supportive learning environment and sense of psychological safety while emphasizing the importance of ongoing practice. Participants should be informed that the training is focused on the team and how the team performs together and that mistakes are expected and serve as a source of learning for the team. Clear performance expectations should be set, and participants should be oriented to resources available. If manikins are used, participants should be made aware of the capabilities, the skills they are able to perform on the manikin (eg, place pads, push medications, defibrillate), and the level of realism expected in their interactions during the training.

Example script: “For the next 10 minutes, I want you to treat this manikin as a real patient. I expect you to do everything you would normally do if this were an actual patient, which means providing ventilation, providing high-quality compressions, defibrillation, and drawing up and pushing medications. Are there any questions about the expectations?”

Provide an overview of the scenario. Include a brief background on the mock patient, including relevant medical history, current condition, and any known allergies or medications.

Moderating

During the training, the facilitator actively updates the team on the patient’s condition and any responses to their actions. This real-time feedback simulates the dynamic nature of an actual emergency and helps participants stay engaged and react appropriately . This can be done by changing vital signs and the clinical picture of the manikin if the team is using a high-fidelity simulator. When a low-fidelity simulator is used, moderators can use photos and verbal cues to describe the patient’s changing condition. The moderator should allow the team to critically think and ask questions about the patient’s condition rather than feed them information throughout the training session.

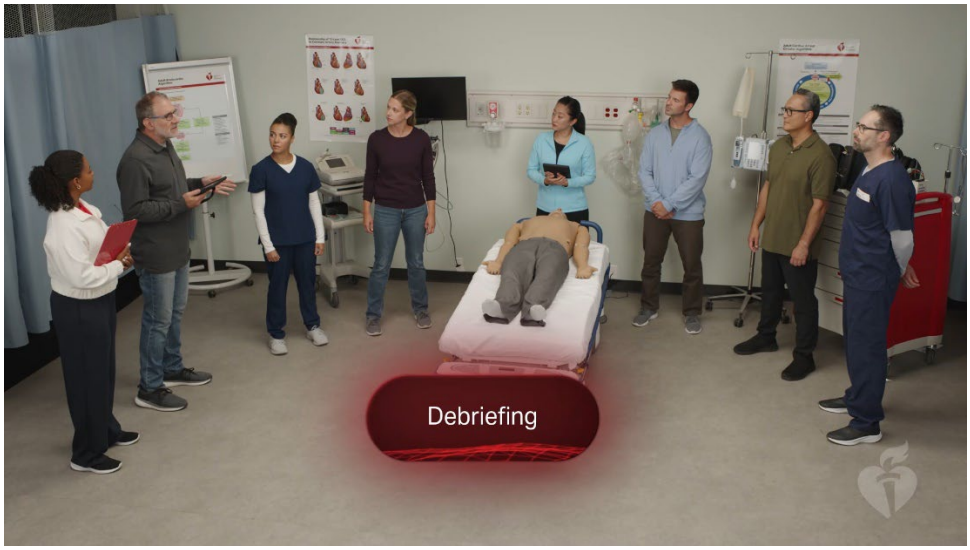
Debriefing

An effective debrief serves as a structured, reflective discussion that allows the team to analyze and evaluate their performance, identify strengths and opportunities to improve, and improve team communication. It must be focused on the objectives of the mock code and how to achieve performance standards.

- Throughout the session take notes on specific activities that can be discussed in the debriefing.
- If possible, record the mock code training and replay segments during the debriefing. This visual feedback can allow participants to observe their actions and decisions critically.

The characteristics of an effective debriefing session include active participation by training participants, participant discussion, self-analysis, application, and thorough processing of information.

Consider using a structured, learner-centered debriefing model that focuses the discussion on what the participant knows and thinks (eg, gather-analyze-summarize (GAS), Plus/Delta, Promoting Excellence and Reflective Learning in Simulation [PEARLS]). It may also be reasonable for an instructor to use a debriefing script during resuscitation education.[3]



Here are details of the GAS model:

1. **Gather:** Gather information about the events. Ask participants what happened during the session to develop a shared mental model of the event. Listen to participants to understand what they think and how they feel about the simulation.
2. **Analyze:** Analyze the information by using an accurate record. Facilitate participants' reflection and analysis of the team's actions, specifically focusing on the objectives of the mock code training and identified patient safety issues. This involves reflecting on and examining individual and team performance during the simulation.
3. **Summarize:** Summarize positive and constructive learning for future improvement. Identify and review the key lessons learned that participants feel can be taken into actual practice. Highlight the positive aspects of the team's performance and outline specific steps to address any issues identified during the analysis.

While debriefings may be used for quality improvement, they may also be conducted to assess health care professionals' well-being and identify care team members in need of additional support. Processes should be in place to ensure any identified care team members receive necessary services, with guarantees of confidentiality.[1]

Additional Elements

Recording and Replay

If possible, the facilitator may video record the mock code training and replay segments of it during the debriefing. This visual feedback allows participants to critically analyze their performance and understand the nuances of their actions. If recording, be sure to include in the prebrief and consider obtaining participant consent if needed.

Performance Feedback

The facilitator provides detailed feedback on performance (including quantitative performance, if available), focusing especially on the fundamental skills being practiced. Give positive feedback when desired actions are observed.

Encourage Questions

The facilitator may encourage participants to ask questions about the mock code training to clarify any uncertainties and gain deeper insights into their actions and decisions.

By following this structured approach, mock code training can effectively enhance the preparedness, competence, and confidence of care teams.

How Should the Process Be Evaluated?

It is important to evaluate team performance and gather perspectives on training effectiveness in meeting established goals and learning needs. An observer should be assigned to capture key information about flow, teamwork, and group dynamics.

Evaluation Tool

Use a tool to evaluate performance during mock code training.[3] There are different types of evaluation tools that can be adapted to fit specific goals. Tools can be as simple as a list of objectives and skills rated with "achieve/did not achieve" or more complex scoring tools that detail ways to compare and evaluate the interventions performed during the mock code training. It is reasonable for evaluators to use data gathered from mock code documentation forms to evaluate performance. For example, collected data may show that compressions were interrupted for 22 seconds during resuscitation, highlighting a specific learning need. With maintenance of a psychologically safe practice environment in mind, consider keeping evaluation results anonymous and reporting in a general summary.

Information gathered from an evaluation tool should provide

- Concrete feedback to participants to help them learn
- Guidance on educational needs if standards of care are not met
- Identification of processes that need improvement
- Indicators for patient safety and quality improvement

Evaluate key quality metrics of response, like time to code team arrival, presence of essential personnel, and timing for critical interventions (see the Get With The Guidelines®-Resuscitation "Quality of Respiratory and Cardiopulmonary Resuscitation" form).[5]

Objectively evaluate team performance with a clinical performance tool. Examine important performance factors like chest compression fraction, adherence to clinical guidelines, and overall team performance (see hot debriefing form examples[6]).

In follow-up, it is reasonable to send an after-action report to all participants and relevant stakeholders with action plans to drive improvement.

Championing a Mock Code Training Program

Steps to Implementing Mock Code Training

1. **Gain facility leadership support:** Meet with key unit and organizational leaders. If possible, highlight the opportunities for improvement in your system and how those are impacting the quality of patient care. Be prepared to discuss best practices, return on investment, and what mock code training will provide for staff and the patients you serve. Getting support from the administration is crucial for a successful training program. Seek to gain leadership and staff agreement to mock code training ground rules before launching the program. Leadership can help gain staff agreement to mock code training and establish ground rules before launching the program. Leadership can also help with budget and resources, participation, staff compliance, and sustained quality improvement. Even with limited budget and resources, effective mock code training is possible.
2. **Identify champions and evaluate where you want to start:** *Champions* are individuals who volunteer or are appointed to enthusiastically promote and facilitate implementation of an innovation.[7] Champions are not required but can be very helpful to begin or revamp a mock code training program. Evaluate whether there is a specific unit, discipline, care team, or skill you want to focus on first. Historical performance data may help identify a focal point.
3. **Form a planning committee:** Create a multidisciplinary group to guide and develop mock code training. Include representatives from nursing, physicians, and education. Also consider involving respiratory therapy, pharmacy, and advanced practice providers. If forming a new committee is not possible, use an existing one (eg, Hospital Code Blue Committee or Quality Improvement Committee) ensuring it includes key players and has a focus on mock code training.
4. **Perform a needs assessment:** Identify key information such as care team comfort level with handling emergencies, their experience with codes, suggested topics for scenarios, and preferred times for mock code training. Regularly conduct needs assessments to evaluate the program's effectiveness and find opportunities for improvement.

   Here is an example of a needs assessment form for a mock code training program:

Training Program Needs Assessment							
Role	APN	Other	PA	RN	LPN	MD/DO	Pharm	PCT	RT
Number of team trainings attended in the past year	1	2	3	4	5	>6			
Which courses do you have provider cards for?	BLS		ACLS		PALS				
Rank the case scenarios you would prefer from 1 to 8	__ Cardiac arrest __ Chest pain __ Pulmonary embolism __ Anaphylaxis __ Gastrointestinal bleed __ Obstetrics codes __ Shock __ Drowning						
Preferred days	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Rate the items below using the following scale (circle one response): **1=strongly disagree, 2=somewhat disagree, 3=neutral, 4=somewhat agree, 5=strongly agree**							
Codes are frightening to me.	1	2	3	4	5		
I feel comfortable in code settings.	1	2	3	4	5		
I understand my role in a code setting.	1	2	3	4	5		

5. **Get buy-in:** It is normal for people to be nervous, anxious, and uncertain about participating in mock code events. Consider starting with specific training on key skills so that care teams feel they are set up for success.
6. **Provide updates:** Ensuring that all care team members are well-informed about the mock code training program is crucial for its success. Regular communication about the program's progress, expectations, and benefits can significantly enhance awareness and encourage participation. Some strategies to achieve this are
    - Regular meetings and updates
    - Electronic dashboards
    - Communication channels
    - Engagement and feedback
    - Highlighting benefits
    - Recognition and rewards

By implementing these strategies, you can ensure that all care team members are consistently informed and engaged in mock code training. This comprehensive communication approach may help maintain high levels of participation and enthusiasm and contribute to the program's success and the overall improvement of patient care.

7. **Develop mock code training scenarios:** Developing realistic scenarios for mock code training is vital to ensure that health care professionals are well prepared for actual emergencies. Identify common and high-risk situations and recreate events using available resources. Refine scenarios based on participants' evaluation and changes in protocols or practices. Ensure that scenarios remain relevant and challenging.
8. **Schedule dates and times for mock code training:** Inform all involved care team members of the schedule for planned mock code trainings. For spontaneous mock code training, inform the facilitators and key individuals. Plan out a periodic schedule for training sessions.
9. **Prepare for mock code training:** Assign responsibilities for setting up the area and checking equipment. For example, assign someone to restock the code cart and collect all training supplies used after the mock code training. Use available resources. Be ready to provide prebriefing, debriefing, and feedback. Plan for continuous improvement.
10. **Ensure team participation:** Encourage department leaders to adjust schedules to free up care team members for participation in mock code trainings. Additionally, ensure that physicians, advanced practice professionals, and professionals from other disciplines are invited and encouraged to attend and actively participate in these training sessions.
11. **Run the mock code training realistically:** To maximize the effectiveness of mock code training, it is essential to ensure that all team members actively engage in the entire process. This may include responding to the code call, performing required interventions, participating in the prebriefing and debriefing session, and completing a survey and evaluation form.
12. **Analyze and adjust:** Have the committee review the event and make any necessary adjustments for future training exercises.

Barriers and Solutions

- **Funding and staffing issues:** Many systems struggle with funding and staffing for mock code training.
  - **Solution:** Meet with organizational leaders to share the data-informed opportunities for improvement and key challenges in your system. Convey the impact on the quality of patient care and patient outcomes. Discuss evidence-based resuscitation training best

practices, return on investment, and benefits for care teams and patients. Ask leaders to support the program with funding, resources, and compliance standards.

Schedule mock code training during shift hours to avoid overtime. Use community resources like local fire departments, nursing schools, and other hospitals for training supplies. Break down the training into periodic exercises.

- **Perception of low priority:** Some facilities may not see mock code training as a priority.
  - **Solution:** Collaborate with leadership to prioritize continued education and training for care teams. Highlight studies showing higher mortality rates in facilities due to lack of preparedness and linking prioritization to outcomes. Emphasize that mock code training is important for all facilities (regardless of size), even those with outpatient services.
- **Physician-nurse interactions:** A lack of strong physician-nurse relationships and communication can hinder the program.
  - **Solution:** Improve relationships through communication and teamwork. Seek a physician and/or nurse partner to champion training efforts.
- **Resistance to change:** Some experienced providers may feel they have nothing to learn from mock code training.
  - **Solution:** Communicate that scenarios are based on actual events that have occurred. Show that even experienced clinicians can miss essential steps. Encourage participation from all providers and provide detailed feedback. Share literature on the benefits of mock code training.[1] Place emphasis on thoroughly communicating to employees the value and importance of education and training.[4]
- **Latent conditions:** Mock code training effectively reveals hidden safety threats within hospital systems. By replicating real-life resuscitation scenarios, these simulations identify unique threats, including equipment failures, medication errors, and communication and role assignment issues among teams. This method directly informs administration of system vulnerabilities, highlighting areas needing immediate improvement[8] before reaching a patient.
- Equipment issues, medication errors, and other issues, such as, infrastructure, training adequacy, and organizational culture, can affect communication and teamwork.
  - **Solution:** Routine reevaluation. Educate administration about system errors during resuscitation and the benefits of hospital-wide cardiac arrest in situ simulation to identify and mitigate latent safety threats.[8]

Scenarios

What Should Be Included and Emphasized in Scenarios?

Common and High-Risk Situations

Frequency analysis: Analyze the most common and high-risk situations encountered in your facility. Use historical data to identify trends and prioritize scenarios. Each facility should choose scenarios based on needs-assessment surveys and the specific needs of their patient population.

Specialty considerations: Tailor scenarios to the specific departments, care teams, or specialties within your facility. For example, use obstetric emergencies in a maternity ward or pediatric emergencies in a children's hospital. Patient history and details should align with the patient population cared for. Scenarios may address difficult or controversial issues that may occur during actual resuscitation efforts, such as cultural differences and family presence during resuscitation. For example, having family members present during resuscitation can be included in training scenarios if the hospital has a policy that allows it. Also, consider conducting mock code training in different areas of the facility, like the cafeteria, radiology department, or stairwell. This can help care teams learn where to find and how to transport equipment.

Available Resources

Simulation technology: When available, high-fidelity simulation technology can create a life-like environment. High-fidelity simulation technology includes advanced manikins, virtual reality systems, and simulation software that can mimic real-world medical conditions and responses. However, high-fidelity technology is not necessary to begin a mock code program or to create effective training. Use what you have available.

Environmental factors: Replicate the actual environment where the code would occur. Set up the training room to mirror the layout and equipment found in the emergency department, intensive care unit, or specific ward. Include realistic background noises and interruptions that might occur during an actual emergency.

Continuous Improvement

Scenario refinement: Regularly update and refine scenarios based on feedback from participants and changes in medical protocols or practices. Ensure that scenarios remain relevant and challenging.

Diverse scenarios: Develop a diverse range of scenarios to cover various medical emergencies, patient demographics, and clinical settings. This helps ensure comprehensive training and preparedness.

Make sure to vary and rotate scenarios so that they do not become predictable to the care teams.

What Skills Should Be Addressed?

The highest priority should be to rapidly identify an actual or potential life-threatening emergency and act promptly, correctly, and with confidence. Other important skills to practice may include

- Effective communication and team leadership
- Team dynamics
- Recognition of cardiac arrest[1]
- Intravenous and intraosseous placement and fluid management
- Correct type, dosage, and preparation of medications
- Using emergency reference tools (eg, color-coded length-based resuscitation tape)
- Managing hypoglycemia and hyperglycemia
- ECG interpretation
- Reassessment skills
- Documentation

Communication and interactions among team members are also crucial in all team trainings. Breakdowns in communication can cause delays and errors in lifesaving interventions. Communicating effectively includes knowledge sharing, summarizing, and reevaluating; using closed-loop communication and clear messages; and showing mutual respect and professionalism. Role identification is key to effective communication and teamwork. Team members should rotate through all appropriate roles to increase their comfort level and ensure a comprehensive knowledge base during a real event.

Participants should also practice documenting by using the same code recording resource that is used in real medical emergencies in that setting. This helps increase familiarity with the form and identify any missing elements while also practicing accurate and timely recordkeeping. Include simulated documentation tasks, such as recording vital signs, administering medications, and noting the time of interventions.

See the appendix for sample scenarios, evaluation tools, and a scenario template.

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Appendix: Resources

Sample Scenarios

Adult Scenario: In-Hospital Symptomatic Bradycardia Leading to Cardiac Arrest

Background

You are a part of the rapid response team at a hospital. You are called to the medical unit where a 55-year-old male patient, admitted for uncontrolled hypertension and type 2 diabetes, has suddenly become unresponsive. The patient was previously alert but complained of dizziness and chest discomfort earlier in the day.

Initial Assessment

- **Consciousness:** The patient is unresponsive.
- **Breathing:** The patient is not breathing adequately.
- **Circulation:** There is a weak carotid pulse present.
- **Vital signs:**
  - Heart rate: 45/min
  - Blood pressure: 70/40 mm Hg
  - Respiratory rate: 6/min
  - Spo_2: 82% on room air
  - Temperature: 36 °C

Scenario Flow

1. **Bradycardia management**

- Maintain patent airway and initiate bag mask ventilation with oxygen at 15 L/min.
- Attach a cardiorespiratory monitor. It shows sinus bradycardia with occasional premature ventricular contractions.
- Monitor pulse.

2. **Bradycardia persists with cardiopulmonary compromise**

- Establish IV access and administer atropine IV dose, 1 mg bolus.
- Repeat second dose. Atropine is effective.
- Begin transcutaneous pacing and/or administer a dopamine or epinephrine infusion.

3. **Progression to pulseless ventricular tachycardia**

- The patient's rhythm changes to ventricular tachycardia on the monitor. There is no pulse.
- Discontinue pacing and defibrillate as soon as possible.

- Deliver the first biphasic shock (use the manufacturer's recommended energy dose).
- Resume CPR immediately for 2 minutes.
- Continue to follow the Adult Cardiac Arrest Algorithm through delivery of an additional shock and epinephrine.

4. **Transition to pulseless electrical activity**

- After 2 minutes of CPR, recheck the rhythm: shows organized rhythm but no signs of return of spontaneous circulation (ROSC) (pulseless electrical activity).
- Continue to follow the Adult Cardiac Arrest Algorithm, which includes giving epinephrine and treating reversible causes.

5. **Post–cardiac arrest care (ROSC)**

- ROSC is obtained. Follow the Adult Post–Cardiac Arrest Care Algorithm.
- Reassess vital signs:
    - Consciousness: Patient remains unconscious
    - Heart rate: 100/min
    - Blood pressure: 90/55 mm Hg
    - Respiratory rate: 12/min spontaneous breathing
    - Spo_2: 94% on oxygen
- Initial stabilization phase:
    - Manage airway: assess and consider placement or exchange of an advanced airway.
    - Manage oxygenation and ventilation.
    - Manage hemodynamics:
        - Obtain IV access if not already established and verify that any IV lines are open.
        - Avoid hypotension in adults after cardiac arrest by managing hemodynamics and targeting mean arterial pressure $\geq$65 mm Hg.
    - Perform early diagnostic testing.
- Perform a 12-lead electrocardiogram and continue management.
    - Treat arrest etiologies and complications.
    - Consider other advanced treatments.

Critical Actions Checklist

- ☐ Assign team member roles and ensure effective team communication
- ☐ Ensure high-quality CPR at all times: ventilation rate and compression rate, depth, and recoil

- ☐ Administer appropriate drugs and doses at the correct time
- ☐ Perform timely defibrillation and rhythm checks, as appropriate
- ☐ Manage airway and assist breathing effectively, considering advanced airway placement if needed
- ☐ Address reversible causes of cardiac arrest (ie, H's and T's)
- ☐ Provide post–cardiac arrest care, ensuring continuous monitoring and stabilization

Pediatric Scenario: In-Hospital Sepsis Leading to Cardiac Arrest

Background

You are a part of the pediatric code team at a hospital. You are called to the pediatric ward where a 6-year-old child admitted for pneumonia is now showing signs of septic shock. The child was previously alert but developed worsening tachypnea and is now unresponsive.

Initial Assessment

- **Consciousness:** The child is unresponsive.
- **Breathing:** The child is gasping with irregular, shallow breaths.
- **Circulation:** There is a weak central pulse; extremities are cool with mottling.
- **Vital signs:**
  - Heart rate: 160/min (tachycardia)
  - Blood pressure: 60/35 mm Hg
  - Respiratory rate: 8/min (agonal breaths)
  - SpO_2: 78% on room air
  - Temperature: 39 °C (102.2 °F)

Scenario Flow

1. **Initial sepsis management**

Immediately (10-15 minutes)

- Support airway, breathing, and circulation.
  - **Attach a cardiac monitor:** Shows sinus tachycardia
  - **Monitor and support airway:** Start oxygen therapy by bag-mask ventilation at a rate of 20 to 30/minmin with 15 L oxygen.
- **Establish IV/IO access**
- **Fluid boluses:** Give 10 to 20 mL/kg boluses of isotonic crystalloid over 5 to 20 minutes because of signs of septic shock; reassess after each bolus.

Within the first hour

- **Draw blood for cultures and additional laboratory studies specific to institutional protocols.**
- **Administer antibiotics**: Broad-spectrum antibiotics per hospital protocol for sepsis.
- **Assess after each fluid bolus**
- **Administer Antipyretics as needed:** Administer antipyretics as per hospital protocol

2. **Progression to pulseless electrical activity**

- **Clinical deterioration:** Despite initial management, the child's condition worsens; there is no palpable pulse.
- **Cardiac monitor:** Displays sinus rhythm with a heart rate of less than 80/min
- **Interventions per Pediatric Cardiac Arrest Algorithm:**
  - Start CPR, beginning with chest compressions.
  - Administer epinephrine 0.01 mg/kg (0.1 mg/mL concentration) IV/IO) every 3 to 5 minutes.
  - Consider advanced airway placement with capnography.
  - **Reassess after 2 minutes of CPR:** Check for shockable rhythm. Monitor shows an organized rhythm, but no pulse is detectable.
  - **Continue high-quality CPR:** Maintain effective compressions and ventilations.
  - **Address reversible causes (H's and T's):** Focus on potential hypovolemia, hypoxia, hypoglycemia, and acidosis due to sepsis.
  - **Administer additional doses of epinephrine every 3 to 5 minutes** while reassessing rhythm and pulse.

3. **ROSC and post–cardiac arrest care**

- **ROSC is achieved:** Pulse returns, and the child shows signs of improved perfusion.
- **Reassess vital signs:**
  - Heart rate: 120/min
  - Blood pressure: 75/40 mm Hg
  - Spo_2: 92% on supplemental oxygen
- Follow the Post-Cardiac Arrest Care Checklist

Critical Actions Checklist

- ☐ Assign team roles and maintain clear, closed-loop communication throughout the code.
- ☐ Initiate high-quality CPR immediately when indicated, with appropriate ventilation rate, compression rate, depth, and recoil for a child.
- ☐ Administer medications timely and appropriately according to pediatric advanced life support guidelines.
- ☐ Ensure airway management is optimized; consider advanced airway if respiratory failure persists.
- ☐ Address reversible causes promptly (hypoxia, hypovolemia, hypoglycemia, acidosis).
- ☐ Provide post–cardiac arrest care, focusing on maintaining hemodynamic stability and addressing ongoing sepsis.

Sample Evaluation Tools

Quality of Respiratory and Cardiopulmonary Resuscitation (Get With The Guidelines-Resuscitation)

1. Was continuous end-tidal CO_2 monitoring used to monitor CPR quality?
   - ☐ 1 = Yes
   - ☐ 2 = No/not documented

   If yes, was an end-tidal CO_2 value of >10 mm Hg achieved?
   - ☐ 1 = Yes
   - ☐ 2 = No/not documented
2. Was arterial line diastolic pressure used to monitor compression quality?
   - ☐ 1 = Yes
   - ☐ 2 = No/not documented
   - ☐ 3 = Not applicable (arterial line not in place)
3. Was a device or technology used to monitor compression quality?
   - ☐ 1 = Yes
   - ☐ 2 = No/not documented
4. If yes, was a compression rate of about 100/min provided during CPR (at least 80 compressions per minute)?
   - ☐ 1 = Yes
   - ☐ 2 = No/not documented
5. Was the chest compression fraction greater than 80%?
   - ☐ 1 = Yes
   - ☐ 2 = No/not documented
6. Were compressions interrupted (hands-off period) for >10 seconds during CPR (except for interventions)?
   - ☐ 1 = Yes
   - ☐ 2 = No/not documented
7. Were compressions interrupted for >15 seconds (>20 seconds for neonates) during airway placement interventions?
   - ☐ 1 = Yes
   - ☐ 2 = No/not documented
8. Did the ventilation rate exceed 10/min (20/min for pediatric patients), excluding initial tracheal tube confirmation?
   - ☐ 1 = Yes
   - ☐ 2 = No/not documented

Sample Scenario Template

Case number, location, and topic: (example)

Case 1: Out-of-Hospital Respiratory Arrest

Lead-in: (example) You are a paramedic, and you respond to a restaurant for a woman having an asthma attack.

Vital Signs

Heart rate:
Blood pressure:
Respiratory rate:
SpO_2:
Temperature:
Weight:
Age:

Initial information

-
-
-

What are your initial actions?

Additional information

-
-
-

What are your next actions?

Additional information (if needed)

-
-
-

What are your next actions?
Instructor notes: (example) The paramedic must decide whether to attempt an oral endotracheal intubation, which may worsen the airway swelling, or perform a needle cricothyrotomy. Oxygen should be initiated.

[Algorithm information, where applicable; not included for every case]

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

Resource Links

Debriefing

- Hot Debriefing Form Examples (heart.org/-/media/Files/Professional/Quality-Improvement/Get-With-the-Guidelines/Get-With-The-Guidelines-Resuscitation/PEARLS-Hot-Debriefing-Form-Examples-UCM_4865711.pdf?sc_lang=en)

Get With The Guidelines-Resuscitation

- Resuscitation Case Record Form (heart.org/-/media/Files/Professional/Quality-Improvement/Quality-Research/CRFs/Admission--Discharge-CRFIRP12132023.pdf)
- Program Measures and Definitions (heart.org/-/media/Files/Professional/Quality-Improvement/Get-With-the-Guidelines/Program-Measures-and-Definitions/DS19781-QI-GWTGRESUS-PMD2024v5-11024.pdf)
- Quality of Respiratory and Cardiopulmonary Resuscitation (heart.org/-/media/Files/Professional/Quality-Improvement/Get-With-the-Guidelines/Get-With-The-Guidelines-Resuscitation/Quality-of-Resus-Form-UCM_319596.pdf)

Other Resources

- Society for Simulation in Healthcare (ssih.org)
- SimBox+ (emergencysimbox.com)
- Peds Vitals, American Academy of Pediatrics and AHA application (apps.apple.com/us/app/peds-vitals/id1438712004)
- Med Sim Studio, medical education software (medsimstudio.com)
- Simpl Patient Monitor, medical training anywhere application (apps.apple.com/us/app/simpl-patient-monitor/id1444987255)
- ResusMonitor, simulates patient vitals (resusmonitor.com/get_started)