2025

IMMEDIATE CARDIAC CARE/ADVANCE LIFE SUPPORT CARDIAC (ICC/ALSC)

TRAINER'S MANUAL

Professional Skill Development Centre
University of Health Sciences Lahore

Immediate Cardiac Care/Advance Life Support Cardiac (ICC/ALSC)

Trainer Manual 2025

UNIVERSITY OF HEALTH SCIENCES LAHORE

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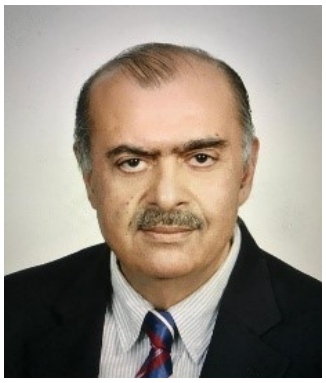
Welcome Messages



Prof. Ahsan Waheed Rathore
Vice Chancellor

It gives me great satisfaction to announce that the University Syndicate, in its 82nd meeting held on November 28, 2024, has approved the induction of mandatory training in six essential life support courses for all MBBS, BDS, Nursing, Pharmacy, and Allied Health Sciences students of the University of Health Sciences (UHS), Lahore. This strategic decision reflects our unwavering commitment to producing healthcare professionals who are not only academically competent but also proficient in delivery timely, lifesaving interventions.

The inclusion of these courses ranging from Cardiac First Response to Emergency Obstetrics and Neonatal Care underscores our recognition of the vital role that rapid and effective emergency response plays in healthcare delivery. This training will not only enhance the clinical competence of our graduates but also ensure they are better prepared to meet international standards of emergency care.

I commend the team at the Professional Skills Development Centre for meticulously preparing comprehensive training manuals for both students and instructors. I am confident that this initiative will prove to be a milestone in the transformation of healthcare education in Pakistan.

Prof. Nadia Naseem
Pro-Vice Chancellor

Healthcare professionals must be prepared to act swiftly and competently in emergency situations, where seconds can mean the difference between life and death. The University of Health Sciences has taken a significant step by mandating certified training in key life support skills for all students across our health sciences disciplines.

These manuals have been developed with careful attention to international standards and local needs, providing both students and trainers with structured, evidence-based guidance. They represent an important shift in our educational philosophy—one that prioritizes not only knowledge but also the ability to translate that knowledge into immediate, practical action.

I extend my appreciation to all those involved in the development of this initiative, and I urge our students and faculty to approach these courses with the seriousness and dedication they demand. Together, we can ensure that every UHS graduate is a confident and capable responder in any medical emergency.

Prof. Shane Knox

Director of Paramedics, National Ambulance Service College, Ireland

The National Ambulance Service College of Ireland has enjoyed a long-standing and productive partnership with the University of Health Sciences (UHS), spanning nearly two decades. Together, we have collaborated on numerous initiatives aimed at strengthening first response, emergency care, and pre-hospital services.

We are now proud to introduce our *Cardiac First Response* programmed, along with a suite of other life-saving short courses, for integration across the health sciences disciplines at UHS. These evidence-based programmed provide a vital foundation for all healthcare professionals, equipping them with essential skills to deliver effective and timely care.

This new initiative—guided by the leadership of UHS and coordinated through the Professional Development Centre—benefits from the expertise of its distinguished faculty and a robust quality assurance framework, both internal and external. As a result, it offers a world-class educational experience designed to meet the highest standards in healthcare training.

We are confident that these programmers will empower students to deliver exceptional care to the communities they serve. The Irish National Ambulance Service, together with our faculty members from both Pakistan and Ireland, is honored to continue this collaboration with UHS, and we extend our best wishes for the successful delivery and uptake of these programmes.

Prof. Sarah Ghafoor

Director Special Initiative/ PSDC

The Professional Skills Development Centre (PSDC) at UHS is proud to lead the implementation of this landmark initiative—mandatory life support training for all students of MBBS, BDS, Nursing, Pharmacy, and Allied Health Sciences programs. These courses have been carefully curated to address critical areas of emergency care, ranging from cardiac and trauma response to neonatal and obstetric emergencies.

Each manual developed under this program is a product of extensive research, peer consultation, and alignment with global best practices. They are designed not only to build core competencies but also to instill confidence and readiness among our future healthcare providers.

This initiative marks a paradigm shift in our clinical training model. It ensures that life-saving skills are not just taught but practiced and mastered. I encourage all trainers and students to engage with these resources with diligence and purpose. The skills you acquire here will empower you to save lives perhaps even on your very first day in the field.

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Trainer Manual of Immediate Cardiac Care/ Advance Life Support Cardiac (ICC/ALSC)

The manual has been designed for the trainers of the course. The trainer must have the necessary knowledge and skills to meet the learning and training needs of participants.

Learning Outcomes of the Course

The trainer must be able to train students in the following domains:

i. Recognize and manage cardiac arrest and peri-arrest conditions.
ii. Demonstrate high-quality CPR and effective team dynamics.
iii. Apply immediate cardiac care algorithms in simulated cardiac emergency scenarios.
iv. Manage airways, use defibrillators, and administer medications during high-pressure situations.
v. Function effectively as both team leader and team member during ICC events.

Learning Objectives

The trainer must be able to ensure that following learning objectives are met with the students:

i. Identify signs and rhythms of cardiac arrest, bradycardia, and tachycardia.
ii. Execute ICC interventions, including defibrillation, pacing, and medication administration.
iii. Interpret ECG rhythms relevant to ICC protocols.
iv. Communicate clearly and perform under pressure in a team-based resuscitation scenario.

Teaching Strategies

The following teaching strategies will be used during ICC/ ACLS training workshop

i. Didactic lectures (interactive)
ii. Skill stations with hands-on practice
iii. Team-based learning

Module One: Background and Overview of ICC

Cardiovascular diseases (CVDs) remain the leading global cause of death – responsible for ~17.9 million deaths annually (WHO 2025). Over 85% of CVD deaths are due to heart attacks and strokes, many of which are preventable with timely intervention. Immediate and systematic response improves survival rates and reduces long-term disability. ICC bridges Cardiac First Response/Basic Life Support (CFR/BLS) with Immediate Care Cardiac.

A. **Why is there need for Immediate Care Cardiac (ICC):**

- Sudden Cardiac Death in the community
- Commonest cause of death
- 70-80% caused by ventricular fibrillation
- 70% occur in the home
- 65% are witnessed
- Coronary Artery Disease – Principal cause

B. The Chain of Survival

Adult Out-of-Hospital Chain of Survival

Adult In-Hospital Chain of Survival

Pediatric Out-of-Hospital Chain of Survival

Pediatric In-Hospital Chain of Survival

The trainer will be expected to teach the student based on the following learning objectives:

Learning Objectives:

i. Define ICC and its importance in managing cardiac arrest and other cardiovascular
ii. emergencies.
iii. Identify the key components of ICC & understand the ICC algorithm and its application in various clinical scenarios.
iv. Learn about the ICC treatment sequence and decision-making process.
v. Recognize the roles and responsibilities of team members during an ICC response.

A. Content Focus

Course overview, roles and importance of ICC

B. Teaching Strategies:

Lecture + Discussion

Module Two: Review of Cardiac First Response/ Basic Life Support

A. Systematic Approach of ICC

Goal: Rapid recognition and intervention to decrease mortality in critically ill patients.

Step 1 – Initial Impression: Quick assessment of what is happening.

- **Is the patient conscious or unresponsive?**

Step 2 – Cardiac First Response/ Basic Life Support (BLS)

- **Breathing**: Look for normal, agonal, absent, or labored gasps.
- **Circulation**: Check pulse (≤10 seconds). If pulse is doubtful, treat as pulseless.
- Perform breathing and circulation checks together to minimize delay.

Step 3 – Immediate Action

- **If pulse but no breathing** → Respiratory Arrest Management (rescue breaths, airway support).
- **If no pulse** → Begin CPR immediately (high-quality compressions, early defibrillation if indicated).

The trainer will be expected to teach the student based on the following learning objectives:

A. Learning Objectives:

i. Apply the principles of high-quality CPR in cardiac emergencies
ii. Demonstrate proper chest compression technique.
iii. Provide effective ventilation, including proper bag-mask technique, appropriate ventilation rate.
iv. Recognize cardiac arrest and activate the emergency response system
v. Perform CPR according to CFR guidelines, including, Chest compressions, Rescue breaths, Use of AEDs.

B. Content Focus

Compressions, ventilation, defibrillation

C. Teaching Strategies:

Hands-on Skill Station

1. High-Quality CPR

Key Concepts:

1. **Chest Compression Technique**:

    a. Depth: At least **2 inches** in adults.
    b. Rate: **100-120 compressions per minute**.
    c. Full recoil between compressions.

b) **Effective Ventilation**:

    a) **Bag-mask technique** with appropriate **ventilation rate**.

2. **Minimize Interruptions**:

    a) Aim for **maximum hands-off time of 10 seconds**.

3. **Feedback Devices**:

    a) Use feedback devices to optimize **CPR performance** (depth, rate, and recoil).

Skills:

1. **Chest Compression Technique**:

    a) Learn and practice correct compression depth and rate.

2. **Bag-Mask Ventilation**:

    a) Master the use of **bag-mask devices** for effective ventilation.

3. **AED Operation**:

    a) **Proper use** and troubleshooting of **AEDs**.

Adult Out-of-Hospital Chain of Survival

Adult In-Hospital Chain of Survival

Pediatric Out-of-Hospital Chain of Survival

Pediatric In-Hospital Chain of Survival

Raina M. Merchant. Circulation. Part 1: Executive Summary: 2020 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care, Volume: 142, Issue: 16_suppl_2, Pages: S337-S357, DOI:(10.1161/CIR.0000000000000918)

Module Three: Primary & Secondary Assessment for Immediate Care Cardiac and History Taking

(A) Primary assessment for ICC – ABCDE Approach

Airway

- Open airway: Head-tilt, chin-lift or use OPA/NPA as needed.
- If advanced airway (ETT, supraglottic device):
    a) Confirm placement with equal chest rise and bilateral breath sounds.
    b) Use capnography ($ETCO_2$) for verification.

Breathing

- Provide ventilation with BVM (bag-valve-mask).
- Target SpO_2 ≥94% (avoid hyperoxia).
- During CPR, deliver 100% FiO_2.

Circulation

- Monitor $ETCO_2$ (target >10–20 mmHg during CPR, >40 mmHg after ROSC).
- Establish IV/IO access for drugs and fluids.
- Manage glucose and temperature as indicated.
- Continuous ECG monitoring for rhythm detection.

Disability

- Rapid neurological check: AVPU scale (Alert, Verbal, Pain, Unresponsive).
- Assess Level of Consciousness (LOC) and pupil response.

Exposure

- Fully expose the patient to inspect for trauma, bleeding, burns, rashes, or unusual markings that may indicate underlying causes.

(B) Secondary Assessment

- Evaluate potential underlying causes of arrest
- Diagnose and treat **reversible conditions** to achieve the Return of Spontaneous Circulation **(ROSC)** and prevent recurrence.

Focused Medical History – SAMPLE

S: Signs & Symptoms

A: Allergies

M: Medications

P: Past medical history

L: Last oral intake

E: Events leading to current situation

Module Four: Emergency Conditions (H's and T's)

Common Causes – H's & T's

- **H's**: Hypovolemia, Hypoxia, Hydrogen ion (acidosis), Hypo-/Hyperkalemia, Hypothermia, Hypoglycemia.
- **T's**: Tension pneumothorax, Cardiac tamponade, Thrombosis (coronary/pulmonary), Toxins, Trauma.

Key Principle: *Rapidly identify and reverse the cause.*

H's

a) **Hypovolemia:** A severe loss of blood or fluids, leading to inadequate blood circulation and shock. Treat by administering IV fluids or blood products as appropriate. Hypovolemia is diagnosed based on clinical signs (e.g., hypotension, tachycardia, reduced urine output) and confirmed by low central venous pressure (CVP), hematocrit levels, and lactate.

Treatment involves rapid fluid resuscitation

- intravenous crystalloids
- (e.g., normal saline or Ringer's lactate)

b) **Hypoxia**: Lack of oxygen in the blood, which can result from airway obstruction, respiratory issues, or poor ventilation. Ensure adequate oxygenation and ventilation.

Hypoxia is diagnosed based on clinical signs (e.g., shortness of breath, cyanosis) confirmed by a pulse oximetry reading < 90% or arterial blood gas (ABG) showing low oxygen levels (PaO2 < 60 mmHg). Treatment involves administering supplemental oxygen via nasal cannula, mask, or mechanical ventilation, depending on severity, and addressing the underlying cause (e.g., lung disease, cardiac failure).

c) **Hydrogen Ion (Acidosis):** Excessive acid in the blood (often metabolic acidosis) can impair heart function. This is often corrected with effective ventilation (for respiratory acidosis) or by treating the underlying cause and administering sodium bicarbonate if needed.

Acidosis is diagnosed by measuring arterial blood gases (ABG), showing a pH < 7.35. bicarbonate (HCO3-) levels lower than normal (depending on the type of acidosis: metabolic or respiratory). Treatment involves correcting the underlying cause (e.g., administering bicarbonate for metabolic acidosis. Improving ventilation for respiratory acidosis) and maintaining normal pH levels using appropriate interventions.

d) **Hyperkalemia or Hypokalemia:** Abnormal potassium levels can affect heart rhythm. Hyperkalemia (high potassium) is treated with calcium, insulin, glucose, or sodium bicarbonate, while hypokalemia (low potassium) is corrected by administering potassium.

Hyperkalemia is diagnosed by serum potassium levels > 6.5 mEq/L, with clinical signs like muscle weakness, arrhythmias, and peaked T-waves on ECG. Treatment involves calcium gluconate to stabilize the heart, insulin and glucose to shift potassium into cells, and dialysis in severe cases.

Hypokalemia is diagnosed by serum potassium levels < 3.0 mEq/L, with clinical signs such as muscle cramps, weakness, and arrhythmias. Treatment involves oral or intravenous potassium supplementation, along with addressing the underlying cause (e.g., diuretics, vomiting).

e) **Hypothermia:** A low body temperature can depress cardiac function. Warming techniques, such as warm blankets, warmed IV fluids, or external warming devices, are used to raise body temperature.

f) **Hypoglycemia:** It is critically low blood glucose level (<70 mg/dL) that deprives the brain and heart of essential fuel, often leading to altered mental status, seizures, or cardiac instability if untreated.

Hypoglycemia is diagnosed by a blood glucose level < 70 mg/dL, along with clinical symptoms such as sweating, tremors, confusion, and irritability. Treatment involves administering oral glucose (e.g., glucose tablets, fruit juice) for conscious patients or IV dextrose for unconscious patients, and monitoring glucose levels to prevent recurrence.

T's

a) **Tension Pneumothorax:** Air trapped in the pleural space under pressure can collapse the lung and impair venous return to the heart. Immediate needle decompression or chest tube placement is needed.

It is diagnosed by clinical signs including hypotension, tracheal deviation, decreased breath sounds on one side, and confirmed by chest X-ray or clinical examination showing air accumulation in the pleural space with a shift in mediastinal structures.

Treatment involves immediate needle decompression (e.g., inserting a needle into the 4th intercostal space, midclavicular line) followed by chest tube insertion for continued drainage and to prevent recurrence.

b) **Tamponade (Cardiac):** Accumulation of fluid around the heart restricts heart function. Pericardiocentesis (draining the fluid from the pericardial sac) is the treatment.

Cardiac Tamponade is diagnosed by clinical signs such as hypotension, jugular venous distention (JVD), and muffled heart sounds, along with the classic Pulsus paradoxus (a decrease in systolic BP > 10 mmHg with inspiration). Echocardiography confirms the presence of fluid in the pericardial sac.

Treatment involves pericardiocentesis to remove the accumulated fluid and relieve pressure on the heart, followed by addressing the underlying cause (e.g., trauma, malignancy, infection).

c) **Thrombosis (Pulmonary or Coronary):** Blood clots in the lungs (pulmonary embolism) or coronary arteries (heart attack) can obstruct blood flow. Treatment may include thrombolytic agents or surgical interventions.

Thrombosis is diagnosed based on clinical signs such as pain, swelling, redness (in the case of deep vein thrombosis), and confirmed by ultrasound or CT venography for venous thrombosis, and CT angiography or pulmonary angiography for pulmonary embolism.

Treatment involves anticoagulation therapy (e.g., heparin or warfarin), and in severe cases, thrombolytic therapy

d) **Toxins:** Poisoning or drug overdose (e.g., opioids, tricyclic antidepressants) can depress cardiac function. Treatment depends on the toxin, but may include antidotes, supportive care, and specific reversal agents.

Toxin exposure is diagnosed based on the clinical presentation of poisoning (e.g., altered mental status, respiratory depression, or seizures) and confirmed by toxicology screening or specific blood/urine tests for the suspected toxin.

Treatment involves supportive care (e.g., airway management, fluids), antidotes (e.g., naloxone for opioid overdose), and activated charcoal to reduce absorption, along with specific treatments for the toxin involved (e.g., chelation therapy for heavy metal poisoning).

e) **Trauma:** Severe injury (blunt or penetrating) causing hemorrhage, hypoxia, or direct cardiac disruption leading to arrest.

Trauma is diagnosed based on clinical signs such as pain, bleeding, deformities, loss of function, and altered mental status. Imaging studies (e.g., X-rays, CT scans, MRI) and laboratory tests are used to assess the extent of injuries (e.g., fractures, internal bleeding, organ damage).

Treatment involves stabilization (e.g., airway management, control of bleeding), rapid assessment using the ABCDE approach (Airway, Breathing, Circulation, Disability, Exposure), and interventions like fluid resuscitation, surgical repair, and pain management depending on the injury severity.

Module Five: Mega code Simulation (Team Scenarios)

Member 1: Team Leader

Directs the resuscitation efforts, makes critical decisions, and ensures team coordination.

Assess the Situation: Quickly determines if it's a true cardiac arrest and if resuscitation is needed.

Assign Roles: Delegates specific tasks (e.g., chest compressions, ventilation, defibrillation) to team members.

Direct Resuscitation Efforts: Oversees CPR, defibrillation, and medication administration, ensuring protocols are followed.

Monitor and Make Decisions: Evaluates the patient's response and adjusts interventions as necessary.

Ensure Timeliness: Coordinates prompt actions, minimizing delays in critical interventions.

Communicate Clearly: Provides updates and instructions to the team, and communicates with other healthcare professionals.

Post-Event Review: Leads a debriefing to evaluate the response and address any areas for improvement.

Member 2: Airway Manager

Manages airway, intubates if necessary, and ensures proper oxygenation and ventilation.

Ensure Airway Patency: Quickly assess and secure the airway (e.g., head-tilt-chin-lift or jaw-thrust maneuver).

Ventilate the Patient: Provide rescue breaths or use a bag-valve-mask (BVM) to assist ventilation.

Monitor Oxygenation: Ensure the patient is receiving adequate oxygenation, using pulse oximetry if available.

Assess for Obstruction: Check for any foreign body obstruction and perform maneuvers (e.g., suctioning) to clear the airway if needed.

Prepare for Advanced Airway: If necessary, prepare for advanced airway management like endotracheal intubation or supraglottic airway insertion.

Intubation or Advanced Airway: Perform or assist with endotracheal intubation, supraglottic airway placement, or other advanced airway procedures.

Secure the Airway: Ensure proper placement of the airway device and secure it to prevent displacement.

Confirm Tube Placement: Use capnography, auscultation, or other methods to confirm correct tube placement and proper ventilation.

Monitor Ventilation and Oxygenation: Ensure proper mechanical ventilation and adequate oxygen supply to the patient throughout the resuscitation process.

Member 3: Circulation Manager

Provides chest compression, manages IV/IO access, and supports circulation.

Assess Circulatory Status: Quickly assess the patient's pulse and blood pressure to determine the effectiveness of circulation.

Chest Compressions: If the patient is in cardiac arrest, the circulation member often participates in or supervises high-quality chest compressions to maintain blood flow to vital organs.

Coordinate with the Rest of the Team: Communicate closely with the airway, defibrillation, and team leader to ensure coordinated care, particularly during critical points of the resuscitation process.

Monitor Cardiac Rhythm: Work with the defibrillation team to monitor the patient's heart rhythm and determine if defibrillation (shock) or other interventions are needed.

Member 4: Defibrillator Operator

Assess Cardiac Rhythm: Quickly assess the patient's cardiac rhythm using the defibrillator's monitor to determine whether defibrillation (shock) is required.

Prepare and Apply Pads: Apply defibrillator pads to the patient's chest in the correct positions, ensuring proper contact with the skin for effective shock delivery.

Follow Shock Protocol:

- If indicated (e.g., ventricular fibrillation or pulseless ventricular tachycardia), charge the defibrillator to the appropriate energy level and prepare to deliver a shock.
- Ensure everyone is clear of the patient before delivering the shock.

Deliver Shock: Administer the shock when necessary, following the team leader's instructions. Ensure the shock is delivered at the right moment and with correct timing.

Monitor for Response: After delivering the shock, immediately reassess the patient's rhythm and pulse. Determine if further shocks are necessary.

Reassess and Repeat if Needed: If the patient remains in a shockable rhythm, continue to administer shocks as per the resuscitation guidelines until the patient regains a stable rhythm or the situation changes.

Operates the defibrillator, delivers shocks based on rhythm analysis, and adjusts energy levels.

Survival decreases by **7–10% for every minute** defibrillation is delayed in VF/pulseless VT.

Goal: Deliver the **first shock within 3–4 minutes** of collapse.

Urgent

- Early defibrillation restores a perfusing rhythm before prolonged hypoxia causes irreversible organ damage.
- Most sudden cardiac deaths are due to **VF/VT**, which are highly shockable if treated promptly.

Manual Defibrillator

Adult:

- **Monophasic shock**: 360 J (fixed dose for all shocks)
- **Biphasic shock**: Recommended

1st Shock: 120–200 J (manufacturer-recommended; if unknown, use 200 J; repeat same or escalate if unsuccessful)

2nd Shock: higher dose (e.g., 200 J to 300 J) if the initial shock was ineffective.

Pediatrics:

- 1st shock: 2 J/kg
- 2nd shock: 4 J/kg

European Resuscitation Council (ERC) Guidelines for Resuscitation

These guidelines provide the standardized shock energy recommendations based on the type of defibrillator used (monophasic or biphasic).

Member 5: Medication Administrator

Administers prescribed medications, monitors effects, and ensures timely delivery.

Prepare Medications: Quickly gather and prepare medications according to the resuscitation protocol (e.g., epinephrine, atropine, amiodarone). Ensure medications are correctly dosed and ready for administration.

Administer Medications:

- Administer medications via appropriate routes (IV, IO, or endotracheal tube if necessary).
- Common medications include epinephrine (for cardiac arrest), atropine (for bradycardia), and amiodarone (for ventricular arrhythmias).

Monitor for Effectiveness: After administration, closely monitor the patient's response to the medications (e.g., heart rhythm, blood pressure, and overall clinical status).

Ensure Timely Delivery: Administer medications as per established protocols and timing (e.g., after a specific number of shocks or chest compressions). Follow the guidelines for medication administration during each stage of resuscitation.

Member 6: Documentation/Recorder

Records the timeline of interventions, medications, shocks, and updates for review and analysis.

Record Timeline of Events:

- Accurately document the timing of key events (e.g., when CPR started, medications administered, shocks delivered, changes in rhythm).
- Ensure the time of each action is noted, helping to track the resuscitation process.

Log Medications and Interventions:

- Record the name, dose, route, and time of all medications given.
- Document interventions such as defibrillation shocks, intubation, and other treatments provided to the patient.

Monitor Patient Status:

- Keep track of the patient's vital signs (e.g., heart rate, blood pressure, oxygen saturation) and other relevant data, ensuring that changes are recorded at key intervals.

Maintain Clear and Accurate Notes:

- Ensure that all documentation is legible, clear, and concise for future reference or for debriefing.
- Document any changes in the patient's condition (e.g., return of spontaneous circulation, deterioration) to guide decision-making.

Assist with Communication:

- Relay critical information to the team leader, ensuring everyone is aware of the current status and progress during resuscitation.
- Help ensure that any relevant information (such as the time of death or return of circulation) is accurately noted.

Post-Event Reporting:

- After the event, compile and organize the documentation for review, ensuring it is complete for legal and medical purposes.
- Assist with creating a summary report that includes the actions taken and the outcomes of the Code Blue.

The trainer must be able to train students to achieve following learning objectives:

A. Learning Objectives:

1. Demonstrate **effective teamwork**, communication, and decision-making during **Mega Code Simulation**.
2. Clarify roles and responsibilities during **Mega Code Simulation** and practice **team-based learning**.

Key Concepts

1. **Team Dynamics and Communication:**
   a) Demonstrate effective communication and teamwork skills in high-pressure situations and clearly define roles and responsibilities within the team.
   b) Practice closed-loop communication and clear role assignment.
2. **Clinical Decision-Making:**
   a) Apply ICC algorithms and guidelines to complex clinical scenarios.
   b) Make timely and effective decisions in high-stress situations.
   c) Integrate ECG interpretation, patient assessment, and clinical decision-making.
3. **Simulation-Based Learning:**
   a) Apply knowledge and skills in a simulated clinical environment & Receive feedback and debriefing to improve performance.
4. **Team Leadership and Followership:**
   a) Demonstrate leadership skills, including clear communication and decision-making.
5. **Debriefing and Reflection:**
   a) Participate in debriefing sessions to discuss team performance and identify areas for improvement.
   b) Reflect on individual and team performance to identify strengths and weaknesses.

B. Content Focus

a) **Full ICC Scenarios**: Simulate real-life, advanced cardiac emergencies.
b) **Leadership**: Practice leadership, team communication, and clinical decision-making.
c) **Team Dynamics**: Focus on **team coordination** and role clarity during critical scenarios.

C. Teaching Strategies

1. **Hands-on Skill Station**:
   a) **Practice** chest compression technique, ventilation, AED operation, and airway management.
1. **Simulation + Debriefing**:
   a) **Practice in Mega Code Simulations** with assigned roles and a focus on **team-based learning**.
   b) **Debriefing** to discuss team performance and improve collaboration skills.

Skills:

1. **High-Quality CPR Proficiency**:

    a) Demonstrate proficiency in performing high-quality CPR, including defibrillation and medication administration.

1. **Use of Defibrillators**:

    a) Properly use **defibrillators**, cardioversion, and pacing.

Module Six: Rhythms & Protocols in Immediate Care Cardiac

Cardiac Arrest- Arrythmias (VT/VF/PEA/ASYSTOLE)

Used to evaluate the effectiveness of treatments for heart conditions. Helps in directing the treatment and identifies electrolyte imbalances, effects of medications, and structural abnormalities.

Elements of Chest Leads		
Lead	**Positive Electrode Placement**	**View**
V_1	4th Intercostal space to right of sternum	S
V_2	4th Intercostal space to left of sternum	S
V_3	Directly between V_2 and V_4	A
V_4	5th Intercostal space at left midclavicular line	A
V_5	Level with V_4 at left anterior axillary line	L
V_6	Level with V_5 at left midaxillary line	L

Electrical Components	
Deflection	**Description**
P Wave	First wave seen Small rounded, upright (positive) wave indicating atrial depolarization (and contraction)
PR Interval	Distance between beginning of P wave and beginning of QRS complex Measures time during which a depolarization wave travels from the atria to the ventricles
QRS Interval	Three deflections following P wave Indicates ventricular depolarization (and contraction) Q Wave: First negative deflection R Wave: First positive deflection S Wave: First negative deflection after R wave
ST Segment	Distance between S wave and beginning of T wave Measures time between ventricular depolarization and beginning of repolarization
T Wave	Rounded upright (positive) wave following QRS Represents ventricular repolarization
QT Interval	Measured from beginning of QRS to end of T wave. Represents total ventricular activity.
U Wave	Small rounded, upright wave following T wave Most easily seen with a slow HR. Represents repolarization of Purkinje fibers.

Method 2: Count Small Boxes

Sometimes it is necessary to count the number of small boxes between two R waves for fast heart rates. That number is divided into 1500 to calculate bpm. Remember: 60 sec/min divided by 0.04 sec/small box = 1500 small boxes/min.

Examples: If there are six small boxes between two R waves: 1500/6 = 250 bpm.
If there are ten small boxes between two R waves: 1500/10 = 150 bpm.

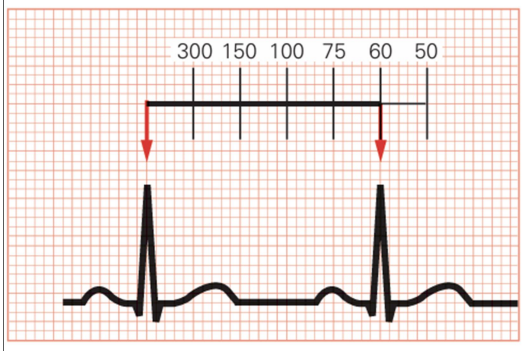
Methods 1 and 2 for Calculating Heart Rate

Number of Large Boxes	Rate/Min	Number of Small Boxes	Rate/Min
1	300	2	750
2	150	3	500
3	100	4	375
4	75	5	300
5	60	6	250
6	50	7	214
7	43	8	186
8	38	9	167
9	33	10	150
10	30	11	136
11	27	12	125
12	25	13	115
13	23	14	107
14	21	15	100
15	20	16	94

♥ **Clinical Tip:** Approximate rate/min is rounded to the next-highest number.

Method 1: Count Large Boxes

Regular rhythms can be quickly determined by counting the number of large graph boxes between two R waves. That number is divided into 300 to calculate bpm. The rates for the first one to six large boxes can be easily memorized. Remember: 60 sec/min divided by 0.20 sec/large box = 300 large boxes/min.



Counting large boxes for heart rate. The rate is 60 bpm.

Method 3: Six-Second ECG Rhythm Strip

The best method for measuring irregular rates with varying R-R intervals is to count the number of R waves in a 6-sec strip and multiply by 10. This gives the average number of bpm.

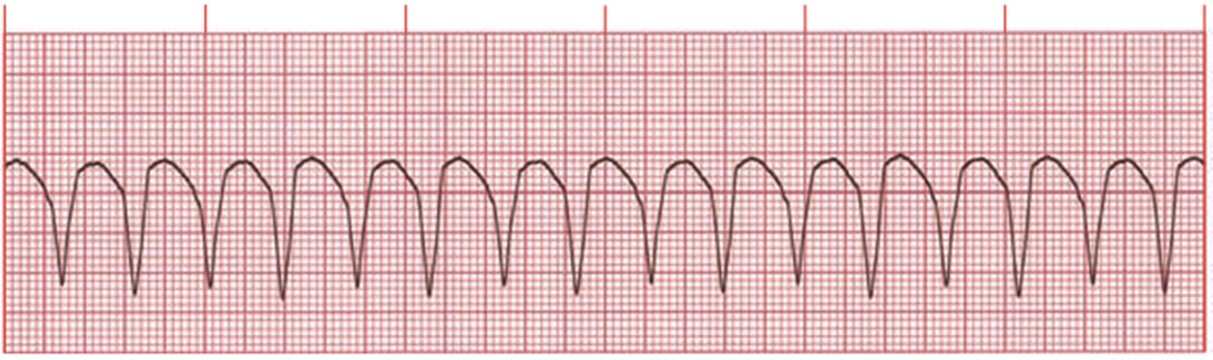
Using 6-sec ECG rhythm strip to calculate heart rate. Formula: 7 × 10 = 70 bpm

♥ **Clinical Tip:** If a rhythm is extremely irregular, it is best to count the number of R-R intervals per 60 sec (1 min).

Shockable Rhythms

Ventricular Tachycardia (VT): Monomorphic

- QRS complexes in monomorphic VT have the same shape and amplitude.

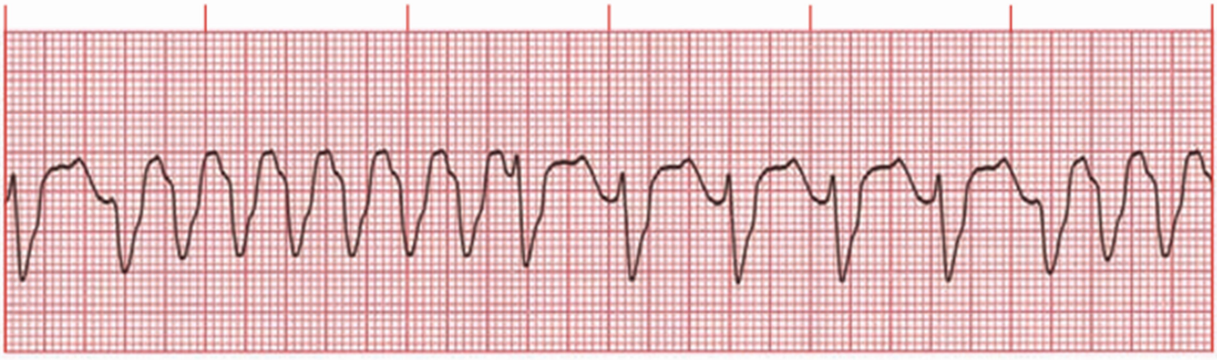


Rate: 100–250 bpm
Rhythm: Regular
P Waves: None or not associated with the QRS
PR Interval: None
QRS: Wide (>0.10 sec), bizarre appearance

♥ **Clinical Tip:** It is important to confirm the presence or absence of pulses because

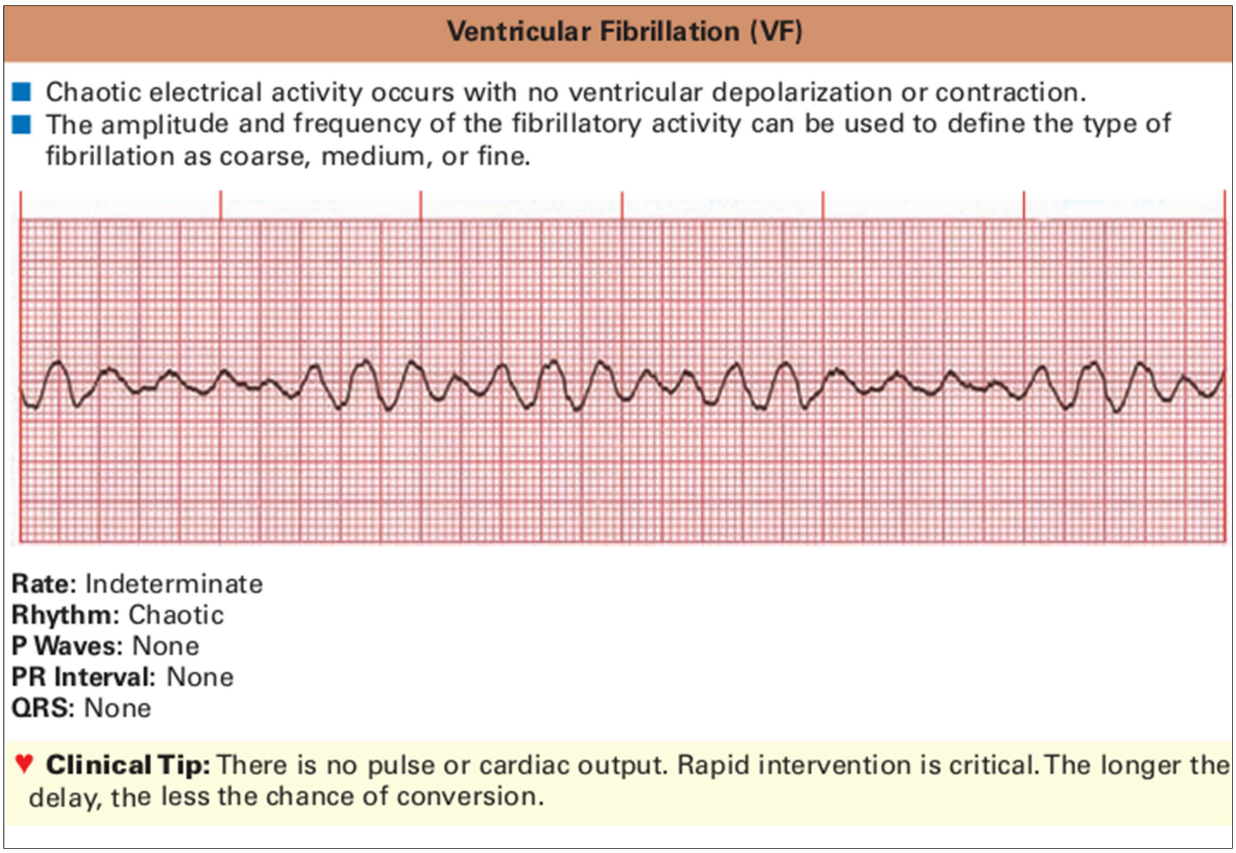
Ventricular Tachycardia (VT): Polymorphic

- QRS complexes in polymorphic VT vary in shape and amplitude.
- The QT interval is normal or long.



Rate: 100–250 bpm
Rhythm: Regular or irregular
P Waves: None or not associated with the QRS
PR Interval: None
QRS: Wide (>0.10 sec), bizarre appearance

♥ **Clinical Tip:** It is important to confirm the presence or absence of pulses because



VF OR PULSELESS VT – ADULT CPR PROTOCOL

From CFR/BLS Adult CPG

- Transition from Basic Life Support (BLS) to Immediate Care Cardiac (ICC) for VF/VT arrest.

Immediate Access

- Initiate intraosseous (IO) access if IV access is delayed.

CPR and Defibrillation Process

Rhythm Check and Defibrillation

- Initial rhythm check and administer defibrillation if VF/VT is confirmed.
- **CPR Continuation**: Keep CPR ongoing with maximum hands-off time of 10 seconds.

Medication Administration

Epinephrine

- Administer epinephrine (1:10,000) 1 mg IV/IO every 3–5 minutes after the second shock.

Amiodarone for Refractory VF/VT

- First dose: 300 mg (5 mg/kg) IV/IO.
- Second dose (if required): 150 mg (2.5 mg/kg) IV/IO.

Additional Interventions

- **For Torsades de Pointes**
    - Consider Magnesium Sulfate 2 g IV/IO.
- **Tricyclic Antidepressant Toxicity**
    - Administer Sodium Bicarbonate 8.4% 50 mL IV.

Transport and Mechanical CPR

Consider Transport

- Transport to the emergency department if no response after 20 minutes.

Mechanical CPR Device

- Use mechanical CPR during transport if available for consistent compression quality.

Advanced Management and Monitoring

Airway Management and Capnography

- Advanced airway procedures as required.
- Consider waveform capnography for monitoring.

Clinical Leader

- Ensure a clinical leader is present to monitor CPR quality.

Potential Reversible Causes

H's and T's Checklist

- Hydrogen ion (acidosis), Hyper-/Hypokalemia, Hypothermia, Hypovolemia, Hypoxia.
- Thrombosis (pulmonary/coronary), Tension pneumothorax, Tamponade, Toxins, Trauma.

Special Authorizations

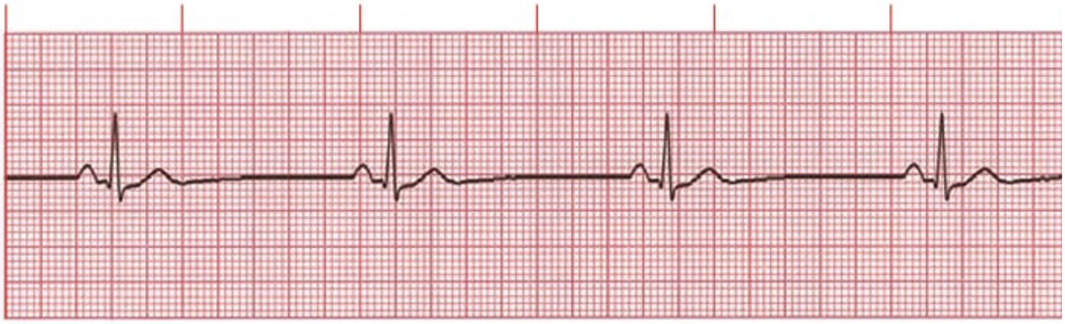
Substitution Options

- Advanced paramedics may substitute Amiodarone with Lidocaine (1–1.5 mg/kg IV) if Amiodarone is unavailable.

Non-shockable Rythms

Pulseless Electrical Activity (PEA)

- Monitor shows an identifiable electrical rhythm, but no pulse is detected.
- Rhythm may be sinus, atrial, junctional, or ventricular in origin.
- PEA is also called electromechanical dissociation (EMD).



Rate, rhythm, P waves, P-R interval, and QRS: Reflect underlying rhythm.

♥ **Clinical Tip:** Potential causes of PEA are pulmonary embolism, MI, acidosis, tension pneumothorax, hyper- and hypokalemia, cardiac tamponade, hypovolemia, hypoxia, hypothermia, and drug overdose (i.e., cyclic antidepressants, beta blockers, calcium channel blockers, digoxin).

Asystole

- Electrical activity in the ventricles is completely absent.

Rate: None
Rhythm: None
P Waves: None
PR Interval: None
QRS: None

Pulseless Electrical Activity (PEA) Protocol / Asystole – Adult

Immediate Actions:

- Use IO access if IV access is delayed.
- Begin CPR with rhythm checks every 2 minutes, maintaining hands-off time to a maximum of 10 seconds.

Medication and Fluids:

- **Epinephrine**: 1 mg IV/IO every 3–5 minutes.
- **NaCl 500 mL IV/IO**: Use as a flush.
- **Optional Fluid Challenge**: NaCl 20 mL/kg IV/IO if needed.

Advanced Interventions:

- Advanced airway management and consider mechanical CPR during transport if available.
- Assign a clinical leader to monitor CPR quality.
- Use waveform capnography if available for monitoring.

Reversible Causes (H's and T's):

- **H's**: Acidosis, hyper-/hypokalemia, hypothermia, hypovolemia, hypoxia.
- **T's**: Pulmonary thrombosis, tension pneumothorax, coronary thrombosis, cardiac tamponade, toxins, trauma.

Special Considerations:

- For tricyclic antidepressant toxicity, consider sodium bicarbonate (8.4%, 50 mL IV).

Transport Consideration:

- If no response after 20 minutes, consider transport to ED if no ALS is available.

Sinus Bradycardia

■ Results from slowing of the SA node.

Rate: Slow (<60 bpm)
Rhythm: Regular
P Waves: Normal (upright and uniform)
PR Interval: Normal (0.12–0.20 sec)
QRS: Normal (0.06–0.10 sec)

♥ **Clinical Tip:** Sinus bradycardia is normal in athletes and during sleep. In acute MI, it may be protective and beneficial or the slow rate may compromise cardiac output. Certain medications, such as beta blockers, may also cause sinus bradycardia.

Symptomatic Bradycardia- ADULT

Initial Actions:

- Provide **oxygen therapy** as required.
- Request Immediate Care cardiac (ICC) support.

Monitoring:

- Start continuous **ECG and SpO_2 monitoring**.

Medication:

Atropine 0.5 mg IV, repeat every 3-5 minutes as needed, up to a maximum dose of 3 mg.

Additional Assessment:

- Conduct a **12-lead ECG** for a comprehensive cardiac assessment.

Reassessment:

- Reevaluate the patient's condition after each intervention.

Transport:

- If necessary, transport the patient to the hospital for further care.

The trainer will be expected to teach the student based on the following learning objectives:

A. ECG Recognition:

1) Identify and interpret ECG rhythms, including, Normal sinus rhythm, Bradycardia Tachycardia, Ventricular fibrillation (VF), Pulseless ventricular tachycardia (VT), Asystole Pulseless electrical activity (PEA), pulse electric activity (PEA)

2) Understand the importance of ECG interpretation in ICC decision-making.

B. Algorithm Review

1) Understand the ICC algorithms for:

   a) Cardiac arrest (VF/pVT, asystole/PEA), Bradycardia, Tachycardia

2) Apply ICC algorithms to clinical scenarios, including, Recognition of cardiac arrest Initiation of CPR, Defibrillation and cardioversion, Medication administration.

3) Integrate ECG interpretation with ICC/ACLS algorithms and treatment sequence

C. Content Focus

Bradycardia, tachycardia, PEA, asystole, VT/VF

D. Teaching Strategies:

Lecture, hand on skill practice

Module Seven: Airway Management

A. Learning Objectives:

1. Assess and manage airways in various clinical scenarios using appropriate devices (bag-mask, intubation, etc.).
2. Recognize and respond to **airway obstruction** in emergency situations.
3. Understand the importance of airway management in ICC and emergency care & recognize and respond to airway obstruction.
4. Demonstrate proper technique for oropharyngeal and nasopharyngeal airway insertion & endotracheal tube placement and confirmation.
5. Demonstrate proficiency in advanced airway management techniques.

B. Content Focus

Airway adjuncts, bag-mask, intubation

C. Teaching Strategies:

Demonstration + Practice Hands-on Skill Station

Key Concepts:

1. **Airway Assessment and Management**:
    a. **Bag-mask ventilation** for initial airway management.
    b. **Endotracheal intubation**: Insertion, confirmation, and securing the airway in unconscious patients.
    c. **Supraglottic airway devices** for airway control when intubation is not possible.

2. **Airway Obstruction**:
    a. Recognize and address **foreign-body airway obstruction** using appropriate techniques.
    b. Ensure airway patency for proper ventilation.
3. **Advanced Techniques**:

    a) **Oropharyngeal and nasopharyngeal airway insertion**.
    b) **Endotracheal tube placement** and verification using capnography.

Skills:

1. **Airway Management Techniques**:

    a) Proficiency in **bag-mask ventilation** and advanced airway management.
    b) Demonstrating the correct technique for inserting **airway adjuncts** (Oropharyngeal and Nasopharyngeal airways).
    c) **ETT Placement**

Content Focus:

a) **Airway adjuncts**, **bag-mask**, **intubation**, and techniques for managing **airway obstruction**.

Teaching Strategies:

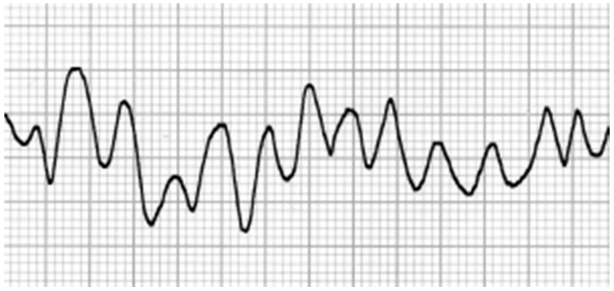
2. **Demonstration + Practice**:

a) **Hands-on Skill Station** for practicing airway management techniques.
b) **Simulation-based practice** for advanced airway techniques.

Module Eight: Management of Myocardial Infarction (MI)

Outcomes from Acute Myocardial Infarction

- 25%+ patients die – half within 2 hours
- Most deaths are due to arrythmias – VF/VT
- VF/VT survival 5-30%, depends on Chain of Survival



AMI – ECG criteria

- ST elevation >1mm in adjacent leads (>2mm in chest leads)
- Reciprocal ST depression
- ST Elevation MI (STEMI) may be suitable for thrombolysis

Cardiac Chest Pain – Acute Coronary Syndrome Protocol

Initial Actions:

- **Start oxygen therapy to maintain SpO_2 between 94%–98%.**
- **Request ALS support and apply a 12-lead ECG and SpO_2 monitor.**
- **Administer Aspirin 300 mg PO.**

Chest Pain Evaluation:

- **If chest pain is present, give GTN 0.4 mg SL (repeat to a max of 1.2 mg SL) until pain relief.**
- **If pain persists, follow the Pain CPG.**

ECG Analysis:

- **Obtain and interpret a 12-lead ECG.**
- **If STEMI (ST-elevation myocardial infarction) is confirmed, assess eligibility for thrombolysis and transport options.**

STEMI Management:

- **Clopidogrel: 600 mg PO if <75 years, 75 mg PO if >75 years.**
- **Determine if the time to PCI center is <90 minutes. If not, proceed with thrombolysis if no contraindications.**

Thrombolysis:

- **Indications: Patient is conscious, understands therapy, consents, <75 years (or per discretion), MI symptoms <3 hours, confirmed STEMI, and no contraindications.**
- **Thrombolytic based on weight**
- **Notify and transport to a primary PCI facility ASAP for urgent intervention.**

Special Instructions:

- **If PCI is unavailable within 20-30 minutes, initiate thrombolysis and then transport.**

The trainer will be expected to teach the student based on the following learning objectives:

A. Learning Objectives:

1. Understand the **management of Acute Myocardial Infarction (MI)**, including **STEMI protocols**.
2. Apply **rapid interventions** to address reversible causes during **cardiac arrest**.

Key Concepts:

1. **Management of Myocardial Infarction (MI)**:
    a. **STEMI Protocol**: Early **aspirin** and **clopidogrel**, thrombolytics or PCI depending on time.
    b. **NSTEMI**: Heparin administration, anti-platelet agents, and urgent coronary angiography.

Skills:

1. **Management of MI**: Using **aspirin**, **clopidogrel**, and **PCI**.

B. Content Focus:

1. **STEMI** and **NSTEMI management**.

C. Teaching Strategies:

1. **Interactive Lecture + Discussion** for emergency conditions.
2. **Hands-on Skill Stations for practice**
3. **Case-based Scenarios** for **MI management** and **coronary interventions**.

Module Nine: Post-Resuscitation Care

A. Learning Objectives:

1. Recognize the importance of **post-cardiac arrest care** in reducing morbidity and mortality.
2. Apply interventions such as **oxygen therapy**, **temperature management**, and **patient monitoring** in post-resuscitation care.
3. Understand the role of the ICC team in transitioning from emergency response to recovery phase.

Key Concepts:

Post-Resuscitation Care – Adult

Symptomatic Bradycardia:

- If present, administer **Atropine 0.5 mg IV/IO**, repeating every 3-5 minutes up to a max of 3 mg.

Hypotension Management:

- For persistent hypotension, use **NaCl IV/IO** to maintain systolic BP >90 mmHg.

Transport:

- Transport smoothly to a PCI facility if ALS is available and local protocol permits.

Reversible Causes (H's and T's):

- **H's**: Acidosis, hypo-/hyperkalemia, hypothermia, hypovolemia, hypoxia.
- **T's**: Pulmonary/coronary thrombosis, tension pneumothorax, cardiac tamponade, toxins, trauma.

Oxygen Therapy:

- Maintain oxygen saturation (SpO_2) between 94%-98%.

Initial Assessment:

- Request ALS if available.
- Determine if patient is responsive.
- If unresponsive and ventilation is inadequate, provide positive pressure ventilations (max 10/minute).

Active Cooling:

- For cooling, use cold packs on the armpits, groin, and abdomen.
- **NaCl 500 mL IV/IO** (4°C) to initiate cooling if required.

Patient Monitoring:

- Keep the patient at rest.
- Monitor using ECG, SpO_2, and a 12-lead ECG.
- Check blood pressure, Glasgow Coma Scale (GCS), blood glucose, and vital signs regularly.

Oxygen Therapy: Maintain oxygen saturation between **94-98%** to ensure adequate tissue perfusion.

Patient Monitoring: Continuous monitoring of **ECG**, **blood pressure**, **blood glucose**, and **vital signs**.

Temperature Management:

a. **Active cooling** with cold saline IV fluids (NaCl 500 mL at 4°C) or cold packs.
b. Target **normothermia** or **mild hypothermia** (32–34°C) for **neuroprotection**.

Medication: Address hypotension with **NaCl IV/IO** and manage symptomatic **bradycardia** with **atropine**.

Neurological Protection:

c. Focus on minimizing **cerebral ischemia** post-cardiac arrest.
d. Early **neurological assessment** for potential brain injury.

Skills:

1. **Administering Oxygen** and **fluids post-resuscitation**.
2. **Continuous Monitoring** of vital signs and adjusting interventions accordingly.
3. **Temperature Management**: Administer **cold saline** for active cooling.

B. Content Focus:

1. **Transitioning from resuscitation to recovery**.
2. **Medication** and **therapeutic strategies** for post-resuscitation care.

C. Teaching Strategies:

1. **Case-based Discussion**: Focus on real-life post-resuscitation care scenarios.
2. **Hands-on Skill Station**: For practicing **oxygen therapy**, **fluid administration**, and **temperature management**.
3. **Simulation-based Learning**: Practice post-resuscitation care interventions in a controlled environment.

Module Ten: Evaluation

I. Question & Answer Session:

1) Clarify any doubts or questions regarding the course material & discuss complex topics and challenging scenarios.
2) Encourage active participation and engagement.

II. Post-Test:

1) Assess knowledge retention and understanding of the course material.
2) Evaluate the effectiveness of the training program.
3) Identify areas for further improvement or review.

III. Wrap-Up Session:

1) Summarize key takeaways and main points from the course & provide final thoughts and recommendations.
2) Encourage continued learning and application of skills

A. Content Focus

Feeback

B. Teaching Strategies:

Discussion + Post Test

Assessment Policy

The passing marks will be 70% for post-test and skills station. Students from 60% -69% will be given a chance to reappear for post-test and skill test on the same day. Less than 60% will reappear with next batch. Assessment will be conducted as follows

a) Formative: Direct observation with feedback during skill session
b) Summative: Skill test (OSCE)
c) Written MCQs- based Post test (10-20)

Course Feedback

Objectives:

i. To examine the areas for improvement based on comments of practice.
ii. To provide the participants with time to comment and seek clarity.
iii. To share the overall performance report with the participants.

Quality Assurance

Quality assurance of all training will be maintained through regular feedback, instructor workshops and on-site evaluation of the training.

Instructor Certification

i. UHS-PSDC trained Instrcutors having completed the provider course training and may have provided training as a co-instructor for at least 3 courses under supervision of a trained master trainer/ instructor

ii. Those with clinical experience in emergency or critical care settings. Familiarity with adult education and skills training and an ability to provide constructive feedback will be of an added advantage

Integration & Sustainability

i. Embed into existing skills lab or clinical rotation schedule
ii. Repeat 2-yearly for reinforcement
iii. Encourage observational learning during actual ICC calls in any emergency

Recommended Guidelines and References

i. Pre Hospital Emergency Care Council- Clinical Practice Guidelines-2021 Edition Updated 2023
ii. Pre Hospital Emergency Care Council- Cardiac First Respond-Student handbook-2011 Edition
iii. American Heart Association (AHA) BLS Guidelines 2020
iv. European Resuscitation Council (ERC) Guidelines 2021
v. WHO Emergency Care Toolkit
vi. ILCOR Guidelines 2010

Session Plan

Duration of Workshop: One day workshop (9:00am-1:00pm). (4 Hours)

Time	Activity
9:00am- 9:10am	Welcome, Registration, Introductory remarks
9:10am-9:25am	Module One: Background and Overview of ICC
9:25am-9:45am	Module Two: Review of Cardiac First Response/ Basic Life Support
9:45am- 10:15am	Module Three: Primary and Secondary Assessment for ICC & History Taking
10:15 – 10:45am	Module Four: Emergency Conditions (H's and T's)
10:45am-11:05 am	Module Five: Mega code Simulation (Team Scenarios)
11:05am-11:20am	Module Six- Rhythms and Protocols in ICC
11:20am-11:40am	Module Seven- Air way management
11:40am-12:00pm	Module Eight- Management of Myocardial Infarction
12:00pm-12:20pm	Module Nine: Post Resuscitation Crae
12:20pm-12:40pm	Module Ten: Evaluation
12:40pm-1:00pm	Feedback and Conclusion

List of Equipment

Course Name	Priority	Section	Equipment	Quantity Per Station
Immediate Care Cardiac /Advanced Life Support Cardiac	Priority-1	Airway Management	Bag Valve Mask (BVM) Adult	1
			Cannula IV 14g	1
			Cannula IV 18g	1
			Cannula IV 22g	1
			Oropharyngeal Airway (OPA) Size 1	1
			Oropharyngeal Airway (OPA) Size 2	1
			Oropharyngeal Airway (OPA) Size 3	1
			Oropharyngeal Airway (OPA) Size 4	1
			Oxygen Mask (Adult)	1
			Pocket Mask	1
		Defibrillation	Automated External Defibrillator (Trainer)	1
			Automated External Defibrillator (Trainer) Adult Pads	1
			Automated External Defibrillator (Trainer) Battery	1
			Automated External Defibrillator (Trainer) Child Pads	1
			External Defibrillator (Original)	1
			External Defibrillator (Original) Adult Pads	1
			External Defibrillator (Original) Batteries	1
			External Defibrillator (Original) Child Pads	1
		Manikin	ALS Manikin	1
			CPR Manikin (Half Body) Adult	1
		Personal Protection	Hand Sanitizers	1

6 to 8 Participants per Skill Station

University of Health Sciences, Lahore | List of required Equipment | Professionals Skill Development Centre

Course Name	Priority	Section	Equipment	Quantity Per Station
		Vital Sign	Sphygmomanometer Manual	1
			Stethoscope	1
	Priority-2	Airway Management	Airway Head Manikin (Adult)	1
			Bag Valve Mask (BVM) Child	1
			Cannula IV 16g	1
			Cannula IV 20g	1
			CPR Mouth Piece	1
			Nasal Cannula	1
			Non-Rebreather Mask	1
			Oxygen Mask (Child)	1
		Manikin	CPR Manikin (Half Body) Child	1
		Medication	Amiodarone	1
			Atropine	1
			Epinephrine/Adrenaline Injection	1
		Personal Protection	Face Mask	10
			Face Shield	1
			Gloves	10
		Vital Sign	Pulse Oximeter	1
	Priority-3	Manikin	Automated Chest Compression Device	1
		Medication	Oxygen Cylinder	1
		Vital Sign	Cardiac Monitor	1

6 to 8 Participants per Skill Station

University of Health Sciences, Lahore | List of required Equipment | Professionals Skill Development Centre

Course Name	Priority	Section	Equipment	Quantity Per Station
		Vital Sign	Sphygmomanometer Manual	1
			Stethoscope	1
	Priority-2	Airway Management	Airway Head Manikin (Adult)	1
			Bag Valve Mask (BVM) Child	1
			Cannula IV 16g	1
			Cannula IV 20g	1
			CPR Mouth Piece	1
			Nasal Cannula	1
			Non-Rebreather Mask	1
			Oxygen Mask (Child)	1
		Manikin	CPR Manikin (Half Body) Child	1
		Medication	Amiodarone	1
			Atropine	1
			Epinephrine/Adrenaline Injection	1
		Personal Protection	Face Mask	10
			Face Shield	1
			Gloves	10
		Vital Sign	Pulse Oximeter	1

6 to 8 Participants per Skill Station

University of Health Sciences, Lahore | List of required Equipment | Professionals Skill Development Centre

Course Name	Priority	Section	Equipment	Quantity Per Station
			Electrocardiogram (ECG) Machine (3 Leads)	1
			Sphygmomanometer Digital	1

Professional Skill Development Centre
University of Health Sciences Lahore