

# First Aid

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Export date: 2026-09-05T17:13:38.281Z

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# Unit 1 – First Aid Basics and Emergency Readiness

## 1.1 Principles and importance of first aid

First aid is the immediate care given to someone in a medical emergency. It's crucial for preserving life, preventing further harm, and promoting recovery. Understanding the principles of first aid empowers individuals to respond effectively in critical situations.

Legal and ethical considerations play a vital role in first aid. Good Samaritan laws protect those who help in emergencies, while obtaining consent respects patient autonomy. These principles ensure that first aid is provided responsibly and ethically.

## Principles of First Aid

### Overview of First Aid and Emergency Care

- First aid involves providing immediate care and support to a person suffering from an injury or illness until professional medical treatment is available
- Emergency care is the provision of first aid in life-threatening situations to preserve life, prevent further harm, and promote recovery
- The goal of first aid is to minimize injury and future disability of the patient
- First aid can be performed by trained professionals or lay rescuers with basic training

### The Chain of Survival

- The chain of survival is a series of steps that maximize the chance of survival for a person experiencing a medical emergency
- Steps in the chain of survival include early recognition and call for help, immediate high-quality CPR, rapid defibrillation, effective advanced life support, and integrated post-cardiac arrest care
- Each link in the chain of survival is critical and interdependent
- Quickly initiating the chain of survival can significantly improve patient outcomes in life-threatening emergencies (cardiac arrest, severe trauma)

### Conducting Primary and Secondary Surveys

- A primary survey is a rapid assessment used to identify and manage immediate life-threatening conditions (airway, breathing, circulation, disability, exposure)
- The primary survey follows the ABCDE approach and should be completed within a few minutes
- A secondary survey is a head-to-toe physical exam conducted after the primary survey to identify all injuries and gather relevant medical information
- The secondary survey is more thorough and includes taking vital signs, patient history, and documenting findings

- The primary and secondary surveys guide the first aid provider in determining the appropriate course of treatment

## Legal and Ethical Considerations

### Good Samaritan Laws and Duty to Act

- Good Samaritan laws offer legal protection to people who provide reasonable assistance to others in need during an emergency
- These laws are intended to encourage bystanders to help others without fear of legal repercussions if unintended consequences occur
- The specific provisions of Good Samaritan laws vary by jurisdiction
- In some situations, individuals may have a legal duty to act and provide assistance (lifeguards, first responders, teachers)
- Failing to fulfill the duty to act can result in legal liability

### Obtaining Consent for First Aid

- Obtaining consent before providing first aid is essential to respect the patient's autonomy and right to make decisions about their care
- Express consent is obtained through clear verbal agreement from a conscious and mentally competent adult
- Implied consent occurs when a patient is unconscious, confused, or unable to give express consent, and a reasonable person would agree to treatment under the circumstances
- Minors may require consent from a parent or guardian, except in life-threatening situations where implied consent applies
- If a patient refuses care, their decision must be respected unless they are mentally incapable of making an informed choice

## 1.2 Legal and ethical considerations in emergency care

Understanding legal and ethical considerations is crucial for first responders. Knowing your responsibilities, patient rights, and privacy laws helps you provide safe, effective care while protecting yourself from legal issues.

Consent, negligence, and confidentiality are key concepts. Always get permission before treating conscious patients, maintain the standard of care, and keep patient information private to avoid legal and ethical pitfalls in emergency situations.

## Legal Responsibilities

### Negligence and Standard of Care

- Negligence occurs when a first aider fails to provide the expected standard of care, resulting in harm or injury to the patient
- The standard of care is the level of care that a reasonably prudent person with similar training would provide under similar circumstances

- Failure to meet the standard of care can lead to legal consequences for the first aider
- Examples of negligence include failing to properly assess a patient's condition or providing inappropriate treatment (administering medication without proper training)

## Abandonment and Documentation

- Abandonment happens when a first aider initiates care for a patient but then leaves without ensuring that the patient's care is transferred to another qualified person or medical professional
- Once a first aider begins providing care, they have a legal obligation to continue until the patient no longer requires assistance or until another qualified person takes over
- Proper documentation is essential for legal protection and continuity of care
- First aiders should record the patient's condition, the care provided, and any changes in the patient's status (vital signs, level of consciousness)
- Documentation should be accurate, objective, and completed as soon as possible after the incident (using a standardized form or incident report)

## Patient Consent

### Implied and Expressed Consent

- Implied consent is assumed when a patient is unconscious, confused, or otherwise unable to give expressed consent and requires immediate medical attention
- In emergency situations where the patient cannot give consent, first aiders can proceed with treatment under the principle of implied consent
- Expressed consent is explicit permission given by a patient who is conscious and mentally competent to understand the nature and consequences of the proposed treatment
- First aiders should obtain expressed consent whenever possible before providing care (asking the patient if they agree to receive treatment)

## Refusal of Care

- Patients have the right to refuse care, even if the first aider believes the treatment is necessary
- If a mentally competent adult refuses care, the first aider must respect their decision and document the refusal
- In cases where a patient refuses care, the first aider should explain the potential consequences of not receiving treatment and attempt to persuade the patient to accept care
- If the patient still refuses, the first aider should document the refusal, including the patient's reason for refusal and any attempts made to persuade them (having the patient sign a refusal of care form if possible)

## Privacy

## Confidentiality

- First aiders have a legal and ethical obligation to maintain patient confidentiality

- Patient information, including their medical condition, treatment, and personal details, should not be disclosed to unauthorized individuals
- Confidentiality helps to build trust between the first aider and the patient and protects the patient's privacy rights
- Exceptions to confidentiality may include situations where the patient gives consent to share information or when required by law (reporting child abuse or communicable diseases to authorities)
- First aiders should discuss patient information only with those directly involved in the patient's care (medical professionals, emergency services) and avoid discussing cases in public areas where others may overhear

## 1.3 Personal safety and scene safety assessment

Personal safety and scene safety assessment are crucial first aid skills. They involve using protective gear, following isolation techniques, and evaluating potential hazards. These practices help first responders stay safe while providing care in emergencies.

Proper assessment of the scene is vital for effective first aid. This includes identifying risks, maintaining situational awareness, and adapting to changing circumstances. These skills ensure the safety of both the responder and the patient during emergencies.

### Personal Protection

#### Protective Gear and Equipment

- Personal protective equipment (PPE) includes items worn to minimize exposure to hazards and prevent illness or injury
- PPE consists of gloves, gowns, masks, face shields, and eye protection (goggles) that create a barrier between the first aider and potentially infectious materials
- Proper use of PPE is essential for reducing the risk of disease transmission and protecting the first aider's health and safety
- PPE should be appropriately selected based on the anticipated level of exposure and properly donned, doffed, and disposed of to maintain effectiveness

#### Isolation Techniques and Precautions

- Body substance isolation is an approach that assumes all bodily fluids are potentially infectious and requires the use of PPE when contact is anticipated
- Universal precautions are a set of infection control practices that treat all human blood and certain bodily fluids as if they are infectious for bloodborne pathogens (HIV, HBV)
- These precautions include proper hand hygiene, use of PPE, safe injection practices, and proper handling and disposal of sharps and contaminated materials
- Implementing body substance isolation and universal precautions helps prevent the spread of infectious diseases and protects both the first aider and the patient

# Scene Assessment

## Initial Evaluation and Hazard Identification

- Scene size-up is the initial assessment of the situation upon arriving at an emergency scene to determine the nature of the emergency and identify potential hazards
- This involves observing the scene, looking for any immediate dangers (fire, downed power lines, unstable structures), and determining the number and condition of patients
- Hazard identification is the process of recognizing and assessing the presence of any physical, chemical, biological, or environmental threats that may pose a risk to the first aider or the patient
- Common hazards include traffic, unstable surfaces, hazardous materials, violent individuals, and environmental factors (extreme temperatures, water)

## Risk Assessment and Situational Awareness

- Risk assessment involves analyzing the identified hazards and determining the likelihood and severity of potential harm to the first aider, the patient, or others on the scene
- This assessment helps prioritize the hazards and guides decision-making regarding scene safety and the appropriate level of intervention
- Situational awareness is the continuous process of actively observing and assessing the environment, anticipating potential threats, and adapting to changing circumstances
- Maintaining situational awareness involves using all senses, staying alert and focused, and being prepared to respond to any changes in the scene or the patient's condition
- Effective risk assessment and situational awareness enable the first aider to make informed decisions, minimize risks, and provide care safely and effectively

## 1.4 Emergency action steps and prioritization

Emergency action steps and prioritization are crucial skills in first aid. They involve quickly assessing patients, determining treatment urgency, and taking immediate action for life-threatening conditions. These skills help first responders make fast, informed decisions in high-pressure situations.

The ABC and CAB approaches guide responders in addressing critical needs. Techniques like triage, rapid assessment, and using tools like SAMPLE history and AVPU scale help gather vital information efficiently. Mastering these skills can make the difference between life and death in emergencies.

## Assessment and Prioritization

### Triage and Rapid Assessment Techniques

- Triage is the process of quickly assessing and sorting patients based on the severity of their condition and prioritizing treatment
- Involves rapidly evaluating a patient's condition to determine the urgency of care needed
- Rapid assessment techniques allow first responders to quickly gather critical information about a patient's condition
- Includes evaluating the patient's level of consciousness, airway, breathing, and circulation

- Goal is to identify life-threatening conditions and initiate appropriate interventions promptly

## Patient History and Assessment Scales

- SAMPLE history is a mnemonic used to gather essential patient information during an emergency
- Stands for Signs/Symptoms, Allergies, Medications, Past medical history, Last oral intake, Events leading up to the incident
- Helps first responders quickly obtain relevant medical history and details about the current situation
- AVPU scale is a simple method for assessing a patient's level of consciousness
- Evaluates if the patient is Alert, responsive to Verbal stimuli, responsive to Painful stimuli, or Unresponsive
- Glasgow Coma Scale (GCS) is a more comprehensive tool for assessing a patient's level of consciousness
- Evaluates three parameters: eye-opening, verbal response, and motor response
- Each parameter is scored, and the total score ranges from 3 (worst) to 15 (best)
- Provides a standardized way to communicate a patient's neurological status (GCS of 13)

## Airway and Breathing Management

### Airway, Breathing, and Circulation (ABC) Approach

- ABC is a mnemonic for the order of priority in managing a patient's condition
- Airway is assessed first to ensure it is open and unobstructed
- Techniques like head-tilt/chin-lift or jaw-thrust can be used to open the airway
- Foreign objects or fluids in the mouth should be removed
- Breathing is evaluated next, checking for the presence, rate, and quality of respirations
- If the patient is not breathing, rescue breaths or artificial ventilation may be necessary
- Circulation is assessed by checking for a pulse and signs of adequate blood flow
- If there is no pulse, chest compressions (CPR) should be initiated

### Circulation, Airway, Breathing (CAB) Approach

- CAB is an alternative mnemonic for the order of priority in managing a patient's condition, emphasizing the importance of early chest compressions in cardiac arrest
- Circulation is addressed first by checking for a pulse and initiating chest compressions if needed
- Airway and Breathing are then managed as described in the ABC approach
- CAB approach is primarily used in cases of suspected cardiac arrest to minimize delays in starting chest compressions

## Immediate Interventions

### Critical Interventions for Life-Threatening Conditions

- Critical interventions are immediate actions taken to address life-threatening conditions and stabilize the patient
- Examples include:
  - Controlling severe bleeding by applying direct pressure, tourniquets, or hemostatic agents
  - Performing CPR when the patient has no pulse and is not breathing
  - Administering epinephrine for severe allergic reactions (anaphylaxis)
  - Providing rescue breaths or artificial ventilation for patients who are not breathing
  - Decompressing a tension pneumothorax using a needle thoracostomy
  - Recognizing and promptly initiating these critical interventions can be life-saving in emergency situations
  - First responders must be trained to identify and manage life-threatening conditions effectively

# Unit 2 – Assessing the Scene and Primary Survey

## 2.1 Scene size-up and hazard identification

Scene size-up and hazard identification are crucial first steps in emergency response. They involve assessing potential dangers and ensuring the safety of rescuers, patients, and bystanders. By identifying risks and taking appropriate precautions, responders can effectively manage the scene and provide care.

Proper assessment includes recognizing environmental hazards, using personal protective equipment, and maintaining situational awareness. Rescuers must prioritize their own safety, establish safe zones, and work in teams when possible. This approach sets the foundation for effective incident management and patient care.

### Scene Safety Assessment

#### Identifying and Mitigating Hazards

- Assess scene safety by identifying potential threats or dangers that could harm rescuers, patients, or bystanders
- Recognize environmental hazards such as extreme weather conditions (heat, cold), unstable structures, or hazardous materials spills
- Maintain situational awareness by constantly observing and evaluating the surroundings for changes or new hazards
- Conduct a risk assessment to determine the level of danger and the appropriate actions to mitigate risks
- Understand that dynamic risk refers to the constantly changing nature of hazards at an emergency scene, requiring ongoing assessment and adaptation

#### Ensuring Rescuer Safety

- Prioritize personal safety as the first step in any emergency response, as an injured rescuer cannot effectively help others
- Avoid entering an unsafe scene or attempting a rescue beyond one's level of training or available resources
- Use appropriate personal protective equipment (PPE) such as gloves, eye protection, or respiratory protection based on the specific hazards present
- Establish a safe zone or perimeter around the incident scene to prevent unauthorized entry and protect bystanders from harm
- Work in teams when possible to provide backup, support, and accountability for each other's safety

## Personal Protection

### Utilizing Personal Protective Equipment (PPE)

- Wear appropriate personal protective equipment (PPE) based on the specific hazards present at the scene (bloodborne pathogens, hazardous materials)
- Use gloves to protect against contact with bodily fluids, chemicals, or other potentially infectious materials
- Wear eye protection such as goggles or face shields to prevent exposure to splashes or airborne particles
- Consider respiratory protection such as masks or respirators in situations with airborne hazards or insufficient ventilation
- Ensure proper fit, use, and disposal of PPE according to manufacturer guidelines and infection control protocols

### Maintaining Bystander Safety

- Establish a safe distance or perimeter to keep bystanders away from the immediate hazard area
- Provide clear and assertive instructions to bystanders to guide them to a safe location or prevent them from entering the scene
- Assign a specific rescuer or team member to manage bystanders and provide updates or instructions as needed
- Consider the potential for secondary hazards or panic reactions from bystanders that could complicate the rescue effort
- Recognize that bystanders may also be a valuable resource for providing information, assisting with care, or calling for additional help when appropriate

## Incident Management

### Assessing the Mechanism of Injury

- Identify the mechanism of injury, which is the cause or forces that resulted in the patient's injuries (falls, vehicle collisions, assaults)
- Consider the type, direction, and amount of force involved in the mechanism to anticipate potential injuries and guide the patient assessment
- Recognize that certain mechanisms, such as high-speed impacts, explosions, or prolonged entrapment, may indicate a higher risk for severe injuries
- Use the mechanism of injury to guide the selection of appropriate PPE, resources, and transport decisions
- Communicate the mechanism of injury to other rescuers, medical providers, or receiving facilities to facilitate continuity of care

## Determining the Number of Patients

- Conduct a scene survey to determine the total number of patients involved in the incident
- Assign a specific rescuer or team to perform a patient count and provide updates to the incident commander
- Triage patients based on the severity of their injuries and the available resources using a standardized triage system (Simple Triage and Rapid Treatment - START)
- Recognize that multiple patients may require additional resources, personnel, and coordination with other agencies or facilities
- Communicate the number of patients and their triage categories to dispatch, incoming units, and receiving facilities to ensure appropriate allocation of resources

## Requesting Additional Resources

- Assess the need for additional resources based on the number of patients, severity of injuries, and available personnel or equipment
- Request specific resources such as additional ambulances, specialized rescue teams, or air medical transport through dispatch or the incident command system
- Provide clear and concise information about the incident location, type of resources needed, and any specific access or staging instructions
- Consider the need for non-medical resources such as utility companies, law enforcement, or hazardous materials teams based on the specific incident
- Coordinate with other responding agencies or facilities to ensure effective utilization of resources and avoid duplication of efforts

## 2.2 Primary survey: ABCDE approach

The Primary Survey: ABCDE approach is a critical first step in assessing and treating patients in emergency situations. It provides a systematic method for quickly identifying and addressing life-threatening conditions, ensuring that rescuers prioritize the most urgent needs first.

This approach covers Airway, Breathing, Circulation, Disability, and Exposure. By following these steps, first responders can quickly assess a patient's condition and provide immediate interventions to stabilize them before moving on to more detailed examinations and treatments.

## Scene Assessment and Safety

### Ensuring a Safe Environment

- Assess the scene for potential hazards before approaching the patient
- Identify and mitigate any risks to the rescuer, patient, or bystanders (traffic, fire, unstable structures)
- Call for additional help or resources if needed to ensure a safe working environment

## Personal Protective Equipment (PPE)

- Wear appropriate PPE to protect against potential exposure to blood, body fluids, or other hazardous materials
- PPE includes gloves, eye protection, face masks, and gowns depending on the situation
- Properly remove and dispose of contaminated PPE after use to prevent cross-contamination

## Assessing the Mechanism of Injury

- Determine the cause and severity of the patient's injury or illness based on the scene and available information
- Consider the forces involved in the incident (high-speed collision, fall from height, penetrating injury)
- Mechanism of injury helps anticipate potential injuries and guides the primary survey and treatment priorities

## Airway and Breathing

### Assessing Airway Patency

- Check if the patient's airway is open and unobstructed
- Look for signs of obstruction such as choking, gurgling, or stridor
- If the airway is compromised, open it using head-tilt/chin-lift or jaw-thrust maneuvers and remove any visible obstructions

### Evaluating Breathing Effectiveness

- Assess the patient's breathing for rate, depth, and effort
- Look for signs of respiratory distress such as cyanosis, nasal flaring, or use of accessory muscles
- If breathing is inadequate, provide rescue breaths or assist with a bag-valve-mask device

### Determining Level of Consciousness

- Assess the patient's responsiveness using the AVPU scale (Alert, Verbal, Pain, Unresponsive)
- Level of consciousness provides insight into the patient's overall condition and potential for airway compromise
- A decreased level of consciousness may require airway interventions to maintain patency

### Measuring Respiratory Rate

- Count the number of breaths the patient takes in 15 seconds and multiply by 4 to calculate breaths per minute
- A normal respiratory rate for adults is 12-20 breaths per minute
- Abnormal respiratory rates (<12 or >20) may indicate underlying respiratory or cardiovascular problems

## Circulation

### Assessing Circulation and Perfusion

- Check for the presence and quality of the patient's pulse at the carotid, femoral, or radial arteries
- Assess skin color, temperature, and moisture for signs of poor perfusion (pale, cool, clammy skin)
- If no pulse is detected, begin chest compressions and follow CPR protocols

### Performing a Pulse Check

- Locate the appropriate pulse point (carotid for adults, brachial for infants)
- Use two fingers to feel for the pulse, avoiding using your thumb as it has its own pulse
- A strong, regular pulse indicates adequate circulation, while a weak, irregular, or absent pulse suggests cardiovascular compromise

### Evaluating Capillary Refill Time

- Press on the patient's nail bed or skin to blanch it and release
- Measure the time it takes for color to return, which should be less than 2 seconds in a well-perfused patient
- Delayed capillary refill (>2 seconds) may indicate shock or poor peripheral perfusion

## Disability and Exposure

### Assessing Neurological Disability

- Perform a brief neurological examination to assess the patient's mental status, motor function, and sensory function
- Look for signs of neurological deficits such as confusion, weakness, or abnormal pupil response
- A rapid neurological assessment helps identify potential brain injuries or other neurological emergencies

### Using the Glasgow Coma Scale (GCS)

- The GCS is a standardized tool for assessing a patient's level of consciousness based on eye-opening, verbal response, and motor response
- Scores range from 3 (deep coma) to 15 (fully alert and oriented)
- A GCS score of 8 or less indicates a severe brain injury and requires immediate advanced care

### Exposing the Patient for Examination

- Remove or cut away clothing as needed to fully examine the patient for injuries or abnormalities
- Protect the patient's privacy and dignity by draping exposed areas and only exposing necessary regions
- Prevent hypothermia by covering the patient with blankets or warm packs after the examination

## Monitoring Body Temperature

- Measure the patient's body temperature using a thermometer or by feeling the skin
- Hyperthermia (high temperature) may indicate infection, heat illness, or drug reactions
- Hypothermia (low temperature) may result from prolonged exposure, shock, or certain medical conditions

## 2.3 Secondary assessment techniques

Secondary assessment techniques are crucial for gathering detailed patient information after the primary survey. These methods include obtaining a SAMPLE history, collecting vital signs, and performing neurological checks to assess the patient's overall condition and identify specific health concerns.

Physical examination is another key component of secondary assessment. This involves a head-to-toe inspection, palpation, and auscultation to detect injuries or abnormalities. Focused assessments based on the patient's chief complaint help prioritize interventions and guide further treatment decisions.

## Patient History and Vitals

### Gathering Information

- Obtain a SAMPLE history from the patient or bystanders
- S: Signs and symptoms (chief complaint, onset, duration, severity)
- A: Allergies to medications, foods, or environmental factors
- M: Medications taken regularly or recently
- P: Past medical history (illnesses, surgeries, hospitalizations)
- L: Last oral intake (food, drink, medications)
- E: Events leading up to the incident or illness
- Collect vital signs to assess the patient's overall condition
- Measure blood pressure, pulse rate, respiratory rate, and temperature
- Compare vital signs to normal ranges for the patient's age and condition
- Perform a pain assessment to determine the location, severity, and nature of pain
- Use a pain scale (numeric, visual, or verbal) to quantify pain intensity
- Ask about the quality of pain (sharp, dull, burning, aching) and any radiating pain
- Inquire about factors that alleviate or exacerbate the pain

## Neurological Assessment

### Evaluating Consciousness and Brain Function

- Utilize the Glasgow Coma Scale (GCS) to assess the patient's level of consciousness
- Evaluate eye opening response (spontaneous, to voice, to pain, none)

- Assess verbal response (oriented, confused, inappropriate words, incomprehensible sounds, none)
- Determine motor response (obeys commands, localizes pain, withdraws from pain, flexion, extension, none)
- Calculate the total GCS score (3-15) to gauge the severity of neurological impairment
- Conduct a neurological check to identify any deficits or abnormalities
- Assess orientation to person, place, time, and situation
- Test memory by asking the patient to recall recent events or specific details
- Evaluate speech for clarity, coherence, and appropriateness
- Check for facial asymmetry, weakness, or drooping
- Test muscle strength, sensation, and coordination in all extremities
- Examine pupil response to light to assess brain stem function
- Check for pupil size, equality, and reactivity to light
- Note any abnormalities such as unequal pupils (anisocoria) or fixed, dilated pupils

## Physical Examination

### Conducting a Thorough Assessment

- Perform a head-to-toe examination to identify any visible injuries, deformities, or abnormalities
- Inspect the head, neck, chest, abdomen, pelvis, back, and extremities
- Palpate for tenderness, swelling, crepitus, or instability
- Auscultate the chest and abdomen for abnormal sounds (wheezes, crackles, absent bowel sounds)
- Conduct a focused assessment based on the patient's chief complaint or mechanism of injury
- Examine the affected body region or system in greater detail
- Look for signs of specific conditions (fractures, burns, lacerations, abdominal pain)
- Perform a rapid body survey in critical situations to quickly identify life-threatening injuries
- Check for major bleeding, airway obstruction, chest injuries, and neurological deficits
- Prioritize interventions based on the findings of the rapid assessment
- Assess skin color and temperature to evaluate perfusion and circulation
- Look for pallor, cyanosis (bluish discoloration), or flushing
- Check for cool, clammy skin or hot, dry skin
- Check capillary refill time to assess peripheral circulation
- Press on the nail bed or fingertip until it blanches, then release
- Normal capillary refill should occur within 2 seconds
- Listen to lung sounds to evaluate air movement and detect abnormalities

- Auscultate the chest bilaterally in the upper and lower lobes
- Listen for normal breath sounds, wheezes, crackles, or diminished sounds
- Perform an abdominal assessment to check for tenderness, distension, or rigidity
- Inspect the abdomen for visible abnormalities (scars, bruising, distension)
- Auscultate for bowel sounds in all four quadrants
- Palpate gently for tenderness, guarding, or masses

## 2.4 Vital signs assessment and interpretation

Vital signs assessment is crucial for evaluating a patient's overall health. By checking pulse, blood pressure, breathing, and other key indicators, first responders can quickly identify life-threatening conditions and prioritize care.

Interpreting vital signs helps determine the severity of injuries or illnesses. Abnormal readings like high blood pressure or low oxygen levels can signal serious problems, guiding treatment decisions and highlighting the need for immediate medical attention.

### Vital Signs Measurement

#### Pulse Assessment

- Pulse rate measures the number of times the heart beats per minute
- Normal resting heart rate for adults is 60-100 beats per minute (bpm)
- Pulse can be measured at various sites on the body including radial, carotid, brachial, and femoral arteries
- When measuring pulse, assess rate, rhythm (regular or irregular), and strength (weak, normal, or bounding)

#### Blood Pressure Measurement

- Blood pressure is the force of blood pushing against the walls of the arteries
- Consists of two measurements: systolic pressure (when the heart beats) and diastolic pressure (when the heart rests between beats)
- Normal blood pressure for adults is considered to be 120/80 mmHg
- Can be measured using a manual sphygmomanometer and stethoscope or an automatic digital blood pressure monitor

#### Respiratory Assessment

- Respiratory rate is the number of breaths a person takes per minute
- Normal respiratory rate for adults is 12-20 breaths per minute
- Assess respiratory rate by counting chest rise and fall for 30 seconds and multiplying by 2
- Also note the depth (shallow or deep), rhythm (regular or irregular), and effort of breathing

- Oxygen saturation (SpO<sub>2</sub>) measures the percentage of hemoglobin binding sites in the bloodstream occupied by oxygen
- Normal SpO<sub>2</sub> is 95-100%
- Can be measured using a pulse oximeter device placed on the finger, earlobe or toe

## Other Vital Signs

- Body temperature is a measure of the body's ability to generate and get rid of heat
- Normal body temperature range is 97.7°F to 99.5°F (36.5°C to 37.5°C)
- Can be measured orally, rectally, tympanically (in the ear) or via the axillary (armpit) route using a thermometer
- Capillary refill time (CRT) is the time taken for color to return to an external capillary bed after pressure is applied
- Assessed by pressing on the nail bed or skin and counting the seconds until color returns
- Normal CRT is less than 2 seconds, delayed CRT may indicate poor perfusion

## Neurological Assessment

### Level of Consciousness

- Level of consciousness (LOC) is a measurement of a person's arousability and responsiveness to stimuli
- LOC can be assessed using the AVPU scale:
- A - Alert: Eyes open spontaneously, responding appropriately
- V - Verbal: Eyes open to verbal stimuli
- P - Painful: Eyes open to painful stimuli like a trapezius squeeze or sternal rub
- U - Unresponsive: Not responding to any stimuli
- Any change in LOC may indicate a decline in neurological function

### Glasgow Coma Scale

- The Glasgow Coma Scale (GCS) provides a more detailed and objective way to assess LOC
- GCS evaluates a patient's best eye, verbal and motor responses, each is given a score:
- Eyes: 1-4 points based on degree of eye opening
- Verbal: 1-5 points based on verbal responses
- Motor: 1-6 points based on motor responses
- Individual scores are tallied for a total between 3 (worst) and 15 (best)
- Severe brain injury: GCS  $\leq$  8
- Moderate brain injury: GCS 9-12

- Mild brain injury: GCS  $\geq$  13

## Vital Signs Interpretation

### Pulse Rate Abnormalities

- Tachycardia is a pulse rate over 100 bpm
- May be caused by exercise, stress, fever, anemia, hyperthyroidism, certain medications
- Sustained tachycardia can lead to decreased cardiac output
- Bradycardia is a pulse rate under 60 bpm
- May be normal in athletes or during sleep
- Pathological causes include hypothyroidism, certain medications, heart block
- Irregular rhythms like atrial fibrillation should be noted

### Blood Pressure Abnormalities

- Hypertension is blood pressure consistently over 130/80 mmHg
- May be primary (essential) or secondary to another condition
- Uncontrolled hypertension can lead to heart disease, stroke, kidney failure
- Hypotension is blood pressure consistently below 90/60 mmHg
- May be caused by dehydration, blood loss, sepsis, anaphylaxis, heart failure
- Can lead to inadequate perfusion of vital organs
- Orthostatic (postural) changes in BP may indicate hypovolemia

### Respiratory Abnormalities

- Tachypnea is a respiratory rate over 20 breaths per minute
- May be caused by anxiety, fever, hypoxia, metabolic acidosis, pulmonary embolism
- Sustained tachypnea can lead to respiratory fatigue
- Bradypnea is a respiratory rate under 12 breaths per minute
- May be caused by head injury, drug overdose, hypothyroidism, sleep apnea
- Can lead to hypoxia and respiratory acidosis if severe
- Abnormal SpO<sub>2</sub> (<95%) indicates hypoxemia which may be caused by lung disease, CHF, PE

# Unit 3 – CPR and AED: Life-Saving Techniques

## 3.1 Adult, child, and infant CPR techniques

CPR techniques vary for adults, children, and infants due to differences in body size and physiology. Proper chest compression depth, hand placement, and compression-to-ventilation ratios are crucial for effective resuscitation in each age group.

Understanding these age-specific techniques is vital for providing life-saving care. This knowledge empowers rescuers to confidently perform CPR on individuals of all ages, maximizing the chances of survival during cardiac emergencies.

## CPR Fundamentals

### Chest Compressions and Rescue Breaths

- Chest compressions are a crucial component of CPR that help maintain blood circulation to vital organs (brain, heart) during cardiac arrest
- Perform chest compressions by pushing hard and fast on the center of the chest, allowing it to recoil completely between each compression
- Rescue breaths, also known as ventilations, provide oxygen to the lungs and are performed by giving mouth-to-mouth breaths or using a barrier device (pocket mask)
- Maintain an open airway during rescue breaths by tilting the head back and lifting the chin (head-tilt/chin-lift maneuver)

### Compression Depth, Rate, and Hand Placement

- Compression-to-ventilation ratio for adult CPR is 30 compressions to 2 breaths, repeated in cycles until help arrives or the person shows signs of life
- Compression depth for adults should be at least 2 inches (5 cm) but no more than 2.4 inches (6 cm) to ensure effective blood circulation without causing injury
- Maintain a compression rate of 100-120 compressions per minute, aiming for a consistent rhythm to optimize blood flow
- Hand placement for adult chest compressions is on the lower half of the breastbone (sternum), with the heel of one hand on top of the other and fingers interlaced

## Airway Management

### Positioning and Responsiveness

- Proper airway positioning is essential for maintaining an open airway during CPR and preventing obstruction by the tongue or other tissues
- Use the head-tilt/chin-lift maneuver to open the airway by placing one hand on the forehead and gently tilting the head back while using the fingertips of the other hand to lift the chin

- The recovery position is used for unresponsive individuals who are breathing normally to maintain an open airway and prevent aspiration of fluids (vomit, saliva)
- Check for responsiveness by tapping the person's shoulder and asking loudly, "Are you okay?" before beginning CPR to determine the level of consciousness

## CPR Scenarios

### One-Rescuer and Two-Rescuer CPR

- One-rescuer CPR is performed when only one trained individual is available to provide care, following the standard compression-to-ventilation ratio and technique
- Two-rescuer CPR allows for more efficient care, with one person performing chest compressions while the other provides rescue breaths and switches roles every 2 minutes to prevent fatigue
- When two rescuers are available, one should call for help (activate emergency response system) while the other begins CPR immediately

### Calling for Help and High-Quality CPR

- Call for help as soon as possible by activating the emergency response system (calling 911) or sending someone to do so while you begin CPR
- Provide dispatchers with clear information about the location, the person's condition, and any other relevant details to ensure a rapid response
- High-quality CPR involves performing chest compressions and rescue breaths with proper technique, depth, rate, and minimal interruptions to maintain blood flow and oxygenation
- Continuously assess the person's condition and adjust care as needed, such as switching roles with another rescuer or using an AED when available

## 3.2 AED operation and safety considerations

AEDs are lifesaving devices that shock the heart back into rhythm during cardiac emergencies. They're designed for easy use by anyone, with voice prompts guiding you through each step. Proper operation and safety are crucial for successful outcomes.

Understanding AED components, shock delivery, and safety considerations is vital for effective use. From electrode placement to scene assessment and patient-specific precautions, knowing these details can make the difference in saving a life during CPR.

### AED Components and Operation

#### Key Components of an AED

- Automated External Defibrillator (AED) is a portable electronic device used to automatically diagnose and treat life-threatening cardiac arrhythmias through defibrillation
- AEDs contain a battery, capacitor, and computerized circuitry to analyze the heart's rhythm and deliver an appropriate shock when needed
- Electrode pads are adhesive pads applied to the patient's bare chest to allow the AED to monitor the heart rhythm and deliver the shock

- Pads are placed on the upper right chest and lower left side of the chest
- AEDs use voice prompts and visual indicators to guide the user through the steps of operation (electrode pad placement, when to perform CPR, when to stand clear for shock delivery)

## Delivering a Shock with an AED

- Shock delivery occurs when the AED detects a shockable rhythm (ventricular fibrillation or pulseless ventricular tachycardia) and prompts the user to stand clear and press the shock button
- Shocks are delivered in a specific joule setting (typically between 120-360 joules for adults) to depolarize the heart muscle and allow it to reset to a normal rhythm
- Most AEDs will automatically analyze the heart rhythm after each shock and prompt for additional shocks if needed
- Pediatric pads or a pediatric key should be used for children under 8 years old or weighing less than 55 lbs to reduce the energy delivered during the shock (typically 50-75 joules)

## Scene Safety Considerations

### Environmental Hazards

- Scene safety is the first priority when using an AED, rescuers must ensure there are no environmental hazards that could harm the patient or rescuers
- Hazards may include traffic, unstable structures, fire, or hazardous materials
- Wet environment precautions are necessary as water conducts electricity and can cause the shock to arc or spread to rescuers or bystanders
- Move patient to a dry area if possible, or ensure no one is touching the patient or standing in any puddles during shock delivery
- Metal surfaces can also conduct electricity and should be avoided during AED use (remove the patient from metal bleachers, gurneys, or chairs if possible)

### Ensuring Rescuer and Bystander Safety

- Always loudly state "Clear" and visually check that no one is touching the patient before delivering a shock
- Ensure rescuers and bystanders stand several feet away from the patient during analysis and shock delivery
- If needed, assign a bystander to help keep the area clear and crowd controlled

## Patient-Specific Precautions

### Medical Devices and Patches

- Implanted medical devices such as pacemakers or internal defibrillators can be damaged by AED shocks
- Avoid placing electrode pads directly over these devices, move the pad at least 1 inch away from any visible devices

- Medication patches (nitroglycerin, nicotine, pain relief patches) must be removed from the patient's chest before applying electrode pads
- Patches can block the conduction of the shock and cause skin burns
- Ensure the chest is wiped clean of any residual medication patch adhesive before applying electrode pads

## Patient Characteristics Affecting AED Use

- AED use is not recommended for patients under 1 year of age, as the lowest energy setting may still be too high
- Manual defibrillators should be used for infants, allowing trained providers to adjust the energy setting
- Patients with excessive chest hair may need to have electrode pad sites shaved quickly to allow the pads to adhere and conduct the shock properly
- Patients with large breasts may require a modified pad placement, placing one pad on the upper chest and one on the side of the chest to ensure proper shock conduction

## AED Maintenance

### Routine Checks and Upkeep

- AED maintenance is crucial to ensure the device is always ready for use in an emergency
- Most AEDs will perform regular self-checks and alert with a chirp or flashing light if maintenance is needed
- AED batteries should be checked monthly and replaced every 2-5 years depending on the model
- Expired batteries are the most common cause of AED failure
- Electrode pads have expiration dates, typically 2-5 years, and should be checked monthly and replaced as needed
- Expired or damaged electrode pads can fail to stick or conduct the shock properly

### Post-Use Procedures

- After an AED is used on a patient, it must be properly cleaned and decontaminated according to manufacturer guidelines and local protocols
- The AED data should be downloaded by the appropriate personnel for quality improvement review and documentation
- Most AEDs save data on the patient's heart rhythm, shocks delivered, and CPR intervals that can be useful for the patient's medical record or for training and quality control
- Any used supplies (electrode pads, razors, towels) should be replaced and the AED returned to its storage location for the next use

## 3.3 CPR and AED integration in cardiac emergencies

CPR and AEDs are lifesaving tools in cardiac emergencies. They work together to keep blood flowing and restart the heart. Knowing how to use them correctly can mean the difference between life and death.

This section covers the basics of CPR techniques, AED operation, and how to integrate them effectively. We'll look at proper hand placement, compression depth, and AED pad placement. These skills are crucial for anyone who might need to respond to a cardiac emergency.

## CPR Fundamentals

### Chain of Survival Steps

- Early recognition and activation of emergency response system to quickly get help on the way
- Immediate high-quality CPR to maintain blood flow to vital organs (brain, heart)
- Rapid defibrillation using an AED to shock the heart back into a normal rhythm
- Advanced life support provided by emergency medical services (EMS) personnel
- Post-cardiac arrest care in a hospital setting to treat the underlying cause and manage complications

### High-Quality CPR Techniques

- Proper hand placement on the lower half of the sternum in the center of the chest
- Compression depth of at least 2 inches (5 cm) for adults to ensure adequate blood flow
- Compression rate of 100-120 per minute, allowing full chest recoil between compressions
- Minimize interruptions in chest compressions to less than 10 seconds
- Avoid excessive ventilation, as it can decrease cardiac output and survival rates

### Compression-to-Ventilation Ratios

- 30:2 ratio for single rescuers, providing 30 chest compressions followed by 2 breaths
- Continuous chest compressions with asynchronous ventilations every 6 seconds for advanced life support providers
- 15:2 ratio for two-rescuer CPR in infants and children, with 15 compressions followed by 2 breaths
- Ratio may be modified based on the patient's age, number of rescuers, and presence of an advanced airway

### Hands-Only CPR for Bystanders

- Hands-only CPR involves providing continuous chest compressions without rescue breaths
- Recommended for untrained bystanders or those unwilling to perform mouth-to-mouth ventilations
- Dispatcher-assisted CPR instructions often guide bystanders to perform hands-only CPR
- Hands-only CPR has been shown to be as effective as conventional CPR in the first few minutes of cardiac arrest

### CPR Certification and Training

- Certification courses teach proper CPR techniques, AED use, and choking relief

- American Heart Association (AHA) and American Red Cross (ARC) offer widely recognized certification programs
- Healthcare providers require Basic Life Support (BLS) certification, which includes CPR and AED training
- Certification typically lasts for two years before requiring renewal
- Regular training and practice are essential to maintain skills and confidence in performing CPR

## AED Integration

### AED Operation and Prompts

- AEDs are designed to be user-friendly with voice and visual prompts guiding the rescuer
- Power on the AED and follow the device's instructions
- AED will analyze the heart rhythm and determine if a shock is needed
- If a shockable rhythm (ventricular fibrillation or pulseless ventricular tachycardia) is detected, the AED will charge and instruct the rescuer to deliver the shock
- Resume CPR immediately after shock delivery or if no shock is advised

### Proper Pad Placement

- Remove clothing from the patient's chest and ensure the skin is dry
- Apply one pad on the upper right side of the chest, just below the collarbone
- Place the other pad on the lower left side of the chest, below the armpit
- For infants and small children, use pediatric pads (if available) and place one pad on the front of the chest and the other on the back
- Ensure pads are adhered securely to the skin and not touching each other

### Safe Shock Delivery

- Ensure no one is touching the patient before delivering the shock to avoid accidental electrocution
- Loudly state, "Clear!" and visually check that everyone is clear of the patient
- Press the shock button when instructed by the AED
- Immediately resume CPR after the shock, starting with chest compressions
- Continue CPR until the AED prompts to stop for the next rhythm analysis or until advanced life support arrives

### CPR-AED Sequence

- Perform CPR until the AED is available and ready to use
- Turn on the AED and follow the prompts
- Attach the AED pads to the patient's bare chest as directed

- Allow the AED to analyze the heart rhythm, ensuring no one is touching the patient
- Deliver a shock if advised by the AED, ensuring everyone is clear of the patient
- Resume CPR immediately after the shock, starting with chest compressions
- Continue the CPR-AED sequence until advanced life support arrives or the patient shows signs of life

## AED Maintenance and Readiness

- Regularly check the AED's battery life and replace batteries as needed
- Ensure electrode pads are within their expiration date and replace if necessary
- Perform routine maintenance as specified by the manufacturer
- Store the AED in an easily accessible location and ensure all potential rescuers know its location
- After each use, replace used electrode pads, batteries, and other consumables
- Document the use of the AED and any maintenance performed

## Post-Resuscitation Care and Considerations

### Post-Resuscitation Care Priorities

- Continuously monitor the patient's vital signs, including heart rhythm, blood pressure, and oxygen saturation
- Provide supplemental oxygen and advanced airway management as needed
- Treat underlying causes of the cardiac arrest (heart attack, drug overdose, etc.)
- Initiate targeted temperature management (therapeutic hypothermia) to improve neurological outcomes
- Transfer the patient to a hospital with comprehensive post-cardiac arrest care capabilities

## Legal and Ethical Considerations

- Good Samaritan laws protect rescuers who provide CPR and use AEDs in good faith
- Obtain consent for CPR and AED use whenever possible, but implied consent applies in emergency situations
- Respect patient's advanced directives (DNR orders) if known
- Maintain patient confidentiality and privacy when discussing the incident
- Document the resuscitation attempt, including the use of CPR and AED, for legal and quality improvement purposes

# Unit 4 – Respiratory Emergencies – Choking and Asthma

## 4.1 Recognition and management of choking in adults, children, and infants

Choking can be life-threatening, blocking airflow and causing panic. Quick action is crucial. Recognizing signs like the universal choking gesture and cyanosis can save lives. Knowing how to perform the Heimlich maneuver and back blows is essential.

Different techniques are used for adults, children, and infants. The Heimlich maneuver works for adults and children, while infants need gentler back blows and chest thrusts. After choking, monitor the person closely and seek medical attention if needed.

### Identifying Choking

#### Signs and Symptoms

- Airway obstruction occurs when a foreign object becomes lodged in the throat or windpipe, blocking the flow of air
- Partial obstruction allows some air to pass through, while complete obstruction totally blocks the airway
- Universal choking sign is when a person clutches their throat with one or both hands, indicating they are choking
- Cyanosis, a bluish discoloration of the skin and mucous membranes, may occur due to lack of oxygen

#### Assessing Consciousness

- Conscious choking victims can typically cough, speak, or breathe, and may exhibit the universal choking sign
- Unconscious choking victims are unresponsive, not breathing, and may have a bluish color to their skin (cyanosis)

### Adult and Child Choking Management

#### Heimlich Maneuver and Abdominal Thrusts

- Heimlich maneuver, also known as abdominal thrusts, is a first aid technique used to dislodge an object from a choking person's airway
- Stand behind the person, wrap your arms around their waist, and place your fist, thumb-side in, just above their navel
- Grasp your fist with your other hand and perform quick, upward thrusts into the abdomen to force air from the lungs and dislodge the object

## Back Blows and Finger Sweep

- Back blows involve delivering firm blows between the person's shoulder blades with the heel of your hand to dislodge the object
- Alternate between abdominal thrusts and back blows until the object is dislodged or the person becomes unconscious
- Finger sweep is a technique used to remove a visible object from the throat, but should only be performed if you can see the object

## Self-Administered Abdominal Thrusts

- If you are alone and choking, you can perform self-administered abdominal thrusts
- Press your abdomen quickly against a firm object, such as the back of a chair or a countertop edge, to force air from your lungs and dislodge the object

## Infant Choking Management

### Infant Choking Protocol

- Infant choking protocol differs from adult and child management due to their smaller size and more fragile bodies
- If an infant is choking, sit or kneel with the infant in your lap, supporting their head and neck with your non-dominant hand

## Back Blows and Chest Thrusts

- Deliver up to five firm back blows between the infant's shoulder blades using the heel of your hand
- If the object is not dislodged, turn the infant face-up, supporting their head and neck, and deliver up to five chest thrusts using two fingers at the center of the chest, just below the nipple line
- Alternate between back blows and chest thrusts until the object is dislodged or the infant becomes unconscious

## Post-Choking Care

### Recovery Position

- After successfully dislodging the object, place the person in the recovery position to maintain an open airway and prevent aspiration
- The recovery position involves laying the person on their side with their top leg and arm crossed over their body, and their head tilted back to keep the airway open

## Monitoring for Complications

- Monitor the person for any complications, such as difficulty breathing, persistent coughing, or chest pain
- Seek medical attention if the person experiences any complications or if you are unsure about their condition

- Even if the choking incident seems resolved, it is essential to have the person evaluated by a medical professional to ensure no further damage has occurred

## 4.2 Asthma attack identification and first aid response

Asthma attacks can be scary, but knowing the signs can save lives. Wheezing, shortness of breath, and coughing are key symptoms to watch for. Quick action with inhalers and proper breathing techniques can make a big difference.

Managing asthma is about more than just meds. Avoiding triggers, using peak flow meters, and following an action plan are crucial. In emergencies, remember pursed-lip breathing and don't hesitate to call for help if symptoms worsen.

### Asthma Attack Symptoms

#### Bronchial Constriction and Wheezing

- Asthma is a chronic respiratory condition characterized by inflammation and narrowing of the airways (bronchial constriction)
- Bronchial constriction occurs when the muscles surrounding the airways tighten, reducing airflow
- Wheezing, a high-pitched whistling sound during breathing, is a common symptom of asthma caused by the narrowed airways
- Wheezing is often more pronounced during exhalation (breathing out)
- Can be heard with a stethoscope or sometimes even without one in severe cases (audible wheezing)

#### Shortness of Breath and Chest Tightness

- Shortness of breath, also known as dyspnea, is a feeling of difficulty breathing or not getting enough air
- Chest tightness is a sensation of pressure or constriction in the chest, often described as a squeezing or heavy feeling
- Both shortness of breath and chest tightness are caused by the narrowed airways and increased effort required to breathe
- Can be accompanied by rapid, shallow breathing (tachypnea) as the person tries to compensate for the reduced airflow
- May worsen with physical activity or exposure to triggers (allergens, cold air, stress)

#### Coughing in Asthma Attacks

- Coughing is another common symptom of asthma, particularly during an attack or flare-up
- Asthma-related coughing is often dry and persistent, occurring more frequently at night or early morning
- Coughing serves as a reflex to clear the airways of mucus and irritants
- However, excessive coughing can further irritate the airways and worsen symptoms

- Coughing may be accompanied by mucus production (sputum), which can be clear, white, or yellow in color

## Asthma Medications and Devices

### Inhalers and Spacers

- Inhalers are portable devices used to deliver medication directly to the lungs
- Metered-dose inhalers (MDIs) are the most common type, releasing a measured dose of medication as a fine mist when activated
- Spacers are tube-like devices attached to the inhaler to improve medication delivery and reduce side effects
- Spacers create a larger chamber for the medication mist, allowing more time for inhalation and reducing the need for precise timing
- Spacers also reduce the amount of medication deposited in the mouth and throat, minimizing side effects like thrush (oral yeast infection)

### Peak Flow Meters and Monitoring

- Peak flow meters are handheld devices used to measure how well air moves out of the lungs
- Patients blow forcefully into the meter, which measures peak expiratory flow rate (PEFR) in liters per minute
- Peak flow monitoring helps track asthma control and detect worsening symptoms before an attack occurs
- Patients establish their personal best PEFR when asthma is well-controlled
- A drop in PEFR below a certain percentage of the personal best indicates worsening asthma and the need for adjustments in treatment

### Rescue and Controller Medications

- Rescue medications, also known as quick-relief or short-acting bronchodilators, are used to rapidly relieve acute asthma symptoms
- Examples include albuterol (ProAir, Ventolin) and levalbuterol (Xopenex)
- Rescue medications work by relaxing the airway muscles, reducing bronchial constriction, and improving airflow
- Controller medications, also called long-term control or maintenance medications, are used daily to prevent asthma symptoms and attacks
- Examples include inhaled corticosteroids (fluticasone, budesonide), long-acting bronchodilators (salmeterol, formoterol), and leukotriene modifiers (montelukast)
- Controller medications work by reducing airway inflammation, preventing bronchial constriction, and decreasing mucus production

# Asthma Management Strategies

## Asthma Action Plans and Trigger Avoidance

- An asthma action plan is a written, personalized guide created by the patient and healthcare provider to manage asthma daily and during flare-ups
- Includes information on medications, triggers, peak flow zones, and when to seek emergency care
- Helps patients recognize worsening symptoms and take appropriate action to prevent or manage attacks
- Trigger avoidance is a key component of asthma management, involving identifying and minimizing exposure to factors that worsen asthma symptoms
- Common triggers include allergens (pollen, dust mites, pet dander), irritants (smoke, pollution, strong odors), respiratory infections, exercise, and cold air
- Strategies for trigger avoidance may include using air filters, maintaining a clean environment, covering bedding, and warming up before exercise

## Breathing Techniques and Emergency Care

- Pursed-lip breathing is a technique used to control shortness of breath and slow down breathing during an asthma attack
- Involves breathing in through the nose and exhaling slowly through pursed lips (as if whistling)
- Helps to keep the airways open longer, allowing more air to flow in and out of the lungs
- Can be used in conjunction with rescue medications to manage symptoms
- Emergency medical services (EMS) should be activated if asthma symptoms are severe, not responding to rescue medications, or if the person is having difficulty speaking or breathing
- Signs of a severe asthma attack include rapid breathing, inability to speak in full sentences, bluish lips or fingernails (cyanosis), and drowsiness or confusion
- EMS providers can administer oxygen, nebulized medications, and provide transportation to a hospital for further treatment if necessary

## 4.3 Other respiratory distress conditions and interventions

Respiratory distress can take many forms beyond choking and asthma. From chronic lung diseases to acute illnesses, various conditions can make breathing difficult. Understanding these issues is crucial for providing effective first aid in respiratory emergencies.

Recognizing abnormal breathing patterns and using tools like pulse oximetry are key skills. Interventions range from oxygen therapy to medication administration and teaching breathing techniques. Quick action in severe allergic reactions can be life-saving.

# Respiratory Conditions

## Chronic Lung Diseases

- Chronic obstructive pulmonary disease (COPD) is a progressive lung disease that makes it hard to breathe due to airway inflammation and damage to lung tissue
- Includes emphysema which is damage to the air sacs in the lungs (alveoli) and chronic bronchitis which is inflammation of the airways
- Caused by long-term exposure to irritants like cigarette smoke, air pollution, and chemical fumes
- Cystic fibrosis is an inherited disorder that causes thick, sticky mucus to build up in the lungs and digestive tract
- Leads to frequent lung infections and difficulty breathing over time as mucus clogs airways
- Also affects pancreas function leading to digestive issues and poor growth

## Acute Respiratory Illnesses

- Pneumonia is an infection that inflames the air sacs in one or both lungs, which may fill with fluid or pus
- Caused by bacteria, viruses or fungi and leads to cough with phlegm, fever, chills and difficulty breathing
- Can be life-threatening especially in infants, older adults and those with chronic illnesses
- Bronchitis is inflammation of the lining of the bronchial tubes which carry air to and from the lungs
- Acute bronchitis is usually caused by viral infections and improves within a few weeks
- Chronic bronchitis is a type of COPD with long-term inflammation and mucus production

## Pulmonary Embolism

- A pulmonary embolism occurs when a blood clot gets lodged in an artery in the lung, blocking blood flow
- Most often, the clot travels up from deep veins in the legs (deep vein thrombosis)
- Causes sudden shortness of breath, chest pain, and cough that may include blood
- Risk factors include prolonged immobility (long trips, bedrest), certain medications, smoking, cancer, and pregnancy

## Respiratory Symptoms and Assessment

### Abnormal Breathing Patterns

- Dyspnea, or shortness of breath, is difficulty breathing or uncomfortable breathing
- Can occur with exertion or at rest depending on severity and underlying cause
- Important to assess onset, duration, aggravating/alleviating factors, and associated symptoms
- Hyperventilation is very fast, deep breathing that can cause dizziness, numbness and tingling

- Often related to anxiety or panic attacks but can have medical causes like asthma, heart failure, or pulmonary embolism
- Assess respiratory rate and depth, mental status changes, chest pain, and ability to speak in full sentences

## Pulse Oximetry

- Pulse oximetry is a noninvasive method of measuring the oxygen saturation of a patient's blood
- Uses a sensor placed on a thin part of the body, usually a fingertip or earlobe
- Normal pulse ox readings are 95-100%; below 90% indicates hypoxemia and need for supplemental oxygen
- Provides critical information about a patient's oxygenation status and response to respiratory interventions
- Factors that can affect accuracy include poor circulation, skin pigmentation, and nail polish

## Respiratory Interventions

### Oxygen Therapy

- Oxygen therapy provides supplemental oxygen to patients with low blood oxygen levels (hypoxemia)
- Can be delivered via nasal cannula, simple face mask, non-rebreather mask or other devices
- Flow rate and delivery method depend on patient's oxygen saturation, respiratory status and underlying condition
- Concerns with oxygen therapy include fire hazard, drying of nasal passages, and suppressed respiratory drive in some COPD patients

### Bronchodilator Medications

- Nebulizer treatments deliver liquid bronchodilator medication in mist form using compressed air or oxygen
- Helps open narrowed airways to make breathing easier; common in asthma, COPD and other lung diseases
- Takes 10-15 minutes to administer medication; patient breathes normally with occasional deep breaths
- Rescue inhalers (albuterol) provide quick relief of asthma symptoms and bronchospasm
- Administered by metered dose inhaler (MDI) using a spacer device
- Patient takes 1-2 puffs as needed for cough, wheeze, chest tightness or shortness of breath

### Breathing Techniques

- Pursed-lip breathing helps control shortness of breath by slowing down breathing rate and relieving tension
- Inhale slowly through nose for 2 counts with mouth closed

- Exhale slowly through pursed lips (like blowing out a candle) for 4 counts
- Especially useful during exertion and stress; promotes relaxation and more efficient breathing
- Positioning for comfort relieves breathing difficulty by optimizing lung expansion
- Sit upright in bed or chair with arms resting on pillows or overbed table
- Lean forward with elbows resting on knees while sitting (tripod position)
- Lie on side with head elevated and pillow between legs to ease breathing and reduce pressure on chest

## Severe Allergic Reaction

### Anaphylaxis

- Anaphylaxis is a potentially life-threatening allergic reaction that can occur within seconds or minutes of exposure to an allergen
- Triggers include foods (peanuts, shellfish), medications, latex and insect stings
- Causes the immune system to release a flood of chemicals that can lead to shock and respiratory failure
- Signs and symptoms include hives, swelling of throat and tongue, difficulty breathing, dizziness, and loss of consciousness
- Epinephrine (adrenaline) is the first-line treatment given by intramuscular injection to reduce airway swelling and improve blood pressure
- Antihistamines, steroids, and bronchodilators are also used to control symptoms
- Patients with known allergies should carry an epinephrine auto-injector (EpiPen) at all times for emergency use

# Unit 5 – Wound Care: Bleeding Control & Bandaging

## 5.1 Types of wounds and bleeding

Wounds come in various types, from minor scrapes to severe lacerations. Understanding these differences is crucial for proper first aid. Open wounds involve breaks in the skin, while closed wounds damage tissues beneath the surface. Recognizing wound types helps determine appropriate treatment.

Bleeding can be classified by source (arterial, venous, or capillary) and location (internal or external). Knowing how to control bleeding through hemostasis techniques is vital. In severe cases, hemorrhage can be life-threatening, requiring immediate intervention to prevent shock and organ failure.

## Types of Wounds

### Open Wounds

- Abrasion occurs when skin is rubbed or scraped away (road rash)
- Laceration is a cut or tearing of skin caused by an object (knife wound)
- Puncture wound is a small hole caused by a long, pointy object such as a nail or needle
- May be deceiving because external bleeding can be limited while causing extensive internal damage
- Avulsion involves tissue being partially or completely torn away (gunshot wound)
- Amputation is the complete removal of a body part (severed finger)

### Closed Wounds

- Contusion (bruise) occurs when blood vessels are damaged or broken underneath the skin
- Causes bleeding beneath the surface of the skin without breaking the skin
- Blood leaks into tissues under the skin causing discoloration (black eye)

## Bleeding Classifications

### Bleeding Source

- Arterial bleeding is bright red and spurts with each heartbeat due to high pressure in the arteries
- Venous bleeding is dark red and flows steadily from the veins
- Capillary bleeding oozes slowly since capillaries are small blood vessels (scraped knee)

### Bleeding Location

- Internal bleeding occurs inside the body when blood leaks from blood vessels or organs
- Can be hard to recognize but can cause shock and be life-threatening (ruptured spleen)
- External bleeding occurs outside the body from a natural opening or break in the skin

- Visible bleeding that can be easier to identify and control (nosebleed)

## Bleeding Control

### Hemostasis

- Hemostasis is the body's physiological process to stop bleeding
- Involves three steps: vascular spasm, platelet plug formation, and coagulation (blood clotting)
- Vascular spasm is the first response as blood vessels constrict to restrict blood flow
- Platelets stick together and adhere to the vessel wall forming a plug to seal the hole
- Coagulation reinforces the platelet plug with threads of fibrin to form a stable clot

### Hemorrhage

- Hemorrhage is the loss of a large amount of blood in a short time
- Can lead to shock, organ failure, and death if not treated promptly
- Control hemorrhage by following steps: direct pressure, elevation, pressure points, and tourniquet
- First apply direct pressure on the wound with a dressing
- Elevate the wound above the level of the heart if possible
- Apply pressure to an artery proximal to the wound to slow blood flow (brachial artery for arm wounds)
- A tourniquet is a last resort that stops arterial blood flow to a limb (combat situations)

## 5.2 Hemorrhage control techniques

Hemorrhage control is crucial in first aid. From identifying bleeding types to applying direct pressure, these techniques can save lives. Understanding factors affecting bleeding severity and recognizing signs of shock are key to effective management.

Advanced methods like tourniquets and hemostatic agents are vital for severe cases. Proper shock management, including positioning and monitoring vital signs, complements bleeding control. These skills are essential for anyone learning first aid.

## Hemorrhage Assessment and Classification

### Identifying Bleeding Type and Severity

- Distinguish between arterial bleeding which is bright red, spurting, and hard to control vs. venous bleeding that is darker, steadier, and easier to manage
- Assess the wound thoroughly noting location, size, depth, and any foreign objects present
- Classify hemorrhage as minor (superficial wounds with minimal bleeding), moderate (deeper wounds with increased bleeding), or severe (life-threatening bleeding from deep wounds or amputations)
- Understand the role of clotting factors in the body's natural response to bleeding (platelets, fibrin, thrombin)

## Factors Affecting Bleeding Severity

- Consider factors that can impair clotting such as certain medications (anticoagulants, NSAIDs), medical conditions (hemophilia, liver disease), and alcohol consumption
- Evaluate the impact of the wound location on bleeding severity as some areas are more prone to severe bleeding (head, neck, torso, groin)
- Assess the patient's overall health status and ability to tolerate blood loss based on age, fitness level, and pre-existing conditions
- Monitor for signs of shock (rapid pulse, pale skin, dizziness) which can occur with severe blood loss and requires immediate treatment

## Direct Pressure Techniques

### Manual Pressure Methods

- Apply firm, direct pressure to the wound using a clean cloth or dressing to constrict blood vessels and promote clotting
- Utilize pressure points located near the wound to compress major arteries and reduce blood flow to the area (brachial artery for arm wounds, femoral artery for leg wounds)
- Elevate the wounded area above the level of the heart, if possible, to reduce blood flow via gravity and aid in bleeding control
- Apply compression bandages snugly over the wound dressing to maintain consistent pressure and prevent further bleeding

## Considerations for Effective Pressure Application

- Ensure the wound is covered completely with the dressing material before applying pressure to avoid contamination and promote clotting
- Avoid removing the initial dressing if it becomes blood-soaked as this can disrupt clot formation; instead, add additional layers on top
- Maintain pressure consistently for at least 5-10 minutes to allow sufficient time for clotting to occur before checking the wound status
- Monitor the patient's response to pressure application and adjust techniques as needed based on the level of bleeding control achieved

## Advanced Hemorrhage Control

### Tourniquets for Extremity Bleeding

- Apply a tourniquet proximal to the wound on an extremity (arm or leg) for severe, life-threatening bleeding not controlled by direct pressure
- Ensure proper tourniquet placement by selecting a site 2-3 inches above the wound, avoiding joints, and tightening until bleeding stops
- Record the time of tourniquet application and communicate this information to medical personnel for proper care and monitoring

- Understand the risks of prolonged tourniquet use (tissue damage, nerve injury) and the importance of timely medical intervention

## Hemostatic Agents and Wound Packing

- Use hemostatic agents (QuikClot, Celox) that promote clotting when applied directly to the wound for severe bleeding not amenable to tourniquet use
- Pack deep wounds with hemostatic gauze or regular sterile gauze, filling the cavity completely to apply internal pressure and control bleeding
- Apply pressure dressings over packed wounds to maintain consistent pressure and secure the packing material in place
- Monitor packed wounds closely for signs of continued bleeding or saturation, replacing packing material as needed until bleeding is controlled

## Shock Management

### Recognizing and Treating Shock

- Identify signs of shock (rapid, weak pulse; cool, clammy skin; altered mental status) which can result from severe blood loss and inadequate tissue perfusion
- Place the patient in a supine position with legs elevated (shock position) to promote blood flow to vital organs
- Keep the patient warm using blankets or extra clothing to prevent further heat loss and maintain body temperature
- Avoid giving the patient anything by mouth, including water or medications, as this can interfere with medical treatment and worsen shock

### Monitoring and Supporting Vital Functions

- Assess the patient's level of consciousness and responsiveness regularly, noting any changes or deterioration in mental status
- Monitor the patient's breathing and airway, providing support (jaw thrust, rescue breaths) if necessary to maintain adequate oxygenation
- Check the patient's pulse rate and quality frequently to assess circulatory status and the effectiveness of hemorrhage control measures
- Provide reassurance and emotional support to the patient, keeping them calm and informed about their condition and the care being provided

## 5.3 Wound cleaning and dressing application

Wound cleaning and dressing application are crucial skills in first aid. Proper cleaning prevents infection, while correct dressing protects the wound and promotes healing. These techniques are essential for effective wound care and management.

Mastering antiseptic use, irrigation, and debridement is key to wound cleaning. For dressing, understanding non-adherent materials, antibiotic ointments, and secure application methods ensures optimal wound protection and healing. These skills are fundamental in bleeding control and bandaging.

## Wound Cleaning

### Antiseptic Solutions and Wound Irrigation

- Antiseptic solutions help prevent infection by killing bacteria and other microorganisms on the skin and in wounds
- Common antiseptic solutions include hydrogen peroxide, iodine, and chlorhexidine gluconate
- Wound irrigation involves flushing the wound with sterile saline or water to remove debris, foreign material, and bacteria
- Irrigation should be performed using a syringe or squeeze bottle with enough pressure to effectively clean the wound without causing further damage
- Sterile gauze can be used to gently clean around the wound edges and remove any remaining debris

### Debridement Techniques

- Debridement is the removal of dead, damaged, or infected tissue from a wound to promote healing and prevent infection
- Mechanical debridement involves using sterile instruments (forceps, scissors) or wound dressings to physically remove debris and necrotic tissue
- Enzymatic debridement uses topical medications containing enzymes (collagenase, papain) to break down and dissolve necrotic tissue
- Autolytic debridement relies on the body's natural ability to break down necrotic tissue through the use of moisture-retaining dressings (hydrogels, hydrocolloids)
- The choice of debridement method depends on factors such as the type and size of the wound, the presence of infection, and the patient's overall health status

## Dressing Application

### Non-Adherent Dressings and Antibiotic Ointments

- Non-adherent dressings are designed to prevent sticking to the wound surface, reducing pain and trauma during dressing changes
- Examples of non-adherent dressings include silicone-coated gauze, petrolatum gauze, and polyurethane foam dressings
- Antibiotic ointments, such as bacitracin or mupirocin, can be applied to the wound before applying the non-adherent dressing to help prevent infection
- When applying antibiotic ointment, use a sterile cotton swab or gloved finger to apply a thin layer to the wound surface, avoiding excessive application that may macerate the surrounding skin

### Securing Dressings with Adhesive Tape and Sterile Gauze

- After applying the non-adherent dressing and antibiotic ointment (if indicated), the dressing should be secured in place using adhesive tape or a secondary dressing

- Adhesive tape, such as paper or silk tape, should be applied around the edges of the dressing, leaving a small border of exposed skin to prevent maceration
- Alternatively, sterile gauze can be used as a secondary dressing to hold the primary dressing in place
- When using sterile gauze, wrap it gently around the affected area, ensuring that it is snug but not too tight to restrict blood flow or cause discomfort
- Secure the sterile gauze in place with adhesive tape or a flexible bandage, such as a self-adherent wrap (Coban)

## 5.4 Bandaging methods for various body parts

Bandaging is a crucial skill in wound care, combining various techniques and materials to protect injuries and control bleeding. From versatile triangular bandages to specialized pressure dressings, each type serves a specific purpose in first aid situations.

Proper bandaging techniques are essential for effective wound management. Whether using figure-eight wraps for joints or spiral bandages for limbs, mastering these methods ensures secure coverage and promotes healing while maintaining circulation and comfort.

### Bandage Types

#### Versatile Bandages for Various Applications

- Triangular bandage
- Versatile bandage made from a triangular piece of cloth
- Can be used as a sling, tourniquet, or to secure splints
- Adaptable for various body parts and injuries
- Roller bandage
- Long, narrow strip of cloth wrapped around a body part
- Provides compression and support
- Available in different widths and lengths for specific applications (2-inch, 4-inch)

#### Specialized Bandages for Specific Needs

- Elastic bandage
- Stretchy bandage that provides compression and support
- Commonly used for sprains, strains, and swelling
- Maintains flexibility while providing consistent pressure
- Pressure bandage
- Designed to apply direct pressure to a wound
- Helps control bleeding and promote clotting
- Often includes a sterile pad or dressing to cover the wound

## Bandage Techniques

### Wrapping Techniques for Secure Coverage

- Figure-eight bandage
- Wrapping technique that resembles the number eight
- Provides stability and compression to joints (ankles, wrists)
- Overlapping layers distribute pressure evenly
- Spiral bandage
- Wrapping technique that spirals up the limb
- Covers long, cylindrical body parts (arms, legs)
- Each layer overlaps the previous by about one-third to one-half the width

### Anchoring and Securing Bandages

- Tying off the bandage
- Secure the end of the bandage to prevent unraveling
- Use a square knot or tape to fasten the bandage
- Ensure the knot or tape is not too tight or restrictive
- Checking circulation
- Assess circulation below the bandaged area
- Check for skin color, temperature, and capillary refill
- Loosen or adjust the bandage if circulation is impaired

### Bandaging Specific Areas

#### Head and Neck Bandaging

- Head bandage
- Used to cover wounds or apply pressure to the scalp or forehead
- Can be a triangular or roller bandage, depending on the location and size of the injury
- Avoid covering the ears, eyes, nose, or mouth when possible
- Neck bandage
- Used to support the neck or apply pressure to wounds
- Triangular bandage is often used as a sling or collar
- Be cautious not to restrict breathing or circulation

## Torso and Extremity Bandaging

- Chest bandage
  - Used to support the ribcage or apply pressure to chest wounds
  - Wide roller bandages or triangular bandages can be used
  - Allow for chest expansion during breathing
- Extremity bandage
  - Covers wounds or provides support to arms and legs
  - Roller bandages, elastic bandages, or triangular bandages can be used
  - Start wrapping from the distal end (fingers or toes) and move proximally
  - Leave fingertips or toes exposed to monitor circulation

# Unit 6 – Shock – Recognition and Management

## 6.1 Types and causes of shock

Shock is a life-threatening condition where the body can't deliver enough oxygen to vital organs. It comes in different types, each with unique causes. Understanding these types helps first responders quickly identify and treat shock effectively.

Hypovolemic shock from blood loss, cardiogenic shock from heart problems, and distributive shock from widespread blood vessel dilation are common types. Recognizing the signs and causes of each type is crucial for proper emergency care and preventing organ damage.

## Types of Shock

### Categories of Shock Based on Underlying Cause

- Hypovolemic shock occurs when there is a significant decrease in blood volume leading to reduced cardiac output and inadequate tissue perfusion (hemorrhage, severe vomiting, diarrhea)
- Cardiogenic shock happens when the heart is unable to pump effectively due to damage or dysfunction resulting in poor cardiac output and tissue hypoperfusion (myocardial infarction, arrhythmias, valvular disorders)
- Obstructive shock is caused by a physical obstruction that impedes blood flow and leads to reduced cardiac output despite normal blood volume and heart function (pulmonary embolism, tension pneumothorax, cardiac tamponade)
- Distributive shock involves abnormal distribution of blood flow due to vasodilation and increased vascular permeability causing relative hypovolemia and inadequate tissue perfusion (sepsis, anaphylaxis, spinal cord injury)

## Causes of Hypovolemic Shock

### Mechanisms Leading to Reduced Intravascular Volume

- Blood loss from external or internal hemorrhage can rapidly deplete intravascular volume and lead to hypovolemic shock (trauma, gastrointestinal bleeding, ruptured ectopic pregnancy)
- Dehydration from excessive fluid losses or inadequate fluid intake causes a reduction in intravascular volume and can progress to hypovolemic shock if severe (prolonged vomiting, diarrhea, heat exposure, inadequate oral intake)

### Other Causes of Hypovolemia

- Severe burns cause fluid shifts from the intravascular space into the interstitial space due to increased vascular permeability leading to relative hypovolemia
- Excessive diuresis from diuretic medications or uncontrolled diabetes insipidus can lead to significant fluid losses and hypovolemia if not adequately replaced

## Causes of Obstructive Shock

### Pulmonary Embolism as a Cause of Obstructive Shock

- Pulmonary embolism occurs when a blood clot becomes lodged in the pulmonary arteries impeding blood flow to the lungs and reducing left ventricular preload
- The obstruction to pulmonary blood flow leads to increased right ventricular afterload, right ventricular failure, and decreased cardiac output resulting in obstructive shock

### Other Causes of Obstructive Shock

- Tension pneumothorax occurs when air accumulates in the pleural space under pressure collapsing the lung and compressing the heart and great vessels leading to decreased venous return and cardiac output
- Cardiac tamponade happens when fluid accumulates in the pericardial sac compressing the heart and restricting ventricular filling resulting in reduced cardiac output and obstructive shock

## Types of Distributive Shock

### Anaphylactic Shock

- Anaphylactic shock is a severe allergic reaction causing massive vasodilation, increased vascular permeability, and fluid shifts leading to relative hypovolemia and distributive shock (bee stings, food allergies, medication allergies)
- The release of inflammatory mediators such as histamine and leukotrienes leads to bronchospasm, laryngeal edema, and cardiovascular collapse in addition to the distributive shock state

### Septic Shock

- Septic shock occurs when an overwhelming systemic infection leads to vasodilation, increased vascular permeability, and relative hypovolemia resulting in distributive shock (pneumonia, urinary tract infections, abdominal infections)
- The release of inflammatory cytokines and other mediators leads to peripheral vasodilation, capillary leak, and myocardial depression contributing to the distributive shock state

### Neurogenic Shock

- Neurogenic shock is caused by a sudden loss of sympathetic tone due to spinal cord injury leading to massive vasodilation and pooling of blood in the periphery resulting in relative hypovolemia and distributive shock
- The level of the spinal cord injury determines the extent of sympathetic dysfunction with injuries above T6 causing the most profound vasodilation and bradycardia

## Causes of Cardiogenic Shock

### Heart Failure as a Cause of Cardiogenic Shock

- Heart failure occurs when the heart is unable to pump effectively due to various causes leading to reduced cardiac output and cardiogenic shock (myocardial infarction, cardiomyopathy, valvular disorders)
- Systolic heart failure involves reduced contractility and ejection fraction while diastolic heart failure involves impaired ventricular filling and relaxation both leading to reduced cardiac output

### Other Causes of Cardiogenic Shock

- Acute myocardial infarction causes damage to the myocardium leading to reduced contractility, arrhythmias, and mechanical complications such as ventricular septal rupture or papillary muscle rupture resulting in cardiogenic shock
- Severe arrhythmias such as ventricular tachycardia or complete heart block can significantly impair cardiac output leading to cardiogenic shock if not promptly corrected

## 6.2 Signs and symptoms of shock

Shock is a life-threatening condition where the body can't deliver enough oxygen to vital organs. It's crucial to recognize the signs early. From pale, cool skin to rapid breathing and weak pulse, these symptoms indicate the body's struggle to maintain blood flow.

Shock affects multiple systems, causing altered mental status, fatigue, and reduced urine output. Understanding these signs helps first responders quickly identify and treat shock, potentially saving lives. Prompt recognition and action are key to preventing organ damage and improving outcomes.

### Skin and Vital Signs

#### Abnormal skin appearance and temperature

- Pale skin indicates reduced blood flow to the skin surface due to blood being diverted to vital organs (brain, heart, lungs)
- Cool skin suggests a decrease in body temperature as a result of impaired thermoregulation and reduced peripheral circulation
- Clammy skin refers to a cold, sweaty feeling caused by the body's attempt to maintain blood pressure through increased sympathetic nervous system activity

#### Changes in pulse and breathing

- Rapid, weak pulse is a compensatory mechanism to maintain adequate cardiac output and blood pressure in the face of decreased blood volume or cardiac function
- Rapid, shallow breathing (tachypnea) occurs as the body tries to compensate for the decreased oxygen delivery to tissues by increasing the rate of respiration
- Hypotension, or low blood pressure, is a key sign of shock as the cardiovascular system struggles to maintain adequate perfusion to vital organs

## Neurological Symptoms

### Altered mental status and cognition

- Restlessness or confusion may occur due to reduced cerebral blood flow and oxygenation, leading to impaired brain function
- Altered mental status can range from mild disorientation to complete unresponsiveness (coma) depending on the severity and duration of shock
- Patients may exhibit difficulty focusing, answering questions, or following commands as a result of cerebral hypoperfusion

### Fatigue and weakness

- Weakness or fatigue is common in shock due to inadequate oxygen and nutrient delivery to muscles and other tissues
- Patients may feel exhausted or have difficulty moving their limbs as a result of cellular energy depletion and lactic acid accumulation

## Gastrointestinal and Urinary Symptoms

### Reduced urine output

- Decreased urine output (oliguria) occurs as the kidneys attempt to conserve fluid and maintain circulating blood volume in response to hypoperfusion
- Urine output of less than 0.5 mL/kg/hour in adults or less than 1 mL/kg/hour in children is a sign of inadequate renal perfusion and potential acute kidney injury

### Thirst and nausea

- Thirst is a common symptom of shock as the body senses a decrease in circulating blood volume and attempts to stimulate fluid intake
- Nausea may occur due to reduced blood flow to the gastrointestinal tract, leading to hypoxia and irritation of the gut lining
- Vomiting can further exacerbate fluid and electrolyte imbalances in shock patients

## 6.3 First aid interventions for shock management

Shock can be life-threatening, requiring quick action. First aid for shock focuses on positioning the patient, controlling bleeding, and maintaining body temperature. These interventions aim to improve circulation and prevent further deterioration.

Monitoring vital signs and providing reassurance are crucial. Treating the underlying cause, if possible, and activating emergency services promptly are essential steps. Remember, early recognition and intervention can significantly improve outcomes for shock patients.

## Positioning and Comfort

### Patient Positioning

- Position the patient in a comfortable position that allows for optimal circulation and breathing, often with the head slightly lower than the feet
- Place the patient in the Trendelenburg position by elevating the feet and legs 8-12 inches above the level of the heart using a pillow or blanket, which helps increase blood flow to the brain and heart
- Avoid laying the patient completely flat as this can worsen breathing difficulties and cause the patient to feel more anxious or restless

### Maintaining Body Temperature and Providing Reassurance

- Maintain the patient's normal body temperature by covering them with a blanket or coat to prevent heat loss and further decline in circulation
- Remove any wet clothing and replace with dry, warm coverings (blankets, coats) to prevent hypothermia, which can worsen shock
- Provide reassurance to the patient by speaking calmly, explaining what is happening and what you are doing to help, and staying with them until emergency medical services arrive, as this can help reduce anxiety and stress

## Bleeding Control and Resuscitation

### Controlling Bleeding

- Control any external bleeding by applying direct pressure to the wound using a clean cloth or dressing and elevating the affected limb above the level of the heart
- If bleeding is severe or not controlled by direct pressure, apply a tourniquet proximal to the wound (between the wound and the heart) and tighten until bleeding stops
- Monitor for signs of internal bleeding such as bruising, swelling, or tenderness in the abdomen or chest, and report any findings to emergency medical services

### Oxygen Administration and Fluid Resuscitation

- Administer supplemental oxygen if available using a non-rebreather mask at 10-15 liters per minute to improve oxygenation and tissue perfusion
- If the patient is conscious and able to swallow, provide small sips of water or an electrolyte solution (sports drink) to help maintain fluid balance and prevent dehydration
- Avoid giving the patient anything by mouth if they are unconscious, have a decreased level of consciousness, or are likely to need surgery, as this can increase the risk of aspiration

## Monitoring and Treatment

### Monitoring Vital Signs

- Monitor the patient's vital signs every 5-10 minutes including blood pressure, heart rate, respiratory rate, and level of consciousness

- Report any changes in vital signs or patient condition to emergency medical services, as this can indicate worsening shock or development of complications
- Keep a record of the patient's vital signs and any interventions provided to assist with ongoing care and treatment

## Treating the Underlying Cause and Activating Emergency Medical Services

- Identify and treat any underlying causes of shock if possible, such as providing epinephrine for anaphylaxis or glucose for hypoglycemia
- If the underlying cause cannot be identified or treated, focus on supportive care measures such as positioning, oxygen administration, and fluid resuscitation until emergency medical services arrive
- Call for emergency medical services (911) immediately if shock is suspected, and provide a clear and concise report of the patient's condition, vital signs, and any interventions provided

# Unit 7 – Musculoskeletal Injuries:

## Fractures & Sprains

### 7.1 Identification of fractures, sprains, and strains

Fractures, sprains, and strains are common musculoskeletal injuries that can occur due to trauma or overuse. Understanding the types, signs, and symptoms of these injuries is crucial for proper assessment and treatment in first aid situations.

Identifying these injuries involves recognizing key indicators like pain, swelling, and limited mobility. Physical examination techniques and diagnostic tests help pinpoint the exact nature and severity of the injury, guiding appropriate first aid measures and further medical care.

## Fractures

### Types of Fractures

- Fracture occurs when a bone breaks or cracks due to trauma, overuse, or disease
- Open fracture (compound fracture) involves a broken bone that protrudes through the skin, increasing the risk of infection and complications
- Closed fracture (simple fracture) occurs when the bone breaks but does not penetrate the skin, which is generally less severe than an open fracture
- Deformity refers to the abnormal shape or position of a body part, often indicating a fracture or dislocation (angulation, rotation, or shortening)
- Crepitus is the grating, crackling, or popping sensation felt or heard when broken bone ends rub against each other, which can help identify a fracture

### Signs and Symptoms of Fractures

- Pain, especially when pressure is applied or the affected area is moved
- Swelling and bruising around the injured area due to damage to blood vessels and soft tissues
- Inability to bear weight on the affected limb or joint
- Visible deformity, such as an abnormal bend or twist in the bone (angulation or rotation)
- Tenderness and guarding of the injured area to protect it from further damage

## Soft Tissue Injuries

### Types of Soft Tissue Injuries

- Sprain occurs when a ligament, which connects bone to bone, is stretched or torn due to excessive force or overextension (ankle sprain)
- Strain happens when a muscle or tendon, which connects muscle to bone, is stretched or torn due to overexertion or improper use (hamstring strain)

- Dislocation occurs when a bone is forced out of its normal position within a joint, often causing visible deformity and severe pain (shoulder dislocation)
- Swelling is the accumulation of fluid in the soft tissues surrounding an injury, causing the area to appear larger or puffier than normal
- Bruising (contusion) occurs when small blood vessels beneath the skin are damaged, causing discoloration and tenderness in the affected area

## Signs and Symptoms of Soft Tissue Injuries

- Pain and tenderness in the affected area, which may worsen with movement or weight-bearing
- Limited range of motion in the affected joint due to pain, swelling, or muscle spasms
- Instability or weakness in the affected joint, especially in cases of severe sprains or dislocations
- Cramping or muscle spasms in the affected muscle, particularly with strains
- Discoloration of the skin, such as redness or bruising, indicating damage to blood vessels

## Assessment Techniques

### Physical Examination

- Range of motion assessment involves asking the patient to move the affected joint or limb through its normal range of motion to determine any limitations or pain
- Pain assessment includes asking the patient to rate their pain on a scale (0-10) and describe its location, intensity, and character (sharp, dull, burning)
- Palpation involves gently pressing on the affected area to identify points of tenderness, swelling, or deformity, which can help localize the injury
- Visual inspection of the affected area for signs of swelling, bruising, deformity, or open wounds, which can provide important clues about the nature and severity of the injury

### Diagnostic Tests

- X-rays can help identify fractures, dislocations, and other bony abnormalities
- MRI (magnetic resonance imaging) scans provide detailed images of soft tissues, such as ligaments, tendons, and muscles, to help diagnose sprains, strains, and other soft tissue injuries
- CT (computed tomography) scans combine X-rays and computer technology to create cross-sectional images of bones and soft tissues, which can help diagnose complex fractures or dislocations
- Ultrasound uses high-frequency sound waves to create images of soft tissues, which can help diagnose muscle and tendon injuries, as well as guide needle placement for injections or aspirations

## 7.2 RICE method and immobilization techniques

When it comes to treating musculoskeletal injuries, the RICE method is your go-to approach. Rest, Ice, Compression, and Elevation work together to reduce pain, swelling, and promote healing in injured areas.

Immobilization techniques are crucial for protecting and supporting injured limbs. Slings, bandages, and elastic wraps help stabilize the affected area, while proper use of cold packs and other supplies can speed

up recovery.

## RICE Method

### Rest and Ice

- Rest the injured area to prevent further damage and promote healing
- Avoid putting weight on the affected limb or using it for activities
- Take breaks from physical activity to allow the injury time to recover
- Ice the injured area to reduce swelling, pain, and inflammation
- Apply a cold pack or ice wrapped in a cloth to the affected area for 15-20 minutes at a time
- Repeat icing sessions every 2-3 hours for the first 24-48 hours after the injury

### Compression and Elevation

- Compression helps to reduce swelling and provide support to the injured area
- Use an elastic bandage or wrap to apply gentle pressure around the affected limb
- Wrap the bandage snugly but not too tightly to avoid restricting blood flow
- Loosen the bandage if numbness, tingling, or increased pain occurs
- Elevation involves raising the injured area above the level of the heart to minimize swelling
- Prop up the affected limb on pillows or a chair while resting
- Maintain elevation as much as possible, especially during the first 24-48 hours after the injury

## Immobilization Techniques

### Slings and Bandages

- A sling is used to support and immobilize an injured arm or shoulder
- Create a sling using a triangular bandage or a piece of cloth
- Place the arm in the sling with the elbow bent at a 90-degree angle and the forearm across the chest
- Secure the sling around the neck, ensuring it is snug but not too tight
- Bandages can be used to provide compression and support to an injured area
- Use a roller bandage or elastic wrap to cover the affected limb or joint
- Begin wrapping at the farthest point from the heart and work towards the body
- Overlap each layer of the bandage by about half the width to ensure even coverage

### Elastic Wraps and Immobilization

- Elastic wraps, such as ACE bandages, provide compression and support to injured areas
- Start wrapping at the farthest point from the heart and work towards the body

- Wrap the elastic bandage snugly but not too tightly, allowing for some stretch in the material
- Secure the end of the wrap with tape or clips to prevent it from unraveling
- Immobilization helps to prevent further injury and promote healing by limiting movement
- Use splints, braces, or casts to immobilize fractures or severe sprains
- Follow instructions provided by healthcare professionals for proper immobilization techniques

## Additional Supplies

### Cold Packs and Other Essentials

- Cold packs help to reduce swelling, pain, and inflammation in injured areas
- Keep a few instant cold packs in your first aid kit for easy access
- Activate the cold pack by squeezing or shaking it, following the manufacturer's instructions
- Apply the cold pack to the injured area for 15-20 minutes at a time, with a thin cloth between the pack and skin to prevent frostbite
- Other essential supplies for managing musculoskeletal injuries include:
  - Adhesive tape to secure bandages or wraps
  - Scissors to cut bandages or tape
  - Sterile gauze pads to cover wounds or provide extra padding
  - Pain relief medication, such as ibuprofen or acetaminophen, to manage discomfort

## 7.3 Splinting procedures for various body parts

Splinting is a crucial skill in first aid for musculoskeletal injuries. It involves immobilizing injured body parts to prevent further harm and promote healing. Different types of splints, from rigid to soft, are used depending on the injury and available materials.

Proper splint application requires careful padding, positioning, and monitoring of circulation. First responders must check for pulse, sensation, and movement before and after splinting. Regular reassessment ensures the splint isn't causing additional problems while supporting the injury.

## Splint Types

### Rigid and Soft Splints

- Splints immobilize and support injured body parts to prevent further injury and promote healing
- Rigid splints consist of firm materials (cardboard, metal, plastic) that hold the injured area in a fixed position
- Soft splints use flexible materials (towels, blankets, pillows) to provide cushioning and support without complete immobilization
- Traction splints apply gentle pulling force to realign and stabilize fractures in long bones (femur)

## Specialized Splints

- Anatomical splints utilize the patient's own body to support the injured area
- Securing an injured arm to the chest wall
- Taping injured fingers together for support
- Air splints are inflatable devices that provide circumferential pressure and support
- Commonly used for ankle and wrist injuries
- Sam splints are compact, lightweight, and moldable aluminum splints
- Can be bent and shaped to conform to various body parts
- Improvised splints are constructed from readily available materials in emergency situations
- Branches, boards, rolled newspapers, or magazines can be used

## Splint Application

### Padding and Positioning

- Padding should be applied between the splint and skin to prevent pressure sores and increase comfort
- Use soft materials like cotton, foam, or cloth
- Pay extra attention to bony prominences (ankles, elbows)
- Position the injured body part in a neutral, anatomical alignment before splinting
- Minimize movement of fracture ends to reduce pain and prevent further damage
- Splints should extend past the joints above and below the injury site for optimal immobilization

### Circulation Monitoring

- Check circulation, sensation, and motor function (CSM) before and after splint application
- Assess pulse distal to the injury to ensure adequate blood flow
- Ask patient about numbness, tingling, or loss of sensation
- Observe for movement of fingers or toes
- Loosen or adjust the splint if CSM is compromised
- Impaired circulation can lead to tissue damage and complications
- Recheck CSM every 15-30 minutes and document findings to monitor for any changes
- Prompt detection of circulation issues is crucial for preventing permanent damage

# Unit 8 – Burn Injuries – Classification and Treatment

## 8.1 Burn classification and severity assessment

Burns can range from minor to life-threatening. Understanding burn classification is crucial for proper treatment. This section covers burn degrees, depth assessment, and severity estimation using the Total Body Surface Area (TBSA) method.

Accurate burn assessment guides treatment decisions. First-degree burns affect only the outer skin layer, while deeper burns can damage underlying tissues. The Rule of Nines helps estimate burn severity, which is vital for determining fluid needs and overall patient care.

### Burn Degrees

#### Superficial Burns

- First-degree burns involve only the epidermis, the outermost layer of skin
- Skin appears red, dry, and painful (sunburn)
- No blistering or skin breakdown occurs
- Typically heal within 3-5 days without scarring

#### Partial and Full-Thickness Burns

- Second-degree burns extend into the dermis, the layer beneath the epidermis
- Partial-thickness burns cause blistering, severe pain, and swelling
- Skin appears red, moist, and blanched when pressure is applied
- Typically heal within 2-3 weeks with minimal scarring (superficial second-degree burns)
- Deeper second-degree burns may require skin grafting and result in scarring
- Third-degree burns destroy the epidermis and dermis, extending into the subcutaneous tissue
- Skin appears white, brown, or black and has a leathery texture
- Pain sensation is lost due to nerve damage, but surrounding areas may be painful
- Require surgical intervention, skin grafting, and result in significant scarring
- Fourth-degree burns extend beyond the subcutaneous tissue, damaging muscle, tendons, and bone
- Most severe type of burn, often life-threatening
- Skin appears charred or blackened, with possible exposed bone or muscle
- Require extensive surgical intervention, debridement, and rehabilitation

# Burn Depth

## Assessing Burn Depth

- Superficial burns (first-degree) involve only the epidermis
- Skin is red, dry, and painful, but no blistering occurs
- Blanching occurs when pressure is applied, indicating intact capillary refill
- Partial-thickness burns (second-degree) extend into the dermis
- Superficial partial-thickness burns cause blistering, severe pain, and swelling
- Deep partial-thickness burns may appear mottled or have a waxy texture
- Blanching may be absent or sluggish in deeper partial-thickness burns
- Full-thickness burns (third and fourth-degree) involve the epidermis, dermis, and deeper tissues
- Skin appears white, brown, or black, with a leathery or charred texture
- Pain sensation is absent in the burned area due to nerve damage
- No blanching occurs when pressure is applied, indicating complete capillary destruction
- Accurate burn depth assessment is crucial for determining appropriate treatment and prognosis
- Superficial burns can be managed with conservative measures (pain relief, moisturization)
- Partial-thickness burns may require wound care, dressings, and monitoring for infection
- Full-thickness burns require surgical intervention, skin grafting, and long-term rehabilitation

## Burn Severity Assessment

### Estimating Total Body Surface Area (TBSA) Burned

- Rule of Nines is a quick method for estimating the percentage of TBSA affected by burns
- Body is divided into areas of 9% or multiples of 9% (head/neck 9%, each arm 9%, each leg 18%, etc.)
- Percentages are adjusted for infants and young children due to different body proportions
- Palmar surface of the patient's hand (including fingers) represents approximately 1% TBSA
- TBSA estimation is critical for determining fluid resuscitation needs and burn severity classification
- Burns involving >20% TBSA in adults or >10% TBSA in children are considered major burns
- Burns involving >30% TBSA are classified as severe and carry a high risk of complications
- Other factors influencing burn severity include age, comorbidities, and concomitant injuries
- Extremes of age (young children, elderly) have higher morbidity and mortality rates
- Pre-existing medical conditions (diabetes, cardiovascular disease) complicate burn management
- Inhalation injuries, trauma, or circumferential burns increase the overall severity of the burn

## 8.2 First aid for thermal, chemical, and electrical burns

Burns can be devastating injuries, requiring swift action and proper care. First aid for thermal, chemical, and electrical burns involves extinguishing flames, cooling the affected area, and protecting the wound from infection. These steps are crucial in minimizing damage and promoting healing.

Proper burn management includes applying appropriate dressings, using ointments, and carefully handling blisters. Pain control and infection prevention are also key aspects of burn care. Understanding these techniques is essential for providing effective first aid and improving outcomes for burn victims.

### Immediate Burn Treatment

#### Extinguishing Flames and Cooling the Burn

- Stop, drop, and roll is the recommended action if clothing catches fire to smother the flames and prevent further injury
- Cool the burn with running water for at least 10-20 minutes to reduce pain, swelling, and depth of injury (faucet, shower, hose)
- Burn cooling duration should be longer for more severe burns to effectively dissipate heat and prevent further tissue damage
- Chemical burns require thorough irrigation with running water for at least 20 minutes to dilute and remove the caustic substance
- Powdered chemicals should be brushed off before irrigation to avoid activating them with water
- Electrical burn safety involves shutting off the power source before touching the victim to avoid injury to the rescuer
- High-voltage electrical burns may cause internal injuries and cardiac arrhythmias requiring advanced medical care

### Burn Wound Care

#### Dressings, Ointments, and Blister Management

- Apply loose, sterile dressings to protect the burn wound from infection and provide a moist healing environment (non-stick gauze, burn pads)
- Avoid tight bandages that may compromise circulation or cause pressure damage
- Burn ointments containing antibiotics or analgesics may be applied before dressing to prevent infection and manage pain (silver sulfadiazine, bacitracin)
- Aloe vera gel can soothe and moisturize minor burns
- Blisters should be left intact to serve as a protective barrier against infection and promote healing
- If blisters rupture, gently cleanse the area with soap and water and apply a sterile dressing
- Large, tense, or painful blisters may require medical drainage by a healthcare provider

# Burn Injury Management

## Pain Control and Infection Prevention

- Pain management for burns typically involves over-the-counter analgesics (acetaminophen, ibuprofen) and prescription opioids for more severe pain
- Cooling the burn, elevating the affected area, and applying gentle compression can also alleviate pain and swelling
- Tetanus prophylaxis is recommended for burns, especially if the victim's tetanus immunization status is unknown or out of date
- A tetanus booster shot may be administered to prevent this serious bacterial infection that affects the nervous system

## 8.3 Complications and advanced care considerations

Burn injuries can lead to serious complications, affecting the entire body. Shock, dehydration, and infection are major concerns, requiring aggressive treatment. Proper fluid management and wound care are crucial to prevent these issues and promote healing.

Advanced burn care involves specialized techniques like escharotomy and skin grafting. Burn centers offer expert care for severe cases. Long-term rehabilitation is essential, focusing on physical therapy, scar management, and psychological support to improve outcomes and quality of life.

## Complications

### Systemic Effects

- Shock can occur due to fluid loss, pain, and decreased cardiac output
- Hypovolemic shock is common in burn patients as fluid shifts from the intravascular space to the interstitial space (third-spacing)
- Distributive shock may also occur due to the release of inflammatory mediators
- Dehydration results from increased fluid loss through the damaged skin barrier and evaporative losses
- Burn patients require aggressive fluid resuscitation to maintain adequate intravascular volume and organ perfusion
- Inhalation injury can occur when heat or chemicals damage the airways and lungs
- Inhalation injury increases the risk of respiratory complications such as pneumonia and acute respiratory distress syndrome (ARDS)

### Local Complications

- Infection is a major risk due to the loss of the protective skin barrier
- Burn wounds provide an ideal environment for bacterial growth
- Common pathogens include *Staphylococcus aureus*, *Pseudomonas aeruginosa*, and *Acinetobacter baumannii*

- Compartment syndrome can develop when swelling within a muscle compartment exceeds the capacity of the fascial sheath
- Increased pressure within the compartment compromises blood flow and tissue perfusion
- Compartment syndrome most commonly affects the extremities and requires prompt surgical intervention (fasciotomy) to prevent tissue necrosis

## Burn Management

### Initial Stabilization

- Fluid resuscitation is critical to maintain intravascular volume and prevent shock
- The Parkland formula ( $4 \text{ mL} \times \% \text{ total body surface area (TBSA) burned} \times \text{weight in kg}$ ) is commonly used to guide initial fluid administration
- Crystalloid solutions such as lactated Ringer's are preferred for fluid resuscitation
- Escharotomy involves incising the burn eschar to relieve constriction and improve circulation
- Escharotomy is indicated when circumferential full-thickness burns compromise distal perfusion
- The procedure is typically performed at the bedside under local anesthesia

### Wound Care

- Wound debridement involves removing devitalized tissue, debris, and foreign material from the burn wound
- Early excisional debridement within 24-72 hours of injury is associated with improved outcomes
- Debridement can be performed surgically, enzymatically (e.g., collagenase), or through autolysis (e.g., hydrogels)
- Skin grafting is used to provide permanent wound coverage and promote healing
- Split-thickness skin grafts (STSGs) are harvested from donor sites and applied to the debrided wound bed
- Autografts (from the patient) are preferred, but allografts (from cadavers) or xenografts (from animals) may be used as temporary coverage in extensive burns

### Advanced Care

### Specialized Burn Treatment

- Burn center referral criteria include burns  $>20\%$  TBSA in adults,  $>10\%$  TBSA in children, full-thickness burns, high-voltage electrical burns, and burns with associated inhalation injury or significant comorbidities
- Burn centers provide specialized expertise, resources, and multidisciplinary care to optimize outcomes
- Specialized burn treatment may include advanced wound dressings (e.g., silver-impregnated), topical antimicrobials, nutritional support, and early mobilization

- Negative pressure wound therapy (NPWT) can promote granulation tissue formation and prepare wounds for grafting
- A multidisciplinary approach involving burn surgeons, nurses, therapists, dietitians, and psychologists is essential for comprehensive burn care
- Regular multidisciplinary rounds facilitate communication, care coordination, and patient-centered decision-making

## Rehabilitation and Long-Term Care

- Long-term rehabilitation is crucial to optimize functional outcomes and quality of life
- Physical therapy focuses on range of motion, strength, and mobility to prevent contractures and maintain function
- Occupational therapy addresses activities of daily living (ADLs), adaptive equipment, and community reintegration
- Scar management techniques such as compression garments, silicone gel sheets, and massage can improve scar appearance and pliability
- Reconstructive surgery may be necessary to address functional impairments or cosmetic concerns
- Psychosocial support is essential to address the emotional trauma associated with burn injuries
- Peer support groups and counseling can help patients cope with body image changes, chronic pain, and post-traumatic stress disorder (PTSD)

# Unit 9 – Head, Neck, and Spinal Injuries

## 9.1 Mechanisms and signs of head and spinal injuries

Head and spinal injuries can be life-altering. From mild concussions to severe brain trauma, these injuries impact the body's control center. Understanding the signs and mechanisms is crucial for quick action and proper care.

Assessing head and spine injuries involves checking consciousness, pupil response, and neurological function. Recognizing high-risk situations and using tools like the NEXUS criteria helps identify who needs immediate attention and imaging.

## Head Injuries

### Traumatic Brain Injury (TBI) and Skull Fractures

- Traumatic Brain Injury (TBI) occurs when an external force causes damage to the brain
- Can range from mild (concussion) to severe (coma or death)
- Symptoms of TBI include loss of consciousness, confusion, headache, dizziness, and memory problems
- Skull fractures involve a break in the bones of the skull
- Can be linear (a straight break) or depressed (pushed inward)
- Basilar skull fractures occur at the base of the skull and can be life-threatening

### Intracranial Hemorrhage and Neurological Assessment

- Intracranial hemorrhage is bleeding inside the skull that can compress the brain
- Types include epidural (between skull and dura mater), subdural (between dura mater and arachnoid mater), and subarachnoid (between arachnoid mater and pia mater)
- Glasgow Coma Scale assesses level of consciousness based on eye opening, verbal response, and motor response
- Scores range from 3 (coma) to 15 (fully alert)
- Pupillary response evaluates size and reactivity of pupils to light
- Abnormal pupil size or reactivity can indicate brain injury

### Signs of Basilar Skull Fracture

- Battle's sign is bruising behind the ear that indicates a basilar skull fracture
- Raccoon eyes are bruising around the eyes that also suggests a basilar skull fracture
- Cerebrospinal fluid leak from the nose or ear is another sign of basilar skull fracture
- Cerebrospinal fluid surrounds and cushions the brain and spinal cord
- A leak indicates a tear in the protective membranes around the brain

## Spinal Injuries

### Cervical Spine Injury

- Cervical spine injury affects the neck region of the spinal column
- Can range from mild (whiplash) to severe (paralysis or death)
- Symptoms include neck pain, tenderness, limited range of motion, and neurological deficits
- Cervical collar should be applied to immobilize the neck and prevent further injury

### Spinal Cord Injury and Neurological Deficits

- Spinal cord injury involves damage to the spinal cord itself
- Can result in partial or complete loss of sensation and movement below the level of injury
- Neurological deficits are abnormalities in sensory or motor function
- Examples include numbness, tingling, weakness, and paralysis
- Level and extent of deficits depend on the location and severity of the spinal cord injury

## Assessment and Criteria

### Mechanism of Injury

- Mechanism of injury refers to the way in which the trauma occurred
- High-risk mechanisms for head and spinal injuries include falls from height, motor vehicle collisions, and diving accidents
- Understanding the mechanism can help predict potential injuries and guide assessment and treatment
- For example, a fall from a ladder onto the head suggests possible TBI and cervical spine injury

### NEXUS Criteria for Cervical Spine Assessment

- NEXUS (National Emergency X-Radiography Utilization Study) criteria guide decision-making for cervical spine imaging
- Criteria include no midline cervical tenderness, no focal neurological deficit, normal level of alertness, no intoxication, and no painful distracting injury
- If all criteria are met, cervical spine injury is unlikely and imaging may not be needed
- Helps reduce unnecessary radiation exposure and cost while identifying patients who require further evaluation

## 9.2 Concussion assessment and management

Concussions are serious brain injuries that can have lasting effects. Proper assessment and management are crucial for recovery. This section covers how to identify concussions, evaluate their severity, and guide athletes through a safe return to play.

Long-term complications like second impact syndrome and chronic traumatic encephalopathy highlight the importance of careful concussion management. Understanding these risks helps emphasize the need for

thorough evaluation and gradual return to activities.

## Concussion Assessment

### Identifying and Evaluating Concussions

- Concussion is a traumatic brain injury caused by a blow, bump, or jolt to the head that disrupts normal brain function
- Symptoms of concussion can include headache, dizziness, confusion, memory problems, nausea, and sensitivity to light or noise
- SCAT5 (Sport Concussion Assessment Tool) is a standardized tool used to evaluate athletes for concussion
- Includes symptom checklist, cognitive assessment, and balance testing
- Helps identify concussion and determine severity
- Cognitive assessment evaluates mental functions such as memory, concentration, and reaction time (Standardized Assessment of Concussion (SAC) test)
- Balance testing assesses vestibular function and coordination (Balance Error Scoring System (BESS) test)

### On-Field Assessment and Management

- Immediate removal from play if concussion is suspected based on signs and symptoms
- Sideline assessment using SCAT5 or other concussion assessment tools
- If concussion is confirmed, athlete should not return to play on the same day
- Referral to medical professional for further evaluation and management
- Monitoring for worsening symptoms and signs of more serious brain injury (loss of consciousness, seizures, worsening headache)

### Post-Concussion Management

#### Initial Treatment and Recovery

- Post-concussion syndrome refers to persistent symptoms (headache, dizziness, cognitive problems) lasting weeks to months after concussion
- Initial treatment involves physical and cognitive rest to allow the brain to recover
- Avoid activities that worsen symptoms (physical exertion, screen time, reading)
- Gradual return to school and work as tolerated
- Medications may be used to manage specific symptoms (pain relievers for headache, anti-nausea medication)
- Referral to specialists (neurologist, neuropsychologist) for persistent or severe symptoms

## Return to Play and Activity

- Return-to-play protocol is a gradual, step-wise process to safely return athletes to sport after concussion
- Progression from light aerobic activity to sport-specific drills to full contact practice
- Each step requires 24-48 hours without symptoms before progressing
- If symptoms return, athlete goes back to previous step
- Gradual return to other activities (school, work, driving) as tolerated
- May require accommodations or modifications (reduced workload, frequent breaks)
- Importance of not rushing recovery to prevent prolonged symptoms or further injury

## Long-Term Complications

### Second Impact Syndrome

- Second impact syndrome is a rare but catastrophic condition that occurs when an athlete sustains a second concussion before fully recovering from the first
- Can lead to rapid brain swelling, herniation, and death
- Emphasizes the importance of proper concussion management and not returning to play too soon

### Chronic Traumatic Encephalopathy (CTE)

- Chronic Traumatic Encephalopathy (CTE) is a progressive neurodegenerative disease associated with repetitive head impacts
- Symptoms can include memory loss, confusion, impaired judgment, impulse control problems, aggression, depression, and dementia
- Can only be diagnosed definitively by autopsy
- Has been found in athletes, military veterans, and others with a history of repetitive brain trauma
- Raises concerns about the long-term effects of concussions and the need for prevention and proper management

## 9.3 Spinal immobilization techniques

Spinal immobilization techniques are crucial for preventing further injury in patients with suspected head, neck, or spinal trauma. These methods focus on maintaining proper alignment and minimizing movement to protect the delicate structures of the nervous system.

From cervical collars to backboards and vacuum mattresses, various tools and techniques are employed to stabilize patients. Proper assessment, careful handling, and clear communication among rescuers are essential for effective immobilization and safe transport of injured individuals.

## Cervical Immobilization

### Stabilizing the Cervical Spine

- Cervical collar used to restrict movement of the cervical spine and prevent further injury
- Inline stabilization maintains the head and neck in a neutral position, minimizing movement and reducing risk of additional damage
- Neutral alignment ensures the head, neck, and spine are kept in a straight line, preventing any twisting or bending that could exacerbate the injury
- MILS (Manual In-Line Stabilization) technique involves manually holding the patient's head and neck in a neutral position until a cervical collar can be applied

### Assessing and Maintaining Airway

- Assess the patient's airway while maintaining cervical spine stabilization to ensure it remains open and unobstructed
- If the patient is unconscious or has a compromised airway, use jaw-thrust maneuver instead of head-tilt/chin-lift to open the airway without moving the cervical spine
- Monitor the patient's breathing and be prepared to provide ventilatory support if necessary, taking care not to move the head or neck during the process

## Spinal Immobilization Equipment

### Rigid Immobilization Devices

- Backboard is a rigid, flat board used to immobilize the entire spine and prevent movement during transport
- Head blocks are placed on either side of the patient's head to prevent lateral movement and maintain neutral alignment when secured to the backboard
- Strapping techniques involve securing the patient to the backboard using straps across the chest, pelvis, and legs to prevent any movement or sliding during transport

### Conforming Immobilization Devices

- Vacuum mattress is a flexible device filled with small beads that conform to the patient's body shape when air is removed, providing full-body immobilization
- Vacuum mattress is particularly useful for patients with suspected spinal injuries who are found in awkward positions or have other complicating factors (pregnancy, obesity)
- Once the patient is positioned on the vacuum mattress, air is removed using a pump, causing the mattress to harden and maintain the patient's position for safe transport

## Spinal Immobilization Techniques

### Moving Patients with Suspected Spinal Injuries

- Log roll technique is used to move a patient with a suspected spinal injury onto a backboard or vacuum mattress while maintaining spinal alignment

- Log roll involves multiple rescuers working together to roll the patient onto their side as a single unit, allowing the backboard to be placed behind them before rolling them back onto it
- Proper log roll technique requires clear communication and coordination among the rescuers to ensure the patient's spine remains in a neutral position throughout the process

## Clearing the Cervical Spine

- Spinal clearance protocols are used to assess whether a patient requires full spinal immobilization based on specific criteria and physical examination
- Protocols typically involve assessing the patient's level of consciousness, mechanism of injury, presence of pain or tenderness in the spine, and any neurological deficits
- If the patient meets all criteria for spinal clearance, the cervical collar may be removed and full immobilization may not be necessary, allowing for more efficient patient assessment and transport

# Unit 10 – Poisoning and Substance Abuse Emergencies

## 10.1 Common poisons and their effects

Poisons come in many forms, from household chemicals to toxic gases. Ingested, inhaled, or absorbed through the skin, they can cause severe health problems or even death. Understanding common poisons and their effects is crucial for preventing and responding to poisoning emergencies.

This section covers various types of poisons, including medications, toxic gases, and environmental toxins. We'll explore how these substances enter the body, their potential effects, and the importance of proper handling and safety measures to prevent poisoning incidents.

### Ingested Poisons

#### Common Toxins and Chemicals

- Toxins are poisonous substances produced by living organisms that can cause harm when ingested (snake venom, certain mushrooms)
- Household chemicals include cleaning products, detergents, and solvents that can cause severe damage to the digestive system if swallowed
- Pesticides used in agriculture and gardening can be highly toxic if ingested, leading to severe illness or death (organophosphates, carbamates)
- Many common plants contain toxic compounds that can cause adverse effects when consumed (oleander, castor beans, yew)

#### Medication Overdose and Misuse

- Medications, both prescription and over-the-counter, can be dangerous if taken in excessive doses or by someone for whom they were not prescribed
- Accidental ingestion of medications by children is a common cause of poisoning incidents
- Intentional misuse or abuse of medications, such as opioids or benzodiazepines, can lead to severe toxicity and potentially fatal overdoses
- Mixing medications with alcohol or other substances can increase the risk of adverse effects and toxicity

### Inhaled Poisons

#### Toxic Gases and Fumes

- Carbon monoxide is an odorless, colorless gas that can cause severe poisoning when inhaled, often from faulty furnaces, gas appliances, or vehicle exhaust in enclosed spaces
- Toxic fumes from chemicals, such as chlorine gas or ammonia, can cause severe respiratory irritation and damage when inhaled

- Smoke from fires contains a mixture of toxic gases and particles that can cause respiratory distress and long-term health effects

## Airborne Particles and Aerosols

- Airborne particles, such as asbestos fibers or silica dust, can cause chronic lung diseases when inhaled over an extended period (mesothelioma, silicosis)
- Aerosols, such as spray paints or household cleaners, can contain volatile organic compounds (VOCs) that can cause respiratory irritation and central nervous system effects when inhaled
- Inhalation of fine particulate matter, such as air pollution or wildfire smoke, can exacerbate respiratory conditions and increase the risk of cardiovascular disease

## Absorbed Poisons

### Environmental Toxins

- Lead poisoning can occur through exposure to lead-based paints, contaminated soil, or drinking water, causing developmental delays and neurological damage, especially in children
- Pesticides can be absorbed through the skin or inhaled during application, leading to acute or chronic toxicity (organochlorines, pyrethroids)
- Solvents, such as benzene or toluene, can be absorbed through the skin or inhaled, causing neurological effects, liver damage, and increased cancer risk

### Occupational Exposures

- Chemicals used in industrial processes, such as heavy metals or organic solvents, can be absorbed through the skin or inhaled, leading to chronic health effects (mercury, trichloroethylene)
- Workers in certain industries, such as agriculture, manufacturing, or healthcare, may be at higher risk of exposure to absorbed poisons due to their occupational activities
- Proper use of personal protective equipment (PPE) and adherence to safety protocols can help reduce the risk of occupational exposures to absorbed poisons

## 10.2 First aid for ingested, inhaled, and absorbed poisons

Poisoning emergencies require quick action and specific treatments. From ingested toxins to inhaled fumes, knowing how to respond can save lives. This section covers key strategies like contacting Poison Control, administering antidotes, and performing decontamination procedures.

First aid for poisons involves a range of techniques tailored to the type and route of exposure. We'll explore supportive care, gastrointestinal decontamination methods, and external decontamination procedures for skin and eye exposures. Understanding these approaches is crucial for effective poison management.

### Poison Treatment

#### Poison Control Center and Supportive Care

- Poison Control Center provides expert advice on poison treatment and management available 24/7 by calling 1-800-222-1222

- Supportive care focuses on maintaining vital functions (airway, breathing, circulation) until the poison is metabolized or eliminated from the body
- Oxygen therapy administers supplemental oxygen to support breathing and oxygenation in cases of respiratory distress caused by poisoning (carbon monoxide)

## Antidotes and Specific Treatments

- Antidotes are substances that counteract or neutralize the effects of a specific poison (naloxone for opioid overdose, atropine for organophosphate pesticides)
- Some poisons have specific treatments that enhance elimination or reduce absorption of the substance
- Chelation therapy uses chelating agents (EDTA, dimercaprol) to bind and remove heavy metals (lead, mercury) from the body
- Hemodialysis filters the blood to remove certain poisons (ethylene glycol, lithium) that are not effectively cleared by the kidneys

## Gastrointestinal Decontamination

### Activated Charcoal

- Activated charcoal is a highly porous substance that binds to many poisons in the gastrointestinal tract, preventing their absorption into the bloodstream
- Typically administered orally as a liquid or powder mixed with water within 1 hour of ingestion for maximum effectiveness
- Not effective for all poisons (acids, alkalis, ethanol, metals) and may interfere with the absorption of oral antidotes

### Induced Emesis and Gastric Lavage

- Induced emesis (vomiting) was previously used to remove ingested poisons from the stomach but is no longer recommended due to the risk of aspiration and further injury
- Gastric lavage involves inserting a tube through the mouth into the stomach to flush out its contents with water or saline
- Reserved for potentially life-threatening ingestions within 1 hour, when activated charcoal is ineffective or contraindicated
- Risks include aspiration, esophageal or stomach injury, and electrolyte imbalances

## External Decontamination

### Skin and Eye Decontamination

- Skin decontamination involves removing contaminated clothing and flushing the skin with copious amounts of water for at least 15 minutes to remove or dilute the substance
- Dry chemicals (lime, phenol) should be brushed off before flushing to avoid activation by water

- Some chemicals (hydrofluoric acid) require specific decontamination solutions (calcium gluconate gel) to neutralize the substance and prevent further injury
- Eye decontamination requires continuous irrigation with water or saline for at least 15-30 minutes, while holding the eyelids open and rotating the eyes to ensure complete flushing
- Contact lenses should be removed if present and discarded to prevent trapping the substance against the eye

## Decontamination Safety Precautions

- Rescuers should wear appropriate personal protective equipment (gloves, gowns, masks, eye protection) to avoid secondary contamination when handling poisoned patients or their belongings
- Decontamination should be performed in a well-ventilated area or outdoors, if possible, to minimize exposure to toxic fumes or vapors
- Contaminated clothing and materials should be properly bagged and disposed of as hazardous waste to prevent further exposure or environmental contamination

## 10.3 Substance abuse emergencies and interventions

Substance abuse emergencies can be life-threatening. From alcohol poisoning to opioid overdoses, recognizing signs and taking quick action is crucial. This section covers common overdose types, their symptoms, and immediate interventions.

Treatment for substance abuse emergencies involves more than just addressing the immediate crisis. We'll explore the use of medications like naloxone, proper positioning techniques, and the importance of long-term support and harm reduction strategies.

## Overdose Emergencies

### Types of Overdoses

- Drug overdose occurs when an individual takes more than the recommended or safe amount of a drug, leading to potentially life-threatening consequences
- Alcohol poisoning happens when a person consumes a large quantity of alcohol in a short period, causing dangerous levels of alcohol in the bloodstream that can impair vital functions (breathing, heart rate, temperature regulation)
- Opioid overdose involves taking excessive amounts of opioids (heroin, prescription painkillers), which can cause respiratory depression, unconsciousness, and death
- Stimulant overdose results from taking high doses of stimulant drugs (cocaine, methamphetamine), leading to increased heart rate, blood pressure, body temperature, and risk of stroke or heart attack
- Depressant overdose occurs when taking excessive amounts of depressant drugs (benzodiazepines, barbiturates), causing slowed breathing, decreased heart rate, and potential loss of consciousness or coma

### Signs and Symptoms of Overdose

- Common signs of overdose include unresponsiveness, shallow or irregular breathing, bluish lips or fingernails, cold and clammy skin, and pinpoint pupils (opioid overdose)

- Alcohol poisoning symptoms may include confusion, vomiting, seizures, slow or irregular breathing, low body temperature, and loss of consciousness
- Opioid overdose is characterized by pinpoint pupils, slowed or stopped breathing, gurgling or choking sounds, and unresponsiveness to stimuli
- Stimulant overdose signs include chest pain, rapid or irregular heartbeat, high body temperature, agitation, confusion, and possible seizures or cardiac arrest
- Depressant overdose symptoms may include slurred speech, impaired coordination, slowed or stopped breathing, weak pulse, and loss of consciousness

## Treatment and Intervention

### Immediate Actions and Medications

- Naloxone is an opioid antagonist medication that can rapidly reverse the effects of an opioid overdose by displacing opioids from their receptors and restoring breathing
- Administered as an injection or nasal spray
- Can be given by trained bystanders or first responders
- Recovery position helps maintain an open airway and prevent aspiration in an unresponsive person
- Place the person on their side with the top leg and arm positioned to support the body
- Tilt the head back slightly to keep the airway open
- Call emergency services immediately and provide CPR if the person is not breathing or has no pulse

### Long-term Support and Harm Reduction

- Withdrawal symptoms may occur when a person dependent on a substance stops or reduces use, and can include anxiety, tremors, nausea, sweating, and seizures depending on the substance
- Medical supervision during detox can help manage withdrawal safely
- Harm reduction strategies aim to minimize the negative consequences of substance use without necessarily requiring abstinence
- Examples include providing clean needles to reduce disease transmission, offering safe injection sites, and distributing naloxone kits
- Encourage individuals to seek professional help through substance abuse treatment programs, counseling, and support groups to address underlying issues and develop coping strategies

# Unit 11 – Allergic Reactions and Anaphylaxis

## 11.1 Types of allergic reactions and their symptoms

Allergic reactions can range from mild to severe, with symptoms affecting various body systems. Understanding the types and signs of these reactions is crucial for proper response and treatment.

Common allergens like foods, insect stings, medications, and latex can trigger reactions. Recognizing symptoms and knowing how to manage them is essential for anyone dealing with allergies or providing first aid.

### Types of Allergic Reactions

#### Severity Levels of Allergic Reactions

- Mild allergic reaction involves localized symptoms that are not life-threatening such as itching, redness, or hives
- Moderate allergic reaction includes more widespread symptoms that can affect multiple body systems (respiratory, gastrointestinal) but are not immediately life-threatening
- Severe allergic reaction, also known as anaphylaxis, is a potentially life-threatening reaction that can cause difficulty breathing, swelling of the throat, and a sudden drop in blood pressure

#### Progression and Timing of Allergic Reactions

- Allergic reactions can progress from mild to moderate to severe if left untreated or if the allergen exposure continues
- Mild and moderate reactions typically develop within minutes to a few hours after exposure to the allergen
- Severe allergic reactions (anaphylaxis) can have a rapid onset, often within seconds to minutes of exposure, requiring immediate treatment with epinephrine

### Symptoms of Allergic Reactions

#### Skin Manifestations

- Hives are raised, red, itchy welts on the skin that can appear suddenly and change location
- Angioedema is swelling of the deeper layers of the skin, often affecting the face, lips, tongue, and throat
- Itching and redness of the skin are common in milder allergic reactions

#### Respiratory Symptoms

- Rhinitis involves symptoms of sneezing, runny nose, nasal congestion, and itching of the nose, eyes, or roof of the mouth

- Asthma symptoms in allergic reactions can include coughing, wheezing, shortness of breath, and chest tightness
- In severe reactions, swelling of the throat and tongue can lead to upper airway obstruction and difficulty breathing

## Role of Histamine

- Histamine is a chemical released by the immune system during an allergic reaction
- It is responsible for many of the symptoms associated with allergies, such as itching, hives, runny nose, and watery eyes
- Antihistamine medications work by blocking the effects of histamine and can help alleviate mild to moderate allergic symptoms

## Common Allergens

### Food Allergens

- Food allergies are caused by an immune reaction to specific proteins in foods
- Common food allergens include peanuts, tree nuts, milk, eggs, soy, wheat, fish, and shellfish
- Symptoms of food allergies can range from mild (hives, itching) to severe (anaphylaxis)

### Insect Sting Allergens

- Insect sting allergies are caused by the venom injected during a sting
- Common culprits include bees, wasps, hornets, and fire ants
- Reactions can be local (swelling and pain at the sting site) or systemic (hives, difficulty breathing, anaphylaxis)

### Medication Allergens

- Drug allergies occur when the immune system reacts to a medication as if it were a harmful substance
- Antibiotics (penicillin), pain relievers (aspirin, ibuprofen), and chemotherapy drugs are common triggers
- Symptoms can include hives, itching, swelling, and in severe cases, anaphylaxis

### Latex Allergens

- Latex allergies are caused by an immune reaction to proteins found in natural rubber latex
- Healthcare workers and individuals with frequent exposure to latex products (gloves, balloons) are at higher risk
- Symptoms can include itching, hives, runny nose, and in severe cases, anaphylaxis

## Defining Allergens

- An allergen is a substance that triggers an allergic reaction in sensitized individuals
- Allergens are usually harmless substances that the immune system mistakenly identifies as a threat

- Common allergens include pollen, pet dander, dust mites, and certain foods, medications, and insect venoms

## 11.2 Anaphylaxis recognition and emergency response

Anaphylaxis is a severe allergic reaction that can be life-threatening. It can affect multiple body systems, causing symptoms like hives, breathing difficulties, and a dangerous drop in blood pressure. Quick recognition and response are crucial for saving lives.

Emergency responders must assess the airway, breathing, and circulation of someone experiencing anaphylaxis. They should be ready to administer epinephrine, provide oxygen, and manage shock. Knowing how to spot and handle anaphylaxis is a vital first aid skill.

### Anaphylaxis Recognition

#### Symptoms and Presentation

- Anaphylaxis is a severe, potentially life-threatening allergic reaction that can occur within seconds or minutes of exposure to an allergen
- Anaphylactic shock occurs when the body's blood pressure drops suddenly and the airways narrow, blocking normal breathing
- Skin changes associated with anaphylaxis include hives, itching, and swelling (angioedema)
- Gastrointestinal symptoms may include abdominal pain, cramping, vomiting, and diarrhea

#### Progression and Severity

- Anaphylaxis can progress rapidly and affect multiple body systems simultaneously
- The severity of anaphylaxis can vary from mild symptoms to severe life-threatening reactions
- Anaphylaxis can lead to respiratory distress, circulatory collapse, and even death if not treated promptly
- Recognizing the signs and symptoms of anaphylaxis is crucial for providing timely emergency care

### Airway and Breathing Assessment

#### Airway Compromise

- Airway compromise in anaphylaxis can result from swelling of the tongue, throat, or larynx
- Signs of airway compromise include stridor, hoarseness, and difficulty speaking or swallowing
- Assess the patient's ability to speak, cough, and breathe effectively
- If the airway is compromised, immediate intervention is necessary to maintain an open airway

#### Breathing Difficulties

- Anaphylaxis can cause breathing difficulties due to bronchospasm and inflammation of the airways
- Patients may experience wheezing, shortness of breath, rapid breathing, or chest tightness
- Assess the patient's respiratory rate, effort, and the presence of abnormal breath sounds (wheezing)

- Provide supplemental oxygen and assist ventilation if necessary to support adequate oxygenation

## Circulatory Assessment

### Circulatory Collapse

- Anaphylaxis can lead to circulatory collapse due to vasodilation and increased vascular permeability
- Signs of circulatory collapse include hypotension, tachycardia, weak or absent pulses, and altered mental status
- Assess the patient's blood pressure, pulse rate, and quality of pulses
- If circulatory collapse is suspected, position the patient supine and elevate their legs to promote blood flow to vital organs

### Shock Management

- Recognize the signs and symptoms of shock, such as pale, cool, and clammy skin, rapid breathing, and decreased level of consciousness
- Administer epinephrine intramuscularly as the first-line treatment for anaphylaxis to counteract the effects of the allergic reaction
- Provide high-flow oxygen and establish intravenous access for fluid resuscitation if available
- Monitor the patient's vital signs and be prepared to perform CPR if necessary

## Emergency Response

### Emergency Action Plan

- Develop an emergency action plan for responding to anaphylaxis in various settings (schools, workplaces, public spaces)
- Train staff and individuals on how to recognize anaphylaxis and initiate the emergency response
- Ensure that epinephrine auto-injectors are readily available and easily accessible
- Regularly review and update the emergency action plan based on current guidelines and best practices

### Activating Emergency Medical Services

- Call 911 or the local emergency number immediately when anaphylaxis is suspected
- Provide the dispatcher with the location, the patient's condition, and any other relevant information
- Stay on the line with the dispatcher and follow their instructions until emergency responders arrive
- Designate someone to guide emergency responders to the patient's location

### Patient Positioning and Comfort

- Position the patient in a comfortable position that facilitates breathing and circulation
- If the patient is conscious and breathing, allow them to sit up or lie down with their legs elevated

- If the patient is unconscious or has difficulty breathing, place them in the recovery position to maintain an open airway
- Provide reassurance and comfort to the patient while waiting for emergency responders to arrive

## 11.3 Epinephrine auto-injector use and precautions

Epinephrine auto-injectors are lifesaving devices for severe allergic reactions. They deliver a quick dose of epinephrine to combat anaphylaxis symptoms like breathing difficulties and low blood pressure.

Proper use is crucial. Inject into the outer thigh, hold for 3 seconds, and seek medical help. Always carry two doses, check expiration dates, and practice with training devices to stay prepared.

## Epinephrine Auto-Injectors

### Epinephrine Medication

- Epinephrine is a medication used to treat severe allergic reactions (anaphylaxis)
- Acts quickly to constrict blood vessels, relax smooth muscles in the lungs to improve breathing, stimulate the heart, and reduce swelling and hives
- Available in auto-injector devices for easy administration during emergencies
- Common brand names include EpiPen, Auvi-Q, and Adrenaclick

### Auto-Injector Devices

- Auto-injectors are designed for quick and easy administration of epinephrine during an anaphylactic emergency
- Consist of a spring-loaded needle that automatically injects a single dose of epinephrine when pressed firmly against the thigh
- Provide a convenient and portable way to carry and administer epinephrine
- Some auto-injectors have audio and visual instructions to guide users through the injection process (Auvi-Q)

### Dosage and Availability

- Epinephrine auto-injectors are available in two dosages: 0.15 mg for children weighing 33-66 lbs (15-30 kg) and 0.3 mg for children and adults weighing over 66 lbs (30 kg)
- Prescribed by a healthcare provider and can be purchased at most pharmacies
- People with known severe allergies should carry two doses of epinephrine with them at all times in case a second dose is needed before emergency medical help arrives

## Administration Technique

### Injection Site and Method

- Epinephrine should be injected into the middle of the outer thigh (vastus lateralis muscle)
- Can be injected through clothing if necessary

- Remove safety cap and press auto-injector firmly against the thigh at a 90-degree angle until a click is heard, then hold in place for 3 seconds to ensure full dose is delivered
- Massage injection site for 10 seconds to promote absorption

## Second Dose Administration

- If symptoms do not improve within 5-15 minutes or if symptoms return, a second dose of epinephrine may be needed
- Administer second dose in the opposite thigh
- Seek immediate medical attention after using an epinephrine auto-injector, even if symptoms seem to have resolved

## Training and Practice

- Individuals with severe allergies, as well as their family members and caregivers, should be trained on how to recognize signs of anaphylaxis and properly use an epinephrine auto-injector
- Practice with a training device (often provided by the manufacturer) to become familiar with the injection technique
- Review instructions and practice regularly to maintain competency in using the auto-injector

## Precautions

### Storage and Expiration

- Store epinephrine auto-injectors at room temperature (68-77°F or 20-25°C) and protect from light
- Do not refrigerate or freeze, as this can cause the device to malfunction
- Check expiration dates regularly and replace expired auto-injectors
- Most epinephrine auto-injectors have a shelf life of 12-18 months

## Side Effects and Considerations

- Common side effects of epinephrine include anxiety, restlessness, tremors, palpitations, and headache
- These side effects are usually mild and short-lived
- Rare but serious side effects can include irregular heartbeat, chest pain, and stroke
- Use with caution in individuals with certain medical conditions such as heart disease, high blood pressure, and diabetes
- Inform all healthcare providers of epinephrine use and presence of severe allergies

# Unit 12 – Sudden Illnesses: Diabetes, Seizures, Stroke

## 12.1 Diabetic emergencies: Hypoglycemia and hyperglycemia

Diabetes can cause two dangerous emergencies: hypoglycemia and hyperglycemia. These conditions occur when blood sugar levels drop too low or rise too high, respectively. Both can be life-threatening if not treated promptly.

Recognizing the signs of diabetic emergencies is crucial for first responders. Hypoglycemia requires fast-acting carbs, while hyperglycemia may need medical intervention. Understanding these conditions helps provide effective care for diabetic patients in crisis.

### Hypoglycemia

#### Causes and Symptoms

- Hypoglycemia occurs when blood glucose levels drop too low, typically below 70 mg/dL
- Can be caused by taking too much insulin, skipping meals, or engaging in excessive physical activity
- Symptoms include shakiness, dizziness, confusion, sweating, and rapid heartbeat
- If left untreated, hypoglycemia can lead to seizures, unconsciousness, and even death

#### Treatment

- Treat conscious patients with 15-20 grams of fast-acting carbohydrates such as glucose tablets, fruit juice, or regular soda
- Recheck blood glucose levels using a blood glucose meter 15 minutes after treatment and repeat if levels remain low
- For unconscious patients or those unable to swallow, administer glucagon intramuscularly or intravenously
- Glucagon is a hormone that stimulates the liver to release stored glucose into the bloodstream
- Glucagon kits are available by prescription for emergency use

### Hyperglycemia and Diabetic Emergencies

#### Hyperglycemia

- Hyperglycemia is a condition characterized by high blood glucose levels, typically above 180-200 mg/dL
- Can be caused by insufficient insulin, infection, stress, or consuming too many carbohydrates
- Symptoms develop gradually and may include increased thirst, frequent urination, blurred vision, and fatigue

- If left untreated, hyperglycemia can progress to more serious complications such as diabetic ketoacidosis or diabetic coma

## Diabetic Ketoacidosis (DKA)

- DKA occurs when the body produces high levels of blood acids called ketones due to insufficient insulin
- Ketones build up in the blood and urine, leading to a chemical imbalance in the body
- Symptoms include nausea, vomiting, abdominal pain, rapid breathing, fruity-smelling breath, and confusion
- DKA is a life-threatening emergency that requires immediate medical attention and treatment with insulin and intravenous fluids

## Treatment

- For mild to moderate hyperglycemia, patients may be treated with increased insulin doses and oral hydration
- Severe hyperglycemia or DKA requires hospitalization for intravenous insulin therapy, fluid replacement, and electrolyte management
- Monitor blood glucose levels closely and adjust insulin doses as needed to gradually lower blood glucose to target range

## Diabetes Mellitus Overview

### Types and Causes

- Diabetes mellitus is a chronic condition characterized by high blood glucose levels due to insufficient insulin production or insulin resistance
- Type 1 diabetes is an autoimmune disorder in which the body's immune system attacks and destroys the insulin-producing cells in the pancreas
- Type 2 diabetes occurs when the body becomes resistant to insulin or the pancreas doesn't produce enough insulin
- Gestational diabetes develops during pregnancy due to hormonal changes that affect insulin sensitivity

### Management

- Treatment goals for diabetes include maintaining blood glucose levels within a target range, typically 80-130 mg/dL before meals and less than 180 mg/dL two hours after meals
- Management strategies include regular blood glucose monitoring, healthy eating, physical activity, and medication (insulin or oral diabetes medications)
- Patients with type 1 diabetes require lifelong insulin therapy through injections or an insulin pump
- Patients with type 2 diabetes may be managed with lifestyle changes, oral medications, and/or insulin therapy

- Regular check-ups with a healthcare provider are important to monitor diabetes control and screen for complications such as nerve damage, kidney disease, and eye problems

## 12.2 Seizure types, first aid, and safety measures

Seizures can be scary, but knowing how to help is crucial. We'll look at different types of seizures, from tonic-clonic to absence seizures, and learn how to spot them. Understanding seizure emergencies and what happens after a seizure is key to providing proper care.

Managing seizures is about more than just first aid. We'll explore epilepsy, seizure precautions, and anticonvulsant medications. This knowledge helps us create safer environments for those with seizure disorders and respond effectively when seizures occur.

### Types of Seizures

#### Generalized and Focal Seizures

- Generalized seizures involve both sides of the brain and cause loss of consciousness
- Include tonic-clonic seizures (formerly known as grand mal seizures) which involve muscle rigidity (tonic phase) followed by muscle contractions (clonic phase)
- Also include absence seizures (formerly known as petit mal seizures) which involve brief lapses in consciousness without muscle activity (staring spells)
- Focal seizures (formerly known as partial seizures) begin in one area of the brain and may or may not cause loss of consciousness
- Simple focal seizures do not cause loss of consciousness but can cause sensory, motor, or psychic symptoms (auras)
- Complex focal seizures cause loss of consciousness and may involve repetitive movements (automatisms) such as lip smacking or hand wringing

#### Tonic-Clonic and Absence Seizures

- Tonic-clonic seizures are the most common type of generalized seizure
- Tonic phase involves muscle rigidity and may cause the person to fall to the ground
- Clonic phase involves rhythmic muscle contractions and may cause the person to bite their tongue or lose bladder control
- Typically last 1-3 minutes but may be longer in some cases
- Absence seizures most commonly occur in children and are characterized by brief lapses in consciousness
- May involve staring, eye blinking, or slight muscle twitching
- Typically last less than 10 seconds but may occur frequently throughout the day
- Can be mistaken for daydreaming or inattentiveness

# Seizure Emergencies

## Status Epilepticus

- Status epilepticus is a life-threatening condition characterized by a seizure lasting longer than 5 minutes or multiple seizures without regaining consciousness in between
- Can cause brain damage or death if not treated promptly
- Treatment involves administering anticonvulsant medications (benzodiazepines) to stop the seizure
- If seizure does not stop with initial treatment, additional medications may be needed (phenytoin, levetiracetam)
- In some cases, general anesthesia may be necessary to stop the seizure

## Postictal State

- The postictal state occurs after a seizure and is characterized by confusion, drowsiness, and memory loss
- Can last minutes to hours depending on the type and severity of the seizure
- During this time, the person may be disoriented and have difficulty communicating or following commands
- It is important to stay with the person and provide reassurance until they have fully recovered
- In some cases, the person may experience postictal paralysis (Todd's paralysis) which is temporary weakness on one side of the body

## Seizure Management

### Epilepsy and Seizure Precautions

- Epilepsy is a chronic neurological disorder characterized by recurrent seizures
- Treatment involves taking daily anticonvulsant medications to prevent seizures
- Common medications include carbamazepine, valproic acid, and levetiracetam
- Medication adherence is important to maintain therapeutic levels and prevent breakthrough seizures
- Seizure precautions involve taking steps to prevent injury during a seizure
- Avoid activities that could be dangerous during a seizure such as swimming or climbing ladders
- Wear a medical alert bracelet or carry a card indicating that you have epilepsy
- Inform family, friends, and coworkers about your condition and how to respond if a seizure occurs

### Anticonvulsant Medications

- Anticonvulsant medications work by reducing the excitability of brain cells and preventing the spread of seizure activity
- There are many different types of anticonvulsant medications, each with its own mechanism of action and side effect profile

- Some medications work by blocking sodium channels (carbamazepine, phenytoin) while others enhance the activity of GABA, an inhibitory neurotransmitter (benzodiazepines, valproic acid)
- Side effects can include drowsiness, dizziness, nausea, and weight gain
- Medication selection is based on the type of seizure, age of the patient, and other medical conditions
- Regular follow-up with a neurologist is important to monitor medication effectiveness and adjust dosage as needed
- In some cases, surgery may be considered for patients with medication-resistant epilepsy

## 12.3 Stroke identification and immediate care

Strokes are serious medical emergencies that can cause lasting brain damage. Quick action is crucial. The FAST method helps identify stroke symptoms: Face drooping, Arm weakness, Speech difficulties, and Time to call for help.

Understanding stroke types, risk factors, and treatments is vital for prevention and care. Ischemic strokes from blood clots and hemorrhagic strokes from bleeding require different approaches. Recognizing symptoms early can save lives and reduce long-term effects.

### Types of Stroke

#### Ischemic Stroke and Transient Ischemic Attack (TIA)

- Ischemic stroke occurs when a blood clot blocks an artery supplying blood to the brain, depriving brain cells of oxygen and nutrients
- Accounts for approximately 87% of all strokes
- Can be caused by a thrombus (blood clot formed in the artery) or an embolus (blood clot formed elsewhere in the body that travels to the brain)
- Transient ischemic attack (TIA) is a temporary blockage of blood flow to the brain that resolves on its own within 24 hours
- TIAs are often referred to as "mini-strokes" and serve as warning signs of a potential future stroke (approximately 1/3 of people who experience a TIA will have a major stroke within a year)

#### Hemorrhagic Stroke

- Hemorrhagic stroke occurs when a weakened blood vessel in the brain ruptures, causing bleeding into the brain tissue
- Accounts for approximately 13% of all strokes but is responsible for about 30% of all stroke deaths
- Can be caused by an aneurysm (weakened area of a blood vessel that bulges out and may rupture) or an arteriovenous malformation (AVM, abnormal tangle of blood vessels)
- Two main types of hemorrhagic stroke are intracerebral hemorrhage (bleeding within the brain tissue) and subarachnoid hemorrhage (bleeding into the space between the brain and the surrounding membrane)

# Stroke Symptoms and Assessment

## FAST Assessment and Hemiparesis

- FAST is an acronym used to quickly assess and identify potential stroke symptoms:
- Face: Ask the person to smile and check if one side of the face droops
- Arms: Ask the person to raise both arms and see if one arm drifts downward
- Speech: Ask the person to repeat a simple phrase and check for slurred or unusual speech
- Time: If any of these signs are present, note the time symptoms began and call emergency services immediately
- Hemiparesis is weakness or paralysis on one side of the body, a common symptom of stroke (can affect the face, arm, or leg)

## Aphasia and Other Symptoms

- Aphasia is a language disorder caused by damage to the brain's language centers, often resulting from a stroke
- Can affect a person's ability to speak, understand, read, or write (may have difficulty finding the right words, understanding others, or forming coherent sentences)
- Other potential stroke symptoms include sudden severe headache, vision problems (blurred vision, double vision, or loss of vision), dizziness, loss of balance or coordination, and confusion

## Stroke Treatment and Risk Factors

### Time-Sensitive Treatment and Thrombolytic Therapy

- Stroke treatment is highly time-sensitive, and early intervention is crucial for minimizing brain damage and improving outcomes
- "Time is brain": The longer a stroke goes untreated, the more brain cells die, emphasizing the importance of quick recognition and action
- Thrombolytic therapy, also known as "clot-busting" medication, can be administered to break up blood clots in ischemic strokes (most commonly used drug is tissue plasminogen activator, or tPA)
- tPA must be given within 3-4.5 hours of symptom onset for the best chance of success and to reduce the risk of complications (underscores the importance of the "Time" component in the FAST assessment)

### Stroke Risk Factors

- Some stroke risk factors are non-modifiable, such as age (risk increases with age), family history, and race (African Americans and Hispanics have a higher risk)
- Modifiable risk factors include high blood pressure, high cholesterol, diabetes, smoking, obesity, and physical inactivity
- Lifestyle changes such as maintaining a healthy diet, exercising regularly, quitting smoking, and managing underlying health conditions can help reduce the risk of stroke

- Regular check-ups and screenings can help identify and manage risk factors before a stroke occurs (early detection and intervention are key in stroke prevention)

# Unit 13 – Heat and Cold–Related Emergencies

## 13.1 Heat exhaustion and heat stroke management

Heat exhaustion and heat stroke are serious conditions that can occur when the body overheats. These illnesses result from prolonged exposure to high temperatures, often combined with dehydration and physical exertion.

Recognizing the symptoms and providing prompt treatment is crucial. Cooling techniques, rehydration, and supportive care are key steps in managing these conditions. Understanding risk factors and prevention strategies can help reduce the likelihood of heat-related emergencies.

### Heat-related Illnesses

#### Types of Heat-related Illnesses

- Heat exhaustion occurs when the body becomes overwhelmed by heat and loses excessive amounts of water and salt through sweating
- Symptoms include heavy sweating, rapid pulse, dizziness, fatigue, cool and moist skin, muscle cramps, nausea, and headache
- Heat stroke is a life-threatening condition that develops when the body's temperature regulation system fails, leading to a core body temperature above 104°F (40°C)
- Characterized by red, hot, and dry skin (without sweating), rapid and strong pulse, throbbing headache, dizziness, nausea, confusion, and unconsciousness
- Hyperthermia refers to an abnormally high body temperature resulting from the body's inability to regulate heat effectively
- Can be caused by exposure to high environmental temperatures, strenuous physical activity, or certain medications that interfere with the body's cooling mechanisms
- Heat cramps are painful, involuntary muscle spasms that typically occur in the legs, arms, or abdomen during or after intense physical activity in hot environments
- Caused by the loss of fluids and electrolytes through sweating, which disrupts the balance of minerals in the muscles

#### Risk Factors and Prevention

- Factors that increase the risk of heat-related illnesses include dehydration, prolonged exposure to high temperatures, physical exertion, lack of acclimatization, and certain medical conditions (cardiovascular disease, obesity)
- Prevention strategies involve staying hydrated, wearing loose and light-colored clothing, taking frequent breaks in cool or shaded areas, and avoiding strenuous activities during the hottest parts of the day
- Acclimatization, the gradual adaptation of the body to hot environments through repeated exposure, can help reduce the risk of heat-related illnesses

- Monitoring the heat index, a measure that combines air temperature and relative humidity to determine the perceived temperature, can help assess the risk of heat-related illnesses

## Physiological Factors

### Body Temperature Regulation

- Core body temperature refers to the internal temperature of the body, which is normally maintained around 98.6°F (37°C) through thermoregulation
- Thermoregulation is the process by which the body maintains its core temperature within a narrow range, balancing heat production and heat loss
- Mechanisms include sweating, vasodilation (widening of blood vessels), and behavioral adaptations (seeking shade or cooler environments)
- Dehydration occurs when the body loses more fluids than it takes in, leading to a decrease in total body water
- Can impair the body's ability to regulate temperature effectively, as sweating becomes less efficient in cooling the body

### Electrolyte Imbalance

- Electrolyte imbalance can occur during heat stress due to the loss of essential minerals (sodium, potassium, chloride) through sweating
- Proper balance of electrolytes is crucial for maintaining fluid balance, muscle function, and nerve impulse transmission
- Symptoms of electrolyte imbalance may include muscle cramps, fatigue, dizziness, confusion, and irregular heartbeat
- Rehydration with fluids containing electrolytes (sports drinks) can help restore the balance and prevent further complications

## Treatment

### Cooling Techniques

- The primary goal in treating heat-related illnesses is to lower the body's core temperature and prevent further heat gain
- Cooling techniques for heat exhaustion include moving the person to a cool, shaded area, removing excess clothing, applying cool and wet cloths to the skin, and encouraging oral rehydration with water or sports drinks
- For heat stroke, rapid cooling is crucial to prevent organ damage and potentially fatal complications
- Methods include immersion in cold water, applying ice packs to the groin, armpits, and neck, or using evaporative cooling (misting the skin while fanning)

### Supportive Care and Monitoring

- In addition to cooling measures, supportive care for heat-related illnesses involves rest, rehydration, and close monitoring of vital signs

- Intravenous fluids may be necessary for severe dehydration or if the person is unable to drink orally
- Monitoring should include assessing mental status, body temperature, pulse, blood pressure, and respiration rate
- Hospitalization may be required for severe cases of heat stroke or if complications arise (organ dysfunction, electrolyte abnormalities)
- Prevention education and guidance on acclimatization should be provided to individuals at risk of heat-related illnesses, especially athletes, outdoor workers, and those living in hot climates

## 13.2 Hypothermia and frostbite recognition and treatment

Cold-related emergencies can be life-threatening. Hypothermia occurs when body temperature drops below 95°F, causing shivering and vasoconstriction. Frostbite is the freezing of skin and tissues, progressing from frostnip to severe tissue damage.

Quick action is crucial for both conditions. Rewarming techniques, like moving to a warm environment and using warm blankets, help restore body temperature. Avoid rubbing affected areas or using direct heat sources, as these can worsen damage.

### Hypothermia Recognition and Treatment

#### Core Temperature Drop and Body's Response

- Hypothermia occurs when the body's core temperature drops below 95°F (35°C) due to prolonged exposure to cold temperatures
- Core temperature refers to the internal temperature of the body's vital organs, which is normally maintained around 98.6°F (37°C)
- As the core temperature drops, the body initiates shivering, involuntary muscle contractions that generate heat to warm the body
- Peripheral vasoconstriction, narrowing of blood vessels in the extremities, occurs to reduce heat loss and redirect blood flow to vital organs
- Immersion hypothermia can develop rapidly when a person is submerged in cold water, as water conducts heat away from the body 25 times faster than air

#### Afterdrop Phenomenon

- Afterdrop is a continued decrease in core temperature even after removal from the cold environment
- Occurs when cold blood from the extremities returns to the body's core, further lowering the core temperature
- Can be life-threatening if not properly managed during the rewarming process (gradual rewarming, close monitoring of vital signs)

### Frostbite Recognition and Stages

#### Frostnip: Early Stage of Frostbite

- Frostnip is the earliest stage of frostbite, characterized by numbness and tingling in the affected area

- Skin appears red and feels cold to the touch, but tissue damage is minimal and reversible
- Commonly affects exposed skin, such as the nose, ears, cheeks, fingers, and toes

## Progression to Frostbite and Tissue Damage

- If exposure to cold continues, frostnip can progress to frostbite, a more severe condition involving the freezing of skin and underlying tissues
- Frostbite causes skin to become pale, waxy, and hard, with a loss of sensation in the affected area
- As frostbite progresses, tissue damage becomes more extensive, potentially leading to blisters, skin necrosis (death), and gangrene (tissue death) in severe cases
- Depth of tissue damage depends on the duration and severity of cold exposure (superficial frostbite vs. deep frostbite)

## Rewarming Techniques

### Passive and Active Rewarming Methods

- Passive rewarming involves moving the person to a warm environment, removing wet clothing, and allowing the body to rewarm naturally
- Active rewarming techniques are used for more severe cases of hypothermia and frostbite to help restore normal body temperature
- Examples of active rewarming include warm water immersion (104-108°F or 40-42°C), warm blankets, and heated intravenous fluids

## Precautions and Considerations

- Rewarming should be done gradually to prevent further tissue damage and complications, such as afterdrop
- Avoid massaging or rubbing the affected area, as this can cause additional damage to the skin and tissues
- Do not use direct heat sources (fire, heating pad) as they can cause burns and worsen tissue damage
- Seek medical attention for severe cases of hypothermia and frostbite to ensure proper treatment and monitoring

## 13.3 Prevention strategies for environmental emergencies

Heat and cold can be dangerous. Knowing how to prevent emergencies is key. From acclimatization to proper clothing, these strategies help our bodies handle extreme temperatures safely.

Monitoring conditions, using the buddy system, and protecting against sun exposure are crucial. By understanding and applying these prevention methods, we can enjoy outdoor activities while minimizing risks.

## Prevention Strategies for Heat-Related Emergencies

### Preparing the Body for Hot Environments

- Acclimatization involves gradually exposing the body to hot environments over a period of time (usually 7-14 days) to allow physiological adaptations that improve heat tolerance
- Proper hydration means consuming adequate fluids before, during, and after exposure to hot environments to maintain fluid balance and prevent dehydration
- Appropriate clothing for hot environments should be lightweight, loose-fitting, and light-colored to facilitate heat dissipation and protect against sun exposure (wide-brimmed hats, long-sleeved shirts)

### Monitoring Environmental Conditions

- WBGT (Wet Bulb Globe Temperature) is a composite temperature used to estimate the effect of temperature, humidity, wind speed, and solar radiation on the human body
- WBGT takes into account the cooling effect of evaporation from a wet bulb thermometer, the heat from direct sunlight measured by a black globe thermometer, and ambient air temperature
- Rest periods should be scheduled based on environmental conditions (WBGT), work intensity, and individual factors to allow the body to cool down and prevent heat stress

## Prevention Strategies for Cold-Related Emergencies

### Assessing Cold Stress Factors

- Wind chill factor is the perceived decrease in air temperature felt by the body on exposed skin due to the flow of air, which accelerates heat loss from the body
- Wind chill factor is determined by air temperature and wind speed, with higher wind speeds resulting in lower wind chill temperatures and increased risk of cold stress
- Appropriate clothing for cold environments should be layered, insulating, and wind/water-resistant to trap heat, wick away moisture, and protect against wind and precipitation (thermal underwear, fleece, waterproof outer layer)

### Implementing Safety Measures

- Buddy system involves working in pairs to monitor each other for signs and symptoms of cold stress (shivering, confusion, slurred speech) and provide assistance if needed
- Buddies should take frequent breaks together in warm, sheltered areas to allow the body to warm up and prevent further heat loss

## General Prevention Strategies

### Protecting Against Sun Exposure

- Sun protection measures include wearing protective clothing (wide-brimmed hats, long-sleeved shirts), applying broad-spectrum sunscreen (SPF 30 or higher), and seeking shade during peak sun hours (10 am to 4 pm)

- Proper hydration is essential in both hot and cold environments to maintain fluid balance, regulate body temperature, and support physical performance
- Consuming water, electrolyte beverages, and other non-caffeinated fluids regularly throughout the day can help prevent dehydration and heat-related illnesses

## Promoting Safety Through Teamwork

- Appropriate clothing selection should consider the specific environmental conditions, activity level, and individual factors (age, health status) to ensure adequate protection and comfort
- Clothing should be adjusted as needed based on changing conditions (adding or removing layers) to maintain a comfortable body temperature and prevent overheating or overcooling
- Buddy system is an important safety measure in both hot and cold environments to ensure that individuals look out for each other, recognize signs of distress, and provide prompt assistance if needed
- Buddies should be familiar with emergency procedures and have means to communicate with each other and summon help if necessary (whistles, two-way radios)

# Unit 14 – First Aid: Patient Care Principles for Nurses

## 14.1 Patient assessment and history taking

Patient assessment and history taking are crucial skills in first aid. They help identify life-threatening conditions and guide treatment decisions. The primary survey uses the ABCDE approach, while the secondary survey involves a head-to-toe examination.

Vital signs provide key information about a patient's condition. The SAMPLE history gathers essential details about the patient's health and the incident. Understanding the mechanism of injury helps predict potential injuries and tailor the assessment process.

### Patient Assessment

#### Primary and Secondary Surveys

- Primary survey quickly identifies life-threatening conditions using the ABCDE approach (Airway, Breathing, Circulation, Disability, Exposure)
- Involves checking for responsiveness, assessing airway patency, evaluating breathing quality and rate, checking pulse and signs of bleeding, determining level of consciousness, and exposing the patient for a thorough examination
- Secondary survey is a head-to-toe assessment performed after the primary survey to identify additional injuries or conditions
- Includes a systematic examination of the patient's body, starting from the head and working down to the toes, looking for signs of injury, deformity, or abnormalities (bruising, swelling, tenderness)

#### Vital Signs and Body Systems Assessment

- Vital signs provide crucial information about the patient's physiological status and include temperature, pulse rate, respiratory rate, blood pressure, and oxygen saturation
- Temperature can indicate infection, hypothermia, or hyperthermia (normal range: 97.7°F to 99.5°F or 36.5°C to 37.5°C)
- Pulse rate reflects the heart's functioning and can be measured at various pulse points (radial, carotid, femoral) (normal adult range: 60-100 beats per minute)
- Respiratory rate and quality indicate the effectiveness of the patient's breathing (normal adult range: 12-20 breaths per minute)
- Blood pressure measures the force of blood against the arterial walls during systole and diastole (normal adult range: 120/80 mmHg)
- Oxygen saturation measures the percentage of hemoglobin saturated with oxygen and can be assessed using a pulse oximeter (normal range: 95-100%)
- Body systems assessment involves evaluating the functioning of major organ systems, such as the cardiovascular, respiratory, neurological, and gastrointestinal systems

- Assessing the cardiovascular system includes checking for signs of shock, evaluating capillary refill time, and monitoring heart sounds
- Respiratory system assessment involves observing chest wall movement, auscultating lung sounds, and checking for signs of respiratory distress (cyanosis, nasal flaring, retractions)

## History Taking

### SAMPLE History and Chief Complaint

- SAMPLE is an acronym used to gather essential patient information: Signs/Symptoms, Allergies, Medications, Past medical history, Last oral intake, Events leading to the incident
- Obtaining a SAMPLE history helps provide context for the patient's condition and guides treatment decisions
- Signs and symptoms are the patient's subjective complaints and objective findings (pain, nausea, visible injuries)
- Allergies to medications, foods, or environmental factors should be identified to avoid adverse reactions during treatment
- Medications, both prescription and over-the-counter, can impact the patient's condition and treatment options
- Past medical history, including chronic illnesses, surgeries, and hospitalizations, provides insight into the patient's overall health status
- Last oral intake helps determine the risk of aspiration during resuscitation and guides the decision to administer oral medications
- Events leading to the incident, such as the mechanism of injury or onset of symptoms, help establish the cause and severity of the patient's condition
- Chief complaint is the primary reason the patient is seeking medical attention and should be documented in the patient's own words (shortness of breath, chest pain, abdominal pain)

### Mechanism of Injury

- Mechanism of injury describes the forces and events that caused the patient's injury or illness
- Understanding the mechanism of injury helps predict potential injuries and guides the assessment and treatment process
- Examples of mechanisms of injury include blunt trauma (motor vehicle accidents, falls), penetrating trauma (stab wounds, gunshot wounds), and medical emergencies (stroke, myocardial infarction)
- Gathering information about the height of a fall, the speed of a vehicle, or the type of weapon involved can provide valuable insights into the severity of the injury

## Neurological Assessment

### Glasgow Coma Scale and Pain Assessment

- The Glasgow Coma Scale (GCS) is a standardized tool used to assess a patient's level of consciousness and neurological functioning

- GCS evaluates three components: eye-opening response (4 points), verbal response (5 points), and motor response (6 points)
- The total GCS score ranges from 3 (deep coma) to 15 (fully conscious) and helps guide treatment decisions and monitor patient progress
- Pain assessment is a crucial component of patient care, as pain can be a sign of underlying injury or illness
- Pain can be assessed using various scales, such as the numeric rating scale (0-10) or the visual analog scale (line with "no pain" and "worst pain" endpoints)
- Patients should be asked to describe the location, intensity, quality, and duration of their pain, as well as any aggravating or alleviating factors

## Neurological Assessment Techniques

- Neurological assessment involves evaluating the patient's cognitive function, motor strength, sensory perception, and reflexes
- Cognitive function can be assessed by asking the patient to state their name, location, and current date/time (orientation) and testing short-term memory
- Motor strength is evaluated by having the patient resist force applied to various muscle groups and comparing strength bilaterally
- Sensory perception is assessed by testing the patient's ability to feel light touch, pain, and temperature in different dermatomes
- Reflexes, such as the patellar and biceps reflexes, are tested using a reflex hammer to evaluate the integrity of the nervous system
- Pupillary response to light is assessed by shining a light into each eye and observing the constriction and dilation of the pupils (normal response is equal and reactive)
- Abnormal neurological findings, such as weakness, numbness, or altered mental status, can indicate underlying conditions (stroke, traumatic brain injury, spinal cord injury) and require prompt intervention

## 14.2 Communication skills in emergency situations

Effective communication is crucial in emergency situations. First responders must master active listening, clear language, and nonverbal cues to connect with patients. Cultural sensitivity and de-escalation strategies help navigate diverse scenarios, ensuring everyone feels heard and understood.

Structured frameworks like closed-loop communication and SBAR enhance information exchange among healthcare teams. These tools minimize errors and ensure critical details are conveyed accurately. By mastering these skills, first responders can provide better care and support in high-stress situations.

## Effective Communication Techniques

### Active Listening and Clear Language

- Engage in active listening involves fully concentrating on the speaker, understanding their message, and responding thoughtfully
- Maintain eye contact, nod occasionally, and avoid interrupting the speaker to demonstrate attentiveness

- Use clear and concise language that is easy for the patient or their family to understand
- Avoid medical jargon and technical terms that may confuse or overwhelm the listener
- Break down complex information into smaller, more manageable chunks to facilitate comprehension

## Nonverbal Communication and Empathy

- Pay attention to nonverbal cues such as facial expressions, body language, and tone of voice, as they can convey important information about the speaker's emotions and concerns
- Use appropriate nonverbal communication techniques, such as maintaining an open posture and using gentle touch (with permission), to show care and support
- Practice empathy by putting yourself in the patient's shoes and trying to understand their perspective and feelings
- Validate the patient's emotions and concerns by acknowledging them and expressing understanding (e.g., "I can see how difficult this must be for you")

## Reassurance Techniques

- Provide reassurance to help alleviate the patient's anxiety and fear in emergency situations
- Use a calm and confident tone of voice to convey a sense of control and competence
- Offer specific information about what is being done to help the patient and what they can expect in the near future
- Emphasize the patient's strengths and resilience to help them cope with the challenges they are facing
- Encourage the patient to ask questions and express their concerns, as this can help them feel more in control of the situation

## Communicating in Diverse Situations

### Cultural Sensitivity

- Recognize and respect cultural differences that may impact communication, such as language barriers, religious beliefs, and social norms
- Use a professional interpreter when necessary to ensure accurate and effective communication with patients who have limited English proficiency
- Avoid making assumptions about a patient's cultural background or beliefs, and instead ask open-ended questions to better understand their perspective
- Adapt communication style and approach to meet the patient's cultural needs and preferences (e.g., involving family members in decision-making for collectivistic cultures)

### De-escalation Strategies

- Use de-escalation techniques to calm agitated or aggressive patients and prevent situations from escalating
- Remain calm and composed, even in the face of anger or hostility, to avoid further escalating the situation

- Use a non-threatening body language, such as keeping hands visible and maintaining a safe distance, to convey a sense of safety and respect
- Listen actively to the patient's concerns and validate their feelings, while gently redirecting the conversation towards finding a solution
- Offer choices and options, when possible, to give the patient a sense of control and autonomy in the situation

## Structured Communication Frameworks

### Closed-Loop Communication

- Employ closed-loop communication to ensure that information is accurately transmitted and received among healthcare team members
- The sender initiates the communication by making a clear and concise statement or request
- The receiver acknowledges the message by repeating back the key points to confirm their understanding
- The sender then confirms that the receiver has accurately understood the message, closing the communication loop
- This technique helps minimize misunderstandings and errors, particularly in high-stress or time-sensitive situations

### SBAR (Situation, Background, Assessment, Recommendation)

- Use the SBAR framework to effectively communicate patient information among healthcare professionals, especially during handoffs or when seeking consultation
- Situation: Briefly state the current situation or problem, including the patient's name, age, and chief complaint or concern
- Background: Provide relevant background information, such as the patient's medical history, medications, allergies, and any recent changes in their condition
- Assessment: Share your assessment of the situation, including vital signs, physical examination findings, and any diagnostic test results
- Recommendation: Clearly state your recommendation for the next steps in the patient's care, such as further testing, medication changes, or specialist consultation
- This structured approach helps ensure that all essential information is communicated efficiently and effectively, reducing the risk of omissions or confusion

## 14.3 Documentation and handover procedures

Accurate documentation and effective handover procedures are crucial in first aid and patient care. They ensure continuity of care, protect patient privacy, and provide legal records. Proper documentation includes patient care reports, incident details, and SOAP notes, while handovers use techniques like SBAR for clear communication.

Confidentiality and legal considerations are paramount in healthcare documentation. Providers must maintain patient privacy, follow chain of custody procedures for evidence, and create thorough, accurate records to mitigate legal risks and demonstrate compliance with professional standards.

## Documentation

### Patient Care Reports and Documentation

- Patient care reports (PCRs) document all aspects of patient care from initial assessment to final disposition
- Includes patient demographics, chief complaint, history, physical exam findings, vital signs, interventions, and outcomes
- Serves as a legal record of care provided and aids in continuity of care
- Incident documentation records details of the emergency incident
- Encompasses scene assessment, hazards, resources utilized, and actions taken
- Provides a comprehensive account of the event for legal, quality improvement, and debriefing purposes
- Electronic health records (EHRs) store and transmit patient information digitally
- Facilitates data sharing among healthcare providers and institutions
- Enhances accessibility, legibility, and security of patient records compared to paper-based systems

### SOAP Notes

- SOAP notes are a standardized format for documenting patient encounters
- Subjective: Patient's reported symptoms, concerns, and relevant history
- Objective: Measurable findings such as vital signs, physical exam results, and diagnostic tests
- Assessment: Provider's diagnosis or impression based on subjective and objective data
- Plan: Recommended treatment, interventions, referrals, and follow-up
- Organizes information in a clear, concise manner for effective communication and decision-making
- Commonly used in various healthcare settings (primary care, emergency departments, rehabilitation)

## Legal and Ethical Considerations

### Confidentiality and Chain of Custody

- Confidentiality ensures patient privacy by protecting sensitive health information from unauthorized disclosure
- Governed by laws and regulations (HIPAA in the United States, Data Protection Act in the United Kingdom)
- Requires secure storage, transmission, and access controls for patient records
- Chain of custody tracks the movement and handling of evidence from collection to presentation in legal proceedings
- Maintains integrity and credibility of evidence by documenting each transfer of custody
- Crucial in cases involving criminal investigations or legal disputes related to patient care

## Legal Considerations

- Documentation must be accurate, complete, and timely to mitigate legal risks
- Inconsistencies or omissions can lead to questions about the quality of care provided
- Thorough documentation supports defense against malpractice claims or disciplinary actions
- Providers must adhere to scope of practice, professional standards, and institutional policies
- Deviations from established protocols may constitute negligence or misconduct
- Proper documentation demonstrates compliance with legal and ethical obligations

## Handover Procedures

### ISBAR Handover Technique

- ISBAR is a structured communication tool for effective handovers between healthcare professionals
- Identify: Introduce yourself, your role, and the patient being discussed
- Situation: Briefly state the current situation and reason for the handover
- Background: Provide relevant medical history, treatment, and progress to date
- Assessment: Share your clinical impression, concerns, and potential risks
- Recommendation: Propose a plan of action, including pending tasks and contingencies
- Ensures critical information is conveyed clearly and concisely during transitions of care
- Minimizes omissions, misunderstandings, and delays in treatment
- Particularly valuable in time-sensitive situations (shift changes, transfers between units or facilities)

# Unit 15 – Emergencies: Pediatric, Geriatric & Pregnancy

## 15.1 Pediatric emergency considerations and techniques

Pediatric emergencies require special considerations due to children's unique anatomy and physiology. From assessing appearance and breathing to performing age-appropriate resuscitation techniques, first responders must adapt their approach to meet the needs of young patients.

Common pediatric emergencies like fever, seizures, and trauma demand specific interventions. Recognizing signs of abuse and neglect is crucial. By understanding these key aspects, first responders can provide effective care tailored to children's distinct requirements.

### Pediatric Assessment and Resuscitation

#### Initial Assessment Techniques

- Pediatric Assessment Triangle assesses appearance, work of breathing, and circulation to skin to rapidly determine the severity of illness or injury in children
- Appearance evaluates tone, interactivity, consolability, look/gaze, and speech/cry
- Work of breathing assesses abnormal airway sounds (stridor, grunting, wheezing), abnormal positioning (sniffing position, tripodding), retractions, and nasal flaring
- Circulation to skin looks for pallor, mottling, cyanosis
- Airway positioning in children requires padding under the shoulders to accommodate the larger occiput and align the airway (sniffing position)
- Avoid hyperextension of the neck which can collapse the airway
- Jaw thrust maneuver can be used to open the airway without extending the neck (trauma)

#### Resuscitation Techniques

- Chest compressions for infants (< 1 year old) are performed with 2 fingers on the lower half of the sternum at a rate of at least 100 compressions per minute
- Depth should be at least  $\frac{1}{3}$  the anterior-posterior diameter of the chest (about 1.5 inches)
- Allow full chest recoil between compressions
- Choking management in children involves a series of 5 back blows followed by 5 chest thrusts for infants and abdominal thrusts for children > 1 year old
- Encourage coughing if the child is responsive and breathing
- Only perform blind finger sweeps if a solid object is visible in the mouth
- Pediatric dosing for medications and fluids is based on the child's weight in kilograms
- Broselow Tape is a color-coded tool that estimates weight based on the child's length and provides pre-calculated medication doses

- Maintenance fluid rate can be calculated using the 4-2-1 rule: 4 mL/kg/hr for the first 10 kg, 2 mL/kg/hr for the second 10 kg, and 1 mL/kg/hr for every kg above 20 kg

## Common Pediatric Emergencies

### Fever and Seizures

- Fever management in children focuses on treating the underlying cause rather than the fever itself
- Antipyretics (acetaminophen, ibuprofen) can be used for comfort but do not prevent febrile seizures
- Fever in infants < 28 days old is considered an emergency and requires a full septic workup
- Seizures in children are often caused by fever (febrile seizures) and typically last < 5 minutes
- Most febrile seizures do not require treatment beyond supportive care and addressing the underlying fever
- Prolonged (> 5 minutes) or repeated seizures may require anticonvulsants (benzodiazepines)

### Trauma Assessment

- Pediatric trauma assessment follows the same ABCDE approach as adults but with age-appropriate normal vital signs
- Airway is assessed for patency and protected with jaw thrust or chin lift maneuvers
- Breathing is evaluated for rate, effort, and effectiveness of ventilation
- Circulation is assessed by heart rate, blood pressure, capillary refill time, and skin color/temperature
- Disability is determined by AVPU scale (Alert, Verbal, Pain, Unresponsive) and pupillary response
- Exposure involves fully undressing the child to assess for injuries while preventing hypothermia
- Pediatric trauma scoring systems like the Pediatric Trauma Score (PTS) can help triage and determine the need for trauma center care

## Special Pediatric Considerations

### Abuse and Neglect

- Child abuse recognition requires assessment for inconsistent history, unexplained injuries in various stages of healing, patterned injuries (handprints, belt marks), and signs of neglect (malnutrition, poor hygiene)
- Mandated reporting laws require EMS providers to report suspected abuse or neglect to child protective services
- Careful documentation of physical findings and statements from the child and caregivers is essential
- Sudden Infant Death Syndrome (SIDS) is the sudden, unexplained death of an infant < 1 year old
- Risk factors include prone sleeping position, soft bedding, overheating, and exposure to tobacco smoke
- EMS providers should provide supportive care to the family, document the scene and position of the infant, and follow local protocols for termination of resuscitation

## 15.2 Geriatric patient care and common emergencies

Caring for older adults requires special attention to their unique health challenges. From managing multiple medications to preventing falls, healthcare providers must consider age-related changes that affect treatment. Recognizing atypical symptoms and addressing cognitive impairments are crucial for effective geriatric care.

Cardiovascular and cerebrovascular emergencies are common in the elderly. Quick identification of stroke symptoms and proper management of heart conditions are vital. Environmental factors like hypothermia risk and social issues such as elder abuse also play key roles in geriatric patient care.

### Geriatric Assessment and Risk Factors

#### Polypharmacy and Medication Considerations

- Polypharmacy involves the use of multiple medications by a patient, which increases the risk of drug interactions, adverse effects, and medication errors in geriatric patients
- Geriatric patients often have multiple chronic conditions requiring various medications (antihypertensives, antidiabetics, anticoagulants)
- Age-related changes in pharmacokinetics and pharmacodynamics can alter drug absorption, distribution, metabolism, and elimination
- Regularly review and reconcile medications to minimize polypharmacy risks and ensure appropriate prescribing
- Monitor for adverse drug reactions and adjust dosages based on renal and hepatic function
- Educate patients and caregivers about proper medication management, adherence, and potential side effects

#### Fall Risk Assessment and Prevention

- Fall risk assessment identifies factors that increase the likelihood of falls in geriatric patients, such as muscle weakness, balance issues, visual impairment, and environmental hazards
- Use standardized assessment tools (Morse Fall Scale, Hendrich II Fall Risk Model) to evaluate fall risk
- Consider age-related changes in gait, balance, and sensory function that contribute to fall risk
- Implement fall prevention strategies based on identified risk factors
- Recommend assistive devices (walkers, canes) and home modifications (handrails, improved lighting) to reduce fall hazards
- Encourage regular exercise and physical therapy to improve strength, balance, and mobility
- Educate patients and caregivers about fall prevention techniques and the importance of reporting falls or near-falls to healthcare providers

#### Cognitive Impairment and Altered Mental Status

- Cognitive impairment refers to a decline in mental function, including memory, attention, language, and problem-solving abilities, which can affect a geriatric patient's ability to communicate and make decisions

- Assess for signs of cognitive impairment using tools like the Mini-Mental State Examination (MMSE) or the Montreal Cognitive Assessment (MoCA)
- Consider underlying causes of cognitive impairment, such as dementia, delirium, or depression
- Altered mental status describes changes in a patient's level of consciousness, awareness, or responsiveness, which can be caused by various factors in geriatric patients
- Evaluate for potential causes of altered mental status, including infections (UTI, pneumonia), metabolic disturbances (hypoglycemia, dehydration), or medication side effects
- Monitor vital signs, oxygen saturation, and glucose levels to identify and treat underlying causes promptly
- Communicate clearly and patiently with cognitively impaired patients and involve caregivers in decision-making and care planning

## Osteoporosis Considerations

- Osteoporosis is a common condition in geriatric patients characterized by decreased bone density and increased risk of fractures
- Assess for osteoporosis risk factors, such as age, gender, family history, and medications (corticosteroids)
- Consider the impact of osteoporosis on fracture risk during falls or trauma
- Implement measures to prevent and manage osteoporosis-related complications
- Encourage regular weight-bearing exercise and adequate calcium and vitamin D intake to maintain bone health
- Prescribe medications (bisphosphonates, denosumab) to improve bone density and reduce fracture risk when appropriate
- Educate patients and caregivers about osteoporosis prevention, fall risk reduction, and the importance of prompt medical attention for suspected fractures

## Cardiovascular and Cerebrovascular Emergencies

### Cardiovascular Emergencies in the Elderly

- Cardiovascular emergencies, such as acute coronary syndrome (ACS), heart failure, and arrhythmias, are common in geriatric patients due to age-related changes in the cardiovascular system and the presence of chronic conditions
- Recognize atypical presentations of ACS in elderly patients, such as absence of chest pain or presence of non-specific symptoms (fatigue, shortness of breath)
- Assess for signs and symptoms of heart failure, including dyspnea, edema, and jugular venous distension
- Monitor for arrhythmias using ECG and treat according to advanced cardiovascular life support (ACLS) guidelines
- Consider the impact of comorbidities and polypharmacy on the management of cardiovascular emergencies in geriatric patients

- Adjust treatment plans based on individual patient factors, such as renal function, bleeding risk, and frailty

## Stroke Symptoms and Management

- Stroke is a leading cause of disability and mortality in geriatric patients, and prompt recognition and treatment are crucial for improving outcomes
- Use the FAST acronym (Face drooping, Arm weakness, Speech difficulty, Time to call emergency services) to identify stroke symptoms
- Assess for additional stroke signs, such as sudden onset of numbness, confusion, vision changes, or severe headache
- Activate stroke protocols and coordinate with stroke centers for timely evaluation and intervention
- Administer thrombolytic therapy (alteplase) within the appropriate time window for eligible patients with ischemic stroke
- Consider endovascular thrombectomy for patients with large vessel occlusions who meet criteria
- Provide supportive care, monitor for complications (cerebral edema, hemorrhagic transformation), and initiate early rehabilitation to optimize functional recovery

## Chronic Disease Management

- Effective management of chronic diseases, such as hypertension, diabetes, and chronic obstructive pulmonary disease (COPD), can reduce the risk of acute exacerbations and cardiovascular events in geriatric patients
- Regularly assess and monitor blood pressure, glucose levels, and respiratory function to ensure optimal control of chronic conditions
- Adjust medication regimens as needed based on patient response, adverse effects, and changes in health status
- Collaborate with primary care providers and specialists to develop comprehensive care plans that address multiple chronic conditions
- Educate patients and caregivers about chronic disease self-management strategies, including medication adherence, lifestyle modifications, and symptom monitoring

## Environmental and Social Considerations

### Hypothermia Risk and Prevention

- Geriatric patients are at increased risk for hypothermia due to age-related changes in thermoregulation, reduced subcutaneous fat, and decreased metabolic rate
- Recognize signs and symptoms of hypothermia, such as shivering, confusion, slurred speech, and bradycardia
- Assess for risk factors, including exposure to cold environments, inadequate clothing, and certain medications (antipsychotics, sedatives)
- Implement measures to prevent hypothermia in geriatric patients

- Encourage proper clothing and layering in cold weather, including hats, gloves, and warm footwear
- Ensure adequate indoor heating and insulation, especially for patients with limited mobility or financial resources
- Treat hypothermia promptly by removing wet clothing, providing warm blankets, and monitoring core body temperature until normothermia is achieved

## Elder Abuse Recognition and Reporting

- Elder abuse encompasses physical, emotional, sexual, and financial abuse, as well as neglect and abandonment, and can have serious consequences for geriatric patients' health and well-being
- Recognize signs of elder abuse, such as unexplained injuries, fearfulness, withdrawal, or sudden changes in financial status
- Assess for risk factors, including cognitive impairment, social isolation, and caregiver stress or substance abuse
- Follow established protocols for reporting suspected elder abuse to appropriate authorities, such as adult protective services or law enforcement
- Provide support and resources to victims of elder abuse, including safe housing, counseling, and legal assistance
- Educate healthcare providers, caregivers, and the public about the signs and consequences of elder abuse and the importance of prevention and early intervention

## 15.3 Pregnancy-related complications and first aid

Pregnancy-related complications can pose serious risks to both mother and baby. From hypertensive disorders like preeclampsia to emergencies during labor and delivery, understanding these conditions is crucial for providing effective first aid and ensuring the best possible outcomes.

This section explores various pregnancy complications, their symptoms, and appropriate first aid responses. By learning about these issues, first responders can better assist expectant mothers and newborns in emergency situations, potentially saving lives and preventing further complications.

### Hypertensive Disorders

#### Preeclampsia and Eclampsia

- Preeclampsia is a pregnancy complication characterized by high blood pressure and signs of damage to organ systems, most often the liver and kidneys
- Typically develops after 20 weeks of pregnancy and is accompanied by protein in the urine (proteinuria) and swelling in the legs, feet, and hands (edema)
- If left untreated, preeclampsia can lead to serious complications for both the mother and the baby, including eclampsia
- Eclampsia is a severe complication of preeclampsia that causes seizures and can be life-threatening for both the mother and the baby
- Occurs when preeclampsia goes untreated and progresses, affecting the brain and causing seizures or coma

## Gestational Hypertension and Placental Abruption

- Gestational hypertension is a form of high blood pressure that develops during pregnancy, usually after the 20th week
- Unlike preeclampsia, gestational hypertension is not accompanied by signs of damage to other organ systems or protein in the urine
- However, gestational hypertension can still lead to complications such as preeclampsia if left untreated
- Placental abruption is a serious complication where the placenta partially or completely separates from the inner wall of the uterus before delivery
- Can be caused by hypertensive disorders like preeclampsia and gestational hypertension
- Symptoms include vaginal bleeding, abdominal pain, and uterine tenderness
- Placental abruption can lead to severe bleeding, putting both the mother and baby at risk, and may require emergency delivery

## Pregnancy Complications

### Miscarriage and Ectopic Pregnancy

- Miscarriage is the spontaneous loss of a pregnancy before the 20th week
- Symptoms include vaginal bleeding, abdominal pain, and cramping
- In most cases, the cause of miscarriage is unknown, but risk factors include advanced maternal age, certain infections, and hormonal problems
- Ectopic pregnancy occurs when a fertilized egg implants and grows outside the main cavity of the uterus, usually in a fallopian tube
- As the pregnancy grows, it can cause the fallopian tube to rupture, leading to severe abdominal pain and internal bleeding
- Ectopic pregnancies are not viable and require immediate medical attention to prevent life-threatening complications

### Pregnancy-Induced Diabetes and Hyperemesis Gravidarum

- Pregnancy-induced diabetes, also known as gestational diabetes, is a type of diabetes that develops during pregnancy
- Caused by hormonal changes that make it difficult for the body to use insulin effectively, leading to high blood sugar levels
- Can increase the risk of complications for both the mother (preeclampsia, cesarean delivery) and the baby (macrosomia, hypoglycemia)
- Hyperemesis gravidarum is a severe form of morning sickness characterized by persistent nausea and vomiting
- Can lead to dehydration, weight loss, and electrolyte imbalances
- In severe cases, hospitalization may be necessary to provide intravenous fluids and nutrition

## Labor and Delivery Emergencies

### Emergency Delivery and Postpartum Hemorrhage

- Emergency delivery may be necessary in situations where the health of the mother or baby is at risk, such as in cases of placental abruption, prolapsed umbilical cord, or fetal distress
- First responders should assess the situation, provide supportive care, and transport the mother to a hospital as quickly as possible
- If delivery is imminent, first responders should assist with the delivery and care for the newborn
- Postpartum hemorrhage is excessive bleeding following childbirth
- Can occur due to uterine atony (failure of the uterus to contract), retained placental tissue, or genital tract lacerations
- Symptoms include heavy vaginal bleeding, decreased blood pressure, and increased heart rate
- Treatment may include uterine massage, medications to promote uterine contractions, and blood transfusions in severe cases

### Umbilical Cord Care

- After delivery, the umbilical cord should be clamped and cut about 1-2 inches from the baby's body
- The remaining umbilical cord stump will dry up and fall off within 1-2 weeks
- To prevent infection, keep the umbilical cord stump clean and dry
- Gently clean the area with water and pat dry with a clean cloth or cotton swab
- Avoid covering the stump with a diaper, as this can trap moisture and increase the risk of infection
- Signs of umbilical cord infection include redness, swelling, discharge, or a foul odor around the stump and should be promptly evaluated by a healthcare provider

# Unit 16 – Psychological First Aid and Crisis Intervention

## 16.1 Principles of psychological first aid

Psychological First Aid (PFA) is a crucial approach for helping people after traumatic events. It focuses on providing immediate support, ensuring safety, and promoting stabilization. PFA aims to reduce stress and assist in healthy recovery through compassionate connection and practical assistance.

Key principles of PFA include active listening, assessing needs, and teaching coping strategies. By connecting survivors with social supports and additional resources, PFA helps individuals navigate the aftermath of crises and fosters long-term recovery and resilience.

## Principles of Psychological First Aid

### Overview and Goals of Psychological First Aid

- Psychological First Aid (PFA) is an evidence-informed approach designed to reduce stress symptoms and assist in a healthy recovery following a traumatic event, natural disaster, public health emergency, or even a personal crisis
- PFA aims to establish a human connection in a non-intrusive, compassionate manner through practical assistance and support
- The primary goals of PFA include enhancing immediate and ongoing safety, providing physical and emotional comfort, calming and stabilizing survivors, helping survivors to tell their stories and experiences, and providing practical assistance and information to help address immediate needs and concerns

### Ensuring Safety and Providing Comfort

- Safety and comfort are the immediate priorities of PFA to help stabilize the situation and reduce distress
- Ensure the physical safety of the individual by removing them from or reducing exposure to the threat or danger (hazardous environments, violent perpetrators)
- Provide physical comforts that can reduce distress such as water, food, blankets, a safe and private place to rest, and access to a phone or communication methods to contact loved ones
- Offer emotional comfort through empathetic listening, validating feelings, and reassuring the person that their reactions are normal given the circumstances
- Respect the individual's privacy while providing comfort and avoid pressuring them to talk about their experiences before they are ready

### Promoting Stabilization and Providing Practical Assistance

- Stabilization is the next priority after ensuring safety and comfort to calm and orient emotionally overwhelmed or disoriented survivors

- Use grounding techniques to help the person become more aware of the present moment and their current surroundings (encourage them to take slow breaths, notice their feet on the floor, the sounds around them)
- Provide practical assistance to help address immediate needs and concerns based on the individual's unique situation
- Practical assistance may include providing accurate and up-to-date information, connecting the person with immediate resources (temporary housing, financial assistance, transportation), and helping to identify and prioritize current needs and develop an action plan

## Communication Techniques

### Active Listening Skills

- Active listening is a key communication skill in PFA that involves giving the person your undivided attention and conveying a genuine interest in understanding and helping them
- Face the person and maintain an open and relaxed body posture, use appropriate eye contact, and eliminate or reduce distractions when possible (silence phone, move to a quieter area)
- Listen more than you speak, be comfortable with silence and allow the person to break the silence, avoid interrupting the person or rushing to provide solutions
- Use verbal and non-verbal cues to demonstrate active listening such as nodding, brief verbal affirmations, and mirroring the person's body language
- Reflect back and summarize what the person has shared to ensure you have understood them correctly and validate their experiences and feelings

## Gathering Information and Assessing Needs

- Information gathering is an essential part of PFA to assess the person's immediate needs and concerns and connect them with the appropriate resources and support
- Ask open-ended questions that invite more than a yes or no response and cannot be answered with a single word to encourage the person to share more about their experiences, needs, and concerns
- Avoid asking questions that begin with "why" as they may imply blame or judgment, instead ask questions that begin with "what" or "how" (What are you most concerned about right now? How are you coping with what happened?)
- Be patient and allow the person time to respond, avoid pressuring them to share more than they are comfortable with or ready to share
- Assess for any immediate medical needs, safety concerns, or practical needs such as food, water, shelter, clothing, or communication methods

## Connecting with Social Supports

- Connecting survivors with their social support network is an important aspect of PFA as social support can enhance coping and recovery following a crisis
- Ask the person about their existing social supports such as family members, friends, co-workers, or community members they trust and feel comfortable reaching out to for support

- Offer to help the person contact their social supports if needed, provide them with a phone or communication methods if available
- Encourage the person to utilize their social support network for practical assistance (temporary housing, childcare, transportation) as well as emotional support and comfort
- Provide information on community resources and support groups that may be helpful based on the person's specific needs (bereavement support groups, domestic violence shelters, mental health services)

## Coping and Recovery

### Teaching Coping Strategies

- Teaching and reinforcing positive coping strategies is an essential component of PFA to help survivors manage distress and promote resilience and recovery
- Educate the person on common stress reactions they may experience following a crisis such as intrusive thoughts, sleep disturbances, irritability, or withdrawal and reassure them that these are normal reactions to an abnormal event
- Teach simple relaxation techniques such as deep breathing, progressive muscle relaxation, or grounding exercises to help reduce stress and promote a sense of calm
- Encourage the person to engage in positive self-care activities that they find comforting or enjoyable such as spending time with loved ones, exercising, journaling, or practicing their faith or spirituality
- Help the person identify and prioritize current problems and break them down into manageable steps to foster a sense of control and accomplishment

### Linking with Additional Services and Resources

- Linking survivors with additional services and resources is the final stage of PFA to ensure ongoing support and promote long-term recovery
- Assess for any ongoing medical or mental health needs and provide referrals to appropriate healthcare providers or mental health professionals as needed
- Provide information on community resources that can assist with ongoing needs such as housing assistance, legal aid, employment services, or financial assistance programs
- Encourage the person to seek additional support if they continue to experience significant distress or difficulty functioning in daily life activities
- Provide written information on coping strategies, community resources, and referrals for additional services that the person can take with them and refer back to as needed

## 16.2 De-escalation techniques and emotional support

De-escalation techniques and emotional support are crucial skills in psychological first aid. These methods help calm intense situations and provide comfort to those in distress. By using effective communication and creating a safe space, we can better assist individuals in crisis.

Mastering these techniques enables us to validate feelings, show empathy, and guide people towards emotional regulation. From redirecting attention to teaching grounding exercises, these strategies empower us to offer meaningful support during challenging times.

## Communication Techniques

### De-escalation and Validation

- De-escalation involves using communication techniques to reduce the intensity of a situation and prevent it from escalating further
- Validation acknowledges and accepts the person's feelings and experiences without judgment, helping them feel heard and understood
- Validating statements can include "I understand this is a difficult situation for you" or "It's okay to feel upset right now"
- Avoid invalidating statements that dismiss or minimize their feelings such as "It's not a big deal" or "You're overreacting"

### Empathy and Non-verbal Communication

- Empathy involves putting yourself in the other person's shoes to understand their perspective and feelings
- Show empathy by actively listening, reflecting back what they've said, and expressing understanding and concern (nodding, maintaining eye contact)
- Non-verbal communication includes body language, facial expressions, and gestures that convey your message and emotional state
- Open and relaxed posture, leaning in slightly, and uncrossed arms demonstrate openness and engagement
- Tense or closed-off body language like crossed arms or turning away can make the person feel dismissed or unheard
- Maintain an appropriate amount of eye contact to show you are paying attention, but avoid staring which can feel intimidating

### Tone of Voice

- Use a calm, even tone of voice to help de-escalate the situation and convey a sense of control and reassurance
- Avoid raising your voice, speaking too quickly, or using a condescending or sarcastic tone which can escalate tensions
- Match the volume and pace of your voice to the other person, speaking more slowly and quietly if they are becoming agitated
- Emphasize key words to convey your message clearly and firmly without sounding aggressive (Please sit down so we can talk about this)

## Emotional Support Strategies

### Creating a Safe Space

- Maintain an appropriate distance and respect the person's personal space to help them feel safe and in control

- Avoid crowding or cornering the person which can make them feel threatened or trapped
- Suggest moving to a quieter, more private location if possible to reduce distractions and help the person feel more comfortable
- Remove any potential weapons or harmful objects from the immediate area to ensure everyone's safety

## Redirection and Grounding Techniques

- Redirection involves shifting the person's attention away from the distressing situation or thoughts to something more neutral or positive
- Suggest taking a walk, getting a drink of water, or focusing on a calming activity like deep breathing
- Ask the person about their interests, hobbies or other topics unrelated to the current crisis to help change their focus
- Grounding techniques help the person reconnect with the present moment and reality, especially if they are dissociating or having a panic attack
- Encourage the person to notice their physical sensations (feet on the floor, hands on their lap) and surroundings (counting objects in the room, naming colors they see)
- Guide them through a simple breathing exercise (inhale for 4 counts, hold for 4, exhale for 4) to help slow their heart rate and promote relaxation

## Emotional Regulation Strategies

- Teach the person simple strategies to help them manage their intense emotions in the moment
- Encourage them to name and validate their emotions (I'm feeling really angry right now and that's okay)
- Suggest positive self-talk and affirmations to counter negative thoughts (I can handle this, This will pass)
- Offer a stress ball, fidget toy, or other sensory item to help ground them and provide a physical outlet for their emotions
- Brainstorm healthy coping skills they can use in the future such as journaling, art, music, or talking to a trusted friend

## 16.3 Referral to mental health resources

Mental health referrals connect patients with professionals for further evaluation and treatment. The process involves providing contact info, scheduling appointments, and facilitating communication. Follow-up care ensures continuity and monitors progress through regular check-ins and support.

Counseling services offer professional guidance for mental health challenges. Individual sessions address specific concerns, while group counseling brings together people with similar experiences. Support groups provide peer-led gatherings for mutual support and a sense of community.

## Mental Health Services

### Referral and Follow-up

- Mental health referral connects the patient with appropriate mental health professionals (psychiatrists, psychologists, therapists) for further evaluation and treatment
- Referral process involves providing contact information, scheduling appointments, and facilitating communication between the patient and mental health providers
- Follow-up care ensures continuity of care and monitors the patient's progress after the initial referral
- Involves regular check-ins with the patient to assess their mental well-being and adherence to treatment plans
- Helps identify any challenges or barriers to accessing mental health services and provides support to overcome them

### Counseling and Support

- Counseling services provide professional guidance and support to individuals experiencing mental health challenges or emotional distress
- Individual counseling offers one-on-one sessions with a trained therapist to address specific concerns and develop coping strategies
- Group counseling brings together individuals with similar experiences to share their struggles, gain insights, and learn from each other in a supportive environment
- Support groups are peer-led gatherings where individuals facing similar mental health issues can connect, share experiences, and provide mutual support
- Examples of support groups include Alcoholics Anonymous (AA) for individuals with substance use disorders and National Alliance on Mental Illness (NAMI) for those affected by mental illness and their families
- Support groups offer a sense of community, reduce feelings of isolation, and provide practical advice and encouragement from others who have faced similar challenges

## Emergency Resources

### Crisis Hotlines

- Crisis hotlines are telephone services that provide immediate support and intervention for individuals experiencing a mental health crisis or suicidal thoughts
- Trained crisis counselors are available 24/7 to listen, assess the situation, and provide guidance and resources
- Examples of crisis hotlines include the National Suicide Prevention Lifeline (1-800-273-TALK) and the Crisis Text Line (text HOME to 741741)
- Crisis hotlines offer a confidential and accessible way for individuals to seek help during a mental health emergency, especially when face-to-face services are not immediately available

## Community Resources

- Community resources are local organizations and agencies that provide mental health services and support within a specific geographic area
- Examples include community mental health centers, social service agencies, and faith-based organizations that offer counseling, support groups, and other mental health programs
- Community resources often provide low-cost or free services, making mental health care more accessible to individuals with limited financial means
- Identifying and partnering with community resources allows for a comprehensive and coordinated approach to mental health care, ensuring that individuals receive the support they need within their local context

## Patient Privacy

### Confidentiality

- Confidentiality is the ethical and legal obligation to protect a patient's private information, including their mental health history, diagnosis, and treatment details
- Mental health professionals are bound by confidentiality laws and professional codes of ethics to safeguard patient information and maintain trust in the therapeutic relationship
- Exceptions to confidentiality may apply in cases where there is a clear and imminent risk of harm to the patient or others, or when required by law (e.g., child abuse reporting)
- Maintaining confidentiality is crucial for creating a safe and trusting environment where patients feel comfortable discussing sensitive mental health concerns without fear of judgment or negative consequences
- Patients should be informed about the limits of confidentiality and the circumstances under which their information may be shared with others
- Proper consent procedures should be followed when sharing patient information with other healthcare providers or family members involved in the patient's care

# Unit 17 – First Aid Kit Essentials and Maintenance

## 17.1 Components of a comprehensive first aid kit

A well-stocked first aid kit is crucial for handling emergencies. It should include wound care supplies like bandages and dressings, tools for wound management, and personal protective equipment. These items help you treat injuries and protect yourself while providing care.

Emergency resources are also essential in a comprehensive first aid kit. A first aid manual, emergency contact info, and items for temperature regulation can make a big difference in critical situations. Being prepared with the right supplies can save lives.

### Wound Care Supplies

#### Bandages and Dressings

- Adhesive bandages (Band-Aids) in various sizes to cover minor cuts and scrapes
- Sterile gauze pads of different sizes (2x2, 4x4) to absorb blood and protect wounds from contamination
- Elastic bandage (Ace wrap) to provide compression and support for sprains, strains, and stabilizing dressings
- Triangular bandage versatile for creating slings, securing splints, or applying pressure to control bleeding

#### Tools for Wound Management

- Scissors to cut bandages, gauze, or clothing if needed to access a wound
- Tweezers to remove small debris, such as splinters or glass, from wounds before cleaning and dressing

### Personal Protective Equipment

#### Barrier Devices

- Disposable gloves (latex or nitrile) to protect the first aider from bodily fluids and reduce the risk of infection transmission
- CPR face shield or pocket mask to provide a barrier during rescue breathing or CPR, minimizing contact with the victim's mouth and nose

#### Cleaning and Disinfection

- Antiseptic wipes (alcohol or iodine-based) to clean minor wounds, cuts, or scrapes and disinfect equipment like tweezers or scissors

# Emergency Resources

## Information and Guidance

- First aid manual or quick reference guide to provide step-by-step instructions for various first aid situations and techniques
- Emergency contact information, such as local emergency services, poison control, and personal emergency contacts

## Temperature Regulation and Protection

- Emergency blanket (space blanket) to retain body heat and prevent hypothermia in cold environments or shock
- Instant cold pack to reduce swelling, pain, and inflammation in cases of sprains, strains, or insect bites

## 17.2 Specialized kits for specific environments

Specialized first aid kits are essential for different environments. From wilderness to marine settings, each kit is tailored to address specific risks and challenges. These kits contain unique items designed to handle emergencies in their respective settings.

Understanding specialized kits is crucial for effective first aid. Whether you're hiking, sailing, or working in a factory, having the right kit can make a huge difference in an emergency. It's all about being prepared for the specific risks you might face.

## Outdoor and Travel First Aid Kits

### Wilderness First Aid Kit

- Designed for remote areas where medical help may be hours or days away
- Includes items for treating common injuries and illnesses encountered in the wilderness such as blisters, sprains, fractures, and hypothermia
- Contains a comprehensive set of supplies including wound care items, splinting materials, medications (antihistamines, pain relievers, antibiotics), and tools (scissors, tweezers, safety pins)
- May also include items specific to the environment such as a snake bite kit or altitude sickness medication
- Should be lightweight and compact for easy carrying in a backpack

### Marine First Aid Kit

- Tailored for use on boats and ships where medical help may be delayed due to isolation at sea
- Includes items for treating seasickness, hypothermia, and injuries common in marine environments such as cuts, burns, and fractures
- Contains waterproof or water-resistant supplies and storage containers to protect items from moisture damage
- May include additional items such as a marine radio for communication, a hypothermia blanket, and a cervical collar for neck injuries

- Should be stored in an easily accessible location on the vessel

## Automotive First Aid Kit

- Designed for use in vehicles for treating injuries that may occur during road trips or accidents
- Includes items for treating cuts, burns, fractures, and other common car accident injuries
- Contains a variety of bandages, gauze pads, antiseptic wipes, and pain relief medication
- May also include items such as a reflective safety vest, a flashlight, and a window-breaking tool for emergencies
- Should be stored in an easily accessible location in the vehicle such as the glove compartment or trunk

## Sports First Aid Kit

- Tailored for use during sports activities and events to treat common athletic injuries
- Includes items for treating sprains, strains, bruises, cuts, and blisters such as elastic bandages, cold packs, and athletic tape
- May contain sport-specific items such as a mouthguard, shin guards, or a splint for finger injuries
- Should be lightweight and portable for easy transport to and from sporting events
- Can be customized based on the specific needs of the sport (football, basketball, soccer)

## Specialized First Aid Kits

### Workplace First Aid Kit

- Designed for use in various work environments such as offices, factories, and construction sites
- Includes items for treating common workplace injuries such as cuts, burns, eye injuries, and sprains
- Contains a variety of bandages, gauze pads, antiseptic wipes, and pain relief medication
- May include additional items specific to the workplace such as eyewash solution for chemical splashes or a tourniquet for severe bleeding
- Should be easily accessible and clearly labeled in the workplace

### Burn Kit

- Specialized kit for treating various types of burns including thermal, chemical, and electrical burns
- Includes items such as burn dressings, sterile gauze, cooling gels, and pain relief medication
- May contain a burn blanket to help prevent hypothermia in severe burn cases
- Should be stored in a cool, dry place and replaced regularly to ensure sterility of contents
- Can be used in conjunction with a regular first aid kit for comprehensive burn treatment

### Snake Bite Kit

- Designed for use in areas where venomous snakes are prevalent

- Includes items for treating snake bites such as a constriction band, a suction device, and antiseptic wipes
- May contain a snake bite identification guide to help determine the appropriate treatment based on the species of snake
- Should be used in conjunction with seeking immediate medical attention after a snake bite occurs
- Can be included as part of a larger wilderness or outdoor first aid kit for comprehensive treatment options

## 17.3 Inventory management and expiration date tracking

Keeping your first aid kit stocked and up-to-date is crucial for emergency preparedness. Proper inventory management ensures you have the right supplies when you need them most. It's not just about having items, but making sure they're fresh and effective.

Tracking expiration dates is a key part of maintaining your kit. By regularly checking and replacing expired items, you ensure that everything in your kit is safe and ready to use. This proactive approach can make a big difference in an emergency situation.

### Inventory Management

#### Maintaining Accurate Inventory Records

- Create and maintain a comprehensive inventory checklist that includes all items in the first aid kit
- Update the inventory checklist regularly, noting any items that have been used, damaged, or expired
- Conduct periodic physical counts of the inventory to ensure the checklist accurately reflects the contents of the kit
- Document any discrepancies between the physical count and the inventory checklist and investigate the cause

#### Implementing Proper Stock Rotation Practices

- Arrange items in the first aid kit using the "first-in, first-out" (FIFO) method, placing newer items behind older ones
- Ensure that items with earlier expiration dates are positioned in front of those with later expiration dates
- When restocking the kit, place new items behind existing ones to maintain the FIFO order
- Regularly review the stock rotation to ensure that older items are being used before they expire (gauze, bandages, medications)

#### Ensuring Quality Control and Product Integrity

- Inspect all items in the first aid kit for signs of damage, contamination, or deterioration
- Check packaging for tears, punctures, or other signs of compromise that could affect the sterility or effectiveness of the item
- Discard any items that show signs of damage or contamination, and replace them with new, sterile items

- Verify that all items in the kit are appropriate for their intended use and meet relevant quality standards (ISO, FDA)

## Conducting Regular Inspections and Maintenance

- Schedule regular inspections of the first aid kit to ensure all items are present, in good condition, and within their expiration dates
- During inspections, clean and organize the kit, replacing any missing or damaged items
- Check the kit's container for signs of wear, damage, or contamination, and replace it if necessary
- Document all inspections and maintenance activities, including the date, items checked, and any actions taken (replacements, cleaning)

## Expiration Date Tracking

### Maintaining an Expiration Date Log

- Create a detailed log that lists all items in the first aid kit along with their expiration dates
- Record the item name, quantity, and expiration date for each entry in the log
- Update the log whenever new items are added to the kit or when expired items are removed
- Regularly review the log to identify items nearing their expiration dates and prioritize their use or replacement

### Establishing a Replacement Schedule

- Based on the expiration date log, create a schedule for replacing items before they expire
- Set reminders or alerts to notify responsible parties when items are approaching their expiration dates
- When replacing expired items, update the inventory checklist and expiration date log accordingly
- Consider factors such as usage rates and lead times when determining how far in advance to order replacement items (3 months, 6 months)

## Ensuring Proper Storage Conditions

- Store the first aid kit in a cool, dry place away from direct sunlight, heat, and humidity
- Maintain a consistent temperature range to prevent degradation of items (medications, ointments)
- Ensure the storage area is clean, organized, and free from contamination risks (dust, pests, chemicals)
- Use airtight containers or resealable bags to protect items from moisture and environmental factors

# Unit 18 – Legal and Ethical Considerations in First Aid

## 18.1 Good Samaritan laws and liability issues

Good Samaritan laws protect people who help in emergencies. They encourage bystanders to assist without fear of legal trouble. These laws shield helpers from liability if they act reasonably and in good faith, even if things go wrong.

Legal responsibilities in emergencies can be tricky. While there's usually no duty to help, once you start, you must act carefully. Staying within your training limits and not abandoning the person are key to avoiding legal issues.

## Legal Protections

### Good Samaritan Laws and Liability Protection

- Good Samaritan laws provide legal protection to individuals who offer assistance to others in emergency situations
- These laws are designed to encourage bystanders to help those in need without fear of legal repercussions
- Good Samaritan laws typically protect individuals from civil liability when they provide reasonable assistance in good faith
- The protection applies even if the person being helped is ultimately injured or dies, as long as the actions taken were not grossly negligent or reckless
- Liability protection under Good Samaritan laws varies by jurisdiction and may have specific requirements (calling 911, staying with the person until help arrives)

### Scope of Immunity

- Immunity under Good Samaritan laws is not absolute and has limitations
- The protection typically only applies to individuals who are not acting in an official capacity or receiving compensation for their assistance
- Immunity may not cover actions that are considered grossly negligent, reckless, or intentional misconduct
- Some states have specific limitations on the types of aid covered by Good Samaritan laws (CPR, AED use, first aid)
- Healthcare professionals and trained responders may have a different standard of care and level of protection compared to untrained bystanders

## Legal Responsibilities

### Duty to Act and Standard of Care

- In general, individuals do not have a legal duty to provide assistance to others in emergency situations

- However, certain circumstances may create a duty to act, such as having a special relationship with the person in need (parent-child, employer-employee)
- Once an individual decides to provide assistance, they have a responsibility to act with reasonable care
- The standard of care refers to the level of competence and caution that a reasonable person with similar training and experience would exercise in the same situation
- Failing to meet the standard of care can result in legal liability for any harm caused

## Scope of Practice and Abandonment

- Scope of practice refers to the range of services and procedures that a healthcare provider or trained responder is legally permitted to perform based on their education, training, and certification
- Individuals providing assistance should only offer care within their scope of practice and level of training
- Attempting to provide care beyond one's scope of practice can lead to legal consequences and potential harm to the person being helped
- Abandonment occurs when an individual who has begun to provide care to someone in need stops providing that care without ensuring that the person is in stable condition or has been transferred to another competent provider
- Abandoning a person in need can result in legal liability for any harm that results from the lack of continued care

## Legal Consequences

### Negligence and Gross Negligence

- Negligence is the failure to exercise reasonable care in a situation, resulting in harm to another person
- In the context of providing emergency assistance, negligence can occur when an individual fails to act with the level of care that a reasonable person with similar training would have exercised
- Gross negligence is a more severe form of negligence that involves a conscious and voluntary disregard for the need to use reasonable care, resulting in foreseeable harm to others
- Gross negligence may involve actions that are reckless, willful, or wanton, such as attempting to perform a complex medical procedure without proper training or equipment
- Individuals who are found to be negligent or grossly negligent in providing emergency assistance may face civil liability and be required to pay damages to the injured party

## 18.2 Consent and confidentiality in emergency care

Consent and confidentiality are crucial in emergency care. First responders must navigate the complexities of obtaining proper consent while respecting patient privacy. Understanding different types of consent and capacity is essential for ethical and legal practice.

HIPAA regulations protect patient information, requiring careful handling of medical records. Special considerations apply to minors and those with impaired capacity. Balancing the need for immediate care with legal and ethical obligations is a key challenge in emergency situations.

## Consent Types and Capacity

### Informed Consent and Capacity

- Informed consent involves providing a patient with all relevant information about their condition, treatment options, and potential risks and benefits so they can make an informed decision
- Requires the patient to have the capacity to understand the information provided and make a rational decision based on that information
- Capacity to consent means the patient is mentally competent, alert, and able to comprehend the situation and potential consequences of their decision
- Factors that may affect capacity include age, mental impairment, intoxication, or severe illness or injury

### Types of Consent

- Implied consent assumes a patient would agree to emergency treatment if they were able to (unconscious patient)
- Expressed consent is given verbally or in writing by a patient with capacity after being informed about the treatment
- Written expressed consent is typically required for invasive procedures or those with significant risk (surgery)
- Verbal expressed consent may be sufficient for less invasive treatments (wound cleaning)

### Refusal of Care

- Patients with capacity have the right to refuse medical treatment, even if it may result in harm or death
- Refusal of care must be informed, meaning the patient understands the potential consequences of refusing treatment
- If a patient refuses care, first responders should clearly document the refusal and have the patient sign a refusal of care form when possible
- In some cases, if the patient lacks capacity or is a danger to themselves or others, medical treatment may be provided despite refusal (mental health crisis, suicidal intent)

## Confidentiality and Privacy

### HIPAA and Patient Privacy

- HIPAA (Health Insurance Portability and Accountability Act) is a federal law that sets standards for protecting patient health information
- Requires healthcare providers to maintain confidentiality of patient information and obtain consent before disclosing it to others
- Patient privacy extends to all forms of communication, including verbal discussions, written records, and electronic transmissions

- Breaching patient confidentiality can result in legal and professional consequences for healthcare providers

## Medical Records and Disclosure

- Medical records include documentation of patient assessments, treatments, and communications
- Must be kept secure and confidential, with access limited to authorized personnel for legitimate purposes
- Disclosure of patient information is only permitted in specific circumstances, such as when required by law (reporting child abuse) or with the patient's express consent
- Patients have the right to access their own medical records and request corrections if needed
- First responders should avoid discussing patient information in public areas or with unauthorized individuals (bystanders at a scene)

## Special Considerations

### Minors and Consent

- Minors are typically defined as individuals under the age of 18, though this varies by state and situation
- In general, minors cannot provide informed consent for medical treatment and require consent from a parent or legal guardian
- Exceptions may include emancipated minors (legally independent from parents) or specific situations outlined by state law (treatment for STDs, substance abuse, or mental health)
- In emergency situations where a parent or guardian is not available, implied consent allows for providing necessary treatment to a minor
- When possible, first responders should attempt to contact a parent or guardian to obtain informed consent for treating a minor patient

## 18.3 Ethical decision-making in first aid scenarios

Ethical decision-making in first aid scenarios requires balancing core principles like beneficence and autonomy. First responders must navigate complex situations, prioritizing patient needs while respecting their rights and cultural beliefs.

Triage, resource allocation, and end-of-life care present unique challenges. First aid providers must make tough choices, aiming for the greatest good while maintaining cultural sensitivity and managing personal biases in high-pressure situations.

## Foundational Ethical Principles

### Core Ethical Principles in First Aid

- Ethical principles provide a framework for making moral decisions in first aid situations
- Beneficence involves taking actions that promote the well-being and best interests of the patient (providing necessary care, alleviating pain)

- Non-maleficence means avoiding actions that could harm the patient (withholding unnecessary interventions, preventing further injury)
- Autonomy respects the patient's right to make informed decisions about their own care (obtaining consent, respecting refusal of treatment)
- Justice ensures fair and equitable treatment for all patients regardless of personal characteristics (non-discrimination, equal access to care)

## Balancing Ethical Principles in Practice

- First aid providers must often balance competing ethical principles in complex situations
- Prioritizing the most pressing needs of the patient while minimizing potential harm (stabilizing life-threatening conditions before addressing minor injuries)
- Respecting patient autonomy while acting in their best interest if they are unable to make decisions (unconscious, severely impaired)
- Allocating limited resources fairly based on medical need rather than personal biases or preferences (triaging multiple casualties, distributing supplies)

## Ethical Decision-Making in Crisis Situations

### Triage and Resource Allocation

- Triage involves prioritizing care for multiple patients based on the severity of their conditions and available resources
- Triage systems categorize patients as critical (red), urgent (yellow), delayed (green), or deceased/expectant (black) to guide treatment order
- Resource allocation decisions may be necessary when supplies, personnel, or transportation are limited (mass casualty incidents, remote locations)
- Ethical principles guide allocating resources to provide the greatest good for the greatest number while minimizing discrimination

### End-of-Life Decisions and Palliative Care

- First aid providers may encounter patients with terminal conditions or injuries incompatible with life
- Ethical decision-making involves weighing the benefits and burdens of interventions for patients near the end of life
- Palliative care focuses on relieving suffering and improving quality of life rather than attempting curative treatment (pain management, emotional support)
- Advance directives, living wills, and surrogate decision-makers can guide care when patients cannot express their own wishes (DNR orders, healthcare proxies)

# Cultural Considerations and Moral Dilemmas

## Providing Culturally Sensitive Care

- Cultural beliefs, values, and practices can influence patient preferences and decision-making in first aid situations
- First aid providers should strive for cultural competence and sensitivity when caring for diverse patient populations
- Accommodating cultural or religious preferences when possible without compromising patient safety or well-being (modesty garments, same-gender providers)
- Utilizing professional interpreters or translation services to facilitate effective communication and informed consent (language barriers, hearing impairment)

## Navigating Moral Dilemmas in First Aid

- First aid providers may face moral dilemmas when personal beliefs conflict with professional duties or patient needs
- Ethical decision-making frameworks and consultation with colleagues can help navigate complex moral issues
- Maintaining patient confidentiality and privacy while reporting information as required by law (suspected abuse, notifiable diseases)
- Recognizing and managing personal biases, emotions, or moral distress to provide objective and compassionate care (self-awareness, stress management techniques)

# Unit 19 – Disaster Preparedness and Triage

## 19.1 Types of disasters and their impact on healthcare

Disasters, both natural and man-made, can wreak havoc on healthcare systems. From earthquakes to pandemics, these events strain resources and test our ability to respond. Understanding different disaster types helps healthcare workers prepare for the unexpected.

The impact on healthcare is profound, requiring surge capacity and careful resource allocation. Emergency management phases guide the response, from mitigation to recovery. Knowing these steps is crucial for effective disaster preparedness and response in healthcare settings.

### Types of Disasters

#### Natural Disasters and Pandemics

- Natural disasters are caused by natural phenomena such as earthquakes, hurricanes, tornadoes, floods, wildfires, and tsunamis
- Can result in significant damage to infrastructure, loss of life, and displacement of populations
- Pandemics are global outbreaks of infectious diseases that spread rapidly across countries and continents (COVID-19, Spanish Flu)
- Pandemics can overwhelm healthcare systems, disrupt economies, and lead to widespread social and psychological impacts

#### Man-made Disasters and Mass Casualty Incidents

- Man-made disasters are caused by human actions, negligence, or technological failures such as industrial accidents, transportation accidents, and acts of terrorism (9/11 attacks, Chernobyl nuclear disaster)
- Mass casualty incidents are events that generate a high number of casualties, exceeding the local healthcare system's capacity to respond effectively
- Examples of mass casualty incidents include mass shootings, building collapses, and large-scale transportation accidents (Pulse nightclub shooting, Miami building collapse)
- These incidents require rapid triage, treatment, and transport of injured individuals to appropriate healthcare facilities

#### Public Health Emergencies

- Public health emergencies are events that pose a significant threat to public health and safety, requiring a coordinated response from healthcare providers and public health authorities
- Examples include outbreaks of infectious diseases (Ebola, Zika virus), contamination of food or water supplies, and environmental disasters (Flint water crisis)
- Public health emergencies may require implementing measures such as quarantine, isolation, mass vaccination campaigns, and risk communication to control the spread of disease and protect public

## Impact on Healthcare

### Healthcare Surge Capacity and Resource Allocation

- Healthcare surge capacity refers to a healthcare system's ability to rapidly expand its resources and capabilities to meet increased demand during a disaster or emergency
- Involves mobilizing additional staff, equipment, supplies, and space to accommodate a sudden influx of patients
- Resource allocation becomes critical during disasters when demand exceeds available resources
- Triage protocols are used to prioritize patients based on the severity of their condition and likelihood of survival, ensuring limited resources are allocated to those who will benefit the most

### Emergency Management and Disaster Response Phases

- Emergency management is the process of preparing for, responding to, and recovering from disasters and emergencies
- Involves developing plans, protocols, and systems to coordinate the activities of healthcare providers, emergency responders, and other stakeholders
- Disaster response typically follows four phases: mitigation, preparedness, response, and recovery
- Mitigation involves taking steps to prevent or reduce the impact of disasters before they occur (building codes, land-use planning)
- Preparedness involves developing plans, training personnel, and stockpiling resources to respond effectively when a disaster strikes
- Response involves activating emergency plans, mobilizing resources, and providing immediate assistance to affected populations (search and rescue, medical care, shelter)
- Recovery involves restoring essential services, rebuilding infrastructure, and providing long-term support to affected communities

## 19.2 Triage systems and prioritization of care

Triage systems are crucial in mass casualty incidents, helping responders quickly sort patients based on severity. START and JumpSTART methods assess key factors like walking ability and breathing to categorize adults and children, ensuring efficient resource allocation.

Color-coded tags and reverse triage further streamline patient management. These systems embody the core principle of mass casualty response: doing the greatest good for the most people with limited resources.

### Triage Systems

#### START and JumpSTART Triage

- START (Simple Triage and Rapid Treatment) triage system used for adults in mass casualty incidents
- Assesses ability to walk, respiratory rate, and perfusion to categorize patients

- JumpSTART triage system adapted from START for use with pediatric patients
- Considers different physiological parameters and developmental stages of children
- Both systems aim to quickly sort patients based on severity and prioritize treatment

## Color-Coded Triage Tags and Reverse Triage

- Color-coded triage tags used to visually identify patient categories (red, yellow, green, black)
- Tags provide quick reference for patient status and priority level
- Reverse triage process of assessing patients already admitted to healthcare facilities
- Determines which patients can be safely discharged or transferred to make room for incoming casualties
- Helps optimize resource allocation during mass casualty events

## Mass Casualty Triage Principles

- Mass casualty triage differs from day-to-day triage in scale and resource limitations
- Goal is to do the greatest good for the greatest number of patients
- Focuses on rapidly assessing and categorizing patients based on severity
- May involve difficult decisions about allocating limited resources
- Requires a systematic approach and clear communication among responders

## Triage Categories

### Primary and Secondary Triage

- Primary triage initial rapid assessment of patients at the scene of an incident
- Quickly categorizes patients based on severity and treatment priority
- Secondary triage more detailed assessment performed once patients have been evacuated to a treatment area
- Provides a more comprehensive evaluation of injuries and treatment needs
- Both stages are crucial for effectively managing mass casualty incidents

### Triage Category Definitions

- Immediate (red) life-threatening injuries requiring immediate intervention (airway obstruction, severe bleeding)
- Delayed (yellow) serious injuries that can wait for treatment (fractures, moderate burns)
- Minimal (green) minor injuries that can be self-treated or delayed (abrasions, sprains)
- Expectant (black) unlikely to survive due to severity of injuries or lack of resources
- Categories help prioritize treatment and resource allocation based on patient needs

## Overtriage and Undertriage

- Overtriage occurs when patients are assigned to a higher priority category than necessary
- Can lead to overutilization of limited resources on less severe cases
- Undertriage occurs when patients are assigned to a lower priority category than required
- Can result in delayed treatment for severe cases and potentially worse outcomes
- Balancing overtriage and undertriage is a challenge in mass casualty incidents
- Triage systems aim to minimize both while ensuring the most critical patients receive timely care

## 19.3 Community disaster response and coordination

When disaster strikes, communities must respond swiftly and effectively. Incident Command Systems and Emergency Operations Centers play crucial roles in coordinating efforts. These structures ensure clear communication and efficient resource allocation among various agencies during crises.

Community involvement is key to disaster preparedness. Programs like Community Emergency Response Teams train volunteers in basic response skills. Mutual aid agreements between jurisdictions enable resource sharing. Effective planning for evacuation, shelter operations, and long-term recovery builds community resilience.

### Incident Command and Coordination

#### Incident Command System (ICS) Structure and Roles

- ICS provides a standardized approach to the command, control, and coordination of emergency response
- Consists of a common organizational structure with defined roles and responsibilities
- Includes Incident Commander, Operations, Planning, Logistics, and Finance/Administration Sections
- Allows for a coordinated response among various jurisdictions and functional agencies (fire, law enforcement, medical)

#### Emergency Operations Center (EOC) Functions and Coordination

- EOC serves as a central location for coordination and support during a disaster
- Facilitates the collection, analysis, and dissemination of information
- Supports resource management and allocation decisions
- Coordinates with other agencies and organizations involved in the response
- Ensures effective communication and information sharing among all stakeholders

#### Interagency Coordination and Communication Protocols

- Establishes clear lines of communication and coordination among different agencies and organizations
- Develops and maintains interagency agreements and mutual aid agreements

- Utilizes standardized communication protocols and equipment (radio frequencies, terminology)
- Conducts joint training and exercises to enhance interagency coordination and familiarity
- Ensures the integration of various response plans and procedures across agencies

## Community Response and Support

### Community Emergency Response Team (CERT) Training and Deployment

- CERT program trains volunteers in basic disaster response skills (fire safety, light search and rescue, medical operations)
- Volunteers can assist in their neighborhoods or workplaces following a disaster
- CERT members can provide immediate assistance until professional responders arrive
- Helps to build community resilience and self-sufficiency
- Deployed under the direction of local emergency management officials

## Volunteer Management and Coordination

- Establishes a system for recruiting, screening, and training volunteers
- Assigns volunteers to specific roles and responsibilities based on their skills and abilities
- Ensures the safety and well-being of volunteers during disaster operations
- Coordinates the deployment and demobilization of volunteer teams
- Maintains accurate records of volunteer hours and contributions

## Mutual Aid Agreements and Resource Sharing

- Establishes agreements with neighboring jurisdictions and organizations for the sharing of resources and personnel
- Identifies available resources (equipment, supplies, expertise) that can be shared during a disaster
- Defines the terms and conditions for requesting and providing mutual aid
- Ensures the reimbursement of costs associated with mutual aid assistance
- Conducts regular reviews and updates of mutual aid agreements

## Disaster Operations

### Evacuation Planning and Procedures

- Develops and maintains evacuation plans for various hazards and scenarios
- Identifies evacuation routes, assembly points, and transportation options
- Establishes procedures for the notification and guidance of the public during an evacuation
- Coordinates with law enforcement and transportation agencies to manage traffic flow

- Ensures the provision of assistance to individuals with disabilities or special needs

## Shelter Operations and Management

- Identifies and assesses potential shelter locations (schools, community centers, churches)
- Establishes procedures for the activation, operation, and demobilization of shelters
- Ensures the provision of basic needs (food, water, bedding) and essential services (medical care, mental health support)
- Manages shelter staff and volunteers, including training and scheduling
- Coordinates with other agencies and organizations to provide additional resources and support

## Recovery and Resilience Planning

- Develops and implements plans for short-term and long-term recovery following a disaster
- Assesses the impacts of the disaster on the community (housing, infrastructure, economy)
- Identifies priorities and strategies for rebuilding and restoration
- Engages community members and stakeholders in the recovery planning process
- Incorporates mitigation measures and resilience-building activities into recovery efforts
- Ensures the equitable distribution of resources and support to all affected populations

# Unit 20 – Practical Skills Assessment and Course Review

## 20.1 Hands-on skills practice and evaluation

Hands-on practice is crucial for mastering life-saving skills. This section covers essential techniques like CPR, AED use, and wound care. Students will learn to perform these skills confidently and effectively in emergency situations.

Practical evaluations ensure students can apply their knowledge under pressure. By practicing scenarios and receiving feedback, future first responders develop the muscle memory and decision-making abilities needed to save lives when it matters most.

### Basic Life Support Skills

#### Cardiopulmonary Resuscitation (CPR) and Automated External Defibrillator (AED) Use

- Perform high-quality CPR by providing chest compressions at a rate of 100-120 per minute and a depth of at least 2 inches (5 cm) for adults, allowing the chest to fully recoil between compressions
- Minimize interruptions in chest compressions and avoid excessive ventilation during CPR to maintain adequate blood flow to vital organs (brain, heart)
- Operate an AED by turning on the device, following the voice prompts, and delivering a shock when advised to restore a normal heart rhythm in cases of ventricular fibrillation or pulseless ventricular tachycardia
- Alternate CPR with AED use, resuming chest compressions immediately after delivering a shock, until emergency medical services arrive or the patient shows signs of life (movement, breathing, pulse)

#### Airway Management and Choking Relief

- Place an unresponsive patient who is breathing normally in the recovery position (lateral recumbent position) to maintain an open airway and prevent aspiration of fluids (vomit, blood, saliva)
- Perform the Heimlich maneuver (abdominal thrusts) on a choking patient who is responsive but unable to cough or speak by standing behind the patient, placing a fist above the navel, and delivering quick, upward thrusts until the foreign object is expelled
- For a choking infant, deliver back blows and chest thrusts, alternating between the two until the object is dislodged or the infant becomes unresponsive, at which point CPR should be initiated

### Trauma Management

#### Wound Care and Bleeding Control

- Control external bleeding by applying direct pressure to the wound using a clean cloth or dressing, elevating the affected limb above the heart level (if possible), and applying a pressure bandage or tourniquet (for severe, life-threatening bleeding)

- Clean wounds with clean water or sterile saline solution to remove dirt, debris, and foreign objects, and apply antibiotic ointment and a sterile dressing to prevent infection
- Use proper bandaging techniques, such as a circular or spiral wrap, to secure dressings and apply even pressure to the wound, ensuring the bandage is snug but not too tight to avoid impairing circulation

## Fracture and Sprain Management

- Immobilize suspected fractures and sprains using splints or slings to prevent further injury and reduce pain by minimizing movement of the affected area
- Apply ice packs to the injured area for 15-20 minutes every hour to reduce swelling, inflammation, and pain in the acute stage of the injury (first 24-48 hours)
- Create makeshift splints using available materials (cardboard, newspapers, sticks) when commercial splints are not accessible, padding the splint for comfort and securing it with bandages or cloth strips

## Patient Evaluation

### Primary and Secondary Assessment

- Conduct a primary assessment using the ABCDE approach (Airway, Breathing, Circulation, Disability, Exposure) to identify and manage life-threatening conditions rapidly
- Perform a secondary assessment, including a head-to-toe examination and SAMPLE history (Signs/Symptoms, Allergies, Medications, Past medical history, Last meal, Events leading to the incident), to gather additional information and identify non-life-threatening injuries or illnesses
- Reassess the patient's condition regularly, monitoring for changes in level of consciousness, breathing, and circulation, and adjust treatment as needed

### Vital Signs Measurement and Interpretation

- Measure and interpret vital signs, including heart rate (60-100 beats per minute), respiratory rate (12-20 breaths per minute), blood pressure (120/80 mmHg), and body temperature (98.6°F or 37°C), to assess the patient's overall health status
- Use a pulse oximeter, if available, to measure the patient's oxygen saturation level (SpO<sub>2</sub>), which should be above 95% in a healthy individual
- Monitor the patient's level of consciousness using the AVPU scale (Alert, Verbal, Pain, Unresponsive) or Glasgow Coma Scale (GCS) to detect changes in mental status that may indicate a deteriorating condition (head injury, shock, hypoxia)

## 20.2 Scenario-based learning and decision-making

Scenario-based learning helps first responders practice decision-making in realistic situations. By simulating emergencies, students can apply their knowledge and skills in a safe environment, improving their ability to handle real-life incidents.

This approach enhances critical thinking, problem-solving, and adaptability. It allows students to experience various scenarios, from triage to stress management, preparing them for the challenges they'll face in the field.

# Incident Management

## Scene Assessment and Safety

- Assess the scene for potential hazards and risks to ensure the safety of the first responder and others
- Identify and mitigate any immediate threats (fire, hazardous materials, unstable structures)
- Establish a safe working area and set up a perimeter to control access to the scene
- Continuously monitor the scene for changes in conditions that may affect safety

## Triage and Prioritization

- Quickly assess the number and severity of casualties to determine the scope of the incident
- Use a systematic approach to triage, such as the START (Simple Triage and Rapid Treatment) method, to categorize patients based on the urgency of their condition (immediate, delayed, minor, deceased)
- Prioritize treatment and transport based on the severity of injuries and available resources
- Reassess patients periodically to ensure their condition has not deteriorated and adjust priorities as needed

## Emergency Response Protocols

- Follow established protocols for specific types of incidents (mass casualty incidents, hazardous materials, active shooter situations)
- Activate the incident command system (ICS) to coordinate the response among multiple agencies and resources
- Communicate effectively with dispatch, other first responders, and medical facilities to ensure a coordinated and efficient response
- Document all actions taken and information gathered during the incident for legal and quality improvement purposes

## Interpersonal Skills

### Communication Skills

- Use clear, concise, and accurate verbal and non-verbal communication to gather information from patients, bystanders, and other first responders
- Adapt communication style to the needs and abilities of the individual (language barriers, hearing impairments, age)
- Provide reassurance and emotional support to patients and their families to help alleviate anxiety and stress
- Communicate effectively with medical professionals to ensure continuity of care and accurate transfer of information

## Teamwork and Collaboration

- Work collaboratively with other first responders, including EMS, fire, and law enforcement, to achieve common goals and ensure the best possible outcome for patients
- Recognize and respect the roles and responsibilities of each team member and their expertise
- Maintain a positive and professional attitude, even in high-stress situations, to foster a cohesive and effective team dynamic
- Participate in debriefings and after-action reviews to identify strengths, weaknesses, and areas for improvement in team performance

## Stress Management

- Recognize the signs and symptoms of stress and burnout in oneself and others, such as irritability, fatigue, and difficulty concentrating
- Use healthy coping mechanisms to manage stress, such as exercise, mindfulness, and talking with peers or a mental health professional
- Maintain a work-life balance and engage in self-care activities to prevent burnout and maintain mental and physical well-being
- Participate in critical incident stress management (CISM) programs, such as debriefings and counseling, after particularly traumatic or stressful incidents

## Cognitive Abilities

### Critical Thinking and Problem Solving

- Analyze complex and dynamic situations to identify problems and potential solutions
- Use clinical reasoning and judgment to make decisions based on available information and resources
- Anticipate potential complications or challenges and develop contingency plans to mitigate risks
- Continuously evaluate the effectiveness of interventions and adapt the approach as needed based on patient response and changing conditions

### Adaptability and Flexibility

- Respond quickly and effectively to unexpected or rapidly changing situations, such as a sudden deterioration in a patient's condition or a change in scene safety
- Adjust treatment plans and priorities based on new information or changes in resource availability
- Maintain composure and focus in high-stress, emotionally charged situations (mass casualty incidents, pediatric emergencies)
- Continuously update knowledge and skills to keep pace with advances in medical science, technology, and best practices in emergency care

## 20.3 Comprehensive review of key first aid concepts

First aid skills are crucial for responding to emergencies effectively. This comprehensive review covers essential concepts like basic life support, emergency action steps, and personal protective equipment. It also delves into specific emergency situations and considerations for vulnerable populations.

Legal and ethical aspects of first aid are equally important. The review emphasizes maintaining professional standards, understanding legal requirements, and adhering to ethical principles. It also stresses the importance of continuous learning to provide high-quality, evidence-based care in emergency situations.

### Emergency Response Fundamentals

#### Essential Skills and Equipment for First Responders

- Basic life support involves providing immediate care to maintain airway, breathing, and circulation (ABC) in life-threatening situations
- Includes performing cardiopulmonary resuscitation (CPR) and using an automated external defibrillator (AED)
- Aims to prevent further deterioration until advanced medical help arrives
- Emergency action steps follow a systematic approach to assess and manage an emergency situation
- Includes scene safety assessment, primary survey (ABCDE), calling for help, and providing appropriate care
- Ensures first responders prioritize critical interventions and maintain a structured approach
- Personal protective equipment (PPE) is essential to protect first responders from potential hazards
- Includes gloves, face masks, eye protection, and protective clothing
- Minimizes the risk of exposure to blood, bodily fluids, and other potentially infectious materials
- First aid kit components vary depending on the context but generally include essential supplies for managing common emergencies
- Includes bandages, dressings, scissors, tweezers, antiseptic wipes, and disposable gloves
- Regular checks and restocking ensure the kit is always ready for use
- Documentation and reporting are crucial for legal, quality improvement, and continuity of care purposes
- Includes recording patient details, assessment findings, interventions provided, and patient response
- Clear, accurate, and timely documentation supports effective communication and decision-making

#### Effective Communication and Teamwork in Emergency Response

- Clear communication is vital for coordinating emergency response efforts and ensuring patient safety
- Involves using simple, unambiguous language and closed-loop communication techniques
- Effective communication minimizes errors, improves teamwork, and enhances patient outcomes
- Teamwork is essential for providing comprehensive and efficient emergency care

- Involves clear role allocation, mutual support, and shared situational awareness among team members
- Effective teamwork optimizes resource utilization, reduces delays, and improves patient care quality

## Specific Emergency Situations

### Recognizing and Managing Life-Threatening Conditions

- Medical emergencies encompass a wide range of acute illnesses that require prompt recognition and intervention
- Includes conditions such as heart attack, stroke, seizures, and anaphylaxis
- Early recognition of signs and symptoms is crucial for initiating appropriate care and minimizing complications
- Trauma emergencies involve physical injuries resulting from accidents, falls, or violence
- Includes fractures, burns, wounds, and head injuries
- Rapid assessment and stabilization of life-threatening conditions (e.g., severe bleeding, airway compromise) are paramount
- Environmental emergencies arise from exposure to extreme temperatures, natural disasters, or hazardous materials
- Includes heat stroke, hypothermia, drowning, and poisoning
- Prompt removal from the hazardous environment and supportive care are key to preventing further harm

### Special Considerations for Vulnerable Populations

- Pediatric emergencies require age-specific assessment and management approaches
- Includes considering anatomical, physiological, and developmental differences in children
- Effective communication with the child and caregivers is essential for reducing anxiety and facilitating care
- Geriatric emergencies often involve multiple comorbidities and polypharmacy, necessitating a comprehensive approach
- Includes considering age-related changes in physiology and pharmacokinetics
- Effective management requires addressing both acute and chronic conditions while minimizing iatrogenic complications

## Legal and Ethical Considerations

### Maintaining Professional Standards and Ethical Principles

- Legal considerations in first aid involve understanding and adhering to relevant laws, regulations, and standards of care
- Includes obtaining informed consent, respecting patient autonomy, and maintaining confidentiality

- Failure to meet legal requirements may result in civil or criminal liability for the first responder
- Ethical considerations in first aid encompass the moral principles and values that guide decision-making and behavior
- Includes acting in the best interest of the patient, avoiding discrimination, and respecting cultural diversity
- Ethical dilemmas may arise when there are conflicting principles or resource limitations
- Maintaining professional boundaries is crucial for ensuring appropriate and effective care
- Involves establishing clear limits on personal involvement and avoiding exploitative or dual relationships
- Professionalism fosters trust, respect, and confidence in the first responder's role and expertise
- Continuous learning and skill development are essential for providing high-quality, evidence-based care
- Includes staying updated with the latest guidelines, techniques, and equipment
- Regular training and certification ensure that first responders maintain competence and confidence in their abilities