सत्यमेव जयते

Ministry of Health & Family Welfare
Government of India

NATIONAL HEALTH MISSION
राष्ट्रीय स्वास्थ्य मिशन

Training Manual on Management of Common Emergencies, Burns and Trauma for Medical Officer

at Ayushman Bharat- Health and Wellness Centres

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2021

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Section 1

Basics of Emergency Care

CHAPTER 1

Ayushman Bharat Health & Wellness Centre and Emergency Care

The National Health Mission (NHM) is the country's flagship health systems strengthening programme, particularly for primary and secondary health care. It envisages "attainment of universal access to equitable, affordable and quality health care which is accountable and responsive to the needs of people".

In the last fifteen years primary health care has focused on health of mothers, children and adolescents, communicable diseases, non-communicable diseases and other chronic communicable diseases like tuberculosis, leprosy and HIV infection. India is also witnessing an epidemiological and demographic transition, where non-communicable diseases such as cardiovascular diseases, diabetes, cancer, respiratory, and other chronic diseases, account for over 60% of total mortality .

Ayushman Bharat (AB) initiative was launched as recommended by the National Health Policy 2017 to move from sectoral and segmented approach to a comprehensive need-based health care delivery to achieve the vision of Universal Health Coverage (UHC). Under this scheme 1,50,000 Health and Wellness Centres (HWCs) were proposed to be operationalized by transforming existing Sub Health Centres (SHCs) and Primary Health Centres (PHCs) which would deliver Comprehensive Primary Health Care (CPHC) covering maternal and child health services , communicable and non-communicable diseases, including free essential drugs and diagnostic services. With the launch of Health and Wellness Centres (HWCs) under the Ayushman Bharat programme , a wide range of additional services are envisaged to be delivered under Comprehensive Primary Health Care .

The provision of Comprehensive Primary Health Care reduces morbidity and mortality at much lower costs and significantly reduces the need for secondary and tertiary care. For primary health care to be comprehensive, it needs to span preventive, promotive, curative, rehabilitative and palliative aspects of care. Primary Health Care goes beyond first contact care, and is expected to mediate a two-way referral support to higher-level facilities (from first level care provider through specialist care and back) and ensure follow up support for individual and population health interventions.

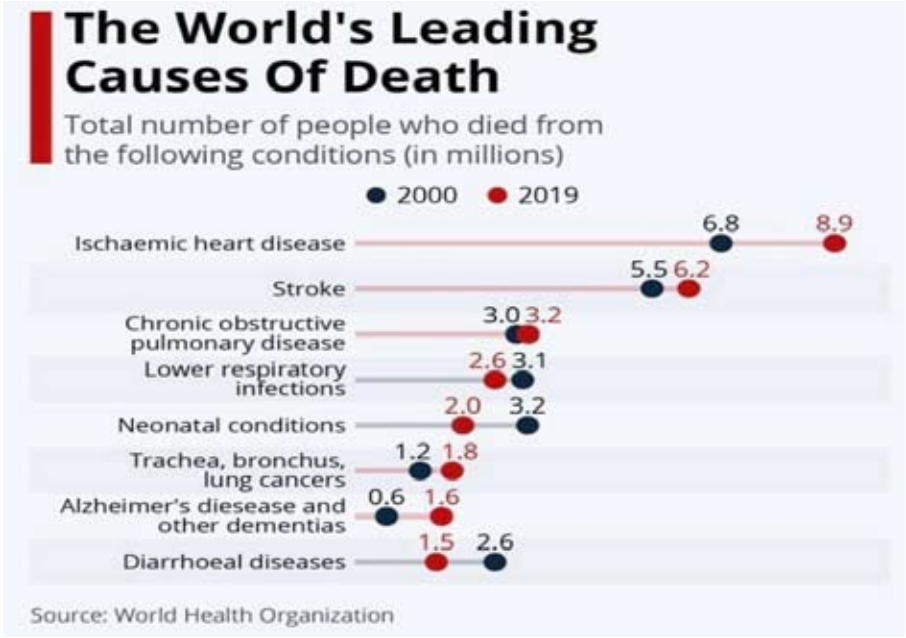
As a medical officer, you are the pillar of the Primary Health Centre, Health and Wellness Centres (PHC-HWC) and instrumental to the roll out the expanded range of services at the PHC-HWC.

Emergency and Trauma Care is one of the new services which is being introduced in the newer package of services to be made available at the AB-HWCs. Till now, you have worked to provide a set of essential services for specific population sub-groups under your PHC-HWC. This module will help you understand your role with respect to Emergency and Trauma Care in terms of capacity building, care co-ordination and clinical management to save lives of people who need immediate medical care. The broad goal is to intervene as quickly as possible to avoid life-threatening morbidity and death in emergency and trauma cases. In this module, you shall learn about some common emergencies and steps to stabilize cases and referrals of the complicated cases . This module is a guidance and you need to update periodically with advancement in knowledge and technology.

Emergency is a condition which threatens the life or well-being of a person/patient. These are conditions which need immediate medical care and intervention. They are non-discriminatory as well as time bound; non-discriminatory in the sense that it can happen to anyone irrespective of age, gender, economic status etc. and time bound in the sense that most of the emergencies require intervention within one hour which is also called as the **"Golden hour".** Emergencies that are commonly encountered in the community may span from accidents and trauma, burns, emergencies arising out of chronic diseases of the heart or lungs, obstetrics emergencies, paediatric emergencies, poisoning and animal bites.

According to the Global Burden of Disease (GBD) estimates for the country, 62% of deaths in 2016 were due to non-communicable diseases, 11% to injuries and the remaining 27% due to other diseases (communicable, maternal, perinatal and nutritional conditions).

Figure 1: The world's leading causes of death



Source: WHO Report, 2019 & World Economic Forum , Accessible at : https://www.weforum.org/agenda/2020/12/cause-of-death-dying-disease-health/, https://www.who.int/news/item/09-12-2020-who-reveals-leading-causes-of-death-and-disability-worldwide-2000-2019

Trauma is one of the most common emergencies that occur in the community and a major reason for morbidity and mortality in India. Road traffic injuries (RTIs), acute myocardial infarctions (AMIs) and cerebrovascular accidents (CVAs) are the most commonly cited causes of death and disability in India. In 2016 nearly 1.5 lakh lives were lost to road traffic injuries alone, costing almost 3% of the GDP and India accounts for 11% of global deaths due to RTIs.

The emergency conditions are largely categorized here into 3 types:

- **Trauma/accidental/injuries**: This refers to any sudden physical injury caused by an external force.
- **Burns:** Depending on the cause, burns can be of different types like thermal, electrical, and chemical etc. Burns can also be categorized based on the extent of the burn and the management for the same will be guided taking into consideration the extent and also separately for the paediatric and adult cases.
- **Medical and surgical emergency:** Medical & surgical emergency is "the sudden onset of a medical or surgical condition manifesting as acute symptoms of sufficient severity (including severe pain) such that the absence of immediate medical attention could reasonably be expected to result in placing the patient's health in serious jeopardy".

Emergency care services are defined as acute medical/surgical/trauma care that is delivered within the first few hours of the onset of a condition which threatens the life or well-being of a patient. It can help better manage the most commonly presenting injuries and diseases to ensure better clinical outcomes. Emergency conditions can sometimes be life threatening so right care should be given at the right time.

However, currently in India, emergency services are confined to tertiary level only with limited access to secondary care and assured advanced referral transport system. The absence of organized emergency care at primary and secondary health care level further worsens the situation. Therefore, to ensure timely intervention for better survival, comprehensive emergency care services should be made available round the clock at the primary level with assured referral linkages wherever required.

Emergency management at primary level can be initiated even with limited resources by ensuring community preparedness and awareness. Provision of a proper platform including infrastructure, capacity building of human resource which would keep the community organized and trained on a regular basis. It is essential to enable them to respond in an effective and organized manner.

This module will explain the scope, objective, community preparedness and awareness required to prevent and rehabilitate such emergencies. It would also explain the service delivery expected at Sub Health Centre -Health and Wellness Centre (SHC-HWC) along with its upward and downward linkages up to family and community levels along with roles and responsibilities of various service providers and program officers so that continuum of care is provided.

Most emergencies, even though common, are also largely avoidable. As a MO, your role with respect to Emergency and Trauma Care is manifold. Your responsibilities can broadly be categorized into:

Roles and responsibilities of medical officers in emergency care

Table 1: Roles & responsibilities of medical officers in emergency care

Clinical functions	▪ To know what is a medical emergency ▪ Learn to apply critical thinking in an emergency ▪ Learn problem solving and communication skills ▪ To work as a team and team leader ▪ Recognition of critical illness and injury ▪ General principles: Patient stabilization and safe transfer

	▪ Airway management principles & skills of endotracheal intubation, Ventilation with AMBU bag and mask ▪ Trauma care: Patient assessment and patient stabilization ▪ Burn care: Patient assessment and stabilization ▪ Tension pneumothorax management, chest tube, cricothyrotomy, intravenous and intraosseous line -insertion and management ▪ Acute coronary syndrome/CCF ▪ Neurological ▪ OBG: PPH & Eclampsia- Principles of emergency management and skills ▪ Neonatal: Assessment, resuscitation, stabilization before transfer ▪ Pediatric: Sepsis/meningitis, respiratory failure, seizures ▪ Cardiac care: Cardiac arrest/ dysrhythmias, cardiopulmonary resuscitation including usage of automated external defibrillator ▪ Toxicology: Poisoning and animal bites ▪ Referral, communication with higher health care centre and safe transport including care during transport ▪ Medicolegal documentation ▪ Training facilitation skills to train SHC-HWC staff ▪ Decision making capacity to identify the right referral facility and right referral mode of transport ▪ Information of referring to the referral health care facility
Public health functions	▪ Health promotion and prevention of avoidable emergencies ▪ Awareness generation in the community with the help of HWC team ▪ Awareness generation through community platforms like VHSNC, JAS and MAS activities ▪ In disaster scenario's lead and support your team in specific activities related to disaster management like triage of victims, stabilization and referral for further management.
Managerial functions	▪ Supervise and coordinate with the team to ensure efficient functioning ▪ Maintaining records of treatment, referrals & follow up

CHAPTER 2

General Principles of Emergency Care

Learning Objectives:

- Identify emergency conditions
- Be able to determine normal and abnormal vital signs
- Be able to articulate the priorities of resuscitation: Airway, Breathing and Circulation (ABC)
- Understand the importance of inter-facility communication for the safe transfer

As a medical officer your roles and responsibilities at the PHC-HWC level would mostly revolve around attending the cases for early recognition, prompt stabilization, safe transport and referring cases that cannot be treated at the PHC level.

In this chapter, you shall learn about the various protocols for management of emergency situations and skills required of you to attend to such cases. Your responsibility would also be that of supervising and facilitating the work of PHC staff and coordinating with the referrals.

As per the IPHS norms, 24 hours emergency services including appropriate management of injuries and accidents, first aid, securing airway, assisting breathing , maintenance of circulation and stabilization of the condition before referral will be provided at Health & Wellness Centre-PHC/UPHC level.

Approach to emergency management at PHC/UPHC include both

1. General measures/common interventions and
2. Specific activities, depending on the nature of the emergency

General measures

These approaches are the most basic and universal to all injuries. This section will give you an idea about the approaches in general and in subsequent chapters we shall cover them with respect to specific management of different emergencies.

Three key components of emergency care services are

I Early recognition of critical illness & injury

II Prompt stabilisation

III Safe transport of referred cases

I: Early recognition of critical illness & injury

Scene safety: Prior to recognising of critical illness & injury, medical officers should ensure safety of self, patients and the public. Provide reassurance at all times. Remove the patient from the source of emergency situation safely.

A clinical condition which if not treated immediately which will lead to irreversible damage to the body or even death is defined as **critical illness.** For example, when a patient becomes unconscious, there can be airway obstruction caused by the tongue falling back which obstructs airflow and results in hypoxia. If this happens for more than four minutes there will be irreversible hypoxic damage to the brain and will lead to death. Recognizing a life-threatening/critical illness condition is the first step in managing any emergency.

Some signs and symptoms indicating critical illness

- Looking really sick
- Pallor, cyanosis, mottling of skin or diaphoresis (sweating)
- Confusion, decreased mental status, coma
- Hypotension or other abnormal vital signs
- Dry mucosa, decreased skin turgor, hypothermia
- Convulsions, dehydration, abdominal distention
- Children: Limp child, irritability, poor eye contact, reduced muscle tone

If critical illness conditions are not so obvious at first instance, the following basic protocol has to be followed:

- Focused history taking
- Monitoring of vital signs
- Appropriate physical examination

It is possible to recognize a critically ill patient within the **first few minutes**. This approach does not focus on diagnosis. We will first review vital signs and subsequently discuss standard emergency protocols.

1.A Quick initial assessment of patients coming for emergency is vital for saving lives and reducing morbidity and call for help including transport.

In critical illness, the initial assessment of vital signs is important. They are simple and are essential components of the initial assessment in an emergency.

Vitals include-

Table 2: Classical & adjunct vital signs

CLASSICAL VITAL SIGNS (Most important clues in determining criticality	ADJUNCT VITAL SIGNS (Can help in determining criticality)
▪ Pulse rate ▪ Respiratory rate ▪ Blood pressure ▪ Temperature Available quickly and can be obtained by nurses and paramedical staff	▪ Pulse oximetry (the fifth Vital Sign) ▪ Mental Status ▪ Pulse quality ▪ Skin color/temperature/moisture ▪ Capillary refill time ▪ Blood glucose measurement

1. **Pulse/Heart rate:** The normal heart rate is **72 per minute** (range of 60-100). Tachycardia is when the heart rate is above **100 per minute**. Bradycardia is when the heart rate is less than **60 per minute.**

Table 3: Common causes of tachycardia & bradycardia

Tachycardia (HR >100)	Bradycardia (HR <60)
Early sign of shock (before BP drops) ▪ Sepsis ▪ Trauma ▪ Hypoxia ▪ Pneumonia (sepsis), pulmonary embolism, asthma, emphysema, pulmonary contusion, pneumothorax or hemo-pneumothorax (trauma) ▪ Acute anemia: Acute (trauma/blood loss) ▪ Chronic anemia ▪ Arrhythmias ▪ Anxiety (diagnosis of exclusion) ▪ Pain (but must first consider other causes) ▪ Physiological (diagnosis of exclusion after all causes have been considered and actively ruled out)	▪ In adults: Much less common as indicator of critical illness/injury ▪ Children: may be a pre-terminal rhythm ▪ Cardiac causes:-Acute coronary syndrome, dysrhythmias (third-degree heart block) ▪ Organophosphate poisoning, may be related to beta blocker use or overdose
Tachycardia should not be ignored, unless you determine it is chronic and this conclusion is arrived at only after ruling out other reversible life-threatening conditions.	

2. **Respiratory rate**: Normal respiratory rate in adults is 15 per minute (range 14-16). Tachypnoea is respiratory rate > 20 per minute in adults & bradypnoea is respiratory rate < 10 per minute in adults.

Table 4: Common causes of tachypnoea & bradypnoea

Tachypnoea (RR >20 per minute)	Bradypnoea (RR <10 per minute)
Hypoxia ▪ Pneumothorax or haemo-pneumothorax (trauma) ▪ Asthma ▪ Congestive heart failure ▪ Pneumonia ▪ Pulmonary embolism. Metabolic ▪ Diabetic ketoacidosis Anxiety (diagnosis of exclusion) Pain (but must first consider other causes)	CNS ▪ Intracranial bleed ▪ Concussion ▪ Hypoperfusion due to shock ▪ Cardiac Drug overdose ▪ Benzodiazepines ▪ Alcohol ▪ Heroin Snake bite

Respiratory rate in pediatric age group:

Age	Breath per minute
Infant	30-53
Toddler (1-3years)	22-37
Pre-school (4-5 years)	20-28
School age (6-12 years)	18-25
Adolescent (13-18 years)	12-20
Alert:>60 (tachypnea) or <10 (bradypnea) breaths per min Apnea: Cessation of breathing >20 sec	

3. **Blood pressure:** As per the Indian Hypertension guidelines II

Normal blood pressure is less than 120/80 mm of Hg. Generally, hypotension or low blood pressure is considered when systolic BP <90. Hypertension is when either the systolic blood pressure (SBP) is higher than 140 and diastolic blood pressure (DBP) >90 mm of Hg.

Table 5: Causes of hypotension & hypertension

Hypotension (SBP <90mm Hg)	**Hypertension (SBP >140 & DBP >100 mm Hg)**

▪ Shock
▪ Sepsis
  • Pneumonia
  • Abscess
  • Urinary infections
  • Diarrhoea
▪ Haemorrhage- Trauma PPH
▪ Cardiogenic- Arrhythmia MI
▪ Anaphylactic shock
	▪ **Hypertension urgency** (Elevated BP with no end organ damage)
	  • Pulmonary edema
	  • Cardiac ischaemia
	  • Neurological deficits
	  • Acute renal failure
	▪ **Hypertension emergency** (Elevated BP with end organ damage)
	  • Cardiac- CHF, angina, coronary ischaemia
	  • Cerebral-mental status changes, Stroke (ischaemia or hemorrhagic)
	  • Pre-eclampsia

Hypotension is NOT a sensitive indicator but specific indicator of shock. Low BP in sick patient is indicative of shock and critical illness. Treat early as it is easy to reverse if addressed early.	**Caution:** Avoid rapid correction of BP. Sudden drop in BP can precipitate end organ damage → Stroke or MI. **SBP should be reduced gently, not more than 20% in 24 hours**

4. **Temperature:** Normal temperature is between **36.8 to 37.4 C**. Generally, **correction of temperature rarely impacts the overall survival and stability of the patient**. However, abnormal temperature provides clues to the underlying pathology contributing to critical illness. A high temperature is generally indicative of infection, which if untreated can cause life-threatening sepsis and shock. Rarely, environmental exposure to extreme heat or cold can cause either hyper or hypothermia respectively. Active rewarming techniques with blankets, warm IV fluids, warm urinary bladder irrigation and nasogastric irrigation can be considered due to exposure hypothermia.

Vitals are Vital!!

1. Adjunct Vitals

The adjunct vital signs are to be obtained in addition to the vital signs. They also aid in recognizing critical illness. They are assessed during clinical examination and/or obtained from commonly available electronic gadgets.

Table 6 : Details of adjunct vitals

Capillary refill time (Sensitive indicator of shock)- Normal value-<2 sec (prolonged in conditions of poor perfusion & shock) **Pulse quality** ▪ Thready- Early shock ▪ Thready with pallor- Hypovolemic shock **Mental Status**- Clinically stable patient is oriented to place, person and time. Altered mental status can be due to: ▪ Central nervous system: Intracranial bleeding, concussion, stroke, infection, status epilepticus ▪ Cardiopulmonary ▪ Hypoxia: CHF, pneumonia ▪ Hypercarbia: Asthma, COPD ▪ Infection: Septic shock due to pneumonia, urinary infection, etc. ▪ Drug: Benzodiazepines, opiates, anti-depressants, anti-psychotics ▪ Poisons: OP and other poisons ▪ Injury: Trauma or spontaneous Intracranial bleeding	**Pulse oximetry** (5th vital sign) Normal value is 95% (90% - 100%). A value < 90, is considered as **hypoxia** and must be managed with oxygen supplementation immediately irrespective of the underlying cause. **Blood glucose measurement** Hypoglycaemia (low glucose), which is life threatening condition and can kill the patient in minutes. **Skin**: color, temperature ▪ Pallor: Anemia, shock ▪ Cyanosis: Hypoxia ▪ Cool + Moist: Shock, organophosphates, hypoglycemia

2.B . **Triage** the patient to assess the type and severity of illness/injury.

'Red' and 'Yellow' category patients will need referral to a higher facility (as per referral protocols- annexure 1)

Triage is a process of sorting patients after their initial assessment and prioritizing them for treatment according to their clinical acuity. The most common triaging method is the 4-level colour coded system (details in annexure 2)

- Red - Immediate
- Yellow - Urgent
- Green - Non- Urgent
- Black- Dead

II- Prompt stabilisation

First step is to see if patients are sick or unstable . Care should be taken so that patient does not deteriorate further until the patient is transferred to higher centres.

1. Call for help and transport
2. Remove any possible threat aggravating injuries, and provide possible first aid.

3. While emergency services are reaching, use the **(H) ABCDE** approach. (details in Annexure 5)

All emergency patients should undergo a quick survey which normally include the following steps: A, B, and C which help in rapid assessment and recognition of critical illness.

This sequence has minor variations in certain scenarios.

- (H), A, B, C, D and E in accident and trauma patients
- C, A, and B in patients with cardiac arrest

4. In case of trauma control of life threatening external arterial bleeding- (H)
5. Ensure safe transport.

Process to check the level of consciousness of the patient

Before ABCDE approach is initiated always check for level of conscious as a part of prompt stabilisation in cases of emergencies.

- **AVPU scale** (Details in Annexure 4)

Check the person's level of consciousness using the **AVPU** method.

A: **Alert:** The person is aware and is responding to the surrounding on their own. The person will also be able to follow your instructions, open eyes spontaneously, and track objects.

V: **Verbally responsive:** The person's eyes do not open spontaneously. The victim's eyes will open only in response to voice/calling out his/her name.

P: **Responsive to pain:** The person's eyes do not open on their own and will only respond to painful stimulus. The victim may move, moan, or cry out directly in response to the painful stimuli.

U: **Unresponsive/unconscious:** The victim does not respond spontaneously and does not respond to verbal or painful stimuli.

Process to check victim's condition by ABCDE(H) approach

- **ABCDE(H) approach:**

Once the level of consciousness has been assessed, this approach should be performed within 1-2 minutes and repeated whenever the victim's condition worsens.

A:Airway **B**:Breathing **C**:Circulation **D**:Disability **E**:Exposure **H**:Hemorrhage control

1. Airway

Anatomy of airway

Upper airway anatomy

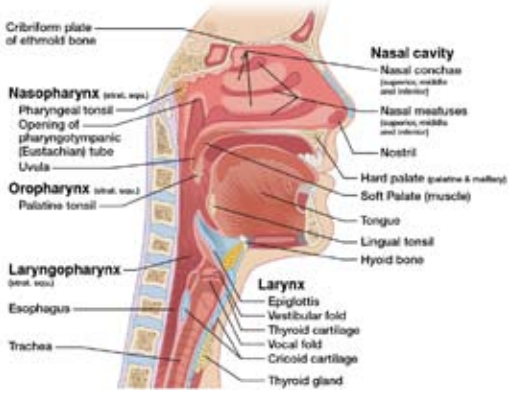
Upper airway extends from the nostrils and the lips to the upper portion of the trachea. In an emergency, there may be obstruction at any level which can seriously impair ventilation.

In patients with impaired consciousness when they are in the supine position, the tongue gravitates and could obstruct the airway at oropharynx. **The tongue is the commonest cause of airway obstruction**. Another common cause of obstruction in such patients is secretions and blood

which accumulate in the oropharynx. In addition to obstructing the upper airway, secretions also tend to enter the trachea. From there into the bronchus and eventually to the alveoli through the bronchioles.

The epiglottis is posterior and inferior to the tongue and the space between the tongue and epiglottis is called the vallecula. During intubation, this is an important landmark when positioning the laryngoscope to visualize the vocal cords. The vocal cords are located in the larynx and they must be visualised during intubation. If the vocal cords are not visualised endotracheal tube should not be inserted. **No blind intubation!**

Figure 2: The upper respiratory tract



Assessment of airway

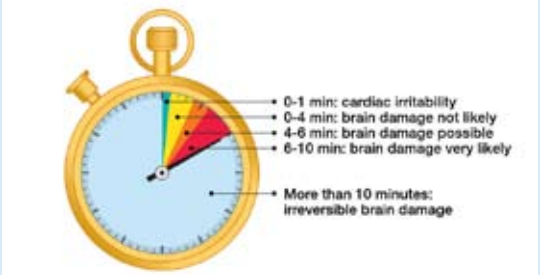
Once the patient's level of consciousness has been assessed, evaluate his/her airway. For a patient who is unresponsive, make sure that he or she is in a supine (face-up) position to effectively evaluate the airway. If the patient is face-down, roll the patient onto his or her back. Take care not to create or worsen an injury anywhere, especially over the neck. The two commonly used methods to open the airway:

- **Head-tilt/chin-lift technique**: Press down on the forehead while pulling up on the bony part of the chin with two to three fingers of the other hand; avoid hyperextension of the neck.
- **Jaw-thrust method**: The jaw-thrust method is used to open the airway when a patient is suspected of having a head, neck or spinal injury. To perform this maneuver on an adult.

Table 7: Signs of airway compromise (patency)

Inability to speak
Unusual raspy quality to voice
Snoring
Gurgling
Drooling
Inspiratory stridor
Hoarseness
Paradoxical chest wall movement
Tracheal tug

Time is critical in Airway Management



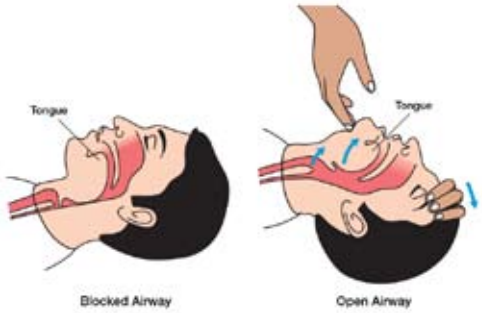
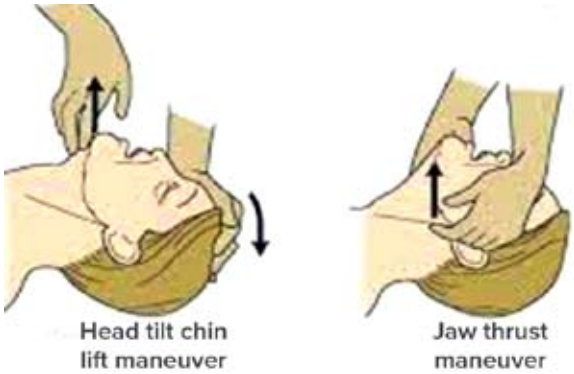


Figure 3: Head tilt/chin lift technique



- Kneel above the patient's head
- Put one hand on each side of the patient's head with the thumb near the corners of the mouth pointed toward the chin, using the elbows for support.
- Slide the fingers into position under the angles of the patient's jawbone without moving the head or neck.
- Thrust the jaw upward without moving the head or neck to lift the jaw and open the airway.

(**Caution:** If there is neck or head injury then only chin lift should be done without turning the head of the person.)

Table 8: Initial airway assessment

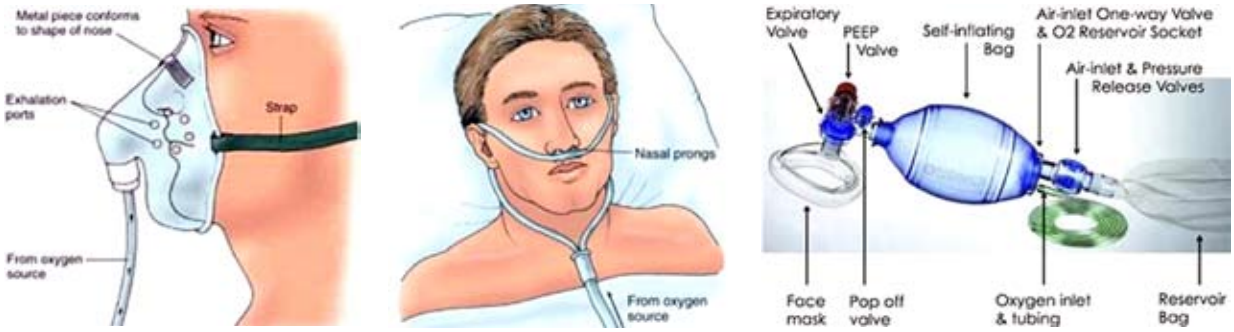
Done within 30 seconds and simple interventions can be initiated in less than a minute (Details in Annexure 3) The three questions to ask are:
1. Is the patient conscious? AVPU scale is a simple tool which helps in quick assessment of consciousness level of the patient (Annexure IV)
2.Is the airway obstructed? Usually the tongue or oral secretions obstruct airway. Severe facial trauma causing fractures of maxillary and mandibular bones can compromise airway due to derangement of airway anatomy and bleeding.
3.Is the cervical spine stable? Due to trauma or underlying disease. Addressing airway is critical but at the same time, certain precautions have to be taken when assessing and managing airway. This will protect the cervical spine and prevent grave complications.
*If the patient is barely awake or unconscious, such patients cannot protect their airway from tongue obstruction or aspiration of vomitus/oral secretions. They need endotracheal intubation.

In critical illness and injury, oxygen delivery to the vital organs is compromised resulting in tissue hypoxia. **Tissue hypoxia lasting more than four minutes leads to irreversible brain damage** and will likely kill the patient. The immediate priority here is to correct the hypoxia irrespective of the underlying cause.

Basic oxygen delivery methods

- Nasal canula (nasal prongs)
- Face mask (simple face mask and non-rebreather)
- Bag-valve-mask (BVM / AMBU bag)

Figure 4: Basic oxygen delivery methods



There are two ways to perform Bag-Valve- Mask ventilation:

1. One person technique:

- One hand (usually the left, non-dominant) is used to maintain face seal and position head to maintain patency of the airway
  - The index and thumb form the C around the connector to compress the mask to maintain the 'seal' to prevent air leak
  - The other three form the E under the chin and enables opening the airway by *elevating* the mandible
- The other hand ventilates by compressing the bag.

Figure 5: One person technique

Figure 6: Two person technique

2. Two person technique is more reliable and effective:

- One person holds the mask: both hands perform the C and E and hence the seal is more secure.
- The other person ventilates by compressing the bag

Table 9: Causes of difficult BVM ventilation (MOANS)

Mask Seal: is compromised in patients with facial hair, facial deformity due to deformity, or when there is blood around the mouth
Obesity / Obstruction: Cancer, lesions, excess tissue
Age: Young children and elderly can be difficult to ventilate
No teeth: Teeth keep the face from caving in during BMV. Keep dentures in place
Stiff / Snoring: Lung resistance issues (edema, COPD). Treat underlying cause

A simple method is to:

- **Look**: for the chest rise and fall
- **Listen**: for bilateral air entry
- **Feel**: the compliance of the bag
- **Pulse oximetry**: shows oxygen saturation

BVM ventilation Rates (per minute)	
Adult	10-12
Child	20
Infant	30
Neonate	40

Advanced airway

Manual airway techniques, airway adjuncts and suction are temporary measures which have to be followed by a definitive airway in patients who do not improve or are unconscious. This is possible by placing definitive airway tubes.

The procedures are invasive and need high degree of skills and experience. Depending on the position of the distal end of the tube definitive airway are grouped as:

- Supra-glottic airways: laryngeal mask airway (LMA)
- Infra-glottic airway: endotracheal tube (ETT) and cricothyroidotomy

Figure 7: Assessment of difficult intubation;3:3:2 rule

Access to airway obtaining glottic view	Can tongue be deflected to accommodate laryngoscope	Predicts location of larynx to base of the tongue. If larynx high angles its difficult

Laryngeal mask airway (LMA)

LMA offers an airway intermediate between the face mask and the tracheal tube. For a medium built adult, size 3 or 4 is appropriate. Before inserting, ascertain that the consciousness of the patient is low enough to suppress all pharyngeal reflexes. First, the cuff of the LMA has to be deflated and lubricated. The classic LMA is inserted blindly to the hypopharynx.

Endotracheal intubation

Placement of endotracheal tube requires practice and must be performed only by care providers who are trained in this procedure.

Direct laryngoscopy: It is a difficult procedure and requires practice and training. The laryngoscope needs maintenance to ensure that it is functioning properly when needed.

Variability in patient anatomy can be challenging and make it difficult to visualize the vocal cord.

Figure 8: Laryngeal mask airway

It involves the following steps:

1. Prepare
2. Pre-Oxygenate
3. Position
4. Peep (visualize the vocal cord)

5. Pass the tube
6. Position confirmation

Table 10: Steps of direct laryngoscopy

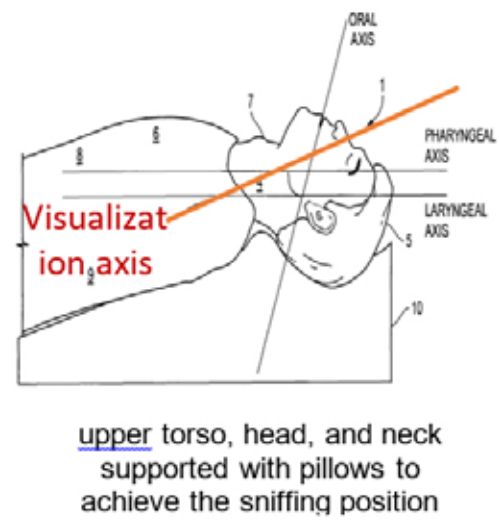
1. **Prepare**- Proper preparation ensures smooth procedure and avoid periods of hypoxia.

- Select correct size endotracheal tube-(ETT) -8.5 for adult men and 7.5 for adult women, In children <6 years ETT size = (Age in years/3) + 3.5)
- >6 years ETT size = (Age in years/4) + 4.5)
- Vacuum suction: Check if working and switch on the machine
- Ensure 2 large bore IV line are secured for medications- Sedate if patient is not unconscious & administer muscle relaxants.
- Laryngoscope blade: Ensure it is working and the luminosity of light bulb is adequate

2. **Pre-oxygenate**- With BVM ventilation and aim for >90% oxygen saturation at all times. The preferred position for pre-oxygenation is head elevation of 20 to 25 degrees

3. **Position**-

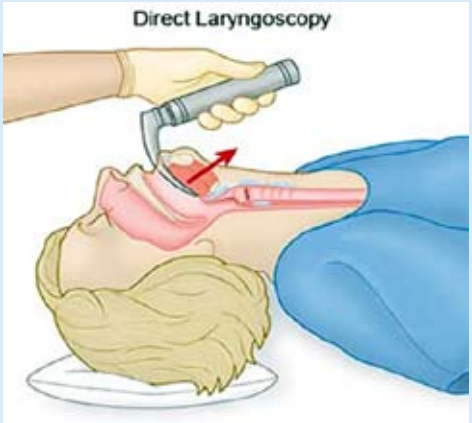
- Position level of bed to assist visualization and place patients head at the edge of the bed.
- Hold the laryngoscope in left hand and suction catheter in the right ready to suction.
- The sniffing position, with the patient's head extended on the neck and the neck flexed relative to the torso ensures alignment oral, pharyngeal, and laryngeal axes.
- Optimal positioning of the head and neck is not possible in trauma patients who require in-line stabilization of the cervical spine.
- In all patients with trauma / suspected cervical spine pathology, a team member should provide inline immobilization of cervical spine during the intubation procedure
- Order "**Stop BVM ventilation**"



upper torso, head, and neck supported with pillows to achieve the sniffing position

4. Peep- to visualize **vocal cords** by inserting laryngoscope

- Open the mouth, sweep the tongue with the laryngoscope blade to the left
- Enter slowly into the glottic area and visualize the epiglottis-don't push blade too deep & suction if needed
- Place blade in:
  - vallecula, anterior to epiglottis (curved blade)
  - under epiglottis (straight blade)
- Lift blade forward and upward direction
  - **DON'T** tilt blade backwards (avoid breaking teeth)
  - Aim for corner of the ceiling on opposite side of the room with the handle



- BURP maneuver: Ask an assistant to apply **B**ackward **U**pward **R**ightward (patient's right) **P**ressure on thyroid cartilage.

  This closes the upper end of oesophagus (prevents aspiration) and might improve the view of the vocal cords. This pressure should be maintained until the ETT is confirmed to be in the trachea by auscultation.

* *No Blind intubation- Don't intubate if vocal cords are not visualized*

5. **Pass the tube-**

- The tube is inserted between and 3-4 centimeters past the vocal cords
  - The designated mark on the ETT MUST be at the level of the teeth
  - Proper depth: 22 cm males, 20 cm females (at teeth)
- Children: Tracheal tube depth (cm) = **[age (yr) / 2] + 12**
- Gently remove the laryngoscope while holding ETT at all times
- With a hold on ETT remove the stylet from the ETT
- Inflate the cuff with air (10-15 ml)
- Attach Bag-Valve portion of BVM
- Secure the ETT to the face with tape/tie

Step 4 and 5 should be as short as possible- Constant monitoring of oxygen saturation has to be done. If the saturation remains lower than 70-80 range for more than a minute stop the attempt. Start BVM ventilation to bring oxygen saturation above 90% before attempting again.

Position confirmation-

- 5- point auscultation: upper and lower chest on both sides and epigastric region
- Chest rises on bagging the patient
- Oxygen saturation improves
- The ETT becomes misty due to moisture in exhaled air
- Confirmation devices which may not be available at PHC/CHC: Esophageal detection device
- End-Tidal CO_2 detector attached to the ETT changes from purple to yellow if CO_2 is detected in expired air
- Record ET tube depth at teeth: average depth is 20 cm in females and 22 cm in males. If not, reposition the tube

Cricothyroidotomy

Cricothyroidotomy is rarely indicated, even in an emergency. It is an invasive procedure requiring incision of the soft tissue of cricothyroid membrane in the neck to insert an airway into the larynx. This bypasses the vocal cords.

Types of Cricothyroidotomy
1. Percutaneous needle cricothyroidotomy
2. Bougie assisted percutaneous cricothyroidotomy
3. Open cricothyroidotomy

Table 11: Indications & contraindications of cricothyroidotomy

Indications	Contraindications
Burns and anaphylaxis: - associated with laryngeal edema which blocks visualization of the vocal cords. In such patient intubation and ventilation can be difficult to impossible	Intrathoracic airway obstruction Inability to locate the cricothyroid membrane Complete airway obstruction Paediatric patients Laryngeal pathology Decreased compliance
Facial trauma causing major fractures of face and larynx when the anatomy is disturbed making intubation difficult.	
Failed intubation for other reasons.	

2. Breathing

See if the patient's chest rises & falls with respiration, presence of flaring of nose and tightening of neck muscles during breathing. Normal breathing is quiet, regular and effortless.

In case of respiratory arrest, the patient would have a definite pulse but he/she would not be breathing. Such patients must be given ventilations immediately. Give 01 breath/ ventilation in every 5 to 6 seconds for an adult patient; with each ventilation lasting about 1 second and making the chest rise

One must continue giving ventilation until:

- The patient begins to breathe on his or her own.
- Another trained rescuer takes over.
- The patient has no pulse. In that case one should begin CPR or use an AED (defibrillator), if it is available and ready to use.

Conditions with abnormal breathing & life threatening

Trauma-Tension Pneumothorax/ Massive Hemothorax, Flail chest / Open chest wound, Circumferential chest burn

Medical- Acute severe asthma,

Respiratory failure, Pulmonary edema

3. Circulation

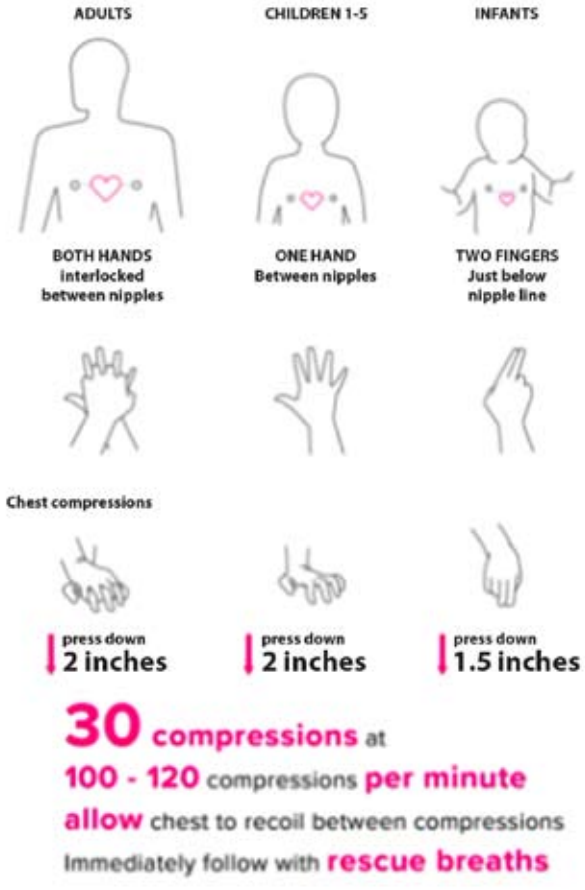
Check carotid artery pulse (or femoral or radial) on either side for about 06 seconds, multiply to it by 10 to get pulse rate per minute. E.g.: If there were 08 pulsations felt in 06 seconds, then the approximate pulse rate would be 80/minute. Simultaneously also look for breathing, respiratory movements over chest.

If there is no breathing, no pulse and the patient is unresponsive, the patient is in cardio-respiratory arrest.

Chest Compressions: Follow the steps as given below:

- Position the patient in supine, on a firm, flat surface as bed, stretcher or on ground.
- Expose the chest to ensure proper hand placement and the ability to visualize chest recoil.
- Rescuer should take a kneeling position on one side of patient's chest.
- Locate the area 2 inches above from the lower tip of the xiphoid sternum, now place the heel/ palm of one hand on the lower end of the sternum (i.e. at located area) and the other hand is placed on the top of first one. Rescuer interlaces the fingers of both the hands and locks the elbows in position.
- "Push hard & push fast" on the center of chest while delivering compressions until the return of patient's pulses.

Figure 9: CPR



- Arms are as straight as possible, with the shoulders placed directly over the hands in a straight line to promote effective compressions.
- Compression depth for adults should be 2 inches (about 5 cm) and rate should be at least 100/minute.

The chest must be allowed to fully recoil between each compression to allow blood to flow back into the heart following the compressions.

4. Disability

This is similar to AVPU scale that you have learnt in the previous sub-section. This is to check for unresponsiveness/unconsciousness. It determines basic neurological status

Table 12: Check neurological status

Score	Eye Opening	Best Verbal Response	Best Motor Response
6			Obeys Commands
5		Oriented	Localizes Pain
4	Spontaneous	Confused	Flexed to Pain
3	To Speech	Inappropriate Words	Flexion of arms with extension of legs(decorticate)
2	To Pain	Incomprehensible sounds	Extension
1	None	No Verbalization	None

5. Exposure

To examine the patient properly full exposure of the body may be necessary. Respect the patient's dignity and minimize heat loss by covering the person's body. The rationale behind this is to protect the victim from hypothermia.

6. Hemorrhage/bleeding control

If there is bleeding from any part of the body, the first step is to stop the bleeding. Profuse or uncontrolled bleeding should be given maximum priority (more details in Chapter 3).

If the victim is unresponsive but breathing, turn them into a recovery position and wait for help to arrive. (Details in Annexure 4)

Measures to control haemorrhage
- Direct pressure
- Pressure dressing
- Tourniquet
- Wound packing

III Safe transport of referral cases

Once patient ABC is maintained, measures have to be taken for safe transfer if cases cannot be managed at the designated level. Communication is very important before the transfer is made to the higher level.

Table 13: Checklist to ensure safe transport of critically ill patient

▪ Appropriate equipment stretcher, wheelchair, belt to fasten, and drugs? ▪ Batteries checked? ▪ Sufficient oxygen? ▪ Trolley available? ▪ Ambulance service aware or ready? ▪ Bed confirmed? ▪ Exact location? ▪ Case notes, X-ray films, results, blood collected? ▪ Transfer chart prepared? ▪ Mobile phone charged? ▪ Contact numbers known? ▪ Money or cards for emergencies?	▪ Estimated time of arrival notified? ▪ Return arrangements checked? ▪ Relatives informed? ▪ Patient stable, fully investigated? ▪ Monitoring attached and working? ▪ Drugs, pumps, lines rationalized and secured? ▪ Adequate sedation? ▪ Still stable after transfer to mobile equipment? ▪ Attendants have adequate competencies, experience, knowledge of case, clothing, insurance? ▪ Anything missed?

Steps to be followed for safe transport

1. Communicate with the referring physician

- First identify the hospital,
- Identify the physician,
- Give complete verbal and written report of patient injuries & present condition
- Place Foley catheter (Except if pelvic fracture suspected, there is blood at the urethral meatus, or prostate exam is abnormal)
- Put an IV line
- Consider tetanus immunization
- Antibiotics for open or contaminated wounds

(Give instructions to ambulance / attendance for care during transfer)

2. Review using ISBAR tool

Table 14: Components of ISBAR

I - Identify	▪ Caller's name, designation, department, institution, place ▪ Receiver: Confirm who you are talking to ▪ Patient: Name, age, sex, location
S - Situation	▪ State purpose "the reason I am calling is ..." If urgent say so, **make it clear from the start** ▪ Patient's symptom, vital signs, stability, level of concern (summary of the assessment)
B - Background	▪ Tell the story – relevant information only ▪ Presenting date of admission, history, findings, investigation and management done before
A - Assessment	▪ Use ABCDE approach to communicate ▪ Assessment and Action done so far ▪ Impression of the situation and state any interventions – What you have done so far

R – Recommendation Requirement Request	What you want from them (receiver)? **BE CLEAR** ▪ Request interventions and clarify expectations Urgent review Appropriate management Specific Investigation and monitoring When and how often

Case scenario: Mr. Babu is brought to the Primary Health Centre with complaints of chest pain and shortness of breath. After initial management, he needs to be referred to a higher centre for further treatment and management. You are a clinician calling the tertiary hospital and handing over to a specialist

ISBAR Tool	
I	**Identify:** Introduce yourself, the patient and identify receiving clinician by confirming names and designation with time and date of conversation.
S	Current Situation: Describe the situation or concern of your patient. Mr. Babu is a 48-year-old gentleman, who came to the health centre with complaints of chest pain on the left side since today at 10AM. He also complained of shortness of breath. His saturation was 86% in room air and BP was 90/60 mm of Hg. ECG showed inferior ischemia.
B	**Background:** Babu is a known **hypertensive** since the past 5 years but is on **irregular medication** and follow up. He has been a **beedi smoker** for over 20 years. He has had previous hospital **admission** due to **uncontrolled blood pressure**, details of which are not available. He attended with his wife and son who are being sent with him to receiving hospital.
A	**Assessment:** **Airway** was patent and patient conscious complaining of central chest pain. **Breathing** was fast with clear lung fields at RR of 22 per minute, Saturation was 86 % on room air which improved to 98% on 5 litres of O2 through a venti mask. **Circulation** was unstable with tachycardia of 112 beats per minute and BP of 90/60 mm of Hg. IV access achieved and maintenance dose of Ringer Lactate started. IV Morphine 8 mg was administered for pain along with oral stat doses of Aspirin 300 mg, Clopidogrel 325 mg and Atorvastatin 80 mg. Random Blood Sugar is 106 mg/dL Patient is currently pain free and family has been informed the need for transfer for further definitive care.
R	**Review** /r**ecommendation**: Kindly **re-assess** the pain, repeat ECG, do routine bloods, chest Xray and keep an eye on the BP. This is a good time to ask for any suggestions and recommendation from the receiving clinician for further treatment prior to transfer. Mention **estimated time** of arrival to the receiving hospital and details including contact number of the accompanying healthcare/paramedic staff. **Attach a written/printed referral letter** with all the necessary details to be taken with the patient. You can also forward a copy **through electronic means** like email/messenger.

Section 2

Management of Specific Emergency Conditions

CHAPTER 3

Trauma & Accidental Injuries

Learning Objectives

- Recognize critical injuries based on-mechanisms, injury patterns & changes in vital signs
- Articulate and demonstrate the structured and sequential approach to evaluation and stabilization of the trauma patient at a primary level of care: A,B,C,D,E
- Articulate and demonstrate the procedures required to stabilize the trauma patient
- Understand the importance and procedure of timely and informed transfer

In the previous chapter, you have been introduced to general measures which you should follow for all the emergency cases referred to you. However, each case is different and hence you would have to modify your approach in **ABCDE(H)** as you deem fit.

In this section, you shall learn about the various protocols that you should follow at HWC-PHC / UPHC for managing trauma accidental injury emergencies.

Trauma & accidental injuries

According to the World Health Organizations (WHO) Global Safety Report on Road Safety 2013, road accidents and injuries is the 8th leading cause of death globally and by 2030 it is predicted to become the 5th leading cause of death, unless any action is being taken. Here are some other facts on road accidents relevant to India:

- More than 2,31,000 people die due to road traffic accidents in India every year.
- About half the number of deaths accounts motorcyclists, cyclists and pedestrians.

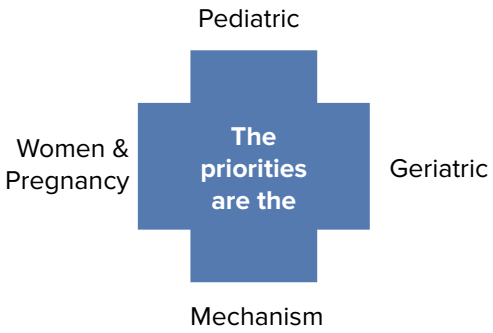
Therefore the only chance of survival for the accident victims remains emergency care and treatment they receive within the first hour of the tragedy (called the golden hour) by a competent health care professional.

Table 15: Guidelines for handling road traffic accidents

- In road, traffic accident patients may have to be moved in order to save lives.
- They should be moved immediately if:
  - Patient is unconscious.
  - Risk of spinal injury
  - Severe internal bleeding.
  - Danger of further injury from fire.
  - Breathing and heart beat have stopped.
- The above situations are not present then carry out full examination and determine the extent of injuries before moving them

Trauma or accident is the most common type of emergency. Though it can be fatal, major disability or even death can be prevented by providing stabilization using two modes:

- Immobilization
- Control of bleeding



Trauma Assessment components

1. Primary survey
2. Secondary survey (done only if there is time)
3. Safe transport
4. Communication with the receiving team

1. **Primary Survey** is defined as the simultaneous assessment and management of life threatening injuries. Primary survey consists of evaluation and management in the sequence HABCDE. This protocol helps identify immediate life threats so that conditions that are likely to kill the patient get addressed first.

Table 16: Trauma (and burns) emergency protocol

H: Haemorrhage, identify and stop life-threatening conditions
A: Airway: cervical spine control
B: Breathing: adequate ventilation with O_2
C: Circulation: IV Fluids / Blood
D: Disability (Neuro): maintain cerebral perfusion
E: Exposure: examine full body
Environment: maintain warmth and dignity

Hence, constant evaluation of vital signs and reassessment of the HABCDE is of utmost importance. After completing one step of the HABCDE protocol and proceeding to the next step, the clinician should quickly review the interventions and response to the previous component. This assessment can be done quickly in a minute or faster. The response to earlier interventions can be assessed and if satisfied the clinician can move to the next step. If not, new findings should be managed as appropriate before moving on to the next step.

2. **Secondary survey** is done only after the initial lifesaving procedure (HABCDE) have been completed and if there is time available prior to transfer.

3. **Safe transport**

Recognizing and stabilizing are the first two steps in managing a critical condition during the 'Golden Hour' of an emergency.

4. **Communication with the receiving team**

Providing quality clinical care, especially in an emergency requires effective communication among team members. A comprehensive handover includes talking (in person or over the phone) and sending written notes which set the tone for high-quality clinical care, promotes staff satisfaction and most importantly, reduces clinical errors.

Trauma (and burns) emergency protocol: HABCDE

ABCDE is being discussed previously . H- is discussed below,

Bleeding/ Haemorrhage can be **external** (visible) or in the internal organs. **Internal** bleeding in the chest, abdomen or pelvis can only be controlled by a surgeon in the operating room. Haemorrhage refers to life-threatening (catastrophic) condition .It can be controlled with pressure**.** In adults on anti-coagulants and in small children, a large wound on the scalp can also induce life-threatening bleeding. Without immediate intervention, the resulting hypo-perfusion of vital organs cause irreversible brain damage and death within minutes.

Table16: Types of haemorrhage in trauma

Controllable: Extremity haemorrhage controllable with pressure.
Uncontrollable Haemorrhage: Bleeding in the internal organs (in chest, abdomen, and pelvis) requires a surgeon.
The goal is to resuscitate cautiously with IVF, stabilize and transfer to a surgeon at the earliest.

The H in HABCDE refers
Massive, catastrophic **Hemorrhage**
In the **extremities or scalp**, and
Controllable with pressure
You don't want the patient to bleed to death during the initial assessment (primary survey)

There are four ways to apply pressure to control catastrophic (life-threatening) haemorrhage in trauma patients and are summarized in the table below. Specific injuries and their management is very vital. (Details in Annexure 5)

Table 27 : H-life threatening (catastrophic haemorrhage)

1. **Direct pressure with hands** on the bleeding site ▪ This can be done in 1-2 seconds ▪ Anybody can do it (no training needed) ▪ Caution: wear gloves	 *Direct pressure*	3. **Tourniquet:** apply circumferential pressure proximal to the bleeding site ▪ Improvised or custom-made tourniquet strap

2. **Pressure dressing** with gauze or cloth applied tightly

- Within a minute and requires no formal training
- Must be tight to stop the bleeding
- If bleeding is severe, care is needed to avoid complications the effect is on top of it

Pressure dressing

3. **Wound packing** if tourniquet cannot be applied (groin and axilla)

- Need basic skills to perform
- Takes a few minutes to prepare. Wound is packed with thick gauze, cotton or cloth and pressure is applied temporary or may not be effective Tourniquet: apply circumferential pressure proximal to the bleeding site

- Needs a few minutes to apply
- Effective for many hours

Improvised with foley catheter and artery forceps

Fracture is an injury that causes break in the bone. The break is usually complete, but in the young the bone can be bent without breaking completely. This is called a greenstick fracture.

Table 18: Types of fracture

i) **Simple or closed** – skin is unbroken and blood is lost into tissues

ii) **Compound or open** – a wound leads to fracture, or bone protrudes through the skin. Blood loss may be severe, and infection can result.

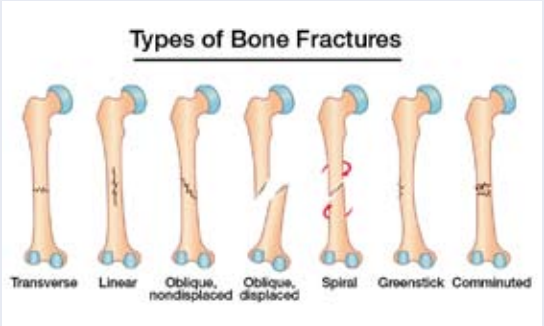
iii) **Spiral fractures** – are caused by twisting of the bones such as those which may occur in skiing accidents.

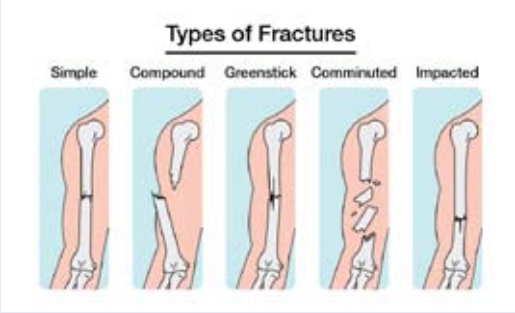
iv) **Transverse fractures** – are horizontal breaks directly across the bone fractures caused by acute trauma, damaging motion such as running or jumping.

v) **Stress fractures**- transverse breaks caused mostly due to overuse or repetitive trauma.

vi) **Greenstick fractures** – usually the result of sudden force and are commonly found in children.

vii) **Comminuted fractures** – are those in which the bone shatters into fragments. These fractures are caused by severe force such as car accident





The victim who has suffered a fracture might have either felt the break, heard the break or both. Some of the common **signs** of a fracture are:

- Pain at the site of the bone that is fractured
- Difficult or impossible normal movement of the limb
- Deformity, abnormal twist or shortening of limb

- Tenderness at the site of fracture, when gentle pressure is applied
- Swelling over and around the fracture
- Bruising at the site of fracture
- A coarse grating sound if one end of the bone moves against the other. This is called crepitation.

In fractures , medical officers need to stabilize the site using a make-shift splint and refer to higher facilities.

A. Protocol for stabilization of victim with a fracture:

- Secure IV access.
- Administer IV fluids if there is blood loss.
- Administer analgesics.
- Stop any bleeding by applying direct pressure and by elevating the injury site.
- Ice packs may be used for closed fractures to lessen pain and swelling.
- Immobilize using splints or minimize movements of the injury site to avoid further injury.
- ***RICER: REST, ICE/IMMOBILIZATION, COMPRESSION, ELEVATION & REFERRAL.***

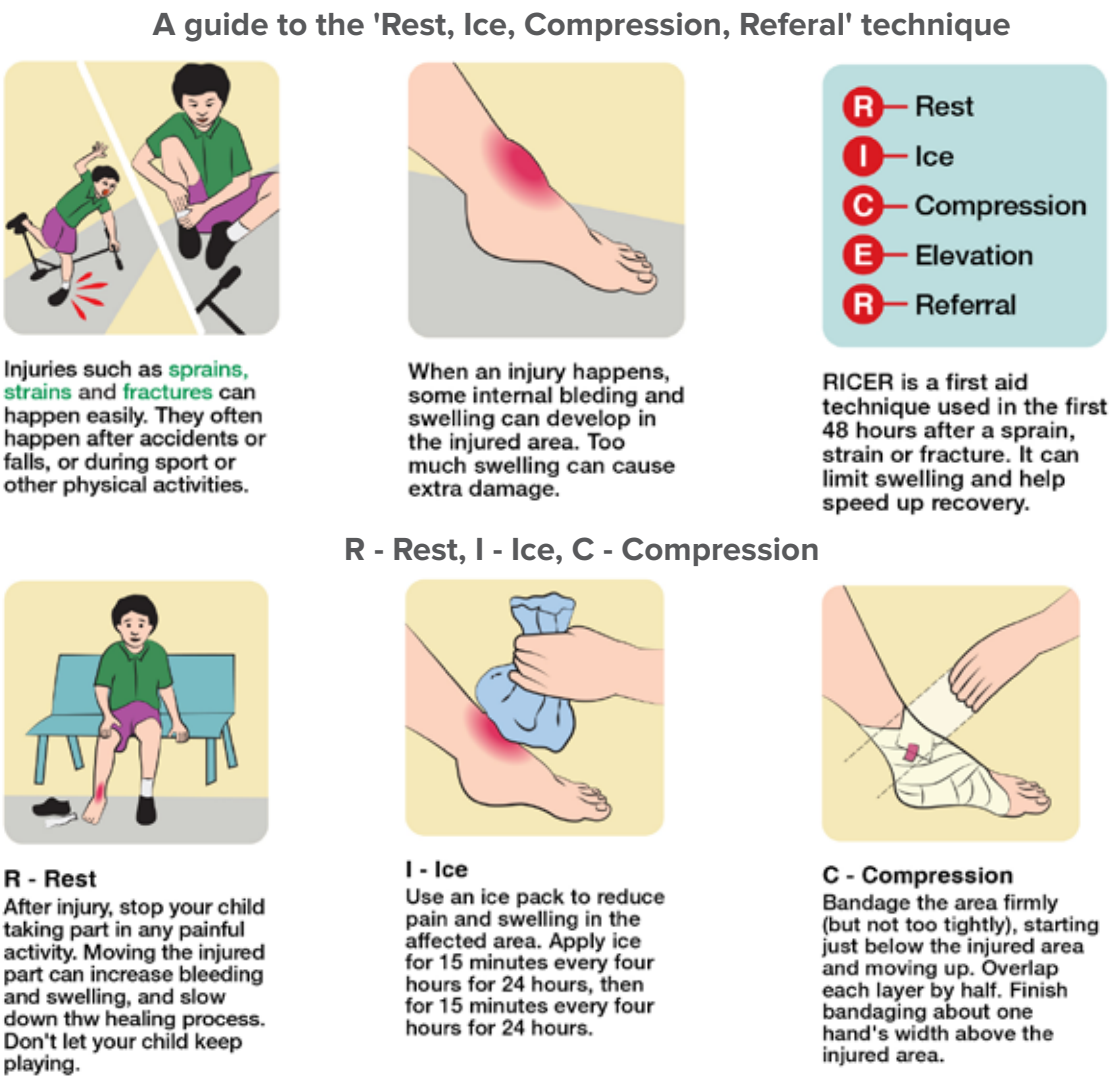


Figure 10: RICER

Note of Caution

When handling a suspected fracture, ***DO NOT*** do the following:

- Massage the affected area
- Apply any ointment like iodex over open wounds
- Straighten the broken bone
- Move the injured part or the limb
- Move the joints above and below the fracture
- Attempt to set the fracture
- Try to push a protruding bone back

Splinting & Bandaging

- Splinting: It's a rigid appliance, usually made of wood or metal, which is tied to a fractured limb to support it and prevent movement from taking place at the site of fracture. Rolled newspapers, magazines, piece of wood, cardboard etc. have been used for splinting in case of emergency.
- **Bandaging:** A bandage is made up of gauze which is used in fracture. Bandaging should be firm so that there is no movement of fractured ends but not too tight which can stop the circulation of the blood to the area.

Instructions for referral of the victim of a fractured spine:

A simple fractured spine may easily be turned into a complicated fracture involving the spinal cord unless the patient is carefully handled. The principles to be followed for shifting the patient with fractured spine are:

- The spine must not bend when moving or lifting the patient.
- Preferably do not turn the patient but if you have to, turn the patient in one piece.
- The stretcher on which the patient is being transported must be rigid so that it will not sag on lifting. Use a board, door, shutter etc. for this purpose.
- Always transport the patient lying flat.
- In case of preexisting spinal injury, patient should be immobilized in that position only, no attempt should be made to lay him/her flat

Summary:

- Importance of Primary Survey: A,B,C,D,E
- Secondary Survey- Head to toe examination
- Re-evaluation Phase
- Safe transfer

CHAPTER 4

Burns

Learning objectives

- Understand priorities of evaluation and resuscitation for burn patients
- Recognize signs of airway compromise requiring early intervention
- Understand the importance of avoiding hypothermia
- Understand initial fluid resuscitation rates for burn patients
- Understand simple calculation of burn surface area

Burns are the leading cause of accidental and suicidal deaths in India and many of them are preventable and treatable at primary levels. Most of the reported victims belong to 15-40 years age group and belong to poor socioeconomic strata. In addition to the burns on skin and varying layers of deeper structures, it affects various vital organs due to loss of fluid through the burn wound and hypovolemic shock.

Burn is defined as a breach in the continuity of integument by heat or extreme cold caused by thermal, electrical or chemical agents or by ice etc. 95% of burn injuries are preventable so we should stress on prevention. (**Once a burn patient always a patient**)

It necessitates aggressive management as highlighted below in order to prevent mortality.

a. Rapid assessment,

b. Adequate fluid administration to revive hypovolemic shock,

c. Timely surgical care including fasciotomy to restore circulation in the limbs and prevent loss in circumferential burns

d. Appropriate antibiotics to prevent infection,

e. Burn wound care, early excision of burn wound and resurfacing

f. Provide adequate nutrition to balance the metabolic state

g. Rehabilitation

Table 19: Aetiology of burns

1. Thermal ▪ Fire and heat ▪ Steam burns ▪ Hot liquids	2. Electric ▪ Contact Burns ▪ Spark Burns ▪ Lightning Burns
3. Chemical Burns ▪ Acid ▪ Alkali	4. Inhalation of fumes

1. Thermal burns

Thermal burn injuries are caused by fire or hot liquids (scalding injuries). They are classified based on the severity of injury.

Figure 11: Degree of burns

1st degree: Are superficial and involve epidermis. No blisters. Skin is red: Mild pain present, heals spontaneously.	
2nd degree Superficial: Involved up to dermis (partial thickness). Blistering, sloughing of outer skins: **very painful,** blistering, blanches to touch. Usually heals from intact skin appendages with some skin discoloration (7-21 days) **2nd degree Deep**: injury through the epidermis deep into dermis. Pale mottled, does not blanch to touch, painful to pin prick. Heals with scarring (>21 days)	
3rd degree: Full thickness of skin up to fascia. Skin thickened, hard leathery , paled and charred, eschar: **No pain,** No visible skin appendages. Skin grafting necessary	
4th degree: Involves deep tissue: muscle & bone. **No pain**	

Table 20: First aid at site of accidents

A. Fire/Flames	**B. Electrical burns**
1. Rescue the victim from accident site 2. In major burns look for signs of circulation, breathing, coughing or movement. If needed start CPR. 3. Smoother any flames by covering them with blanket or water 4. If clothes catch fire, ask client to roll down on ground. 5. When flames get smoother try to take out clothes and jewelry, if stuck with skin don't try to take out. 6. Keep the burnt area under running tap water for 10–15 minutes (in superficial burns). This will decrease the pain. Avoid it in major burns to prevent hypothermia 7. Don't break small blisters formed on burnt area 8. Do not apply butter, grease or oil over the burnt area 9. Raise the burnt area above heart level to maintain circulation 10. Cover burnt area with wet gauze 11. For victims of smoke inhalation- give 100% oxygen by mask 12. In steam inhalation with facial oedema – intubation may be required. 13. In severe burn cases transport victim to nearest health care facilities.	1. Never approach or touch a victim of an electrical injury until you are sure power is turned off. 2. In electrical burns, switch off main source or separate the victim from source with non -conducting equipment (wooden or rubber made equipment). 3. Check for circulation, airway and breathing if victim is unconscious and perform CPR if necessary. 4. Check for other injuries because electric shock causes severe muscular contraction so victim might have an injury during fall. 5. Do not cool the burn area. Cover the burn area with dry and sterile gauze or clean cloth and treat victim for shock 6. If victim is not breathing start rescue procedure immediately. 7. In severe burn cases transport victim to nearest health care facilities 8. Give plenty of oral fluids.
C. Chemical burns:	**D. Inhalation of fumes**
1. Rescue victim from place of accident. 2. In major burns look for signs of circulation, breathing, coughing or movement. If needed start CPR 3. Remove contaminated or chemical soaked clothes from body. Wash area with water at least for 20 minutes (including hair, If the eyes are involved they should have irrigated with water to remove chemical) 4. Cover area with sterile gauze or clean cloth to prevent infection 5. In severe burn cases transport victim to nearest health care facilities Some chemical may cause systemic or respiratory effects separate from burns. If available obtain the name of the chemical and refer to the instructions in the manual for any antidote information.	Fire accidents may also be associated production of toxic fumes and gases like **carbon monoxide and cyanide**. If the patient is trapped in a fire accident in a **closed space like** a room or automobile they can inhale enough to be intoxicated resulting in serious complications. Common toxic fumes are carbon monoxide and cyanide gas. (Details below)

Inhalation of fumes:

Carbon monoxide	Cyanide
▪ It is released by incomplete burning (combustion) of carbon based fuels like natural wood, coal or petroleum products including natural gas. ▪ Inhalation of carbon monoxide usually occurs in these settings: 1. Burns due to fire: in closed space. 2. In poorly ventilated houses – where carbon based fuels used in colder environments & poorly ventilated bathrooms where natural gas (LPG) based water heaters used. ▪ Symptoms are mild and nonspecific (headache, nausea, weakness and confusion) and hence not detected early ▪ With increasing exposure patient develop weakness, confusion and eventually loss of consciousness and die ▪ Treatment- patient should be started on high flow oxygen preferably with non-rebreather mask in all burn patients and patients transferred to higher level of care in case they need treatment with hyperbaric oxygen (oxygen under high pressure).	▪ Occurs when some commonly used household and industrial equipment is burnt. ▪ The symptoms are non-specific and the patient may have headache, nausea, dizziness, tachycardia, confusion. ▪ The patient will have **normal pulse oximeter as in carbon monoxide poisoning.** ▪ **These patients also must be treated with** high flow oxygen by non-rebreather mask. ▪ Such patients should be referred to a high level of care where **hydroxy cobalamin or sodium thiosulfate** may be used at referral hospital

Components of burn assessment: (discussed in previous chapter)

1. Primary Survey: HABCDE and immediate treatment /stabilization at each step
2. Secondary Survey: Is done only if there is time and
   - Re-evaluation phase (manage burns)
3. Safe transport
4. Communication with the receiving team

Special considerations for burn patients

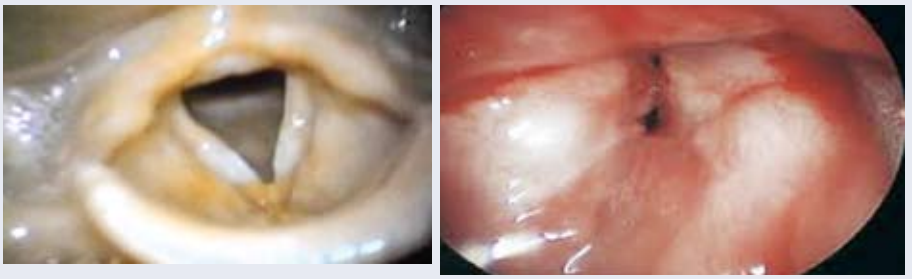
The HABCDE protocol ensures the following goals are met in the initial emergency care of burn patient:

- Assess for trauma or unstable medical conditions
- Secure airway: especially upper airway burns can be cause airway obstruction very early
- Begin IV fluid resuscitation
- Avoid hypothermia
- Provide pain medication as burn can be very painful
- Calculate Total Burn Surface Area (TBSA) to determine fluid resuscitation rate.
- Safely transfer patient to burn center

However, certain special considerations are necessary because the nature of injury causes unique findings.

- Airway management: In all burns patient's upper airway involvement should be aggressively assessed and managed. Patients who are awake seemingly doing well may have sudden airway obstruction due to laryngeal edema from burns.

Figure 12: Airway edema



Early edema Late edema

Signs suggestive of airway burns
▪ Facial burns ▪ Singed facial hair ▪ Carbonaceous sputum ▪ Hoarse voice ▪ Sore throat ▪ Stridor
*Presence of any of these signs, careful evaluation of the airway& Early Intubation is critical

Assessment of burns

Assess surface area and depth of burns

1. **Surface area** using **Rule of nine in adults and Lund and browder chart in children**

Surface area assessment
▪ Erythema should not be considered. ▪ Lund and Browder chart: Most accurate method, it compensates for variation in body shape with age, useful in children. ▪ Wallace rule of nines: Good quick assessment, not accurate in kids ▪ Palmar surface: area of palm and fingers 1 percent

2. Depth of burns:

First degree: Epidermal loss only, superficial layers of skin are involved

Burn wound pink in colour, blanches on pressure, very painful

Second degree: Depth varies with thickness of dermis, deeper layers of skin burnt,

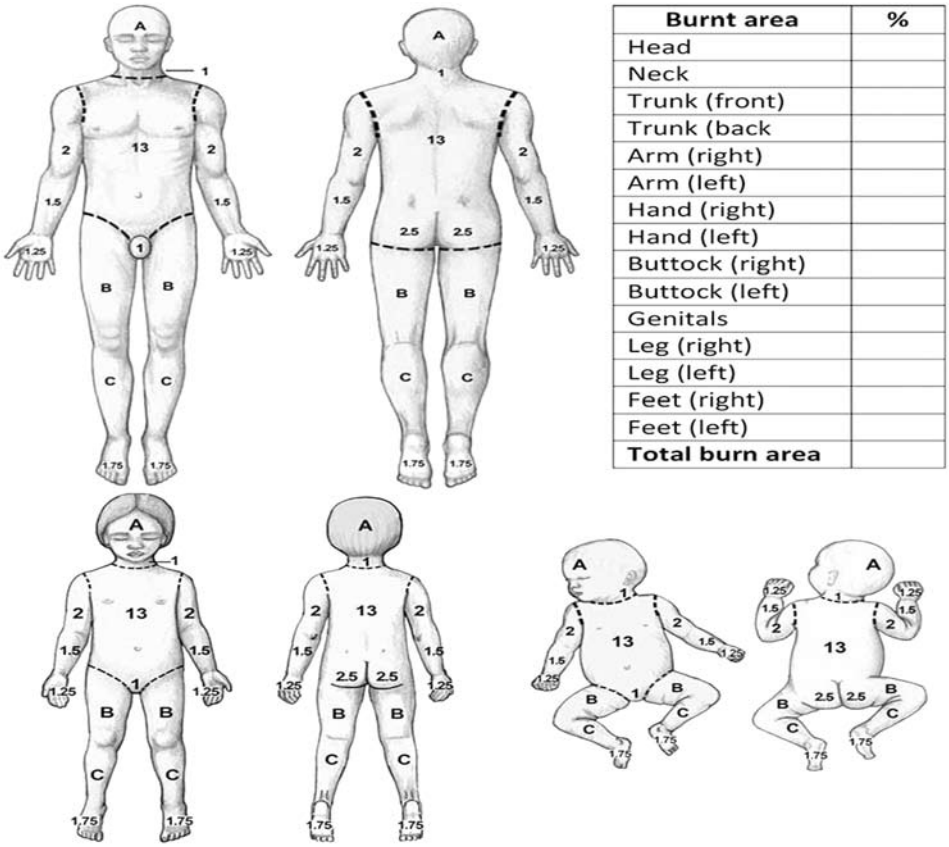
White to dark red in colour

Less painful or painless, No blanching on pressure

Hair follicles can be pulled out easily

Third degree: Full thickness skin burns, deeper tissue may also be involved, No pain

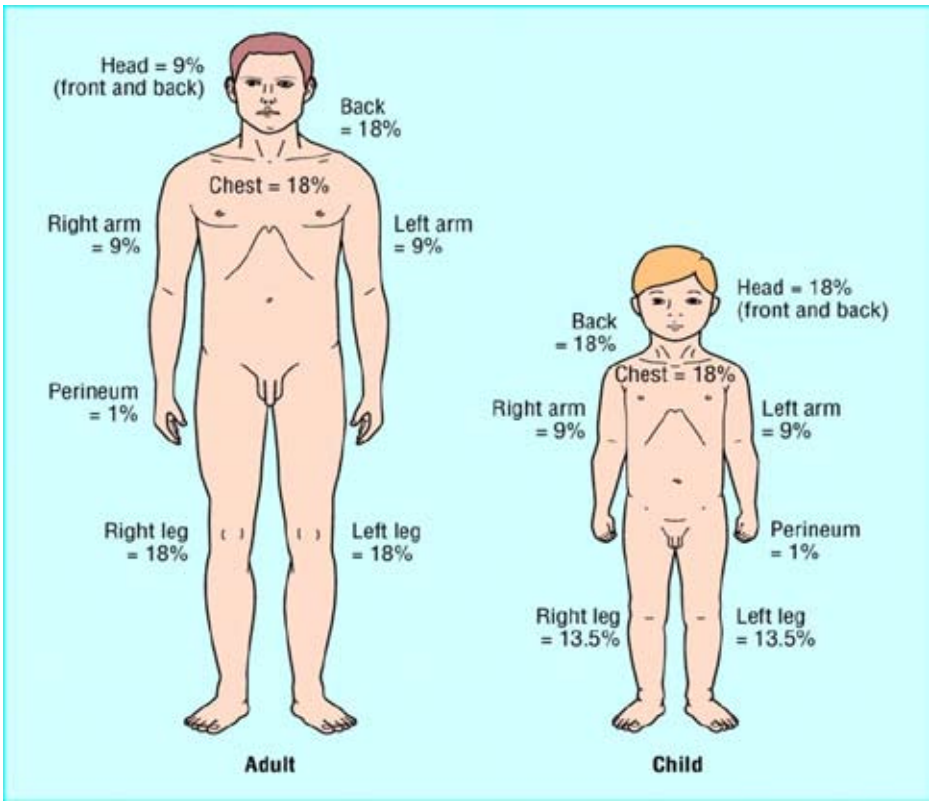
Lund and Browder Charts for area of body burnt



Burnt area	%
Head	
Neck	
Trunk (front)	
Trunk (back	
Arm (right)	
Arm (left)	
Hand (right)	
Hand (left)	
Buttock (right)	
Buttock (left)	
Genitals	
Leg (right)	
Leg (left)	
Feet (right)	
Feet (left)	
Total burn area	

Age (years)	Under 1	2–4	5–9	10–14	15	Adult
A — ½ of head	9½	8½	6½	5½	4½	3½
B — ½ of one thigh	2¼	3¼	4	4½	4½	4¾
C — ½ of one leg	2½	2½	2¾	3	3¾	3

Figure 13: Rule of nine



Severity assessment & management:

Criteria to identify as serious burns	Initial care of burn patient
1. > 10% TBSA in children	1. Assess % of total body surface area involved
2. > 20% TBSA in adults	2. ABC status
3. Burns to face	3. Start IV line- preferably Central
4. Burns to hands	4. Put urinary catheter
5. Burns to genitalia	5. TT prophylaxis
6. Circumferential burns	6. Rule out any associated injury
7. Airway Burns	7. Weigh the patient
	8. Shift patient to ICU

Fluid management in burn patients

Fluid resuscitation in burns should be managed cautiously: Not too much or too less.

Two types of fluid used are colloids-

a. Whole blood , Plasma, Plasma expanders

b. Crystalloids- Normal Saline , Ringer's lactate solution etc.

- Ringer's Lactate is the preferred fluid for burns. Normal Saline (NS) may be substituted.
- Warm fluids are preferred, in order to keep the body warm and avoid hypothermia
- Do not use glucose-containing solution like D5W as it is hypotonic. It causes glycosuria and promotes further fluid loss.
- Use large-bore IV catheters (18 gauge or larger). Avoid burnt area while inserting catheter. If it is not possible, you may start IVs through burnt skin.

Table 21: IV fluid calculation

Adult-	Children-
2ml/kg/%BSA up to 50% Burn + 2500ml Ringer lactate in adults	Maintenance fluid (RL/NS)- 4ml/kg for first 10 kgs + 2ml/kg next 10kgs + 1ml/kg after that
***Half in first 8hrs and half in next 16hrs (In equal divided doses)** ***Ringer's Lactate is the solution for Burn.** ***In small children- Isolyte-P**	
Please note :Urine output is to be 0.5ml -1ml/kg/hr& in electrical injury 2-3ml/kg/hr	

Summary:

- Secure airway, Provide oxygen
- Assess for trauma or unstable medical conditions and treat for trauma first
- Begin IV fluid resuscitation at initial fluid rates
- Avoid hypothermia
- Provide pain medication
- Safely transfer patient to burn center
- Instructions to ambulance transport team

CHAPTER 5

Medical Emergencies

Cardiac emergencies

Learning objectives

- Identify features associated with acute coronary syndrome (ACS) and recognize ECG changes
- Identify signs and symptoms associated with Heart Failure (HF)
- Understand the initial treatment for ACS and HF
- Understand management of a patient with cardiac arrest
- Identify and manage common cardiac arrhythmias
- Identify and manage other medical emergencies

Non-communicable disease can lead to emergency situations if not controlled. These conditions include acute chest pain including Angina and myocardial infarction, stroke etc.

1. Acute chest pain

Signs and Symptoms:

i. A**ngina pectoris or myocardial infarction**: Acute chest pain in the centre of the chest radiating to neck, jaw and arms, associated with sweating, nausea or vomiting, that may last for few minutes (15-20 minutes or more), aggravated by work (more frequently seen in elders with or without hypertension, diabetes mellitus, smoking).

ii. **Pleurisy, respiratory infection or pulmonary infarction**: Sharp catching pain, located laterally and increasing with deep inspiration or coughing.

iii. **Pneumothorax:** Sudden pleuritic pain with progressively increasing difficulty in breathing. Pleuritic chest pain is characterised by sharp, intense, burning or stabbing pain that increases during deep inspiration, coughing, sneezing, laughing, etc.

iv. Chest pain increasing on movements is often **Musculo-skeletal**.

v. Other causes of chest pain are due to rib-fracture (enquire history of trauma, fall) and aortic dissection, myocarditis, pericarditis.

vi. Acute chest syndrome in sickle cell disease patients presents as cough, fever and severe acute chest pain. It is usually a result of infective process or hypoxia

vii. Chest pain associated with burning sensation in chest, more backwards and radiating up to throat, and associated with burping, upper abdominal pain, regurgitation of food or sour liquid in throat and occasional vomiting, etc. may be seen in **GERD (Gastro Oesophageal Reflux Disease)**. This may be confusing at times with acute MI, and needs careful evaluation

2. Acute coronary syndrome (ACS)

Is Imbalance between myocardial oxygen supply and demand, which occurs due to sudden blockade of coronary arteries:

1. ST segment elevation MI (STEMI)
2. Non-ST-elevation MI (NSTEMI)

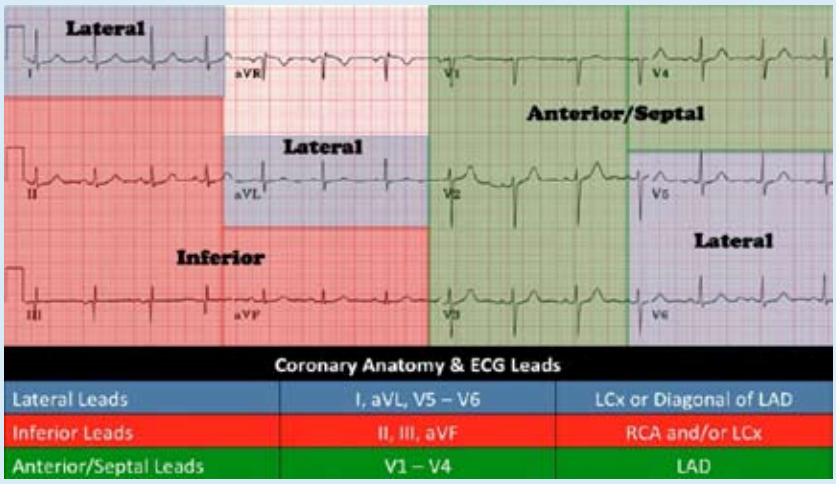
   Unstable angina- Both are Non- ST elevation ACS

Signs

- Central chest pressure, tightness, or pain
- Radiation of pain to arm(s), neck, or jaw.
- Shortness of breath
- Diaphoresis
- Nausea
- Tachycardia or bradycardia (pulse > 100/min or < 60/min)
- Severe blood pressure dysregulation (systolic BP i.e.; ≥ 220 mmHg or Low blood pressures/ shock, SBP <90mmHg)
- Additional heart sounds and apical systolic murmur in Acute myocardial ischemia
- Respiratory insufficiency (SpO_2 < 90%) may be present.

Spectrum of acute coronary syndrome

	Unstable Angina	STEMI	NSTEMI
Definition	Ischaemia without necrosis	Transmural necrosis	Non transmural necrosis
Diagnosis	Negative Biomarkers	Positive Biomarkers	Positive Biomarkers
	No ECG ST segment elevation, May be normal	ECG ST segment elevation	No ECG ST segment elevation, May be normal
Treatment	Invasive or conservative depending on risk	Immediate reperfusion	Invasive or conservative depending on risk

Differential diagnosis	ECG in STEMI
▪ Aortic dissection ▪ Pulmonary embolus ▪ Perforated ulcer ▪ Pericarditis ▪ Pneumonia ▪ Pneumothorax	

First-Aid Treatment for cardiac chest pain at PHC-HWC

- If patient is haemodynamically unstable or in shock, follow protocols for management of shock
- If patient is haemodynamically stable, proceed further to ask for specific history of symptoms and look for possibility of acute MI:
  - Gradual/acute onset
  - Central chest pain crushing or heaviness, radiating to shoulder, back and arms
  - Lasts for 15-20 minutes or more
  - Pain not relieved by pain killers
  - Past history of cardiac chest pain
  - Hypertension, diabetes, etc.
- Start oxygen by mask/ nasal prongs – 2 to 3 litres/minute and continue during transfer. Oxygen is supportive treatment; should be given to everyone, although patient is not hypoxic. Assisted breathing should be given with AMBU bag, if needed.
- Give tablet glyceryl trinitrate 0.5 mg sublingual, it helps to decrease workload of heart and decreases pain; can repeat one tablet in 10 minutes again or during transfer if pain is still severe one. ***Ask patient not to chew the tablet***.

****Do not give nitrate tablets, if patient is already in shock or systolic BP is less than 90mmHg or pulse is less than 50/minute.***

- Tablet aspirin 300 mg + Tablet atorvastatin 80 mg orally is to be administered.
- Insert IV cannula, monitor vitals frequently, Pulse, BP every 15 min. and SpO_2 continuously and look any signs of shock.
- At the same time, continue taking more history from the patient and close relatives regarding history of similar complaints in past, other major respiratory or cardiac diseases, any medications, etc.
- Discuss with family and attendants regarding the clinical condition and need for further care, referral and preparedness for care at tertiary centre.

Table 22: Management of ACS

- IV access and continued monitoring
- Oxygen (if SpO2 < 90% or CHF)
- Nitrates: 5mg
  - Sublingual for 3 doses till pain is relieved
  - Avoid if SBP < 90 mmHg; RV infarction or use of sildenafil in 24 hours
- NSAIDS- Aspirin – 150-325 mg to be chewed (non-enteric coated)
- ADP-receptor inhibitors ($P2Y_{12}$ receptor inhibitors)- Clopidogrel – 300 mg stat and then 75 mg od (no loading if age > 75 years)

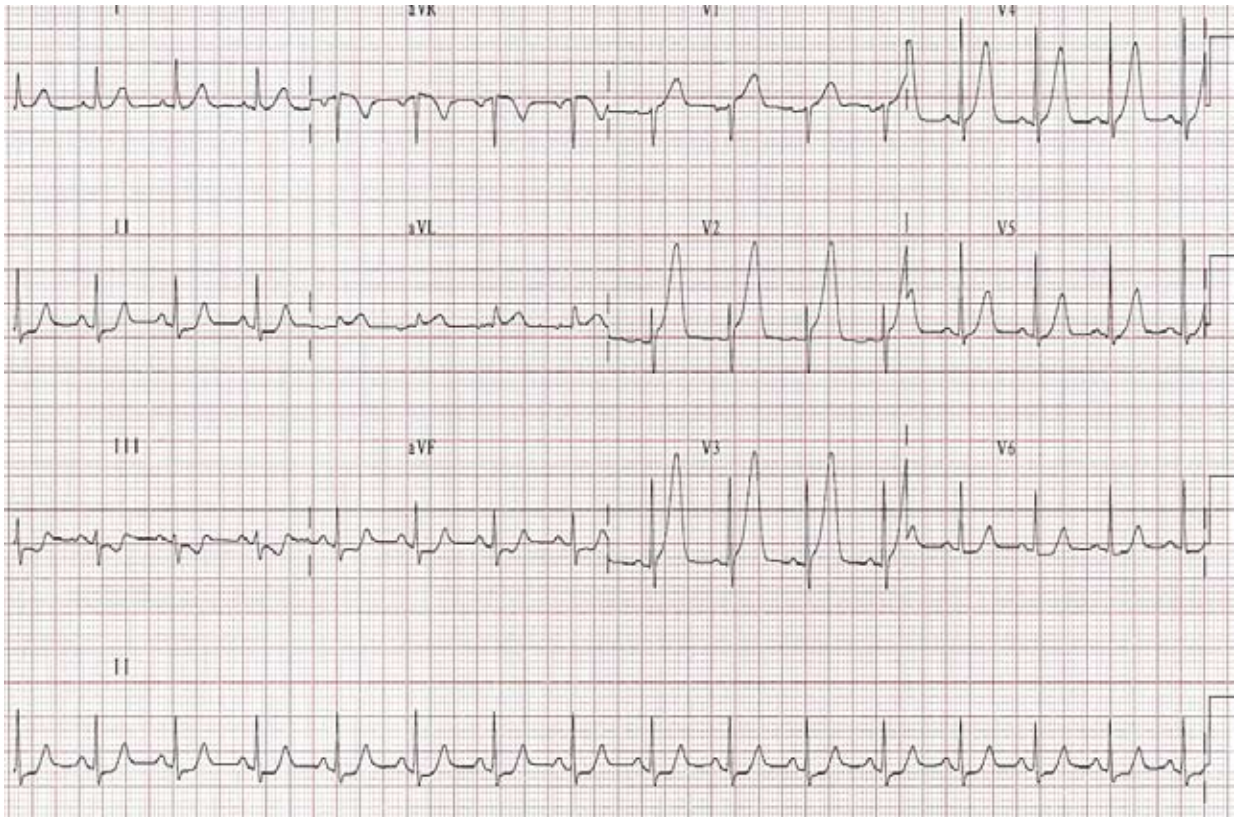
Refer the patient immediately to a higher centre for higher standard of care.

The goal of referral and management in acute MI cases is to identify candidates for thrombolytic therapy (which dissolves blood clot blocking the blood flow within the artery) and administer it within **golden hour**, i.e. with first 60 minutes from onset of symptoms. Thrombolytic therapy if given to appropriate patients within "golden hour" would prove to be lifesaving

If there is less suspicion, do not discharge patient immediately, observe for at least 3-4 hours. Repeat history and examination and assess for other causes of chest pain. Before you discharge stable patient or if you have doubts regarding the case, contact your medical officer at PHC who has referred and inform them about your patient and your findings and make necessary plans as indicated.

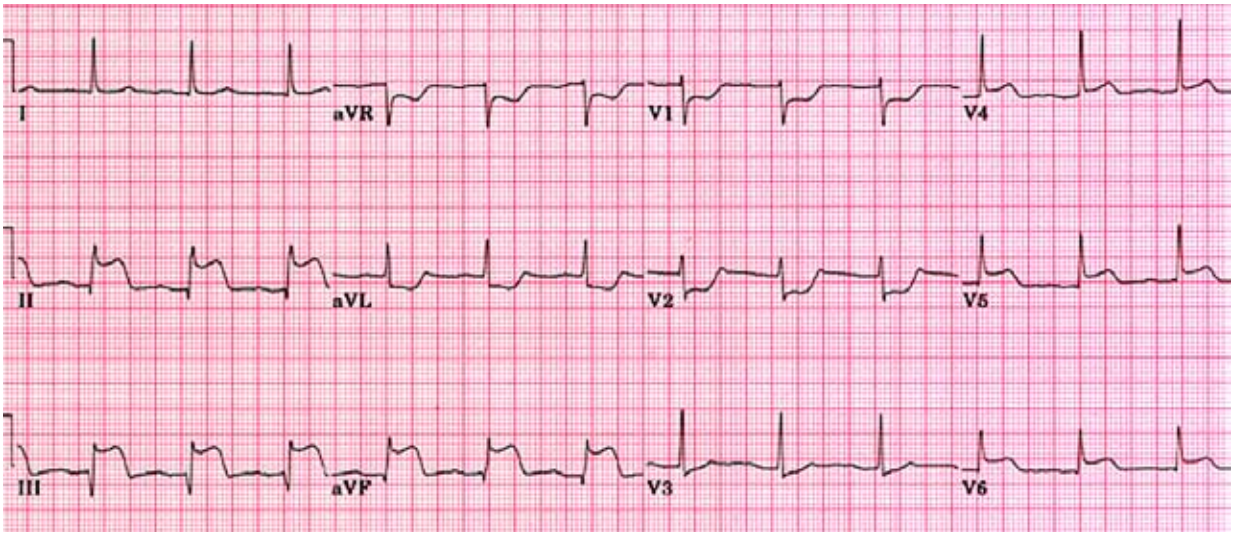
Case Scenario-1

A 54 year old patient presents with right-sided chest pain for 1 hour



Case Scenario-2

A 60 year old patient with chest pain for 2 hours



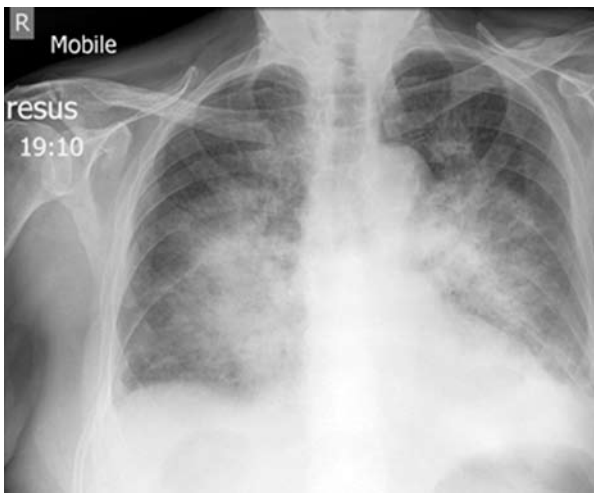
Summary:

- Suspect on the basis of symptoms
- ECG is confirmatory for STEMI; may not be available
- PHC treatment is aimed at relieving symptoms of ischemia
- Rapidly shift the patient

3. Heart failure

Its defined as heart's inability to pump sufficient blood to meet body's metabolic demands.

Clinical features
▪ Fatigue ▪ Dyspnea on exertion ▪ Cough ▪ Orthopnea ▪ Paroxysmal nocturnal dyspnea ▪ Leg/ankle/feet swelling ▪ Weight gain ▪ Severe dyspnea (even at rest) ▪ Hypoxemia (restless, low oxygen saturation) ▪ Crepitations on lung exam: pulmonary edema ▪ May be hypertensive or hypotensive



Signs

- Left heart failure: shows pulmonary edema
- Right heart failure: Liver congestion, peripheral edema, JVD
- Bi-ventricular failure with signs of both

Treatment

Airway: Ensure patency
Breathing: ▪ Ask the patient to be in propped up position, give oxygen ▪ Positive pressure ventilation (CPAP or BiPAP), if available ▪ Consider endotracheal intubation / positive pressure ventilation if: – Increasing respiratory fatigue – Increasing somnolence (hypercarbia) – Low oxygen saturation despite maximal oxygen support
Circulation: ▪ Diuresis: furosemide 40 mg IV ▪ Hypertensive: Gentle lowering of pressure (unless acute onset) – Goal: 20% lowering over 15-60 minutes – Isosorbide 5 mg sublingual (may repeat every 5 minutes) – Enalapril 5 mg IV or po, if needed ▪ Hypotensive: – Seriously ill, pre-terminal – No IV fluids; Dopamine 10 mcg/kg/min IV infusion

Summary

Acute coronary syndrome

- Acute coronary syndrome includes unstable angina and acute MI
- May be suspected by symptoms: chest pain, shortness of breath, diaphoresis
- ECG is confirmatory, but may not be available at the PHC
- PHC treatment is aimed at relieving symptoms of ischaemia
- Rapidly shift the patient to the care of cardiologist

Congestive heart failure

- Suspected by symptoms and signs
- Chest X-ray confirmatory, but not mandatory
- PHC treatment aimed at relieving shortness of breath and hypoxia and stabilizing the blood pressure
- Rapidly shift the patient

4. Cardiac arrest / Cardiac arrhythmias

Arrhythmias are broadly classified based on heart rate as **tachycardia** (too fast) **or bradycardia (too slow).** Arrhythmias can be asymptomatic and are diagnosed during routine check-up. Arrhythmias severe enough to impair cardiac output result in critical illness and need urgent intervention. However, if the cardiac output is totally absent with symptoms and need to be treated urgently. If not treated promptly the condition can worsen leading to cardiac arrest.

The general principles in managing arrhythmia is to first ask if the rhythm is stable or unstable?

- If **Stable:** The blood pressure is adequate with no signs of shock or cardiac ischemia
  - Refer to a specialist at the earliest
  - Attempt to use oral drugs to control rate
  - Obtain inputs from the receiving doctor if any other interventions can be done prior to transfer
- If **Unstable:** The patient is hypotensive, with signs of shock or ischaemia such as pallor, dizziness, chest pain, dyspnea, diaphoresis, confusion, decreased mental status, pulmonary edema or coronary ischaemia

The protocol to be following is CAB

- **Circulation**: Treat underlying cause
  - Control rate with rate lowering drugs. This can be done at the primary health care setting
  - Convert to sinus rhythm using drugs or electrical cardioversion. Needs referral to higher level of care at the earliest
- **Airway**: ensure open airway. Very rarely need intubate unless patient is in CHF or cardiogenic shock and arrest
- **Breathing**: high flow oxygen, use of Lasix if in pulmonary edema.

At any time, no pulse = Start CPR for cardiac arrest and shock as needed

Transfer after CAB is addressed. Ensure IV or IO access is in place. Make contact with receiving cardiologist and if appropriate seek advice on management prior to shifting the patient into the ambulance

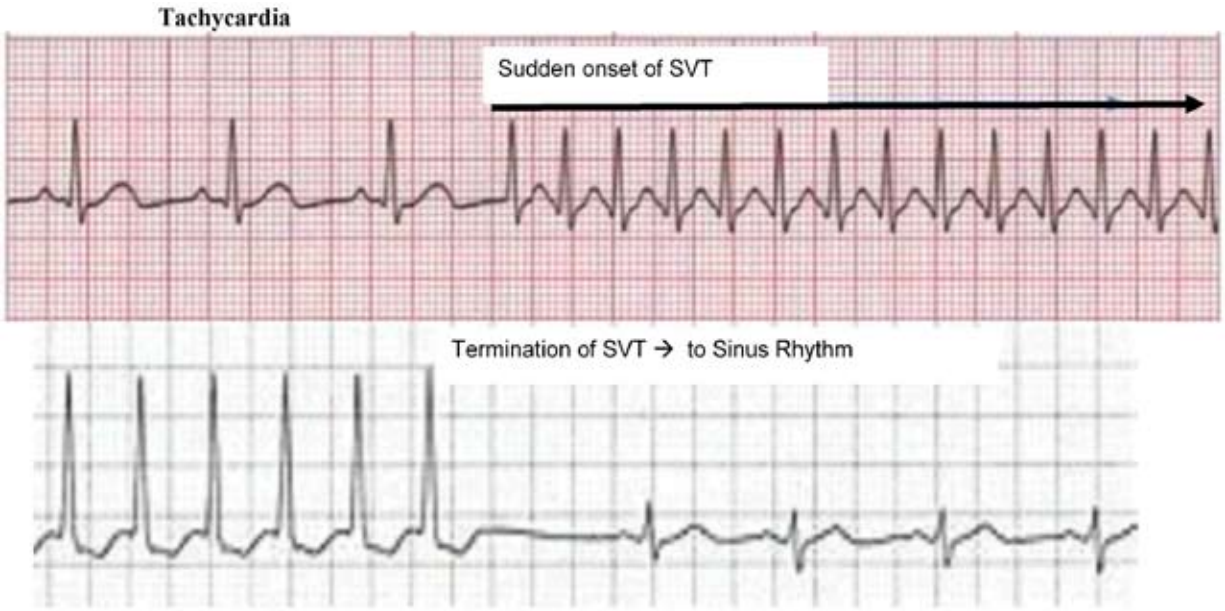
Table 23: Causes & management of tachycardia & bradycardia

Bradycardia	Tachycardia
Common causes – 1- Sinus bradycardia- ▪ Physiological in young health individuals who exercise regularly ▪ Pathological: Hypothyroidism, myocardial infarction, obstructive sleep apnea, due to vasovagal maneuvers, drugs, poisoning (OP poison), etc. 2- Heart block: Interruption in the transmission of atrial impulse to the ventricles ▪ **First degree AV block**: Delayed conduction from the atrium to the ventricle (defined as a prolonged PR interval of >200 milliseconds) ▪ **Second degree** AV block: Intermittent atrial conduction to the ventricle, often in a regular pattern (eg, 2:1, 3:2), or higher degrees of block ▪ **Third degree** (complete AV) block: No atrial impulses conduct to the ventricle	▪ Common causes- hyperthyroidism, acute pulmonary embolism, myo-pericarditis, myocardial infarction, congestive cardia failure and acute exacerbation of chronic obstructive pulmonary disease (COPD), etc. 1 Supraventricular tachycardia- results when electrical impulse goes down a “bypass tract” that avoids the AV node and recirculates to the atrium to initiate the next beat and present as regular tachycardia, with rate ~150 ▪ Heart rate is around 150 / minutes ▪ P-waves are not visible. ▪ Generally, patients are stable, but they must be referred to a specialist for further management as they can worsen into life-threatening arrhythmias Management- **If Stable:** ▪ No specific treatment may be possible.

Bradycardia	Tachycardia
3- Junctional Bradycardia: when the electrical impulse at the level of AV junction. A P wave is absent. This is not normal and must be referred for management Management- If Stable (no symptoms): No treatment required if BP and perfusion adequate ▪ IV access, Oxygen ▪ Frequent monitoring for signs of worsening and prompt referral If Unstable (symptomatic) ▪ As above ▪ Atropine 0.6 – 1.2 mg IV and repeat if necessary (total of 3 mg maximum) ▪ Dopamine or adrenaline IV infusion (if available), to increase rate and BP Transfer after CAB is addressed. Ensure IV or IO access is in place. Make contact with receiving cardiologist and if appropriate seek advice on management prior to shifting the patient into the ambulance.	▪ Apply oxygen and plan for quick transfer to a higher level of care. ▪ Ensure IV access is in place. (The following can be attempted if trained and experienced. Vasovagal maneuver: carotid sinus massage and Valsalva maneuver- explained in Table 31) **If Unstable:** Plan to transfer the patient after evaluation using the **CAB** evaluation protocol. ▪ **Circulation:** Attempt vasovagal maneuver and IV medications (Table 32). If does not respond, then patient needs urgent referral to a specialist for electrical cardioversion. ▪ **Airway:** Ensure patency ▪ **Breathing**: High flow oxygen Transfer after CAB is addressed. Ensure IV or IO access is in place. Make contact with receiving cardiologist and if appropriate seek advice on management prior to shifting the patient into the ambulance

Bradycardia

Tachycardia



Standard Valsalva Maneuver
Place in supine or semi-recumbent position
Inhale normally, then **EXHALE FORECEFULLY** against a closed glottis for **10 to 15 seconds**
Modified Valsalva Maneuver
Step 1 and 2 same as standard Valsalva
Followed by supine positioning (if in semi-recumbent position) and followed by passive leg raising
Carotid Sinus Massage
Carotid sinus massage generally reserved for younger patients. Avoided in elder patients due to risk of stroke from emboli in carotid artery. Never perform on both sides simultaneously.

Table 24: Management of supraventricular tachycardia (SVT)& atrial fibrillation & flutter

Option1: IV Adenosine 6 mg bolus over **2 minutes**, if persistent or recurs,
▪ Repeat in 15 minutes doubling the dose each time, to 12 mg (2nd attempt) and up to a maximum of 18 mg (on 3rd attempt)
▪ Flush promptly with saline. Warn patient in advance about side effects- flushing, chest pain and dizziness and that these are transient.
Option 2:Diltiazem 10-20 mg bolus over **2 minutes,** if persistent or recurs,
▪ 15-25 mg IV bolus after 15 minutes. Flush promptly with saline
Option 3: IV Verapamil 5-10 mg bolus over **2 minutes.** If persistent or recurs,
▪ 10 mg IV bolus after 15-30 minutes. Flush promptly with saline
Option 4:Metoprolol 2.5 – 5 mg bolus over **2 minutes,** if persistent, or recurs,
▪ Repeat same dose every 15 minutes, up to a **maximum of 15 mg**. Flush promptly with saline
Option 5: Propranolol 1 mg over one minute IV, if persists, or recurs,
▪ Can be given and repeated up to three doses at two-minute intervals
Note IV labetalol (B blocker) is not effective in reducing heart rate. It is more effective in reducing blood pressure and hence used in Hypertensive Urgency/Emergency and in Eclampsia to control high blood pressure (refer to respective sections)

5. Cardiac arrest

Cardiac arrest **is sudden cessation of cardiac activity** so that the victim becomes unresponsive, with no normal breathing and no signs of circulation

If corrective measures like CPR (Table 33) and/or defibrillation or cardioversion, or cardiac pacing, are not taken rapidly, this condition progresses to sudden death.

Priorities for resuscitation in cardiac arrest are CAB

- **Circulation**: The two intervention that impact likelihood of positive outcomes in cardiac arrest are
  - Uninterrupted high quality chest compression
  - Early defibrillation with AED or manual defibrillator (for ventricular fibrillation or pulseless ventricular tachycardia)
- **Airway**: Ensure open airway
  - Head tilt / jaw thrust. Nasopharyngeal or oropharyngeal airway
  - **Delay intubation**
- **Breathing**: Apply 100% **high-flow oxygen**. BVM ventilation can be delayed.

High performance CPR: **Cerebral and Cardiac perfusion is the key**

- In cardia arrest, high quality chest compression help generate adequate intracardiac pressure to push the blood to the vital organs.
- The blood starts flowing to the vital organ (like brain and heart) after 15 good quality chest compressions.
- On interruption of chest compression, blood flow stops instantaneously.
- And blood flow commences after 15 chest compressions which translates to about ten seconds during which time the vital organs are hypoxic.
- Every second of absence of blood flow exposes the vital organs (brain, heart) to anoxic injury.
- The duration of interruption (for intubation or BVM ventilation) combined with the ten seconds for providing 15 chest compression add up over a fifteen to twenty-minute resuscitation attempt.
- The duration of time that the vital organs are exposed to anoxic episodes significantly reduced positive outcomes.

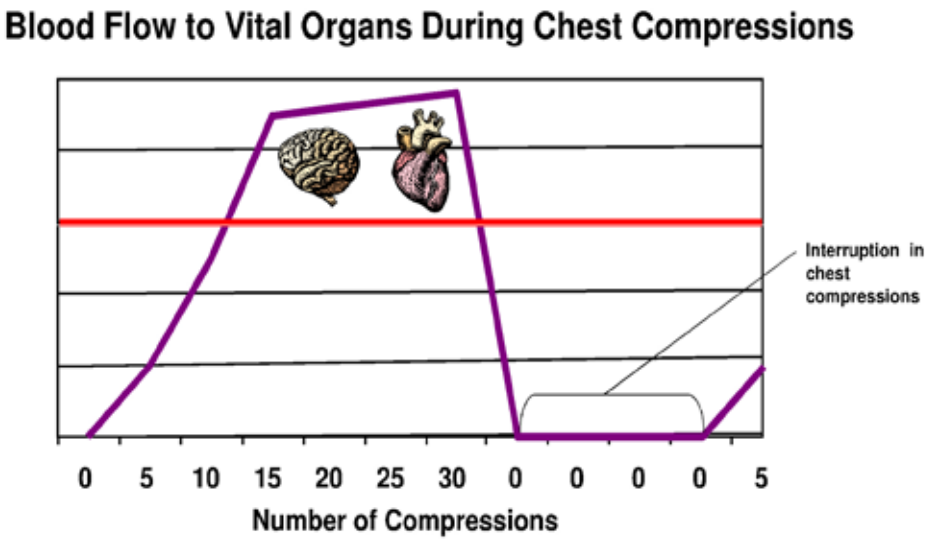


Table 25: Characteristics of high quality CPR

- The **rate is 100-120 per minute** compressions per minute.
- Each compression cycle is **2 minutes** = at least 200 compressions / minute. Compression must be continued until a decision is made to stop resuscitation
- 2 inches or **1/3rd height of chest wall**
- Allow full **chest recoil**
- Decompressions are just as important as compressions for maximal perfusion to heart and brain. Chest recoil allows the heart to fill with blood
- Must be performed on a **hard surface** (floor, firm bed not soft bed)
  - If cannot get patient on the floor bed must be hard or use hard board
  - If bed is tall then those performing CPR must use a stool or stand on the knees over the bed to ensure that their **knees are at the level of the bed**
  - In real life it requires a dedicated 2-person "compression team" to provide compressions in alternate cycle (at the end of two-minute cycle).
  - **Locations**: **lower 1/3 of the sternum** at the level of intermammary line (or inframammary fold in women).

Table 26: Correct position of CPR

You are on one side at right angle to patient such that your shoulder line is aligned and parallel to the patient's sternum

The **heel** of the dominant is on the chest. Finger of the hand at bottom to be extended and those on top to be flexed to lock (as shown in figure).

Elbows locked and straight such that anterior cubital fossa face anteriorly (common mistake is many have this joint facing medially)

The shoulder, elbow and ankle joint must in vertical line such that the body weight is transmitted on to the chest.

The **shoulders, elbows and palm should be vertica**l. It is better if the shoulders are a little anterior to the palm such that the full weight of the body is on the chest

Keep the back straight. DON'T make a hunch

Lock ALL joints- wrist, elbow, shoulder and inter-spinal joints except **Lumbosacral joint**

The spine should straight (**do not flex the spine**). Extend the neck a little (look up a little to help straighten the spine)

Use body weight to compress the chest

Use lower back muscles to lift body to decompress the chest (chest recoil)

When responding to a cardiac arrest situation the sequence is as follows

- Ensure scene safety by asking:
  - Is the environment safe?
  - Am I and my team safe.
  - Is the patient safe?
- Assess Consciousness: Talk and if no response elicit pain response
- Look Listen Feel approach
- Call for Help and immediately
- Start Resuscitation and follow the **CAB** protocol

C-Circulation: High Performance CPR and **defibrillation**.

Start CPR and complete one full cycle: at least 200 compressions in 2 minutes and then:

If defibrillator is available perform rhythm analysis

- Rhythm is analysed after each cycle of 2 minutes compressions.
  - It should be quick rhythm analysis (<5 seconds)
- If ventricular fibrillation or ventricular tachycardia,
  - single shock only, max joules (200 biphasic).
  - If using AED, it will prompt you when to give shock check
- Resume compressions immediately: 200 compressions (2 minutes) so as to perfuse the "stunned" myocardium
- Then recheck rhythm/pulse:
  - STOP. Resuscitation is successful
  - If NO pulse: resume compressions and **repeat cycle**

If defibrillator is **NOT** available:

- At end of each cycle of 2 minutes' cycle of chest compressions
  - Check pulse quickly (in <5 seconds) and continue CPR if there is no pulse
- Resume compressions immediately: 200 compressions (2 minutes)
- Then recheck rhythm/pulse:
  - If pulse present: STOP. Resuscitation is successful
  - If NO pulse: resume compressions and **repeat cycle**

In cardiac arrest priorities are 'chest compression' and 'defibrillation'

A- Airway management during High Performance CPR:

If you are the only person present do not interrupt compressions to attend to airway. If there are additional team members, then

- Ensure airway patency: Manual airway maneuvers or adjuncts (oral or nasal) start give high **flow oxygen by non-rebreather mask**
- Intubation or LMA placement should be considered **only after 2-3 full cycles of compressions (4-6 minutes**)
- But at no point should these procedure interrupt or stop chest compression or use of defibrillator.

B- Breathing during High Performance CPR:

- If BVM (AMBU bag) available start ventilation at 10 / minute
  - Without interrupting **chest compression.**
  - Ventilate during compressions (on upstroke of compression)
- No break in compressions to ventilate **breathing is less important than high quality compressions**

As always check glucose and if hypoglycemic treat immediately with IV dextrose.

Medications in high performance CPR

- Obtain access with an IV or IO line for medication administration
- Medications are less compared to high-quality compressions
- Adrenalin: 1 mg IV can be given **as soon as possible**.
  - Repeat dose with every alternative cycle of compressions (i.e., every 4 minutes)
- Adrenaline administration must not interrupt chest compressions
- **Lignocaine**: Indicated in Ventricular fibrillation and Ventricular tachycardia. These drugs help convert V-fib to normal sinus rhythm (NSR) and maintain normal sinus rhythm after defibrillation (shock). **These medications must be given only if the patient can be connected to a cardiac monitoring.**
- For ventricular fibrillation and ventricular tachycardia with no pulse:
  - Amiodarone: 300 mg IV and Repeat 150 mg IV after 15 minutes. (Maintenance dose of 1 mg per minute may be started if referral required to higher center).
  - Lignocaine: 1 mg/kg IV and 0.5 mg/kg IV 10 minutes later followed by continuous infusion at 2 mg/min

Post-resuscitative care: When there is return of spontaneous circulation (ROSC) occurs the blood pressure should be checked and IV placed immediately and fluid bolus started with normal saline or ringer lactate.

When a person is successfully resuscitated in an out of hospital situation the most common cause of death in patients with out-of-hospital cardiac is neurological injury. Even in in-hospital revivals neurological injury contributes significantly to mortality. Lowering core temperature of the body between in the range 32 to 34°C during the first hours after cardiac has shown to improve neurologic outcome. **Therapeutic hypothermia** doubles neurologically intact survival. Special care is needed to prevent the patient from becoming warm. Avoid covering with excess blankets.

Transport to higher level of care should be expedited and contact made with the physician at referral center. This should preferably be a center with cardiac cauterization capability as the most common cause of V-tach and V-fib is coronary heart disease.

Cardiac Arrest in Special Situations: Drowning Patients

Every year, drowning accounts for at least hundreds of thousands of deaths worldwide. Accidental drowning is more common in children. Drowning causes hypoxemia by means of either aspiration or reflex laryngospasm that occurs when water contacts the lower respiratory tract. The resulting cerebral hypoxia leads to consciousness and death if not rescued and revived immediately.

The priority in resuscitation of drowning victim differs slightly from CPR performed in cardiac arrest. **Here, the guidelines recommend to prioritize ventilation**.

- Pull the patient from the water and place on the back
- **First** administer **two full breaths to** expand the chest (mouth to mouth or with pocket mask if available)
- If the patient doesn't immediately recover, begin chest compressions
  - Adult: 30:2 compression/ventilation ratio
  - Child: 15:2 compression/ventilation ratio

Figure 14: CPR in drowning

Evaluate for possible trauma and if there are positive findings evaluated and manage appropriately including precautions with cervical spine stabilization and protection.

Summary:

Arrhythmias

- Dysrhythmias may be tachycardia or bradycardia. First determine if the patient is stable or unstable
  - Stable patients do not need treatment at the PHC level, **but should be shifted promptly to a cardiologist for further care**
  - Unstable patients must be treated and stabilized, then shifted to the cardiologist for further care
- As in all emergency ensure scene safety
- C, A, B is the priority sequence
- High performance CPR requires maximal perfusion of brain and heart by
  - Continuous compressions with minimal interruptions
  - Compression rate 100-120/min
  - Compression depth > 2 inches; complete release of chest on decompression
  - Rotate personnel doing compressions every 2 minutes
  - **Minimal interruption of compressions for ventilations and airway management**
  - In post resuscitative phase maintain core body temperature between 32-34^0 C
- Resuscitation of cardiac arrest due to drowning: ventilations are important
  - Adult: 30:2 compression/ventilation ratio
  - Child: 15:2 compression/ventilation ratio

6. Acute breathlessness/dyspnoea

Dyspnoea is a perception of inability to breathe comfortably. It is one of the common emergency presentations that often lead to acute respiratory failure and death, if not evaluated and treated in time.

Breathing/respiration has two important functions to serve in our body;

Normal RR
Infants:40-60/min
Adult: 16-20/mon

1- **Ventilation**- movement of air in and out of lungs and airway

2- Oxygenation- transport of oxygen from lungs to blood and of CO2 from blood to lungs. Compromise in any one of the functions can cause difficulty in breathing, which if remains for prolonged time would lead to respiratory failure and death. Increased respiratory rate, uncomfortable breathing pattern and difficulty in speech suggests abnormal ventilation and hypoxia (SpO2 <95%) and/or cyanosis (bluish discolouration of lips, face, fingertips) suggests poor oxygenation.

Causes of dyspnoea-

Foreign body in throat, asthma attacks, pneumonia, etc. are the most common causes of dyspnoea in children, while COPD and asthma exacerbation, heart failure, poisoning, etc. are the common among adult age group.

Figure 15: Causes of dyspnoea

Management in acute breathlessness :

History taking is important to assess and rule out various causes of dyspnoea.

- History taking along with thorough **examination** done simultaneously as patient's condition permit.
- Ask patient and close relatives about details of events happened since onset of first symptoms and specifically ask for "How did breathlessness start?" and about onset, duration and progress of the dyspnoea. (Since when did you start having breathlessness?, Tell me more about how did your symptoms increase?)
- Associated history of cough, with previous respiratory diseases and treatment, smoking, etc. may help to assess different chronic respiratory diseases.
- Presence of fever may suggest infective causes as bacterial/viral pneumonia, bronchitis, etc.
- Presence of stridor (noisy breathing, history of foreign body may indicate upper airway involvement.
- History of dyspnoea on exertion, ischaemic chest pain, and hypertension usually suggests dyspnoea from heart diseases.

Examination of patient – Examination should be done to assess severity of breathlessness and differentiate between various causes of dyspnoea and design necessary treatment plan for individual patient.

Assessment of severity of dyspnoea (Based only on physical signs) -

- No Dyspnoea- When a patient is able to lie down or sit comfortably and has respiratory rate within normal range, and able to speak long sentences without stopping and can explain his history of symptoms himself/herself without any difficulty in breathing, or can walk comfortably for long distances, has no breathing difficulty while walking for toilets, during eating or drinking, or during changing clothes, etc.; this patient would be said to have no dyspnoea at that time of assessment.
- Mild Dyspnoea- Increased respiratory rate is a reliable sign of difficulty of breathing.
- Moderate Dyspnoea
- Severe Dyspnoea
- Gasping Respiration

In all the above mentioned cases, you should provide first-aid and refer the patient to the higher center for further treatment.

7. Stroke

Learning objectives

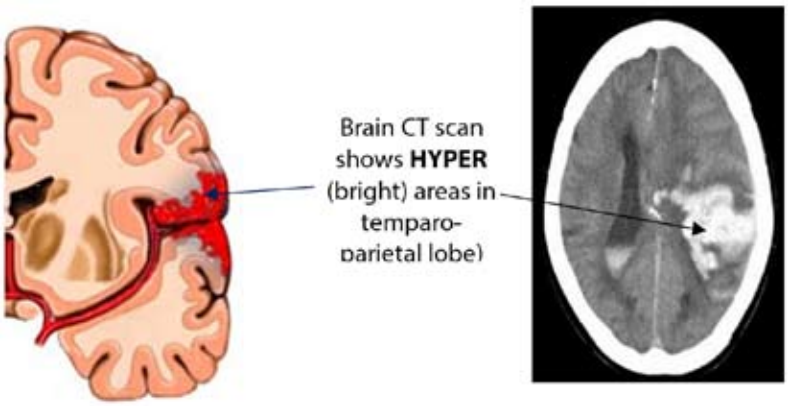
- Identify the signs and symptoms associated with stroke and seizures
- Understand how to recognize a stroke early
- Understand the concept of 'Time is Brain'
- Understand the initial treatment and stabilization for stroke and seizures

A stroke, sometimes called as acute cerebrovascular accident(CVA) or "brain attack", occurs when blood flow to an area in the brain is cut off. The cells in that part of brain get severely injured and die from lack of oxygen and glucose supply which is needed for them to survive. If a stroke is not treated early, permanent brain damage or death can result.

Table 27: Types of stroke

Ischemic stroke	Haemorrhagic stroke	Transient ischaemic attacks (TIA)
▪ It is similar to a heart attack, except it occurs in the blood vessels of the brain. ▪ About 80% of all strokes are ischemic. ▪ Blood clots can form in the blood vessels in the brain or elsewhere in the body and then travel to the brain. ▪ These clots block blood flow to any part of the brain and present as stroke with features of loss of function of that particular part of the brain.	▪ Blood vessel in the brain breaks or ruptures resulting in blood seeping into the nearby brain tissue, causing damage to brain cells	▪ TIAs are brief episodes of neurological dysfunction resulting from focal cerebral ischemia not associated with permanent cerebral infarction. ▪ About 1/3rd of the individuals exhibits sign of new infraction on diffusion weighted MRI

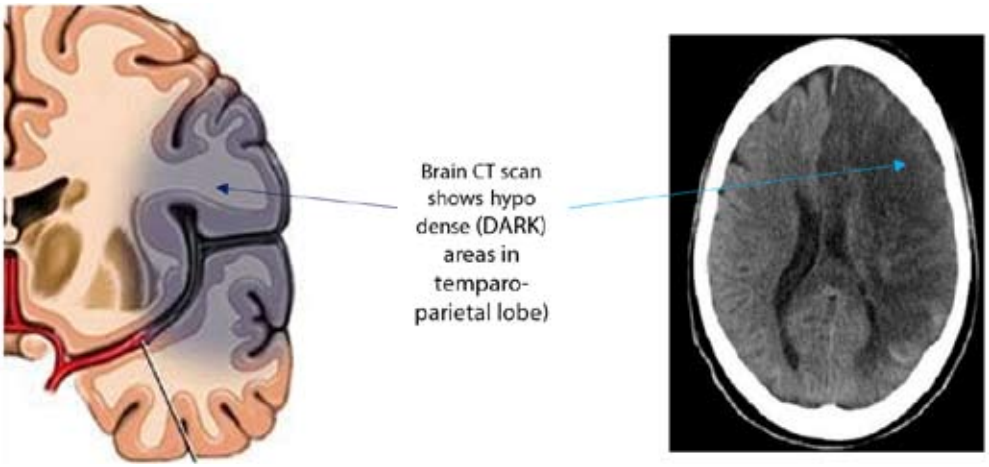
Ischemic stroke



Risk factors for stroke
Hypertension
Diabetes
Smoking
Family history of stroke
Past history of stroke or episode of TIA

Regular anti-hypertensive & anti-diabetic medications to be taken

Haemorrhagic stroke



Clinical features:

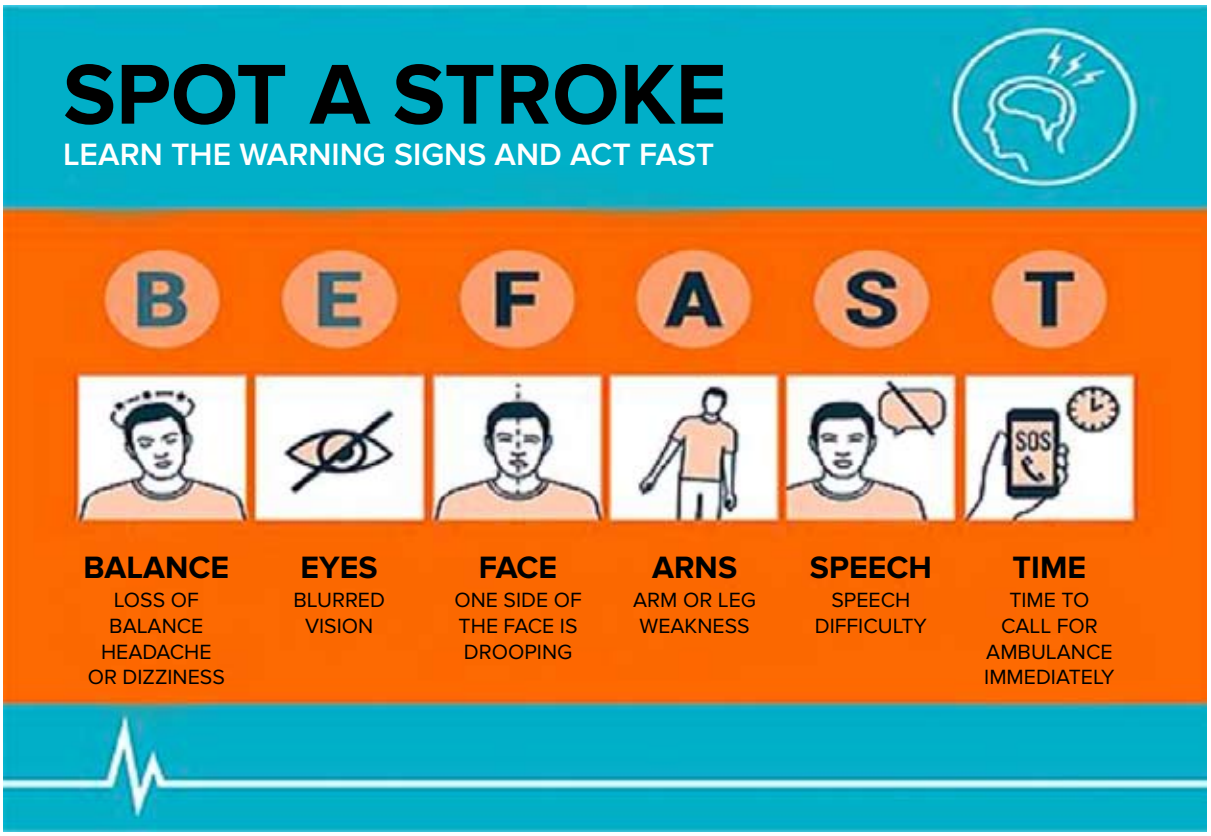
History: The signs and symptoms of stroke depend upon it's causative factor and the part of the brain affected.

Some of the major signs and symptoms reported by a stroke patients include:

- Sudden feeling of weakness or numbness of the face, arm or leg on one side of the body.
- Loss of vision or dimming (like a curtain falling) in one or both eyes.
- Loss of speech, difficulty in talking or understanding what others are saying, deviation of mouth to one side.
- Sudden, severe headache with no known cause.
- Fainting or unstable walking usually combined with another symptoms like light headedness, dizziness and confusion.
- Some patients may have altered sensorium or unconsciousness.

Important part of history that you should ask is time of the day from when all the features of stroke started to appear.

Figure 16: BEFAST in stroke



Investigations

- Diagnosis of stroke is mostly clinical depending on symptoms and signs.
- But for treatment of stroke to save the affected parts of brain, it is necessary to diagnose whether it is an ischaemic or haemorrhagic stroke, because treatment is different for both of them.
- This is possible only with CT scan that is usually available at district hospital level.
- The patient and family should therefore be counselled to immediately get CT scan exam and necessary treatment done within 4 hours of appearance of first sign of stroke.

Hence, you should refer the patient to the facility which has the availability of a CT scan.

Tre**atment** of acute stroke follows the ABC protocol.

- Airway: Maintain airway patency
- Breathing: Assess and oxygenate as per findings
  - Oxygen: goal 94% saturation (**Excessive oxygen can cause brain injury**)
- Circulation: obtain IV access and start fluids.
  - If severely hypertensive (>200 mmHg = hypertensive emergency) lower systolic BP by no more than 20% with IV labetalol (refer to previous section on management of hypertensive emergency)
- Screen and treat **hypoglycemia**

Don't give Aspirin until haemorragic stroke is ruled out

8. Seizures

A **seizure** is a sudden, uncontrolled electrical disturbance in the brain. It can cause changes in your behaviour, movements or feelings, and in levels of consciousness.

Not all seizures are a medical emergency. The patient may present either with active seizures or may present after seizure activity have stopped.

If seizures occur for more than five minutes, then it is termed as **status epilepticus.**

If the patient is actively convulsing: Call for HELP!

- This usually happens when the patient is admitted or when the patient is waiting to be seen in a clinic.
- An actively convulsing patient should first be placed in a safe place. The surrounding cleared of any hard objects which can cause injury to the patient.
- The seizures should be allowed and leave the patient untouched.
- If patient is biting the tongue, a rolled piece of compact gauze or cloth can be placed to prevent tongue biting.
- Ensure the rolled gauze is not so small that it enters the mouth and cause airway obstruction.

Causes of Seizures: Adult
Idiopathic: Epilepsy
Hypoglycemia
Medications
Poisons
Eclampsia
Ethanol withdrawal
Brain tumors
Head trauma
Brain tumor

The standard **ABC evaluation is** be performed (Refer chapter 3)

- **Airway:** Keep airway open
- **Breathing:** Deliver oxygen, use airway adjuvants and BVM ventilation as needed
- **Circulation:** Obtain IV access and start fluids

Specific treatment includes for identifying and treating reversible causes (as above).

- IV Benzodiazepines
  - Lorazepam 4 mg IV push
  - Diazepam 0.15 mg/kg IV, up to 10 mg per dose
  - Midazolam: IM, Intranasal or buccal route
    - Useful if IV access is not available, midazolam can be given as:
      - 10 mg (if >40 kg);
      - 5 mg (if < 40kg)
- Repeat dose in 5 min if seizures persist

Table 28: Causes of other neurological conditions

Head Ache

- Head trauma- Hematomas
- Vascular disorders-Subarachnoid hemorrhage, Temporal arteritis, cerebral vein thrombosis, Severe hypertension
- Non-vascular intracranial disorder-Intracranial infections
- Substance use / withdrawal-Acute or chronic use
- Metabolic disorder- Hypoxia, Hypercapnia, Hypoglycemia

Red flag features- SNOOP

- **S**ystemic symptoms (fever, weight loss); Secondary risk factors (HIV, cancer, trauma)
- **N**eurologic features (confusion, papilledema, focal deficits, nuchal rigidity, visual disturbances)
- **O**nset (sudden, abrupt, split-seconds to minutes)
- **O**lder (new onset or progressive above 50 years)
- **P**rogression(major change from previous attacks in term of severity, frequency or clinical features)

Acute Vestibular Syndrome

- Sudden severe episode of vertigo (an illusion of movement of oneself or one's surroundings)
- Causes - Vestibular neuritis or a stroke

1. Vestibular neuritis – peripheral nystagmus, positive head impulse test, absence of skew deviation, normal hearing
2. Stroke – If all 4 conditions not met

Vertigo

- A sudden internal or external spinning sensation, often triggered by moving your head too quickly.
- 20% of posterior strokes present as isolated vertigo
- Causes- Peripheral / Central

Altered mental status

- A non-specific term; patients with impaired responsiveness
- Coma: a sleep-like state, unarousable
- Lethargy, stupor and obtundation: States between alertness and coma

Causes-

TIPS

- Trauma
- Infection (CNS or other)
- Poisoning
- Space-occupying lesions/Stroke

AEIOU

- Alcohol/Acidosis
- Epilepsy/Endocrine
- Insulin (hypoglycemia, hyperglycemia)
- Oxygen (hypoxia)
- Uremia

Management-

Airway with C-spine:

Endotracheal intubation if:

- GCS 8 or less
- Ventilation:

	▪ Poor oxygen saturation despite supplemental oxygen ▪ Predicted deterioration, i.e. in cases of shock or head injury with signs of increased intracranial pressure **Breathing:** ▪ Supplemental oxygen in all patients with AMS **Circulation**: ▪ Adequate cerebral perfusion critical ▪ Maintain systemic blood pressure at a mean arterial pressure (MAP) of at least 80 mm Hg ▪ Ensure adequate IV access to facilitate above Drugs: ▪ Drugs: Dextrose, Naloxone, Thiamine (if indicated)

Summary:

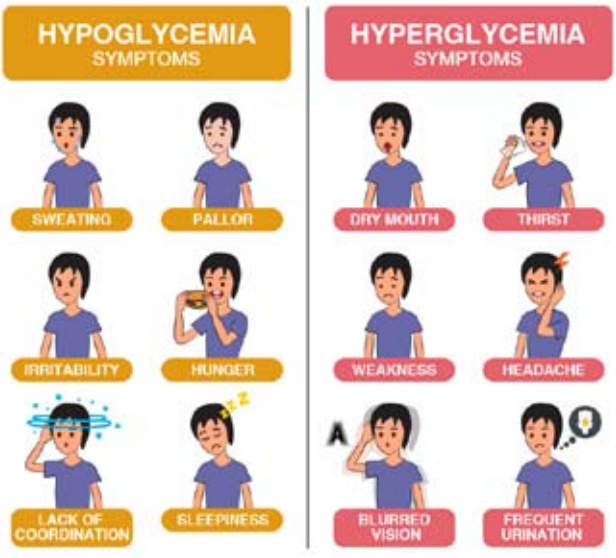
Acute Neurological Emergencies

- Have a high index of suspicion for acute stroke and screen using **BEFAST scale**
- CT scan of head MUST to rule out haemorrhagic stroke before treating with aspirin for ischemic stroke
- In emergency with mental status changes always screen for hypoglycaemia and treat
- Benzodiazepines like lorazepam, diazepam and midazolam are used to treat acute seizures that persist

9. Diabetic emergencies

Diabetic emergencies include high and low sugar in the body called as hyperglycaemia and hypoglycaemia respectively.

- Patients with diabetes have high blood sugar levels because of the body's inability to utilize the glucose.
- Diabetic patients follow a low sugar diet and take medicines which help the glucose to get utilized and thus keeps the blood sugar levels in check.



Diabetic emergencies arise in two situations:

1. When the disease is uncontrolled (the patient does not follow low sugar diet or does not take medicines) it leads to **very high blood sugar** level.
2. When the patient on medications for diabetes does not eat for a long time, it leads to **very low blood sugar** level.

Table 29: Symptoms of high & low blood glucose levels

Low Blood Sugar Level	High Blood Sugar Level
1. Tiredness 2. Sweating 3. Mental confusion 4. Dizziness or unconsciousness 5. Headache	1. Dry mouth 2. Increased thirst 3. Weakness 4. Headache 5. Severe dehydration 6. Nausea and abdominal discomfort 7. Severely high blood sugar levels can cause coma

10. Bites (Animal bite/snake bite/scorpion sting)

Learning objectives

- Understand the basic pathophysiology of common poisonings, snakebites, and scorpion bites
- Recognize the signs and symptoms of common poisonings
- Understand the emergency treatments available for these poisonings and bites

Bites are the wounds caused by piercing or stinging of the flesh of a person by an animal or insect

Bites can be classified as

- Domestic –Dogs, cats, rats
- Peri-domestic-Cows, Buffaloes, Sheep, Goats, Pigs, Donkeys, Horses & Camels
- Wild-Foxes & Jackals, Monkeys, Mongoose & Bears
- Others -Bats, Rodents, Birds & Squirrel

*__All wild animal bites are considered as category III exposures__ (Please refer down)

Types of Bites:

- Insect Bite: Bee/wasp/bed/spider bug, hornet stings, jelly fish
- Scorpion Bite
- Snake Bite
- Dog Bite

Modes of transmission

Common	Rare
▪ Bites from infected animals ▪ Licks on broken skin/mucous membranes ▪ Scratches	▪ Inhalation ▪ Organ transplantation ▪ Ingestion

Table 30: Categorization of bites

	Exposure	Type of contact	Treatment
Category 1	▪ No exposure	▪ Touching or feeding of animals ▪ Licks on intact skin	▪ None if reliable case history is available
Category 2	▪ Minor exposure	▪ Nibbling of uncovered skin ▪ Minor scratches or abrasions without bleeding	▪ Wound management ▪ Anti-Rabies Vaccine
Category 3	▪ Severe exposure	▪ Single or multiple transdermal bites or scratches ▪ Licks on broken skin ▪ Contamination of mucous membrane with saliva i.e: licks	▪ Wound management ▪ Rabies immunoglobulin ▪ Anti-Rabies Vaccine
Serious exposure- ▪ Bites on the Head, Face, Hands, Genitalia, ▪ Multiple bites, extensive lacerations, ▪ Bites by -proven rabid animals, animal not available for observation, wild animal, more than 1 animal			

Table 31: Types of bite, symptoms & treatment

In the following table, you shall learn about each of these insect/animal bites in detail

Type of Bite	Presenting Symptoms	Treatment	What NOT TO DO
Insect Bites Bee/wasp/bed/ spider bug, hornet stings, jelly fish	▪ Sharp pain at the site ▪ Swelling around the affected area with the central reddened puncture point ▪ Sting in the wound. ▪ If the person is prone to allergies, the person may go into shock	The insects have sting which is left at the site of the puncture and has to be removed to prevent the person from danger **Step 1:** **Removal of sting** with tweezers **Step 2:** **Local treatment** ▪ **Bee venom** is acid and it should be neutralised by application of ammonia, soda. ▪ **Wasp venom** is alkaline and it should be neutralised by application of vinegar or lemon juice. ▪ **For jelly-fish** stings, apply calamine lotion. ▪ Apply cold compressions and spirit at the site of sting. **Step 3:** **Treatment** ▪ Give ibuprofen tablet to relieve pain and swelling. ▪ Give antihistamine (avil/ pheniramine tablet/ injection) for allergy.	Do not squeeze the poison sac because this will force the remaining poison into the skin.

Type of Bite	Presenting Symptoms	Treatment	What NOT TO DO
Scorpion Bite	**Mild form** ▪ Itching and swelling at the affected site ▪ Burning pain and increased sensation or numbness near the site of bite. **Severe form (Danger Signs)** ▪ Restlessness, lacrimation, excessive salivation. ▪ Nausea, vomiting. ▪ Anxiety, Palpitations, chest pain ▪ Profuse sweating, cold limbs, peripheries ▪ Prolonged and hard erection of penis ▪ Difficulty in breathing, ▪ respiratory distress ▪ Hypotension	▪ Examine the site of sting. ▪ If the sting is on the extremity, apply a tourniquet proximal to the site of sting ▪ Apply ice packs on the region to slow down the absorption of poison. ▪ Apply cold compress or fresh potassium permanganate solution on the wound. It stops the pain immediately. ▪ Give ibuprofen tablet to relieve pain and swelling. ▪ Give antihistamine (avil tablet) for allergy. ▪ Give 'Ring Block' at site of bite to decrease the pain. Give inj. Lignocaine 2% (without adrenaline) locally surrounding the bite site from all sides in circular motion. ▪ Look for the signs of shock, particularly in children. If prolonged penile erection, profuse loss of water and palpitations are observed, then the patient is at high risk of developing "autonomic storm", (Excessive activation of autonomic nervous system and followed by cardiogenic shock or cardiac arrest). ▪ If these signs begun to appear, give first dose of tablet Prazocin orally 1mg for adults and 30 micro gm/kg body weight and refer immediately to appropriate higher center.	Explained in Fig 20
Snake Bite	▪ Generally, the presence of two puncture wounds indicates a bite by a poisonous snake. ▪ **Pain**: Burning, bursting or throbbing pain may develop immediately after the bite and spread proximally up the bitten limb.	If anti-venom is present you can administer it. If not, you need to refer the victim to the higher center immediately. First aid:(**RIGHT approach)**-explained below ▪ Assess the patient for any local or systemic signs or symptoms of envenomation.	▪ Do not tie a tourniquet in cases of snake bite. ▪ Snake venom does not spread through blood. ▪ Do not try to suck out poison from snake bite, or cut the wound open.

Type of Bite	Presenting Symptoms	Treatment	What NOT TO DO
		▪ If there are no signs/ symptoms of envenomation, keep victim under observation for 24 hours.	▪ Do not make the patient move too much. ▪ In most cases, if the snake has been killed, it should be taken to the hospital along with the patient to make sure the treatment is right .
Dog Bite	Initial symptoms ▪ Pain & unusual or unexplained tingling, pricking, or burning sensation (paraesthesia) at the wound site. ▪ Fever **Later symptoms due to spread of virus to CNS** ▪ Furious rabies results in signs of hyperactivity, excitable behaviour, hydrophobia (fear of water) and sometimes aerophobia (fear of fresh air). Death occurs after a few days due to cardio-respiratory arrest. ▪ Paralytic rabies Muscles gradually become paralyzed, starting at the site of the bite or scratch. A coma slowly develops, and eventually death occurs.	▪ Wash the wound well with soap and flush with running water by syringe/ tap. ▪ If the wound is a small lacerated , avoid suturing on first visit. Only cleanse the wound well. Suturing may cause rabies toxin to go into deeper tissues and increase chances of higher risks. ▪ Take sutures for actively bleeding wounds or the larger ones, but keep these sutures loose and superficial. Do not tighten them. ▪ Apply antiseptic lotion such as betadine. ▪ Bandage the wound with sterile dressing. ▪ Give a single dose of tetanus toxoid 0.5ml IM ▪ Give anti-inflammatory analgesic tablet such as Paracetamol, or Ibuprofen for pain. ▪ Give antibiotic such as capsule amoxicillin 500 mg 8 hourly or cephalexin 500mg qid for five days for open and lacerated wounds. ▪ Give anti-rabies vaccine ▪ Tell the patient to watch the dog for 10 days for the abnormal behaviour as follows and report back when any of the adverse signs are noticed: ▪ If the dog no longer eats ▪ If the dog no longer barks ▪ Shivers, becomes aggressive, barks at those it knows	

Type of Bite	Presenting Symptoms	Treatment	What NOT TO DO
		▪ Has convulsions or has abnormal behaviour ▪ If the dog has died or was killed, send the carcass to the nearest veterinary dispensary for investigation.	

Table 32: Do's & Don'ts in wound management in bites

Do's	Don'ts
Mechanical ▪ Wash the wound with running tap water Chemical ▪ Wash the wound with soap and water ▪ Apply disinfectants Biological ▪ Infiltrate Immunoglobulins in the depth and around the wound in category-III exposures **Suturing only if required (1-2 loose sutures) and only after administration of RIGs.**	▪ Do not touch the wound with bare hands ▪ Do not apply irritants like soil, chillies, chalk, betel leaves, cow dung, etc. ▪ Suturing ▪ Cauterize

Table 33: Post exposure prophylaxis in dog bites

	Vaccine	Dose & site	Schedule
Passive immunization	Rabies immunoglobulin (RIG)	Infiltrate into & around the wound	NA
Active immunization	Anti-Rabies vaccine (ARV) – purified chick embryo	**Intradermal**- 0.1ml/ID site, upper arm over each deltoid	Day 0,3,7,28 (2-2-2-0-2).
		Intramuscular- 0.5ml- 1 ml Deltoid or anterolateral aspect of thigh (Not recommended on gluteal region due to poor absorption)	Day 0,3,7, 14,28,90(optional)

Figure 17: Poisonous snakes in India

Big Four- Cobra, Saw scaled viper, Russell's viper and Common Krait

Figure 18: Signs &symptoms of snake bites

NOTE OF CAUTION

1. Do not tie a tourniquet in cases of snake bite.
2. Snake venom does not spread through blood.
3. Do not try to suck out poison from snake bite, or cut the wound open.
4. Do not make the patient move too much.
5. In most cases, if the snake has been killed, it should be taken to the hospital along with the patient to make sure the treatment is right **BUT DO NOT** waste time in searching for the snake. It could lead to more casualty if the snake is not dead and only injured

In case of snake bite, use the RIGHT approach

R: Reassure the person (70% of snakebites: from non- poisonous snakes only 50% poisonous snakes inject poison).

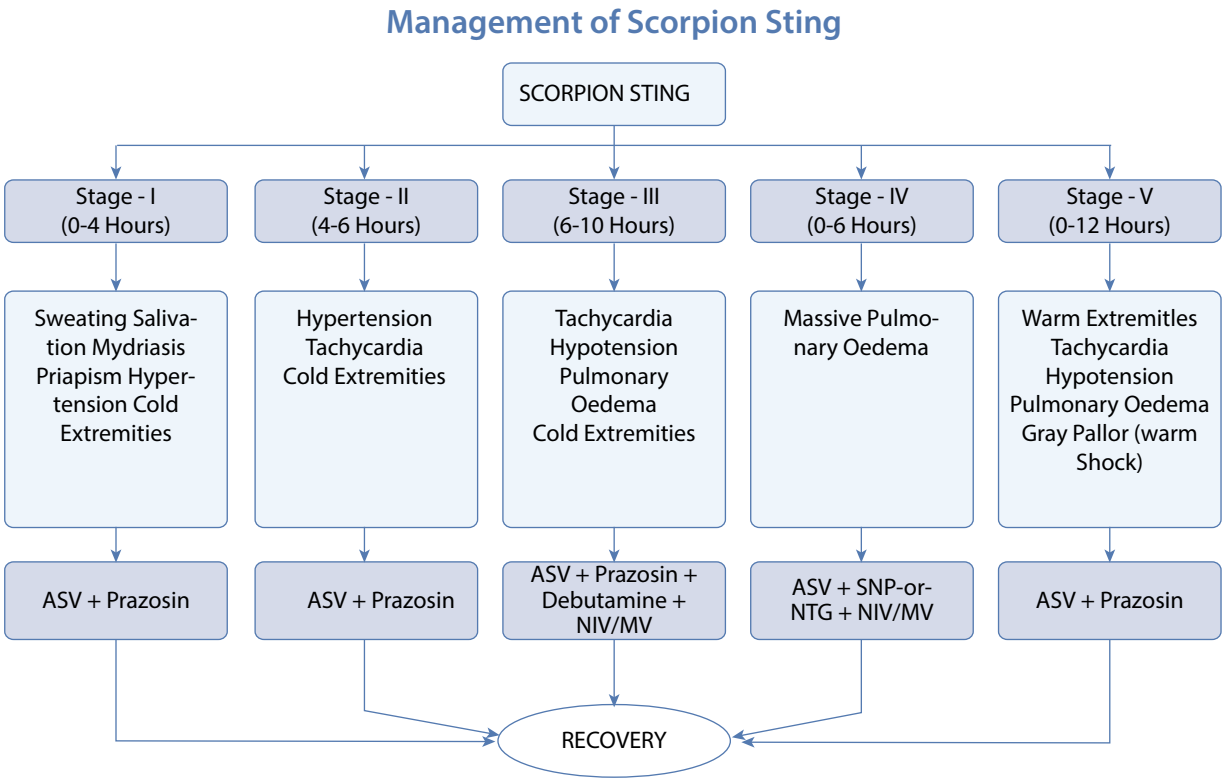
I: Immobilize the affected body part of the person.

GH: Get to the Hospital immediately.

T: Tell the doctor at the referred facility about presence of any symptoms (Pain, weakness, bleeding, etc.).

Figure 19 RIGHT approach in snake bite

Figure 20: Management of scorpion bite



ASV: Antiscorpion Venom; SNP; Sodium Nitroprusside;
NTG: Nitroglycerine; NIV: Non -Invasive Ventilator; MV: Mechanical Ventilator

Case scenario 1

A 25 year old man while coming back from the factory had a bite with pain in his leg while walking in the field at 4.00 PM. He was not sure of the nature of bite and reported himself to the PHC at 6.00 PM. How will proceed further?

Case scenario 2

A 50 year old male while sleeping in the floor at his home was bitten by a snake at 2.00 AM. His family members killed the snake and brought to the PHC along with the patient. On arrival at 5.00 AM patient is conscious but drowsy, bilateral ptosis +, RR – 10/min., and cyanosed. How will proceed further?

Case scenario 3

A 70 year old lady has come to the PHC with the h/o Scorpion Sting and severe pain in the left index finger. How will proceed further to manage?

Case scenario 4

A 10 year old boy while playing with the neighbours pet dog had a scratch in the right hand with bleeding. How will you proceed to manage this boy?

10. Choking/foreign body ingestion

A foreign body is a substance that can enter in the skin, eye, ear, nose, throat, esophagus or stomach and if not removed in time, can lead to complication or even cause death of the victim. Managing foreign body choking cases entering the throat, esophagus and stomach is very important.

In cases of choking, the initial ABCDE assessment that you conduct is of utmost importance. There is a high risk of these objects to descend down into airways. Airways may get blocked and patient dies within minutes due to choking.

In adults, most commonly observed foreign objects stuck in throat are food particles while coins, bottle caps, batteries etc. are commonly noted among children. These foreign bodies can be managed with following simple techniques, if followed appropriately on time.

Whenever a patient with a foreign body in the throat reports to you, proceed with the following instructions:

a. **Give 5 back blows**. First, deliver five back blows between the person's shoulder blades with the heel of your hand.

b. **Give 5 abdominal thrusts**. Perform five abdominal thrusts (also known as the Heimlich manoeuver).

Abdominal thrusts may injure infants so use chest compressions instead.

c. **Alternate between 5 back blows and 5 abdominal thrusts** until the blockage is dislodged.

d. If you are the only rescuer, perform back blows and abdominal blows.

e. If another person is available, have that person call for help while you perform first aid.

f. If the person becomes unconscious, help him or her to the ground and begin CPR.

Figure 21: Abdominal thrusts

Place fist above navel while grasping fist with other hand. Leaning over a chair or countertop, drive your fist towards yourself with an upward thrust

g. After attempted rescue breaths, check the mouth for an object and if visible remove it.

h. Do not perform a blind finger sweep because this could push an object farther into the airway.

Steps to perform the Heimlich manoeuver on someone else

a. **Stand behind the person.** Wrap your arms around the waist. Tip the person forward slightly.

b. **Make a fist with one hand.** Position it slightly above the person's navel.

c. **Grasp the fist with the other hand.** Press hard into the abdomen with a quick, upward thrust, as if trying to lift the person up.

d. **Perform a total of 5 abdominal thrusts,** if needed. If the blockage still is not dislodged, repeat the five-and-five cycle.

Note of Caution

A modified version of the technique is sometimes taught for use with **pregnant or obese** people. In such cases you should place your hand in the center of the chest to compress rather than in the abdomen**.**

Figure 22: Heimlich maneuver

Steps to perform Heimlich maneuver on children

a. Make yourself comfortable and sit holding the child in your lap in prone position, with head lowered than level of back.

b. Tap back of the child till foreign object is expelled out.


Place the infant stomach-down across your forearm amd give five thumbs on the infant's back with heel of your hand

11. Poisoning

Poisoning refers to the development of dose-related adverse effects following exposure to chemicals, drugs, or other xenobiotics. Poisons are the harmful substances found either in natural environment or are chemicals and when ingested/ inhaled in sufficient doses either accidentally (by mistake or by ignorance) or for suicidal purpose, it may prove very dangerous or may kill a person.

Poisoning can be classified as local or systematic.

Table 34: Common poisons in India

▪ Organophosphorus	▪ Kerosene
▪ Organochlorides – Endosulphan	▪ Corrosive
▪ Rat poisons	▪ Acetaminophen overdose
▪ Aluminium phosphide	▪ Barbiturate overdose
▪ Oduvanthalai	▪ Tricyclic overdose
▪ Oleander	▪ Methyl alcohol intoxication

Modes of entry:

- Ingestion - Commonest Route
- Instillation - Absorption through skin, mucous membrane, ears and eyes
- Inhalation
- Injection

When do we suspect poisoning ?
▪ History of ingestion of poison
▪ Unexplained symptoms
▪ Altered sensorium with no obvious cause
▪ Past history of psychiatric illness
▪ History of affair with opposite gender
▪ History of recent declaration of exam results
▪ History of discordant relationships at home
▪ Recent change in behaviour

General measures in poisoning

- **Maintain ABC**
- **Good History** taking- **Talk** with the patients, family, friends and persons whoever brought the victim regarding- type of poison, time, any co-morbid conditions.
- **Physical Examination** of the patient – Head to Toe examination, monitoring of vitals, look for breath odors, look for bite marks, needle marks, and ligature mark in the neck.
- **Toxidrome recognition** - These syndromes are usually best described by a combination of the vital signs and clinically obvious end-organ manifestations. The signs that prove most clinically useful are those involving the:
  - Central nervous system (mental status);
  - Ophthalmic system (pupil size);
  - Gastrointestinal system (peristalsis);
  - Dermatologic system: skin (dryness vs. diaphoresis)
  - Mucous membranes (moistness vs. dryness);
  - Genitourinary system (urinary retention vs. incontinence).

- **Decontamination** of the patient
- **Specific Antidotes** - to be given if necessary (Table 43)
- **Symptomatic and Supportive Care to all the suspects**
- **Referral** if needed

Table 35: Ten golden rules in poisoning

1. **Correct immediate life- threatening** problem. "ABC' Airway, Breathing and Circulation.
2. Many poisoned patients will **recover with simple supportive measures**.
3. **Alleviate anxiety** of the patient and the family members.
4. **Assess** the condition of the patient frequently
5. Encourage the family member (s)/ friend (s) to **bring the remaining materials** of the poison consumed/ tablet taken and any other note left by the patient for identification of the poisonous agent and to decide on appropriate antidote
6. All poison cases **do not require tertiary care**.
7. Never be carried away just because vital signs are stable at the time of presentation, since the **toxic manifestations may appear later**.
8. It is ideal **to observe the poison cases for 24 to 48 hours** before discharge.
9. **Every poison case is different** from others.
10. **Treating poison case is more important** than identifying the causative agent.

Table 36: Toxindromes

Cholinergics- OPCs, carbamates, pilocarpine (DUMBELLS) ▪ **D** iarrhoea, diaphoresis) ▪ **U** rination ▪ **M** iosis ▪ **B** radycardia, **b**ronchorrhoea ▪ **E** mesis ▪ **L** acrimation ▪ **L** ethargic ▪ **S**alivation	**Nicotinics**- (OPCs, carbamates) - days of the week ▪ Monday - Mydriasis ▪ Tuesday - Tachycardia ▪ Wednesday - Weakness ▪ Thursday - Tremors ▪ Friday - Fasciculations ▪ Saturday - Seizures ▪ Sunday - Somnolence
Anticholinergics- Antihistamines, TCAs, atropine, benztropine, phenothiazines (**Hot as a hare, Dry as a bone, Red as a beet, Blind as a bat, Mad as a hatter)** ▪ Hyperthermia ▪ Flushing ▪ Dry skin ▪ Dilated pupils ▪ Delirium, hallucinations ▪ Tachycardia ▪ Urinary urgency and retention	**Sympathomimetics**- Cocaine, amphetamines, ephedrine, phencyclidine ▪ Mydriasis ▪ Tachycardia ▪ Hypertension ▪ Hyperthermia ▪ Seizures

Opiod- Heroin, morphine, codeine, methadone, fentanyl, oxycodone Miosis Hypotension Hypoventilation Coma	**Alcohol withdrawl**- Alcohol, other drugs Diarrhoea Mydriasis Goose flesh Tachycardia Lacrimation Hypertension Yawning Cramps Hallucinations Seizures

Remember that, the most common reason for death in cases of poisoning is the loss of airway-protective reflexes either caused by aspiration of gastric contents, respiratory distress or flaccid tongue. This is the reason why ***all cases of poisoning presented before you should be assumed to have a compromised airway.***

Note: In cases of poisoning remember that your role will be limited to providing anti-dote after correct identification of the poison ingested ,stabilizing the victim and facilitating referral to the higher centers for further treatment.

Aluminium/Zinc Phosphide

Aluminium or Zinc phosphide is commonly used a rodenticide (rat poison) used at homes to kill the rodents . It is available as solid tablet or powder.

- When ingested, on contact with water or hydrochloric acid (in stomach) it releases phosphine gas which is a cellular toxin.
- Phosphine gas inhibits cytochrome oxidase and blocks cellular respiration. It results in release of toxic free radicals and cell death in the lung, kidney, liver and other vital organs.
- Mortality ranges from 30-100% (depending on the dose of ingestion and if any resuscitation was attempted).
- The common life threatening complications are **arrhythmias, profound shock, and metabolic acidosis.**

Symptoms: Phosphide Poisoning
▪ Nausea / vomiting / diarrhoea
▪ Dizziness / syncope
▪ Chest tightness
▪ Shortness of breath
▪ Headache
Signs: Phosphide Poisoning
▪ Hypotension (75-100%) / shock
▪ Arrhythmias (V-tach / V-fib)
▪ Pulmonary edema
▪ ARDS and Respiratory failure

Treatment has two components

1. ABCD protocol:

- **Airway**: Patient may be obtunded and early intubation needed to protect airway.
- **Breathing:** positive pressure ventilation
- **Circulation:** IV/IO access and fluid boluses to treat shock. Vasopressors like dopamine as needed if hypotensive after 2-3 liters of IV bolus
- **Decontamination** and neutralization is performed
  - Nasogastric lavage with: **Potassium permanganate**. It oxidizes phosphine to phosphate
  - Coconut oil also can be tried. It inhibits phosphine release
  - Water only should not be used as phosphine gas is released when it comes in contact with the poison

2. Specific treatment:

- No antidote available. Only supportive care
- Magnesium sulfate 2-4 gm IV over 5 minutes, then 1-2 grams repeated every hour may be of help

Transfer to higher level of care after above interventions.

- Call the doctor at the receiving facility to sign off and to provide details.
- Seek advice for stabilization before transferring the patient.
- Provide instructions to the ambulance team regarding management of IV lines, tubes, fluids, and ventilation.

Organophosphates: Pesticide

Organophosphate (OP) are commonly used as pesticides and easily available and hence ingested in an attempt to commit to suicide. This is similar to nerve gas agent sarin which was used in Tokyo subway terrorist incident and in Iran-Iraq war in 1980s.

Mechanism of action

- The organophosphates bind to and inactivate acetylcholinesterase enzyme.
- Acetylcholinesterase enzyme breaks down acetylcholine in the neuromuscular junction.
- The inactivated acetylcholinesterase cannot clear acetylcholine normally.
- This leads to excess concentration of acetylcholine in the synapse and continued stimulation of parasympathetic nerves.
- Both **cholinergic and nicotinic receptor overstimulation** produces the classical symptoms of OP poisoning represented by the pneumonic "**SLUDGE.**"

Organophosphates: Pesticides

SLUDGE BBB	DUMBELS
Salivation **L**acrimation **U**rination **D**efecation **G**astric **E**mesis **B**ronchorrhea **B**ronchospasm **B**radycardia	Defecation Urination Miosis (pinpoint pupil) Bronchorrhea/ Bronchospasm / Bradycardia Emesis (vomiting) Lacrimation Salivation/ Seizures
Other Features	
Confusion or Coma	

Precaution by health care team
▪ All should wear gloves to prevent contamination themselves with the poison on the skin and from the vomitus. ▪ Decontaminate the patient by removing and destroying all clothing because it may be contaminated even after washing. Wash patient's skin by flushing with water. Dry agents such as flour, sand, or bentonite also can be used to decontaminate the skin. In the case of ingestion, vomiting and diarrhea may limit the amount of substance absorbed but should never be induced

Pin point pupil

Treatment has two components

1. ABCD protocol:

- **Airway**: Patient may be obtunded and early intubation needed to protect airway.
  - Excess salivation cause obstruction and aspiration
- **Breathing:** positive pressure ventilation
  - 100% oxygen
  - Heavy airway secretions due to bronchorrhea needs to be cleared
  - Wheezing and bronchospasm need bronchodilators
- **Circulation:** IV/IO access and fluid boluses to treat shock. Vasopressors like dopamine as needed if hypotensive after 2-3 liters of IV bolus
- **Decontamination:**
  - Remove any clothing that may be wet with the pesticide to prevent further dermal absorption
  - Stomach lavage: increases mortality due to cardiac arrest and probable aspiration of fluid. Very rarely, may be considered in those who have recently (a few hours back) taken a potentially fatal dose of a poison, and who either give their verbal consent for the procedure or are sedated and intubated[1].
- **Disability (another D in OP Poisoning)**
  - Confusion, coma, seizures invariably present. It has to be anticipated and addressed proactively. Take **seizure** precautions as well.
  - Lorazepam 2-4 mg repeat every 15 minutes as needed
  - Diazepam 10 mg IV

2. Specific treatment:

- Atropine: most important medication for treatment- physiological reversal of cholinergic symptoms.
  - Loading doses: 2-5 mg IV, repeat every 5 minutes until secretions begin to dry and bronchospasm improves
  - Maintenance infusion: 1-2 mg/kg/hr.
- Pralidoxime 2 grams IV over 20 minutes. Most effective if given within 2 hours after ingestion. Not useful if found late.
  - It reactivates the acetylcholinesterase molecule (most effective if given early)

Transfer to higher level of care after when airway is secured and ventilations are adequate

- Call the doctor at the receiving facility to sign off and to provide details.
- Seek advice for stabilization before transferring the patient.
- Provide instructions to the ambulance team regarding management of IV lines, tubes, fluids, and ventilation
- Instruct to monitor and to keep **respiratory secretions dry and heart rate >100**
  - Repeat Atropine 2 mg every 5 minutes until above control is reached
  - Ensure transport time has adequate supply of atropine.

Methanol Poisoning

Methanol is found in many common household products like paint remover, antifreeze (anti-icing) solutions among others. It is a contaminant in "country liquor"

- Methanol is metabolized by the same hepatic enzymes as ethanol in the liver and compete for the same enzymes.
- The metabolites of methanol – Formaldehyde and formic acid are toxic.
- Methanol per say is not toxic to the tissues. Formic acid is toxic to the retina and causes **permanent blindness.**
- **Severe m**etabolic acidosis is a common complication in untreated patient and is the most likely cause of death.
- The clinical features of toxicity are similar to ethanol.

Methanol Clinical Features
▪ Intoxication, lethargy, seizures, coma ▪ Headache ▪ Vision difficulties: "like being in a **snowstorm**" ▪ Tachypnoea and Tachycardia ▪ Hypotension (if advanced)

Treatment has two components

1. ABC protocol:

- **Airway**:
  - Assess airway patency
  - Patient may be obtunded and early intubation needed to protect airway.
- **Breathing:** positive pressure ventilation
  - The patient is tachypneic because of metabolic acidosis
  - The respiratory rate is increased to blow off CO
- **Circulation:**
  - IV/IO access and fluid boluses to treat shock.
  - Sodium bicarbonate: reverse acidosis

2. Specific treatment:

- Ethanol: oral (or nasogastric tube)
  - Oral: 125 ml of spirits (alcohol) as loading dose, then at 50 cc per hour
  - It competes with methanol for hepatic enzyme (alcohol dehydrogenase) and prevents the formation of toxic metabolite (formic acid)

Transfer to specialty center for further treatment to a facility with ICU and dialysis. These patient may need **dialysis in severe cases**

- Call the doctor at the receiving facility to sign off and to provide details.
- Seek advice for stabilization before transferring the patient.
- Provide instructions to the ambulance team regarding management of IV lines, tubes, fluids, and ventilation

Medication overdose & antidotes

Most common drugs used are benzodiazepines and opiates.

Table 37: Poisons & antidotes

Poisons	Antidotes
Carbon monoxide	Oxygen
Opioids	Naloxone
Methemoglobinemia	Methylene blue
Cyanide	Sodium nitrite
Iron	Deferoxamine
Acetoaminophen	N-acetylcysteine
Anti-cholinergics	Physostigmine
Organophosphates	Atropine, Pralidoxime
Benzodiazepines	Flumazenil
Beta blockers	Glucagon
TCA	Bicarbonate
Coumadin, anticoagulants,. Rodenticides	Vitamin K
Ethylene glycol, Methanol	Fomepizole (Antizol)

Case scenario -1

A 15 year, old girl was brought to PHC by her mother with the history of ingestion of kerosene. The mother has induced vomiting by giving salt water at home and the girl has vomited twice. How to proceed further?

Case scenario-2

A 50 year old farmer was brought to the PHC with the history of ingestion of Insecticide Poisoning. On examination patient is drowsy, pulse 70/min. RR – 25/min., BP – 100/80, pupil – constricted both sides, frothing present in the mouth. How will you proceed further to examine and manage the patient?

Case scenario-3

20 year old boy come with the history of ingestion of 5 seeds of oleander two hours back. What are the parameters to be monitored and how will you treat?

Case scenario-4

A 30 year old house wife has come with the history of consumption of acid at home. How will proceed further?

13. Heat exhaustion/heat stroke

Heat-related illnesses include heat cramps, heat exhaustion, heat syncope and heat stroke, and are associated with significant morbidity and mortality, especially in a tropical country like India.

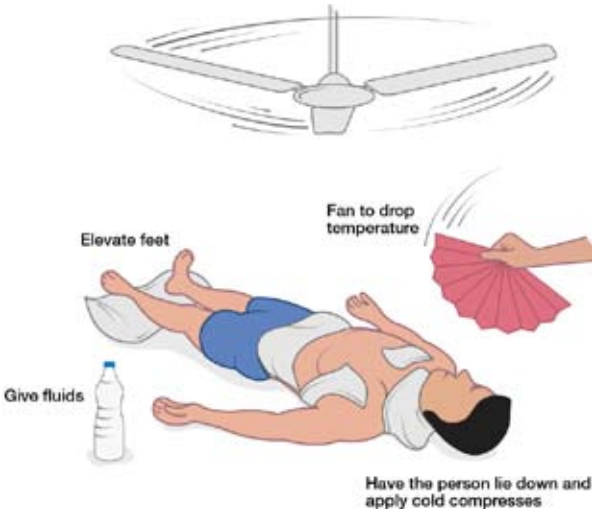
Heat stroke, which is the most severe, caused by failure of thermoregulation with elevation of core temperature to 40°C (104°F) or more, associated with central nervous system dysfunction.

Exertional heat stroke occurs in individuals exercising at warm temperatures and/or humidity. Exertional heat stroke may occur at moderate temperature, especially if humidity is high. Even in healthy individuals, dehydration or the use of common medications (e.g., antihistamines with anticholinergic side effects) may precipitate heat stroke.

Principles of management of heat stroke

General measures:

- Lowering of core temperature immediately to **38.9°C** and supporting organ systems injured by heat, hypotension, inflammation and coagulopathy.
- It is important **to initiate cooling** as fast as possible and keep the individual adequately hydrated to prevent complications.
- **Evaporative cooling** is the easiest and most effective method in classical heat stroke while cold water immersion is very helpful in exertional heat stroke.
- Stabilization of ABC, cooling measures, management of dehydration and hypotension, renal function monitoring, prevention, and management of complications.
- Hydration – **Normal Saline or Ringer's Lactate** are the preferred. Most patients **need 1 litre in the first hour**. Further rehydration needs to be guided by estimated water losses. *(Over hydration may promote cerebral edema, pulmonary edema, and hyponatremia)*



Symptomatic measures

- Seizures – manage with **diazepam**. Consider starting phenytoin if seizures do not cease
- Hypotension – must be treated with volume expansion using **IV fluids**. An adult will need at least one litre of fluid in the first hour. After this, fluid requirements should be titrated according to fluid deficit and serum electrolyte levels. If blood pressure is persistently low, appropriate vasopressor support may be needed
- Agitated delirium: Short-acting benzodiazepines such as **midazolam (2.5 mg–5 mg)** can be given
- Antipyretic therapy: Medications to reduce temperature such as **paracetamol** are not useful because the hypothalamic thermostat is not reset in these patients. Moreover, these drugs may be harmful and precipitate liver and renal dysfunction
- Antibiotics: It is prudent to consider **broad-spectrum antibiotics** pending blood cultures in older patients with hyperthermia if infection is a possible aetiology

CHAPTER 6

Surgical Emergencies

Learning Objectives

- Recognition of surgical emergency conditions
- Become familiar with measures to stabilize emergencies
- Learn important considerations for safe transfer of the patient.

Acute Abdomen

Acute abdomen refers to an acute attack of abdominal pain that may occur suddenly or gradually over a period of several hours and present as symptom complex which suggests a disease that possibly threatens life and demands an immediate or urgent diagnosis for early treatment.

Cases presenting with acute abdomen could either need a surgical intervention or a medical treatment and you could identify this so as to refer to the appropriate facility.

Table 38: Acute abdomen causes

New born ▪ Intestinal obstruction due to atresia & stenosis ▪ Meconium ileus & peritonitis ▪ Imperforate anus ▪ Annular pancreas	Infants ▪ Midgut volvolus ▪ Intussusception ▪ Diverticulitis
Children ▪ Appendicitis ▪ Round worm intestional obstruction ▪ Primary pneumococcal or steptococcal peritonitis	Adults ▪ Appendicitis ▪ Meckel's diverticulitis ▪ Perforation of peptic ulcer ▪ Acute cholecystitis ▪ Acute pancreatitis

Cause & site of pain

The following diagram would help you diagnose the condition that is presenting by helping you find the location of the pain either by the quadrant or region.

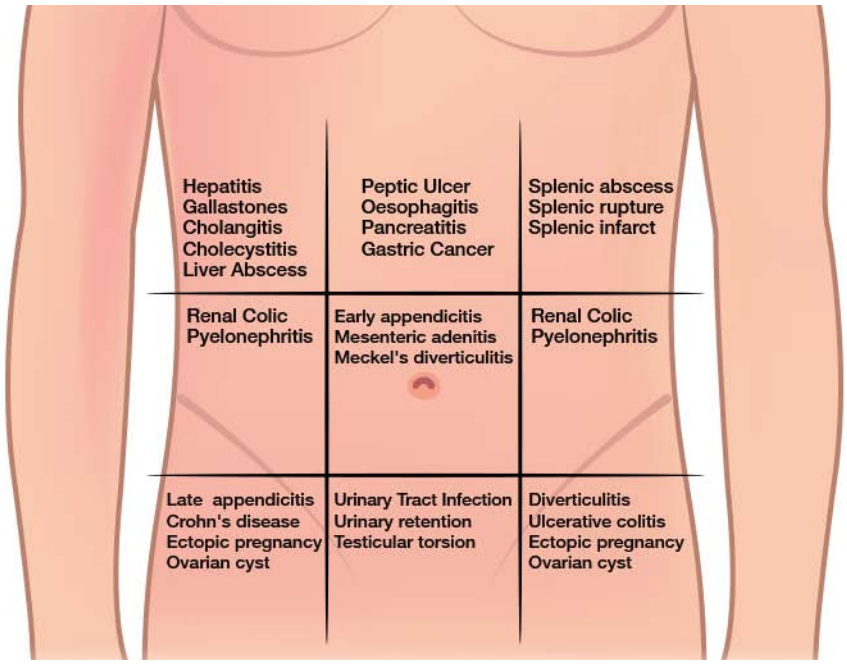


Table 39: Examination of acute abdomen

General Examination	Specific examination
▪ Appearance- – abdominal facies (in pain) – facies of dehydration- sunken eyes, drawn cheeks, dry tongue ▪ Attitude – Colic-tossing on bed – Remains quite- peritonitis ▪ Pulse- rapid in hemorragic conditions ▪ Respiration- high ▪ Temperature- increased in infection ▪ Tongue- dry tongue dehydration ▪ Anaemia (Hemorragic conditions) ,Cyanosis (hemorragic acute pancreatitis), Jaundice (biliary colic)	▪ Inspection – Look for distension, respiratory movement, peristaltic movement, pulsating swelling, flank discoloration ▪ Palpation Look for tenderness, muscular rigidity, distension, lump, ▪ Percussion – Look for shifting dullness and fluid thrill ▪ Auscultation – Noisy abdomen-Intestinal obstruction – Silent abdomen- diffuse peritonities

Table 40: Presentation requiring urgent surgical intervention

Bleeding	**Perforation**
Causes: ▪ Ruptured abdominal aortic aneurysm ▪ Ruptured Ectopic pregnancy ▪ Bleeding Gastric ulcer ▪ Trauma	Causes- ▪ Peptic ulceration ▪ Small or large bowel obstruction ▪ Diverticular disease ▪ Inflammatory bowel disease
Clinical features- ▪ Tachycardia and hypotension, ▪ Pale and clammy on inspection, and cool to touch with a thread pulse. ▪ Might present as hypovolemic shock	Clinical features- These may present as peritonitis ▪ Patients often lay **completely still**, not to move their abdomen, and look unwell this is especially important when compared to a renal colic, whereby patients are constantly moving and cannot get comfortable. ▪ **Tachycardia** and potential hypotension ▪ A completely **rigid abdomen** with percussion tenderness ▪ **Involuntary guarding,** the patient involuntarily tenses their abdominal muscles when you palpate the abdomen ▪ **Reduced or absent bowel** sounds, suggesting the presence of a paralytic ileus
Ischemic Bowel Any patient who has severe pain out of proportion to the clinical signs has ischaemic bowel until proven otherwise. Clinical feature: ▪ Patients will often complain of a diffuse and constant pain, however the examination can often otherwise be unremarkable. Definitive diagnosis is via a CT scan with IV contrast, with early surgical involvement.	**Colic** Colic is an abdominal pain that becomes very severe and then goes away completely. This is most typically seen in either ureteric obstruction **or** bowel obstruction, biliary colic

Acute abdomen usually needs to be referred to higher centers for confirmation and treatment. Once you have arrived at a differential diagnosis, you should facilitate the patient's referral to higher center.

Common symptoms
▪ Pain ▪ Vomiting ▪ Bowel changes-constipation ▪ Micturation- painful, hematuria

You must remember to always consider extra- abdominal organs as the cause of the abdominal pain, including cardiac, gynaecological, respiratory or testicular condition.

In acute abdomen , definitive management depends on the cause. Initial management needs to be done at PHC level before the referral of the patient. These include

- Nil by mouth
- IV access
- Stabilize the patient
- Analgesics
  - Mild- moderate pain- paracetamol/ibuprofen-oral /IV
  - Severe pain-Tramadol oral/ IV
- Anti-emetics

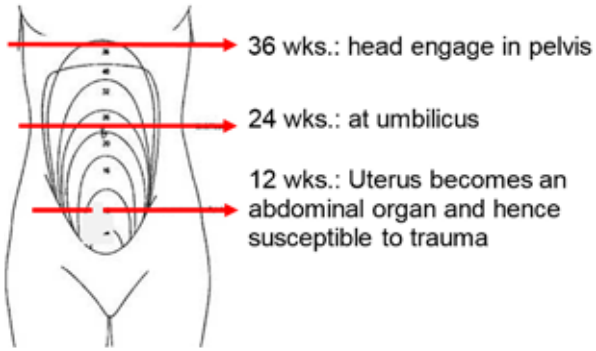
CHAPTER 7

Obstetric Emergencies

Learning Objectives

- Recognition of ante-natal, intra-partum and post-partum emergency conditions
- Become familiar with measures to stabilize obstetric emergencies
- Learn important considerations for safe transfer of the pregnant patient.

Emergencies due to obstetric conditions are common and are associated with high maternal and neonatal morality in developing countries. WHO recommends institutional (health facility) deliveries as a means for early identification of obstetric emergencies and prompt stabilization and if necessary referral to a higher level of care. Obstetric emergencies refer to the conditions during/immediately after pregnancy which are potentially fatal for both the mother and the foetus.



The most common emergencies are -

1. Trauma in pregnancy
2. Pregnancy related emergency-during ante-partum, intra-partum post -partum are **Septic shock , Hemorragic shock & Eclampsia**

Vitals in pregnancy:

Table 41: Vitals in pregnancy

Vitals	Normal	Pregnancy
Respiration	14 – 16 / min	~20/min
Pulse	70 - 80	80 - 90 (3rd Trimester)
BP	120 / 80	**90 / 60** (2nd Trimester)
		SBP upto 130 (3rd trimester)

Trauma in pregnancy

The priorities for resuscitating a pregnant trauma patient, generally remain the same as for non-pregnant patients. Primary survey (H)ABCDE is followed by secondary survey. Call for help!

H: Hemorrhage control.

A: Airway: intubation is difficult in pregnant women.

- Proactive airway management: Administer oxygen as soon as possible to prevent maternal and fetal hypoxia
- Consider and plan for BVM and intubation early. Call for help and alert an expert (Anesthetist, ICU specialist, etc.) if intubation is even remotely expected.

B: Breathing: Caution: Respiratory rate is high in the third trimester and respiratory reserves are reduced. Deliver 100% oxygen at the earliest.

C Circulation: Interpret blood pressure considering the variation in normal values

S**upine Hypotension syndrome** is common and easily reversible

- Position in left lateral position by placing a wedge. Any soft object should be placed as support and tilt the body to the left. This relieves the pressure of uterus on the aorta and blood pressure is corrected.

All pregnant trauma patient must be referred to a higher level of care to be treated by an obstetrician and surgeons.

Septic shock (Puerperal Sepsis)

Septic shock is common during pregnancy, peri-partum and the post-partum period. Generally, the causes of infection during pregnancy are different in the antenatal and postnatal period.

Table 42: Causes of septic shock

Ante-Partum and Intra-Partum Period	Post-Partum Period
▪ Septic abortion, ▪ Intra-amniotic infection (chorioamnionitis), ▪ Complicated pyelonephritis, ▪ Pneumonia caused by streptococcus pneumoniae and influenza	▪ Obstetric cause -endometritis. It is usually due to mixed flora, including anaerobic, gram negative, and gram positive organisms.
The evaluation and management of sepsis and septic shock is similar to that of the non-pregnant patient. As in non-pregnant patients, delay in administering antibiotics is associated with an increased mortality. ***Mortality doubles in women who receive antibiotics an hour later compared to those who get antibiotics within one-hour of diagnosis of sepsis.**	

Management:

- Follow A B C protocol
- Give oxygen
- IVF resuscitation at the rate of 20 ml/kg. Up to 3 litres of IVF may be needed

When to Suspect Sepsis?
If 2 of the 3 "T's" present: ▪ Temp >38.3° or <36.0° C ▪ Tachypnoea (RR >25) ▪ Tachycardia (HR > 100) **Follow ABC protocol if patient progresses to shock**

- • Start broad spectrum antibiotics to counter both aerobic & anaerobic infections (Cefotaxime + Metronidazole is an ideal combo)

Shift to the care of Ob-Gyn after stabilization

Signs of recovery:

- Early Indicators
  - SBP >90 mmHg
  - O_2 saturation improves to >90%
  - Normal mental status
- Later: Increase in urine output (>30 ml /hr)

Pre-eclampsia and eclampsia

Pre-eclampsia is a condition where a pregnant woman develops hypertension after 20 weeks of gestation. When the condition is accompanied by seizures, it is called **Eclampsia**. Any seizure episode in pregnancy is to be treated as eclampsia, until proven otherwise.

Pre-eclampsia (mild)	Pre-eclampsia severe (fulminant)
▪ Usually no symptoms ▪ New onset hypertension – SBP ≥140 or DBP ≥90 mmHg^ – >/= 1+ Proteinuria or other signs of end organ damage ▪ May have brisk reflexes	▪ SBP ≥160 or DBP ≥110 mmHg^ ▪ Headache, blurred vision, epigastric pain, pedal/ facial oedema, jittery, breathless ▪ 3+ proteinuria
^ with high BP recorded on at least two occasions four hours apart	

Pre-eclampsia is diagnosed after **20th week** of pregnancy and has a spectrum of illness from mild to severe. Hypertension should be aggressively managed to prevent stroke complications which account for 20 percent of mortality in eclampsia

Management

- Call for help!
- Place the woman in left lateral tilt position
- Conduct A, B, C primary survey
  - Place oral airway as it prevents obstruction by tongue
  - Give oxygen
  - Insert IV cannula, and give maintenance fluids (NO BOLUS)
- Catheterize bladder
- Give magnesium sulphate bolus (as indicated in the table below)
- Treat Hypertension
  - Labetalol 10-20 mg IV. Double the dose and repeat every 10 m in (max dose 240 mg)
  - BP goal: SBP 140/100 mmHg. Ensure DBP does not drop below 100
  - If labetalol is not available, alternatively give Nifedipine 10 mg orally (not sublingual)

Magnesium sulphate for Pre-eclampsia & Eclampsia

- 50% $MgSO_4$ is the standard available dose
- 2 ml solution contains 1 gram of drug
- Preparing for administration
  - For IV – Take 20 ml syringe, draw 8 ml (4 g) of 50% $MgSO_4$, dilute with 12 ml distilled water or normal saline, to make it 20% $MgSO_4$
  - For IM – Prepare two syringes with 10 ml (5 g) of 50% $MgSO_4$, mixed with 1 ml of 2% Lignocaine in each
- Give both IV and IM for loading dose

	Loading dose	Repeat
IV	4 gm 20% solution, infused over 10 min	2 gm; can repeat ONE time only after 15 minutes, if convulsions recur
IM	5 gm into each buttock	

- Give both IV and IM slowly. Rapid injection may cause respiratory failure and death.
- Before repeating dose, check if
  - RR >16/min
  - Patellar reflexes are present
  - Urine output is >30ml/hr
- Antidote: Calcium gluconate 1 gm IV over 10 minutes

Haemorrhagic Shock

Pregnancy related hemorrhage (peri-partum hemorrhage) and shock is a significant cause of morbidity and mortality, especially in developing countries. Depending on the timing, the cause of hemorrhage varies.

Causes:

1 Antepartum

2 Intrapartum

3 Postpartum

Table 43: Antepartum haemorrhage & management

Before 28 weeks	After 28 weeks	Management
Ectopic pregnancy: Missed period, abdominal pain, vaginal bleeding and syncope: **Spontaneous abortion** (incomplete) **Molar pregnancy**	**Placenta praevia:** Painless bleeding & uterus relaxed. **Placental abruption:** Tense tender uterus with/without bleeding. Early separation of placenta ▪ Uterine Rupture: ▪ Sudden cessation of contractions after a period of increased pain and contractions. ▪ **T**achycardia and eventually progress to shock	▪ Avoid pelvic (vaginal) exam ▪ IV fluids to prevent/treat shock ▪ Rapid transfer to obstetrician

Table 44: Intrapartum hemorrhage -causes & management

Impending rupture	Already ruptured
▪ Presents with low BP and cessation of labour pains	▪ Presents with shock, usually
▪ Stop Oxytocin	▪ Treat shock – oxygen, IVF bolus
▪ Do not attempt vaginal delivery	▪ Bladder catheterization
▪ Rapid transfer for emergency surgery	▪ Rapid transfer for emergency surgery

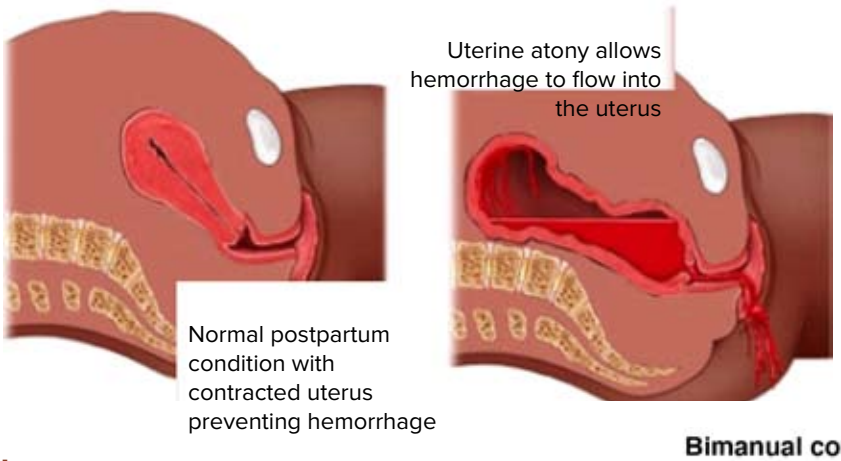
Table 45: Postpartum hemorrhage causes

4 Ts	Specific Cause	Frequency
Tone	Atonic Uterus	70%
Trauma	• Lacerations – cervical, vaginal and perineal •Hematoma pelvis • Inversion of uterus • Rupture of uterus	20%
Tissue	Retained tissue, invasive placenta	10%
Thrombin	Coagulopathies	1%

PPH due to Atonic Uterus

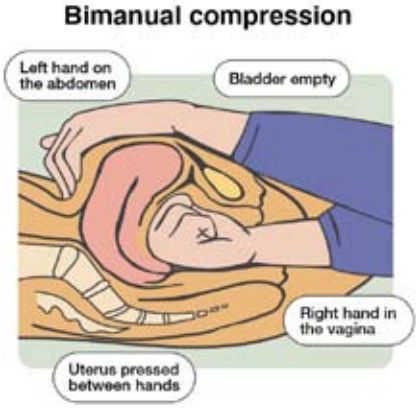
- Atonic uterus occurs when the uterus fails to contract after the delivery of the baby, leading to heavy vaginal bleeding
- Most likely to happen in the first 24 hours after delivery
- On abdominal palpation, an atonic uterus feels soft, boggy and/or enlarged

Figure 23: PPH in atonic uterus



Management:

- Shout for help and assign tasks
- Rapid evaluation of vitals
- Give oxygen by mask
- Get IV access using 2 large-bore needles; infuse bolus IVF to stabilise the patient
- Get blood grouping / Rh-typing done
- Catheterise the bladder



- Massage the uterus / do bimanual uterine compression
- Administer oxytocics in this order: **Oxytocin, Misoprostol, Methergine, Carboprost**

Table 46: Drug in PPH

Drug	Dosage, Route	Action	Side effects	Caution
Oxytocin	For AMTSL: 10 units IM For PPH: 10-20 units in 500 ml NS infusion @ 125 ml/hr	Onset: IV: 30 secs IM: 2-3 min Lasts for 15-20 min	No or minimal side effects; Hypotension when given IV push	No contra-indications
Misoprostol	800 mcg per-rectal or oral	Onset 3-5 min Peak action 20-30 min Lasts for Up to 6 hours	Shivering, slight increase of body temperature	No contra-indications
Methergine (Methyl-ergometrine)	0.2 mg IM or IV	Onset 2-7 min Lasts 2-4 hours	Nausea, vomiting, headache, hypertension	Avoid in hypertension, heart disease
Carboprost	250 mcg IM	Onset 1-2 min Lasts 15-20 min	Vomiting, diarrhea, bronchospasm	Avoid in bronchial asthma

Prevention:

- Atonic uterus is not predictable
- Hence active management of third stage of labour (AMTSL) should be done for all deliveries
- AMTSL reduces PPH by 60%
- AMTSL protocol
  - Oxytocin 10 units IM within a minute of birth of the baby
  - Placental removal by controlled cord traction
  - Uterine massage

PPH due to Trauma

- Caused due to injury during labour
- Suspect trauma when the uterus is well contracted/retracted but bleeding continues
- Rule out atonic uterus as cause of PPH
- Locate and repair site of trauma (usually cervix, vagina or perineum)

PPH due to Tissue (retained placenta)

- Usually, the placenta separates within 30 minutes
- If placenta delivery is delayed, or if placental tissue is retained, it may cause persistent bleeding
- Treatment
  - Bladder catherization

- IV Oxytocin infusion or intra-umbilical vein injection of Oxytocin (20 IU) with saline (20 ml)

- Arrange for transfer if there's no placental delivery or if patient continues to bleed

PPH due to Thrombin (DIC)

- Risk factors
  - Excessive bleeding
  - Intrauterine foetal death (IUD)
  - Sepsis o Severe pre-eclampsia
  - Amniotic fluid embolism
- Suspect DIC if clotting time is more than 7 minutes
- Management
  - Give Fresh Frozen Plasma (FFP) if available
  - Rapidly transfer to higher center

Summary:

- Trauma in pregnancy – adequate resuscitation of mother provides best support for the baby
- PPH is life-threatening – best prevented by AMTSL for all deliveries
- $MgSO_4$ is the drug of choice for Pre-eclampsia (PIH) and Eclampsia
- Stabilisation and safe transfer ASAP to obstetric care is the key to saving lives

CHAPTER 8

Neonatal Resuscitation

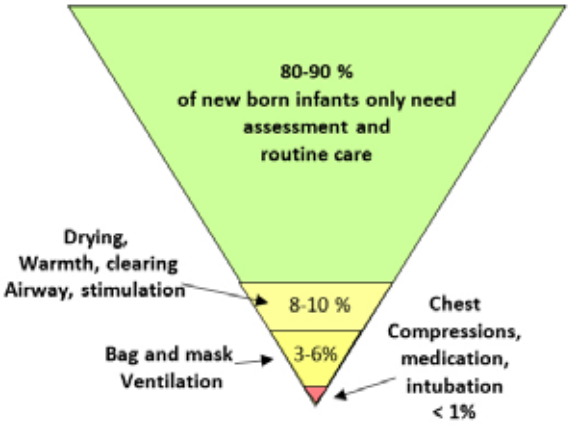
Learning Objectives

- Understand and demonstrate the sequence of priorities in the resuscitation of a newborn baby
- Understand the importance of ventilating a newborn's lungs
- Verbalize and demonstrate preparations for neonatal resuscitation, initial steps of care, positive pressure ventilation and chest compression.
- Demonstrate the right technique of chest compression and its coordination with positive pressure ventilation (3:1 ratio)

Birth is a physiological process and most infants complete the transition to extra uterine life without difficulty. However, a small portion will need minimal intervention.

Physiological transition at birth

- In the fetus, the alveoli are filled with fluid and the pulmonary arterioles are constricted.
- Soon after birth, the baby cries and takes strong deep breaths which expand the lungs, clears the fetal lung fluid and allows the alveoli to be filled with air.
- At the same time, the pulmonary arterioles dilate resulting in increased blood flow through the lungs.
- Thus, oxygenation of blood is made possible and the baby turns pink.



When a newborn infant requires resuscitation, the problem is often inadequate respiration. The heart is essentially healthy in contrast to an adult cardiac arrest, which is usually caused by inadequate circulation.

Key Points	
0-90%	Breath spontaneously at birth. Need no intervention. Assessment at birth and routine care
8-10%	Need simple stimulation at birth like drying and rubbing to help them breath
3-6%	Require basic resuscitation with bag and mask ventilation
< 1 %	Require advanced resuscitative efforts like chest compression, intubation and adrenaline injection
Every birth should be attended by designated personnel trained in neonatal resuscitation	

Peri-natal asphyxia causes hypoxic ischemic injury to vital tissues like brain, heart and kidneys and accounts for about 23% of early neonatal deaths. Rapid and appropriate resuscitative efforts help reduce brain damage and improve outcome. Governments are encouraging 100% institutional deliveries to ensure availability of skilled and trained personnel enabling successful resuscitation of neonates who will have asphyxiation.

High risk delivery can be anticipated by the presence of perinatal risk factors. However, some newborns without any apparent risk factors will require resuscitation, including assisted ventilation.

Successful ventilation of lungs is the single most effective intervention in neonatal resuscitation

Table 47: Sequence priorities in neonatal resuscitation: TABC protocol

The sequence of priorities in neonatal resuscitation. *Babies born through meconium stained amniotic fluid should also be resuscitated using the same sequence.*

T: Temperature

A: Airway

B: Breathing

C: Circulation

D: Drugs

As mentioned in the figure above less than 1% of the new born require advance intervention like chest compression or intubation or drugs.

Steps of Neonatal Resuscitation

1. Preparation

All births should be attended by an individual trained in neonatal resuscitation who will handle '***only the baby***'. This person will be the **'Team Leader'**

Preparation at Birth
▪ Preparation of **Helper-**teach HR counting & emergency numbers noted
▪ Preparation of **Room & Neonatal Corner-**close doors & windows**,** Switch off fans & AC, Switch on radiant warmer, Place 2 baby sheets
▪ **Self-** proper handwashing
▪ Preparation of **equipments -** ensure all equipments of proper size in place, electric suction is working, Bag& Mask, Suction catheter, Sthethscope, radiant warmer

The team leader has to assess by asking these four questions before delivery
What is the expected gestational age of the baby? pre or post –term?
Is the amniotic fluid clear or meconium stained?
How many babies are expected (single, multiple etc.)?
Are there any other risk factors (e.g.: hypertension, gestational diabetes etc.)?

Based on the response to these questions the team leader can determine if he has assembled the necessary personnel and equipment.

Call for HELP: Deliveries, especially in high-risk pregnancies, are a potential emergency and require team work. The window of opportunity to resuscitate the new born is very narrow (seconds to minutes) and hence preparation is extremely important. **The team leader should first call for and ensure help is available before the baby is born.**

- Assign them roles and responsibilities
- If needed instruct them on what to do (like basic techniques)
- Let them know what is expected of them.
- There must be a separate team to handle the newborn.
- There should be another team to take care of the mother and any complication the mother may have.
- If twin delivery, then two 2-person teams trained in NRP should be available

Preparation for NRP in TABCDs sequence as per protocol

Temperature and time

1. Ambient temperature: Switch off air conditioner (AC) and fans, close windows
2. Switch on radiant warmer
3. Place **THREE** towels under the warmer for pre-warming
4. Time: A wall clock with seconds hand in a prominent place o one person assigned to announce time every 30 seconds loudly
5. Vitamin K preloaded in syringe 1 mg (term baby) and 0.5 mg (pre-term)

Airway

1. Shoulder roll to help open the airway
2. Bulb syringe for manual suction
3. Suction apparatus is working properly. Set suction pressure to 100 mm of water
   - Suction catheters (10F,12F)
- 4. If available: Appropriate size laryngoscopes (straight blades) and endotracheal tubes

Breathing

1. Artificial manual breathing unit (AMBU) bag (BVM)- 500 ml volume for term baby: ensure pressure valve is functioning
2. Appropriate size mask: Size 1 for full term and Size 0 for pre term

3. Oxygen cylinder is full and oxygen is flowing
4. Hood to deliver oxygen
5. If available: Pulse oximeter

Circulation:

Another team member who can perform chest compression

Drugs:

Adrenaline: dilute 1 ml (1:1,000) in 9 ml normal saline to make it 1: 10,000 and preload into syringe.

Other Supplies needed are:

1. To cut umbilical cord: sterile scissor or blade
2. Sterile gloves, sterile umbilical cord ties, gloves, suction catheters
3. IV cannula (24 G)
4. Name tag, stethoscope
5. If available: Cardiac monitor, No 5 F catheter and thread for Umbilical vein catheterization and a cardiac monitor

2. Neonatal resuscitation protocol (NRP)

T: Temperature and A: Airway of TABC Initial Steps (first 30 seconds):

At birth the team leader should ask these three questions immediately:

1. Term: Is this a full term baby?
2. Tone: does the baby have good muscle tone?
3. Is the baby Crying or Breathing?

a. If the answer is "yes" to all three questions, then:

- Receive in a pre-warmed towel.
- Place baby in prone position on the mother's abdomen for early skin to skin contact
- Wipe baby dry from head to toe with the 1st pre-warmed towel and discard it.
- Wipe the nose and mouth with a 2nd clean cloth
- Clamp the cord after 1-3 minutes with a sterile instrument and tie it with sterile tie. – Cover the baby (including the head) and mother with a 3rd pre-warmed towel.
- Support initiation of early breastfeeding – Place name tag on the ankle and obtain foot prints (sole)
- Administer Vitamin K IM route 1 mg for term baby (0.5 mg if pre-term)
- Continue on going evaluation. Check weights. Look for any congenital malformation.
- Refer if birth weight is <1.5 kg or if there are any malformations.

The cry of a new born baby indicates successful transition from intra to extra uterine life. In about 90% of the cases these are the only interventions required.

b. If the answer is "no," to any of these 3 questions, then initiate Airway interventions (to be performed with-in the first 30 seconds):

1. Temperature: as above.
2. Airway: Position such that the neck is extended:

   "sniffing position" by placing a roll of cloth (back rest) beneath the shoulder. This opens the airway.

   - Suction: ONLY if secretions are obstructing the airway: mouth first and then nose (M comes before N).
   - Avoid vigorous and deep suctioning as this may cause bradycardia.

3. Stimulate gently by rubbing the back and / or flicking the soles

Tactile stimulation, should be done briefly (for a few seconds only). DO NOT waste time by continuing to stimulate if the baby does not breathe. START Positive pressure ventilation immediately

Then reassess the baby at 30 seconds (from the time of birth).

Assessment within 30 seconds: Is new-born responding to airway interventions?
Duration of assessment: 6 seconds only
1. Breathing: gasping or not breathing? 2. Is heart rate < 100 / minute? Calculation of heart rate: Auscultate over the heart or palpate umbilical vein for 6 seconds and multiply number of heart beats x 10. Example, if 8 beats are heard in 6 seconds, then heart rate is 8 x 10 = 80 / minute which is less than expected. Note: Palpation of umbilical cord pulsations is less accurate and not recommended.
If: ▪ Breathing normally, but has central cyanosis– start free flow oxygen ▪ Breathing is labored– start continuous positive airway pressure (CPAP), if available ▪ If not breathing (apneic) or gasping or HR < 100 / minute – start positive pressure ventilation.

3. Breathing: Positive Pressure Ventilation

Initiate B- Breathing as early as 30 seconds but before end of 60 seconds since time of delivery

At the end of 30 seconds of initial steps, including tactile stimulation positive pressure ventilation (PPV) is started if the new-born baby is:

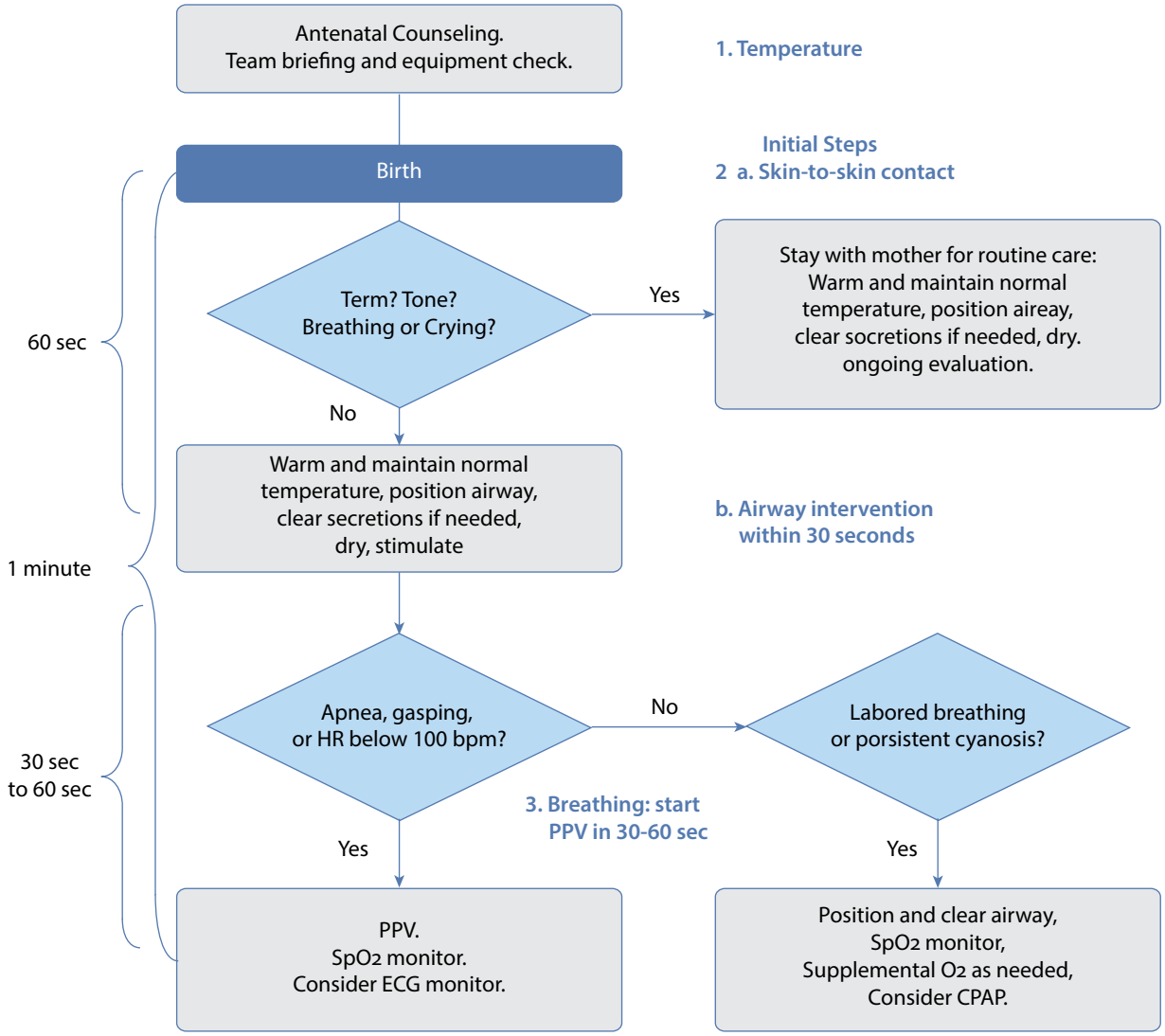
1. not breathing or is gasping or has
2. a heart rate <100 / minute

In this situation, if alone, call for HELP (if already not done) as you may need chest compression soon.

Positive Pressure Ventilation (PPV) is delivered using

1. A self-inflating bag and mask (AMBU bag with a mask most commonly used)
2. A T-piece resuscitator.

NRP Process: Diagrammatic representation



Technique:

- Stand near the head end of the baby.
- Clear airway of any secretions if not already done.
- Position the head and neck in neutral or slight extension (back rest).
- Select appropriate mask size. The mask should rest on the chin and cover mouth and nose but not the eyes. The correct mask will create a tight seal on the face.
- Avoid pressure on the eyes as it can cause bradycardia via vasovagal stimulation.
- Give just enough pressure to achieve a gentle chest rise.

Reassess after first 30 seconds of positive pressure ventilation
Duration of assessment: 6 seconds only
1. Is the child breathing
2. Heart rate <100?
If:
• HR >100/min: continue PPV at 40 / min and gradually stop PPV till breathing established
• HR 60 - 100/min: correct ventilation technique (MR. SOPA). Increase O_2%
3 If HR is <100 after 30 seconds, it indicates that the PPV (AMBU bagging) is in-effective. Correct the ventilation technique using MR-SOPA.

The 6 ventilation corrective steps: MR. SOPA		
	Corrective steps	Actions
M	Mask adjustment	Reapply mask. Consider 2-hand technique
R	Reposition airway	Place head neutral or slightly extended
Try PPV and reassess chest movement		
S	Suction mouth & nose	Use a bulb syringe or suction catheter
O	Open mouth	Open the mouth and lift the jaw forward
Try PPV and reassess chest movement		
P	Pressure increase	Increase pressure on BMV (AMBU bag)
A	Alternative airway	Consider Laryngeal mask airway or Intubation
Repeat PPV. Assess chest movements and breath sounds		

At least 30 seconds of effective positive pressure ventilation must be given before reassessing the new born.

Reassess after 30 seconds of EFFECTIVE positive pressure ventilation
Time taken < 10 seconds
Is the child breathing?
Is the heart rate above 60?
If:
▪ HR > 100/min: continue PPV at 40 – 60 / min till breathing established
▪ HR 60 - 100/min: correct ventilation technique (MR. SOPA). Increase O_2 %
▪ **If HR < 60/min:**
– continue PPV with 100% oxygen
– Call for additional HELP
– **Initiate chest compressions**

4. Chest Compressions

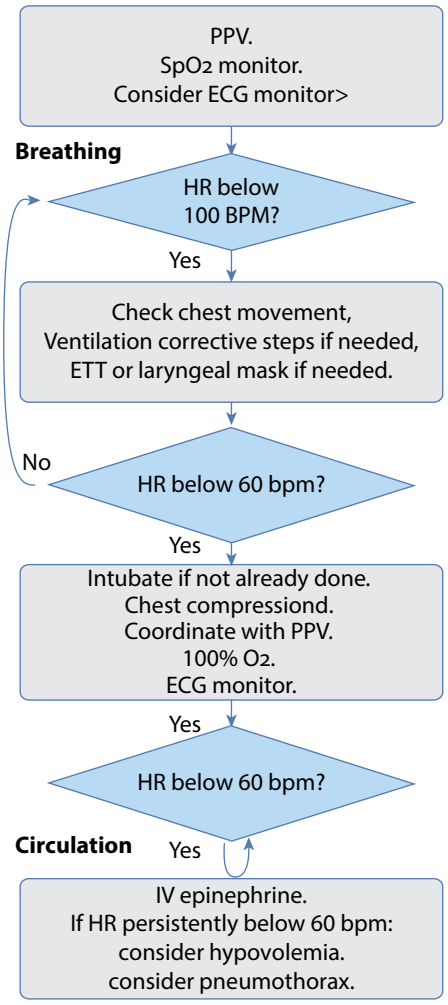
Initiate ***C- Circulation*** if HR is < 60 / minute after 30 seconds of effective PPV

A heart rate of less than 60 / minute despite 30 seconds of effective PPV indicates depressed myocardium due to inadequate blood flow through the coronaries. Chest compression helps restore flow of oxygenated blood to the heart muscle. Ideally it is better to intubate the baby

before initiating chest compressions. *However, if you are inexperienced do not waste time* attempting *intubation. Continue delivering breaths using AMBU bag*.

Technique:

- Chest compressions are done **using two thumb technique**.
- Place both the thumbs over the **lower one third of sternum**, just below an imaginary line connecting the baby's nipples. **DO NOT** place your thumbs over the ribs or the xiphoid.
- Encircle the baby's chest with your hands. Place your fingers under the baby's back to provide support.
- Depress the sternum approximately one third the Anteroposterior diameter of the chest.
- Then release the pressure to allow the heart to refill. **The thumbs should remain in contact with the chest during both compression and release**.
- **Synchronize (**Coordinate) chest compressions with positive pressure ventilation.
  - Compression rate is **90 / min** and ventilation is **30 / min**
  - 3: 1 ratio of compressions to ventilation in **each 2-seconds cycle**
  - Rhythm: **"*One* –** *and* **– *two*** *– and* **– *three*** *– and – breathe – and, so on…."*
  - **Compress** when saying "*one, two, three*" and
  - **Release** when saying "*and*"
  - Pause chest compressions and give a positive pressure breath when saying "*breathe and*"



One	and	Two	And	three	And	BREATH	And.....
compress	release	Compress	release	compress	release...	...continue to release give BREATH → cont.	

- Continue chest compressions for **60 seconds** before checking heart rate again.

Assessment after 60 seconds of coordinated chest compressions and PPV
Time taken < 10 seconds
What is the heart rate?
If: HR > 60 /min: ▪ Stop chest compressions, continue PPV till spontaneous breaths achieved HR < 60 / minute: Continue PPV and chest compressions ▪ Consider IV adrenaline

5. Medications

Only about five percent of the new born require assistance with ventilation and less than 1% will need chest compression. Most of these babies recover with effective positive pressure ventilation and chest compressions. Intubation or medications are rarely necessary which are usually managed by a paediatrician.

Adrenaline is administered intravenously (or via umbilical vein) if the newborn continues to have

- HR <60 / min after 30 seconds of effective PPV followed by 60 seconds of synchronized chest compression ad PPV
- Adrenaline stimulates the heart and also improves coronary perfusion.
- **Route**: Umbilical vein is the preferred route. *Do not attempt to insert peripheral line during neonatal resuscitation as it is likely to be unsuccessful and results in wastage of time.*
- **Dose:** 0.1 ml / kg of 1: 10,000 Adrenaline is given rapid IV.
  - **Flush with 0.5 to 1 ml of saline**.
- **Total 3 doses, given** at 3-5 minute intervals.
  - Increase dose to 0.2 ml/kg and 0.3 ml/kg for 2nd and 3rd dose.
- **Assessment**: assess heart rate every 60 seconds.
- **Note:** Endotracheal route is less effective as absorption is unreliable. Used only if IV or umbilical vein access unavailable. Dosage: 0.5 – 1 ml / kg of 1:10000 Adrenaline.

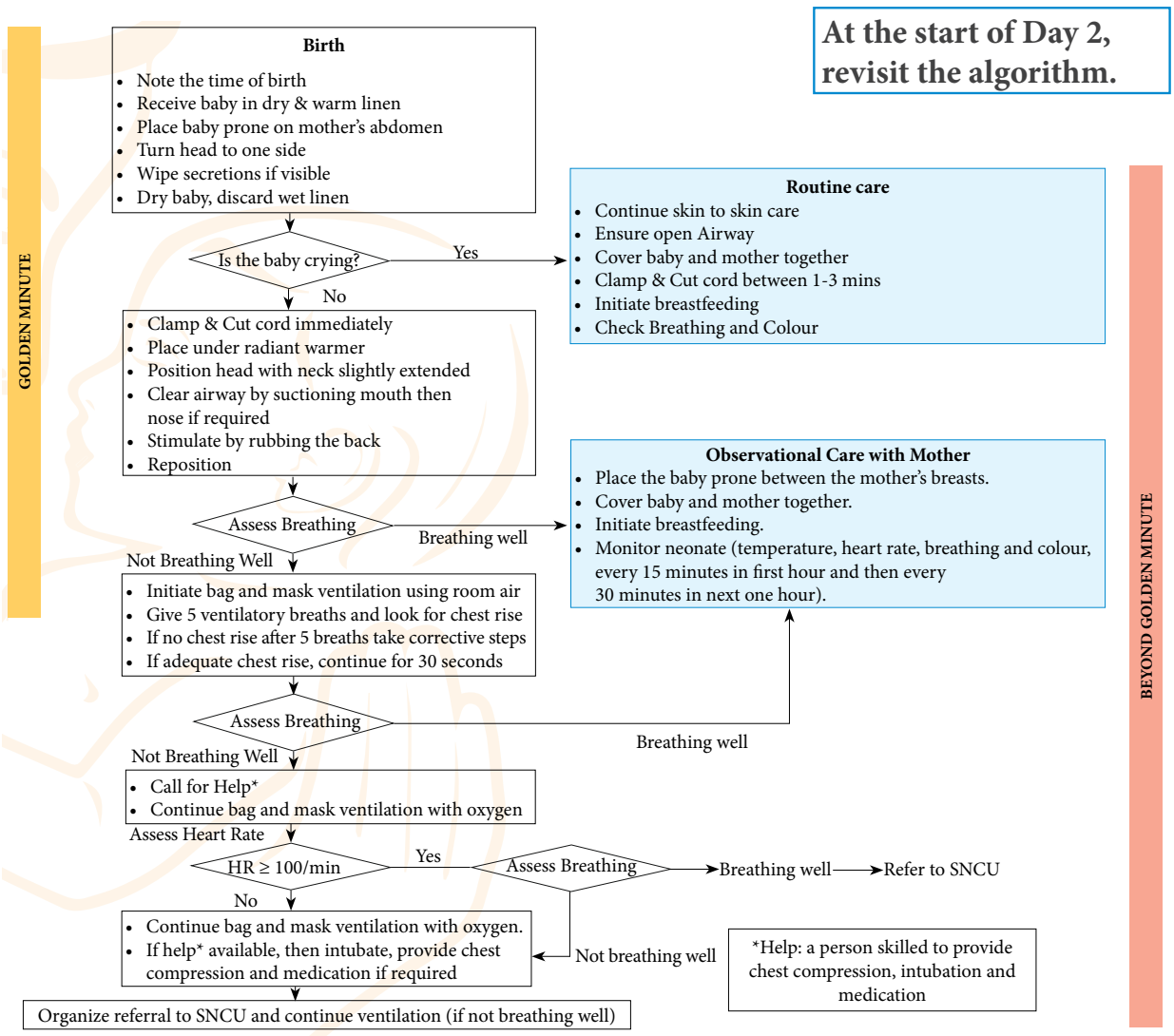
If there is a confirmed absence of heart rate after 10 minutes of resuscitation, it is reasonable to stop resuscitative efforts. However, the decision to continue or stop should be individualized.

Summary

- Majority (90%) of babies cry immediately after birth and do not need resuscitation.
- A health care provider trained in neonatal resuscitation should be present at all deliveries.
- Preparation plays a very important role in improving the outcome of resuscitative effort.
- Keeping the baby warm should be the highest priority during resuscitation.
- Successful ventilation of lungs is the single most effective intervention in neonatal resuscitation. Therefore,
- The most important skill to be learnt in neonatal resuscitation is BVM ventilation

Neonatal Resuscitation Program* - Reference Chart

The most inportant and effective action in neonatal resuscitation is ventilation of the baby's iungs.



CHAPTER 9

Paediatrics Emergencies

Learning Objectives

Identification of Critical Illness in Children

- Compare and contrast evaluation of critical illness in a child as compared to adults
- Describe and apply the components of the Paediatric Assessment Triangle (PAT)
- Primary Assessment pentagon

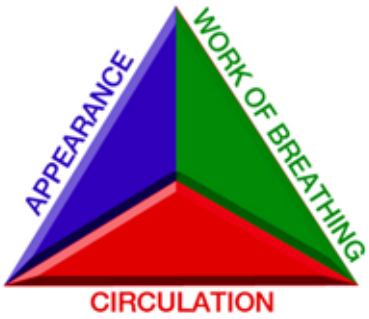
Specific Paediatric Emergencies

- Identification of common paediatric emergencies
- Initial stabilization and goal appropriate therapy
- Safe and timely transfer to paediatric specialist care

Paediatrics emergencies present unique challenges which can overwhelm healthcare workers who do not care for children routinely. Their physiological resilience allows them to compensate well and they may not seem critical until it is too late. What seems obvious in adults may not be so obvious in children.

Steps in Assessing Paediatric emergencies

1. Paediatrics Assessment Triangle (PAT)
2. Paediatric Primary Survey: Airway Breathing Circulation (ABC)
3. Specific paediatric emergencies



1. Paediatric Assessment Triangle (PAT)

- The goal of PAT is to identify whether the child is 'sick' or 'not sick'. In children, assessment is less obvious but potentially serious illness is a challenge.
- Abnormalities in any of these three fundamental areas – Appearance, Work of Breathing and Circulation (to the skin) – denotes an unstable child, that is, a child who will require some attention.

- PAT uses only visual clues to rapidly assess the severity of the child's illness (or injury) and urgency for treatment, regardless of underlying diagnosis.
- PAT is mainly based on astute, directed observation. It does not even require a stethoscope, BP cuff, cardiac monitor, pulse oximeter or any other equipment or test.
- The three components of PAT are overlapping and interdependent, and reflect the child's overall physiologic status.
- PAT helps the emergency responder to obtain critical information on the child's physiologic status, before even touching the child and helps to set priorities for the primary survey.

A. Appearance

- To observe – Tone, Interactiveness, Consolability, Look / Gaze, and Speech / Cry (TICLS)
- It can inform the assessor of the child's appearance as normal or abnormal (for age and development)

B. Work of Breathing

- This describes the child's respiratory status, especially the degree to which the child must work in order to oxygenate and ventilate.
- This is a more accurate and immediate indicator of oxygenation / ventilation than respiratory rate or auscultation.
- To observe if there is
  - Tachypnoea
  - Moaning / grunting / stridor / wheezing
  - Abnormal positioning
  - Intercostal / subcostal retractions
  - Abdominal / seesaw / paradoxical breathing (chest wall retracts and abdomen rises with inspiration; indicates paralysis of diaphragm)
  - Flaring of nostrils

C. Circulation (to the skin)

- This reflects the general perfusion of blood throughout the body
- To observe the colour pattern of the skin and mucous membranes
- By noting changes in skin colour and skin perfusion (such as pallor, cyanosis, or mottling), the provider may recognize early signs of shock. {Mottling is patchy nature/irregular colouration}

PAT further categorizes the child into the following 1-5 categories. The specific category then dictates the type and urgency of intervention.

Category	Appearance	Work of Breathing	Circulation
Stable	Normal	Normal	Normal
Respiratory distress	Normal	Abnormal	Normal
Respiratory failure	Abnormal	Abnormal	Normal
Shock	Normal/Abnormal	Normal	Abnormal
CNS / Metabolic disturbance	Abnormal	Normal	Normal
Cardiopulmonary failure	Abnormal	Abnormal	Abnormal

2. Paediatric Primary Survey (ABC)

- Hands-on assessment of an ill or injured child
- Intent is prioritized sequencing of life support interventions and reversal of pathophysiology
- Sequence of 'ABC' same as in adults
- Take care not to disturb the mother-child dyad

Paediatric normal vital signs: In evaluating the ABCs in children reviewing vital signs are an important part. However, the normal range for blood pressure, heart rate and respiratory rate in children vary widely with age. The table below is a relatively simplified version and is an easy reckoner.

Age	PR	BP	RR
Newborn	> 160	< 60	> 60
1yr	> 140	< 70	> 50
5yr	> 120	< 80	> 40
10-12yr	> 100	< 90	> 25
At ANY age			
Critical Values	< 60	< 60	< 20

In children 1-10 years of age, normal systolic BP is calculated using the simple formula, **2 x Age + 70.**

The normal IV bolus dose is:

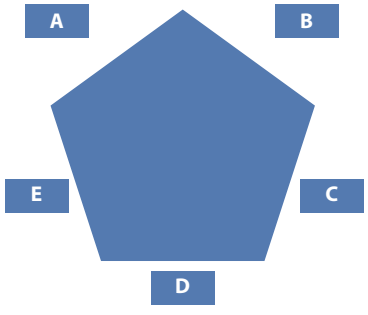
- 20 cc/kg IV for crystalloids (Normal Saline or Ringer Lactate)
- 10 cc/kg IV for colloids (like dextran)

Example: A 8-year-old boy is seen in the ED for septic meningitis. The child weighs 25 kg. The blood pressure is 82 mm of Hg. How much fluid (NS or ringer lactate) should be administered? What is the target blood pressure in this case? How much fluid to administer now? Bolus or maintenance?

- Normal for age systolic blood pressure calculate: (2 x 8) + 70= 86 mm of Hg
- The child should get 20 cc / kg of fluids which is 20 cc x 25 kg = 500 cc bolus
- IV bolus should be repeated until target systolic blood pressure of 86 mm of Hg is achieved. The, slow the fluid rate to maintenance rate of 50-100 ml per minute.

Primary Assement Pentagon

- Airway
- Breathing
- Circulation
- Disability
- Exposure



Assessment Pentagon

A. Airway

Airway assessment is the same as in adult.

1. Is the patient conscious? Use AVPU scale
2. Is airway obstructed? Foreign body, tongue, secretions, laryngeal edema, croup, etc.
3. Is the cervical spine stable? This is normally not of much concern unless the child is involved in a trauma emergency

However, special precautions are taken to avoid making the child uncomfortable and anxious. Oxygen should be administered in a non-threatening manner. Oxygen can be administered to a child using nasal cannula, face mask or an oxygen hood. However, in a combative child, forceful administration of oxygen may further agitate the child and worsen respiratory distress. Here the baby can be allowed to rest on the mother's lap and the mask gently held close to the face by the mother. Alternately, baby can rest on the mother's shoulders and blow by oxygen can be administered by an attender.

Upper airway obstruction in children is commonly due to foreign body aspiration, croup and laryngeal edema (secondary to anaphylactic reaction). Croup is rarely severe enough to require intubation.

Identification	Intervention
Open airway	Clear & Unobstructed
Maintainable	Maintained by *simple measures*
Not Maintainable	Needs *advanced measures*
*Simple measures- Allow position of comfort, head tilt-chin lift, Heimlich or backslaps – chest thrusts, oropharangeal /nasopharangeal airway	*Advanced measures- ET placement, LMA, Laryngoscopy / bronchoscopy for foreign body

Anaphylaxis (Allergic reaction):

Allergic reaction causing anaphylaxis are common in children and can mimic foreign body aspiration causing upper airway obstruction or acute asthma. A quick history during PAT evaluation and ABC protocol will provide clues to suspect anaphylactic reaction. It can be due to medications or bee stings

- Presents as rash, itching, angio-oedema, wheezing, stridor, hypotension
- Infants may have diarrhea and abdominal cramping

Treatment:

- Adrenalin 1:1000 intramuscular in lateral thigh
  - Body weight 0 - 30 kg: 0.15 ml IM
  - Body weight > 30 kg: 0.3 ml IM
  - Repeat every 10 – 15 minutes until symptoms improve o Salbutamol or epinephrine nebulization (for wheeze/stridor)
- IV/IO fluid bolus for hypotension – 20 cc/kg, repeat every 15 minutes until there is improvement

- Diphenhydramine/ Pheniramine (1 mg/kg IV/PO) for itching/rash
- Hydrocortisone 1 mg/kg IV/PO
- Transfer to paediatric specialist for further observation and treatment

B. Breathing

The following evaluation provides information about the breathing status.

1. Is the patient having Tachypnea or Bradypnea?

   Assessed quickly with simple visualization.

2. **Is the patient hypoxic (O2 saturation low)?**

   Helps assess condition on arrival and response to treatment. This should be corrected irrespective of the cause by administering oxygen (target >90%).

3. **Are chest movements and auscultation normal?**

   Provide clues to specific diagnosis which may help in choosing specific treatment. Is air entry equal bilaterally? Any wheeze, bronchial breath sounds or crepitation heard?

Age	Breath per minute
Infant	30-53
Toddler(1-3yr)	22-37
Pre-school(4-5yr)	20-28
School age (6-12yr)	18-25
Adolescent (13-18yr)	12-20
Alert:>60 (tachypnea) or <10 (bradypnea) breaths per min **Apnea: Cessation of breathing >20 sec**	

C. Circulation

It is monitored with following vitals.

1. Heart rate and rhythm- Tachycardia is non-specific (can be increased in anxiety, fever, pain & crying
2. Peripheral and Central pulses- Peripheral pulses seen at radial, temporal, posterior tibial & central pulses-femoral & axillary (infants)& carotid (older children)
3. Capillary refill time (CRT)- Normal-2-3 Sec . Prolonged CRT can be seen in cold ambient temperature , hypothermia (CRT of 10 sec seen in cardiogenic shock in 3 month old)
4. Skin color and temperature- changes seen in circulatory insufficiency (Cold extremities, Pallor , Mottling, Cyanosis)
5. Blood pressure- Measured by traditional sphygmomanometer or oscillometric method. Hypotension is a late sign .Always, look for sensitive indicators of shock like cool peripheries, increased capillary refill time, tachycardia, low pulse volume and narrow pulse pressure (< 20 mm Hg).

Hypotension is	
Age	Systolic BP(mmHg)
Term Neonates(0-28)	<60
Infants(1-12 months)	<70
Children (1-10 years)	70+(age x2)
Children >10 years	<90
Hypotension with hemorrhage: > 20-25% acute blood loss.	
Fall of 10 mm of SBP from the observed level is significant	

Hypotension in paediatric age group

- Hypotension in paediatric age group is a late (near-terminal) sign
- When in doubt, always administer a bolus of normal saline: 20 ml/kg over 5-10 min
- Evaluate response
  - If improved, infuse at maintenance rate
  - If no improvement, push further boluses
- Consider inotropes (dopamine / adrenalin)

Obtaining an IV line in children is of utmost importance. Most health works find it hard to place a peripheral IV line in children. Therefore, before the blood pressure drops and the veins collapse every effort should be made to place two large bore IV cannulas. The correct size should be chosen based on the age and weight of the child.

Type of circulatory problem	Clinical example	ER intervention
Hypovolemic shock	Diarrhea and dehydration	Humidified O2, IO/IV access, crystalloid bolus
Distributive shock	Septic shock	Humidified O2, IO/IV access, crystalloid bolus, antibiotics, vasoactives, source control
Cardiogenic shock	Acute myocarditis	Humidified O2, IO/IV access, ionotropes
Obstructive shock	Tension pneumothorax	Needle thoracocentesis First & then Assisted ventilation, IO/IV access,

Paediatric Seizures

Causes are-

- Idiopathic: unknown cause
- Secondary due fever,
  - Metabolic: Hypoglycemia, Hypocalcemia, etc.
- Infective: meningitis,
- Head trauma: observed / unobserved
- Brain tumor
- Developmental disorder
- Poisoning: OP poison, camphor, isoniazid, aspirin, etc.)

Treatment:

Not actively convulsing	Actively convulsing > 5 min
▪ Do PAT ▪ Focused history and physical examination ▪ Secure ABC ▪ Identify and treat hypoglycemia	▪ Secure ABC ▪ Check blood sugar and correct hypoglycemia ▪ Diazepam – IV/IM (0.3mg/Kg) or rectal (0.5mg/Kg) ▪ Midazolam – IM/intranasal/buccal (0.2 mg/kg) or IV (0.1 mg/kg) ▪ Repeat dose in 5 min if seizures persist

Post-ictal phase:

- Put the child in recovery position (Annexure-4)
- Continue ABC evaluation
- Arrange for safe transfer to higher care center
- If it is febrile seizures (which are self-limiting)
  - Evaluate cause of fever
  - Reassure parents
  - Send the child home if PAT is normal and there are no worrying signs
  - If meningitis is suspected, administer Ceftriaxone IV/IO/IM and transfer to higher care as soon as possible

Paediatric Sepsis

- A spectrum of disorders that result from infection by bacteria, viruses, fungi or parasites or the toxic products of these microorganisms.
- Majority of the cases are bacterial (severe bacteremia)
- Can present with fever or hypothermia, tachycardia, tachypnea, cold extremities, lethargy, confusion/ disorientation, vomiting, decreased urine output
- Early antibiotics save lives! Chance of mortality increases by 10% for every hour of antibiotic delay

Management:

STEP 1 (0–5 min)	STEP 2 (5–40 min)	STEP 3 (40–60 min)
▪ Recognize depressed mental status and decreased perfusion by rapid cardiopulmonary assessment (PAT) ▪ Begin high flow oxygen ▪ Simple mask or non-rebreathing mask may be used for high flow oxygen therapy ▪ Establish intravenous / intraosseous access	▪ Fluid resuscitation: Rapid infusion of 20 ml/kg NS/RL bolus (IV/IO), up to 60 ml/kg, titrated toward shock resolution ▪ Administer Ceftriaxone 50mg/ Kg IV/IO/IM ▪ Identify & correct hypothermia, hypoglycemia	Once stable, quickly transfer to paediatric specialist

Pneumonia/Bronchiolitis

Presents with fever, cough, wheezing, tachypnoea and hypoxia

Treatment:

- Give oxygen

- Salbutamol nebulization (2.5 mg in 3 ml NS) for wheezing; continue if child improves
- Ampicillin/ Amoxicillin 50 mg/kg IM/IV
- Transfer to pediatrician for further treatment

Asthma

- Presents with cough and wheezing (with or without stridor)
- Usually, the child is more than 6-12 months old and there's a history of asthma
- If the wheezing is of sudden onset, consider foreign body aspiration

Treatment:

- Give oxygen
- Salbutamol nebulization (1.25 – 2.5 mg in 3 ml NS)
- Add Ipratropium 2.5 mg (anti-cholinergic) to Salbutamol, if available
- Hydrocortisone 1 mg/kg PO/IV for moderate/severe cases

Croup (Laryngotracheobronchitis)

- Viral upper respiratory infection
- Can present as hoarse voice, 'barking' cough and inspiratory stridor
- Very rarely requires intubation (1-5% cases)

Treatment:

- Adrenaline nebulization (1 ml 1:1000 in 2 ml NS); must observe for 2-4 hours; repeat if stridor recurs
- Dexamethasone 0.6 mg/kg (max 10 mg) oral or IM

Diarrhoea / Dehydration

- Mostly viral in origin
- On Examination:
- Listless, decreased activity and attentiveness
- Decreased muscle tone
- Decreased skin turgor
- Dry mucosa

Treatment:

- Focus on rehydration
- If the child is able to take orally, give WHO formula
- If there are signs of shock: IV 20 ml/kg normal saline, repeat until child improves

Summary

- Paediatric Assessment Triangle (PAT) allows a quick evaluation to detect paediatric distress
- Stabilisation of the paediatric patient involves the same priorities as the adult: A, B, C
- Children must be treated early and aggressively to prevent shock. A low blood pressure in a child is a pre-terminal condition

Section 3

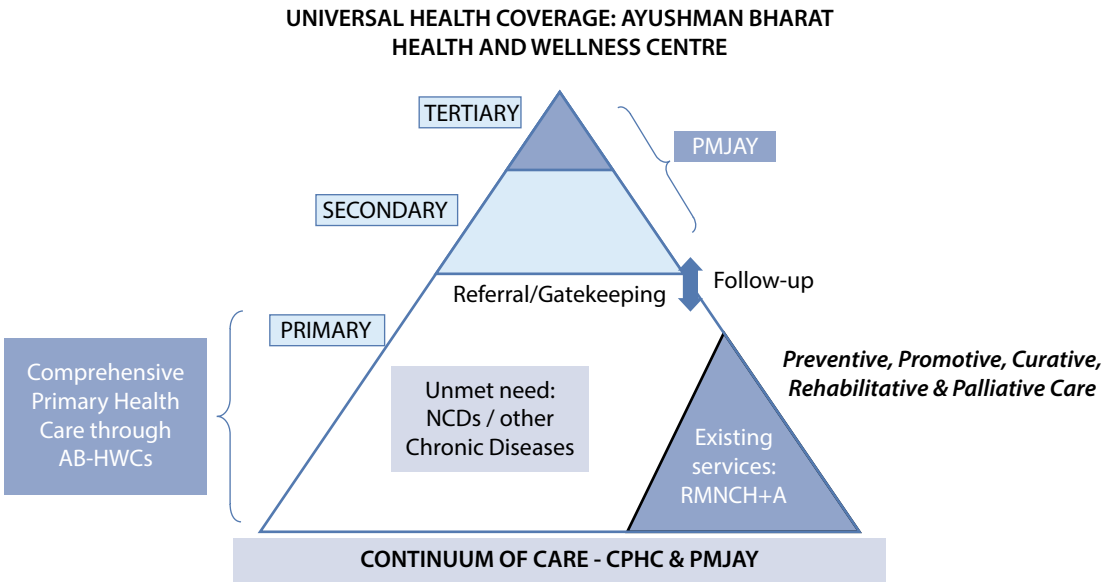
Managerial Aspects of Emergency Care

CHAPTER 10

Managerial Functions of MO in Emergency and Trauma Care

Primary health care team consists of CHO, MPW, ASHA, Staff nurse & ANM.

Figure 24: Universal Health coverage



Following manual or computerized records shall be maintained at the PHC's:

1. **OPD/ treatment register**: One common register for patients of OPD/Emergency containing demographic details along with clinical findings, chief complaint (if any), and provisional diagnosis along with treatment provided.
2. **Inventory register**: Should contain information about drugs, consumables, equipment, instruments and consumables available in the health facility with details about their maintenance, consumption and indent.
3. **Referral register**: should contain information on referral in/out with reason for referral. Information of follow up of cases also to be recorded.
4. **Record for handing over** and taking over of critical care equipment at all levels.
5. Medico legal register

6. Patient/Community feedback register
7. At risk register for vulnerable patients in the catchment area
8. Mapping of the facilities based on the preference of the patients from the community and the healthcare facilities

Additional roles of the medical officers

I. Management & Police Intimation of Medico Legal cases

The MO should handle medico legal cases as per the GOI or State manuals/protocols. Handling of cases of rape/sexual violence against minors and women, should be done in conformity with MoHFW's. "Guidelines and Protocols for Survivors/Victims of Sexual Violence" 2014 which has detailed provisions on treatment, examination, evidence collection, police intimation, consent, confidentiality and privacy. Some of the overarching and broad points related to medico-legal cases, are reinforced herein below:

1. If any medico-legal case is brought ,she/he should, if warranted, provide emergency first aid to save life/stabilize, ,with proper documentation of first aid provided.
2. Types of cases that are to be treated as medico-legal are:
   (a) All cases of injuries and burns - the circumstances of which suggest commission of an offense by somebody (irrespective of suspicion of foul play);
   (b) All vehicular, factory, or other unnatural accident cases specially when there is a likelihood of patient's death or grievous hurt;
   (c) Cases of suspected or evident rape/sexual violence;
   (d) Cases of suspected or evident criminal abortion;
   (e) Cases of unconsciousness where its cause is not natural or not clear;
   (f) All cases of suspected or evident poisoning;
   (g) Cases referred from court or otherwise for age estimation;
   (h) Cases brought dead with improper history creating suspicion of an offense;
   (i) Any other case not falling under the above categories but has legal implications
3. The first and foremost duty of a MO is to treat and save the life of the patient. Information to the police should be sent in a reasonable time, but under no circumstance, the treatment should be delayed because of non-arrival of the police.
4. As per law, the hospital/ examining doctor is required to inform the police about a sexual offence. However, if the survivor does not wish to participate in the police investigation, it should not result in denial of treatment for sexual violence. Further, in case the survivor does not wish to inform the police, then in the MLC intimation being sent to the police, a clear note stating "informed refusal for police intimation" should be made.
5. Treatment for medico-legal cases would include both pharmacological/medical/surgical as well as psychosocial treatment, especially in cases of rape/sexual violence and child abuse
6. MO to conduct medico-legal examination and prepare medico-legal report. In cases of rape/sexual violence of a girl or woman, every possible effort should be made to find a female MO, but unavailability of lady doctor should not deny or delay the treatment and

examination. In case a female doctor is not available, a male doctor should conduct the examination in the presence of a female attendant.

Procedure:

- The privacy and dignity of the patient/ victim should be ensured
- Take the consent of the injured person on the MLR Form. If the patient is less than 12 years, take the consent of the guardian/accompanying person and get his signature/ thumb impression
- The doctor on duty examines the patient and prepares medico legal report in computerized format. In case doctor is unable to provide computerized report immediately, manual report is provided to the patient and computerized report is provided within one week.
- The police are intimated giving brief details of the case in a written format.
- The reporting time and date is also mentioned in the police information.
- MLC police information form is filled in triplicate and one copy is handed over to the police person and one copy is retained in the hospital record.
- Receiving is taken from police person who receives the information form.
- Wherever required various specimens are collected, sealed and handed over to the police authorities after sealing the same. A receipt of the items sealed and handed over to the police is taken. Patient case file is stamped as medico-legal case.

7. Chain of custody: The hospital must designate certain staff responsible for handling evidence and no one other than these persons must have access to the samples. This is done to prevent mishandling and tampering. If a fool-proof chain of custody is not maintained, the evidence can be rendered inadmissible in the court of law. A log of handing over of evidence from one 'custodian' to the other must be maintained.
8. The collected samples for evidence may be preserved in the hospital till such time that police are able to complete their paper work for dispatch to forensic lab test including DNA.

The records should be kept under lock and key, in the custody of the doctor concerned or may be kept in the record room of hospitals, where such facility is available. Preserve all the inpatient records for a period of at least 5 years and outpatient department records for 3 years. All medico legal case records are to be retained as per state guidelines or by default for lifetime. The MO should receive regular trainings on medico legal examination, evidence collection, maintaining chain of custody of samples, age estimations, recording of dying declarations, and on advanced directives etc.

Medical certificate of death (Form 4)

When confronted with 'death' of a person, the medical officer has two tasks at hand.

- To diagnose the occurrence of death and declare the person is dead
  - carried out in all situations i.e. deaths due to diseases, old age, suicide, homicide and accidents etc. Having decided that the person is dead, he proceeds to fill up "Death Report"
- To decide the cause of death and certify the same

- Medical certificate of cause of death, is done immediately after deciding the person is dead, by the same medical officer who has declared the person dead, provided the medical officer is absolutely certain of the cause of death and if it is a natural death.

How to fill the medical certificate of cause of death

Medical officer is the sole authority in deciding the cause of death. Proper documentation of cause of death by him/her is of utmost importance. In addition, the certified cause of death is subjected to legal scrutiny in medico-legal deaths.

- The first portion of the form gives information about the hospital and personal particulars of the deceased including date and time of death. (As regards the date and time of death, it's when the medical officer decides that the individual is dead). Since the medical officer cannot declare a person dead without attending and examining him, this entry will be of the time when he has first seen the individual dead, irrespective of when the death has occurred.
- The disease or circumstances of accident/violence, which started the chain, is the **underlying cause of death** and the subsequent events in the chain are called as **antecedent cause and immediate cause of death**, in that order. The entire sequence gives the complete picture of the cause of death.

Example: In a case of diabetes mellitus, dying of septicaemia due to gangrene of a limb

- Immediate Cause : Septicaemia
- Antecedent Cause : Gangrene of Limb
- Underlying Cause : Diabetes Mellitus
  - Similarly opinion about the manner of death i.e. accident / suicide / homicide is to be provided. However, the most important part of the certificate is the portion giving details of cause of death
  - Having provided all the available information to the best of his knowledge, the certifier signs the certificate giving his name, qualifications, designation and registration number. The date and time of signature will be the same as that of death mentioned in the beginning of the certificate, except in cases where the cause of death has been certified after an autopsy.
  - The bottom portion of the medical certificate of cause of death is to be filled up by the medical officer, detached and handed over to the relatives. This document enables them to get the municipal permission for cremation as well as acts as reference to obtain the extract of the death register (Death Certificate) from the registering authority.

If the death is not clearly identified to be natural category or cause not known/doubtful, the medical officer having carried out first task i.e. declaration of death, informs the police of occurrence of the death for further course of action. He will not issue a medical certificate of cause of death.

If death is natural and no foul play is suspected the medical officer can release the body to the relatives.

Figure 25: Medical certificate of cause of death

FORM NO.4

(See Rule 7)

MEDICAL CERTIFICATE OF CAUSE OF DEATH

(Hospital in patients. Not to be used for stillbirths)

To be sent to Registrar along with Form No.2 (Death Report)

Name of the Hospital .....

I hereby certify that the person whose particulars are given below died in the hospital in ward No..... on ..... at ..... A.M./P.M

NAME OF DECEASED					For use of Statistical Office
Sex Age at Death					
	If 1 year or more, age in years	If less than 1 year, age in Months	If less than one month, age in days	If less than one day, age in Hours	
1. Male 2. Female					
CAUSE OF DEATH					
I. Immediate cause State the disease, injury or complication which caused death, not the mode of dying such as heart failure, asthenia, etc.		(a) ..... due to (or as consequences of)		Interval between onset & death approx.	
Anteccedent cause Morbid conditions, if any, giving rise to the above cause, stating underlying conditions last		(b)..... due to (or as consequencesof)			
II. Other Significant conditions contributing to the aeath but not related to the diseases or conditions causing it		(c).....			

Manner of Death 1. Natural 2. Acident 3. Suicide 4. Homicide 5. Pending Investigation	How did they injury occur?
If deceased was a female, was pregnancy the death associated with? If yes, was there a delivery? 1. Yes 2. No	1. Yes 2. No

Name and Signature of the Medical Attendant certifying the Cause of Death.

Date of Verification:.....

(To be detached and handed over to the relative of the deceased)

Certified that Shri/Smt/Kum ..... S/W/D of Shri.....

R/O..... was admitted to this hospital on .....

and expired on.....

Doctor .....
(Medical Supdt.
Name of Hospital)

Section 4

Capacity Building

CHAPTER 11

Training & Facilitation

States are encouraged to develop their own training modules giving in detail knowledge and skills required for managing common emergencies within the scope of primary care.

Capacity building of primary health care team (ASHA/AF/ANM/AWW), CHO/at AB-HWCs needs to be done . Importance for effective management of common emergencies at and below AB-HWCs needs to be focussed on. The design of the training should be such that the service provider acquires knowledge, skill and attitude for early recognition, prompt stabilization (resuscitation, initial management), timely referral (if required) and safe transport. Also, AB-HWC team should be trained to provide rehabilitation support to patients, after the incident and appropriate treatment at the higher Health Care Centre. Besides these, the service providers should also know how raise awareness regarding preventive activities.

All the service providers dealing with emergencies need to follow protocols (established by the system) for communication among health care teams and also with patients and relatives. They will also require good counselling skills. So the capacity building needs to include training on soft skills like attitude, behaviour, communication and counselling. For provision of assured emergencies at community level, there is a need to create first responders who are trained in BLS/ACLS and also aware of various protocols of emergency situations and disasters. Besides frontline workers, such first responders could be PRIs, active community members, school teachers, scouts, guides and such volunteers who are available in the community. Some of the core knowledge and skills which are essentials to be acquired for the health workers at AB-HWC are as below in the table. The training should be mostly scenario based and should be followed by evaluation and certification to assure learning of the skills.

Different training methods are -Mix and match of these techniques can be used so that an effective training is organised,

- **Lecture** - it provides new information & can be done for large groups
- **Case Study** - involves critical thinking and stimulates to real world situation
- **Group Discussion** - involves both trainers & trainees, allows individual participation
- **Brain Storming**- helps in generation lots of ideas, opinions in short duration
- **Role-Play** - it's act out situation and practice real life situation

- **Structured exercise**- take part in exercise & use new skills
- **Demonstration**- correct steps for a given task is shown, improves understanding
- **Coaching/Mentoring**- correct steps are guided to improve the performance and assessment of performance is done

Facilitation skills

Skills PHC MOs as trainers need to acquire are as follows-

- **Attending behaviour**- facing the participants, maintaining eye contact, moving towards the learners and avoiding distracting behaviour
- **Observation skills**- look at person's body language, try to determine the persons feelings, take appropriate action based on the inferences
- **Listening skills**- listening to the words being expressed, distraction, paraphrase what was said to demonstrate understanding
- **Questioning skills**- asking questions(open & closed ended), phrasing and directing questions, handling answers to the questions and responding to the questions.

Communication skills – is an important part for the success of trainings . Two modes of communication include

- **Verbal communication**- use simple language,
  - Strong introduction to the topic
  - Be short and specific
  - Vary with pitch, tone & volume
  - Incorporate participants ideas,
  - Encouraging words needs to be added (I see, good, that's right)
- **Non -verbal communication**- body language, gestures , eye contact , nodding, mirroring the speakers facial expressions

These techniques are very important for the medical officers to incorporate in their trainings.

Table 4: Training of all cadres

Service Provider	Training Content
ASHA/ANM/ MPW-M	▪ To know what is a medical emergency. ▪ To learn common medical emergencies ▪ Learn to apply critical thinking in an emergency ▪ Learn problem solving and communication skills ▪ To work as a team ▪ Ensuring scene safety ▪ Primary assessment – Assess consciousness: **AVPU scale** – Look, feel: chest rise, breathing, carotid pulse – Is it cardiac arrest?

Service Provider	Training Content
	▪ Basic care life support with ABCDE including c**ardiac resuscitation**, ▪ Save a patient (adult and child) with an **obstructed airway** ▪ First aid in – Heart Attack – Diabetic collapses – Fits – Stroke (cerebrovascular accident) – Snake bite – Infections e.g. COVID 19 – Fractures, wounds, burns and life threatening bleeding ▪ Safe transport ▪ Decision making capacity to identify the right referral facility and right referral mode of transport
CHO	To know what is a medical emergency. To learn common medical emergencies Learn to apply critical thinking in an emergency Learn problem solving and communication skills To work as a team and team leader Ensuring scene Safety Primary Assessment Assess consciousness: **AVPU scale** Look, feel: chest rise, breathing, carotid pulse Is it cardiac arrest? Triaging and identifying life threatening conditions Basic care life support with ABCDE including c**ardiac resuscitation**, Usage of automated external defibrillator. Save a patient (adult and child) with an obstructed airway Recognition, stabilization and/or initial management of common medical, surgical and trauma related emergencies (e.g. acute myocardial infarction, stroke, breathlessness, burns, acute abdomen, long bone fractures) Use of splints, immobilization of neck, handling patients with spinal injuries etc. Skills set: IV line/IO line, Urinary Catheterization, Bag & mask ventilation, Documentation Decision making capacity to identify the right referral facility and right referral mode of transport Information of referring to the referral health care facility

* The content list above is minimal and not exhaustive. States are encouraged to expand the training content as necessary

Annexures

Annexure 1: Referral plan

Any emergency being received at primary care level needs to be quickly triaged and initial management including resuscitation if required should be provided. There after such cases which cannot be further managed needs to be referred to higher level of emergency care.

Following is the referral plan for such commonly presenting emergency conditions. To ensure appropriate management and timely referral to the appropriate health facility where assured care can be given to the case, the emergency conditions have been categorized into 3 types.

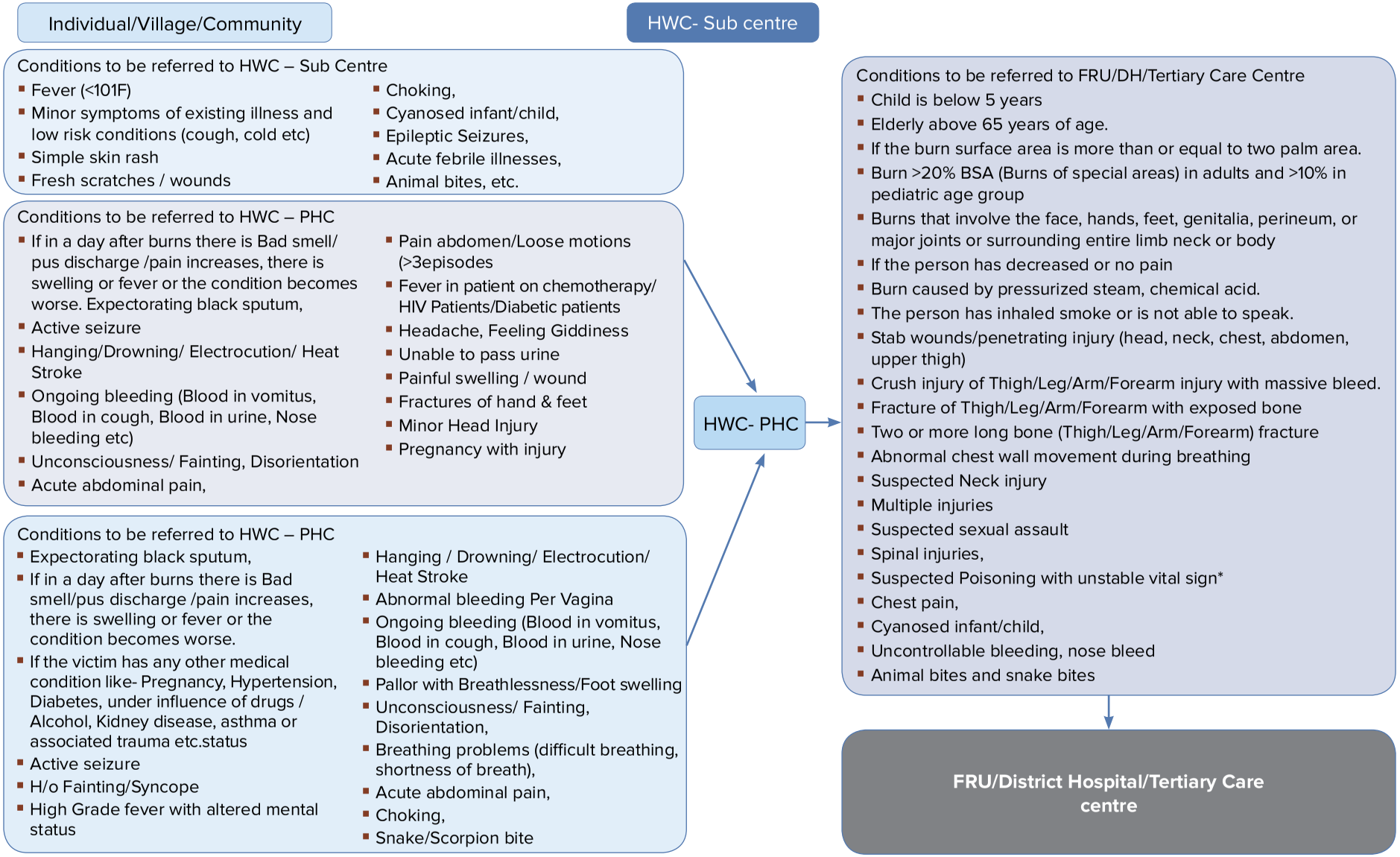
1. Conditions which can be managed at the SHC-HWC by HWC team,
2. Conditions which can be managed at the PHC-HWC by MO and
3. Conditions which should be directly referred to FRU/DH/Tertiary Care Centre

Elements of the SAMPLE history

The SAMPLE approach is a standard way of gathering the key history related to an illness or injury. Sources of information include: the ill/injured person, family members, friends, bystanders, or prior providers. SAMPLE stands for:

- S: Signs and symptoms
  - The patient/family's report of signs and symptoms is essential to assessment and management.
- A: Allergies
  - It is important to be aware of medication allergies so that treatments do not cause harm. Allergies may also suggest anaphylaxis as the cause of acute symptoms.
- M: Medications
  - Obtain a full list of medications that the person currently takes and ask about recent medication or dose changes. These may affect treatment decisions and are important to understanding the person's chronic conditions.
- P: Past medical history
  - Knowing prior medical conditions may help in understanding the current illness and may change management choices.
- L: Last oral intake
  - Record the time of last oral intake and whether solid or liquid. A full stomach increases the risk of vomiting and subsequent choking, especially with sedation or intubation that might be required for surgical procedures.
- E: Events surrounding the injury or illness
  - Knowing the circumstances around the injury or illness may be helpful in understanding the cause, progression and severity.

Sample plan of referral to be adopted by the Individual Community



Annexure 2

Triage for emergency conditions at the health and wellness centre

Triage System:

Triage means initial quick assessment followed by sorting out or categorizing patients as per their severity of illness/injury, so initiate resuscitation for saving life, if it is so required. Thereafter, right kind of care can be provided by right person at right place (Red, Yellow or Green) in right time (e.g. First hour "the Golden hour" for injured patients).

The colour coding is based on the urgency of medical attention required.

A Red tag (Including FAST Track): Those patients who present with abnormal vitals or have a problem which can be fatal (as guided by Triage form), very soon if not resuscitated/ managed.

- For all Patients tagged as red: "**DO URGENT RESUSCITATION**", undertake basic management & **"EARLIEST APPROPRIATE REFERRRAL"**, if required.

B Yellow tag: Those patients who presented with stable vital signs or has become stable in red zone, and have a problem (as guided by Triage form) which needs investigations or observation or both.

- For all Patients tagged as yellow: **"DO NOT LET THEM DETERIORATE, APPROPRIATELY RESUSCITATE" & PLAN FOR TIMELY APPROPRIATE REFERRAL.**

C. Green tag: Those patients who presented with stable vital signs and have a minor problem for example simple cough or fever, minor scratches or wounds (as guided by Triage form) which does not need any observation or investigation.

- For all Patients tagged as green: manage them appropriately and discharge. Request to follow up in out-patient department if required.

Re-triage:

- If a YELLOW tagged patient deteriorates it should be re-triaged as RED
- If a GREEN tagged patient deteriorates it should be re-triaged as YELLOW
- Please document the date & time and reason for re-triage
- Red triaged patient should be given priority over other patients (Yellow & Green) and need to be transferred to higher/appropriate facility at the earliest.

Always remember "DO NO FURTHER HARM"

Follow 3 "R":

- **R**ecognise the problem/illness/condition patient is having (by history, examination, vital signs, investigation report (if any e.g Blood sugar)
- **R**esuscitate by giving appropriate available treatment in timely manner with idea to sustain life and or limb
- **R**efer timely, in appropriate manner (proper communication, documentation, proper transportation with en-route care)

Triage form for medical emergency at the Health and Wellness Centre

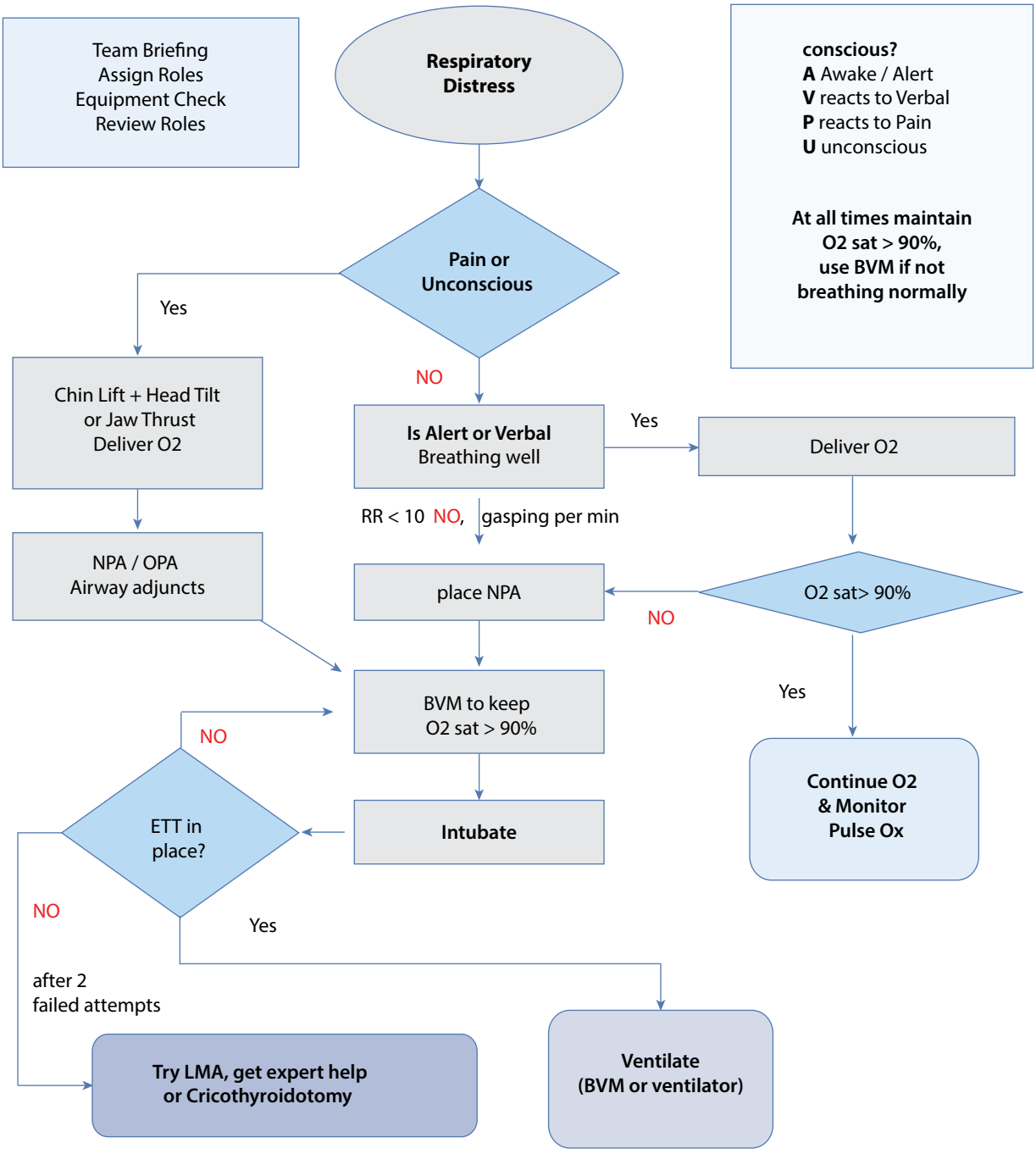
RED - Do urgent resuscitation, basic management & earliest appropriate referral		
MEDICAL	**TRAUMA**	**PHYSIOLOGICAL CHANGES**
Fast Track: 1. Chest pain 2. Altered sensorium 3. Stroke (BEFAST)		
▪ Suspected Poisoning with unstable vital sign* ▪ Active seizure ▪ H/o Fainting/Syncope ▪ High grade fever with altered mental status ▪ Hanging / near drowning/ electrocution/ heat stroke ▪ Snake/Scorpion bite ▪ Abnormal bleeding per Vagina ▪ Ongoing bleeding (blood in vomitus, blood in cough, blood in urine, nose bleeding etc) ▪ Pallor with Breathlessness/ Foot swelling ▪ Burn >20% BSA **(**Burns of special areas) in adults and >10% in pediatric age group ▪ Burns of special area: Hands, face, perineum, airway/ inhalational injury	**Injuries identified** ▪ Stab wounds/penetrating injury (head, neck, chest, abdomen, upper thigh) ▪ Thigh/Leg/Arm/Forearm injury with absent distal pulse ▪ Fracture of Thigh/Leg/Arm/Forearm with exposed bone ▪ Two or more long bone (Thigh/Leg/ Arm/Forearm) fracture ▪ Abnormal chest wall movement during breathing ▪ Feeling of crackles below skin on pressing/seat belt mark ▪ Suspected Neck injury ▪ Multiple injuries ▪ Suspected sexual assault	▪ Noisy Breathing/Stridor ***Unstable vital signs**: ▪ Respiratory Rate<10 or >24/min ▪ SpO2 <92% ▪ Pulse Rate <60 or >100/ min ▪ Systolic BP <90 or >180 mm Hg ▪ Diastolic BP >120 mm Hg ▪ Unresponsive or Responding to pain only (on AVPU, alert, voice, pain, unresponsive)
Management of FAST Track & patients with Red tags: A. Follow ABCD sequence of assessment and management B. Secure IV line, start oxygen, start monitoring vital functions C. Look for specific problem and manage D. Refer to higher centre/appropriate facility **at the earliest** (**Give highest priority FAST track patient**)		
YELLOW tag: Do not let them deteriorate, appropriately resuscitate& plan for timely appropriate referral		
MEDICAL	**TRAUMA**	**PHYSIOLOGICAL CHANGES**
▪ Post-seizure stage ▪ Pain abdomen/Loose motions (>3episodes) ▪ Fever with Headache/ chest Pain/ Jaundice ▪ Fever in patient on chemotherapy/HIV Patients/Diabetic patients ▪ Drug overdose, Poisoning with stable vital signs	**Injuries identified** ▪ Fractures of hand & feet ▪ Isolated long bone fracture ▪ Minor Head Injury ▪ Suspected spine Injury (any) ▪ Pregnancy with injury	▪ Patent airway ▪ Respiratory Rate 10 to 24/ min ▪ SpO2 >92% ▪ Systolic BP >90 ▪ Responding to verbal Commands

▪ Headache, dizziness ▪ Unable to pass stool ▪ Unable to pass urine ▪ Painful Bleeding P/R ▪ Painful swelling / wound ▪ Pallor/ Known Anemia for Transfusion		
Management of YELLOW Tagged: Follow ABCD sequence of Assessment and management Secure IV line, Start Oxygen, start Monitoring vital functions Look for specific problem and manage Refer to higher center/appropriate facility if required		
Green tagged- Manage them appropriately and discharge.		
MEDICAL	**TRAUMA**	**PHYSIOLOGICAL CHANGES**
▪ Fever (<101F) ▪ Minor symptoms of existing illness ▪ Minor symptoms and low risk conditions (cough, cold etc) ▪ Simple skin rash	**Injuries identified** ▪ Fresh scratches / wounds	▪ Patent airway ▪ Respiratory Rate 10 to 24/ min ▪ SpO2 >95 (Trauma) ▪ Systolic BP >90 Alert
Management of GREEN Triage patients: Manage Green Patients appropriately and discharge. Request to follow up in out-patient department if required		
Patient Name: Age/Sex: Date/ Time of Triage: Pulse: BP: SPO_2: Respiratory rate: AVPU: Sign: Name & Designation of Triage officer:	**Re-triage: (Please tick)** Yellow Red Green Red Red Yellow Green Yellow NO RED TO GREEN (ALWAYS RETRIAGE RED TO YELLOW AND REFER)	Date/ Time of Re triage: Sign: Name & Designation of Triage officer:

SBC=Single Breath count, SBP= Systolic Blood Pressure, DBP= Diastolic Blood Pressure,

Annexure 3

Emergency Management of Airway

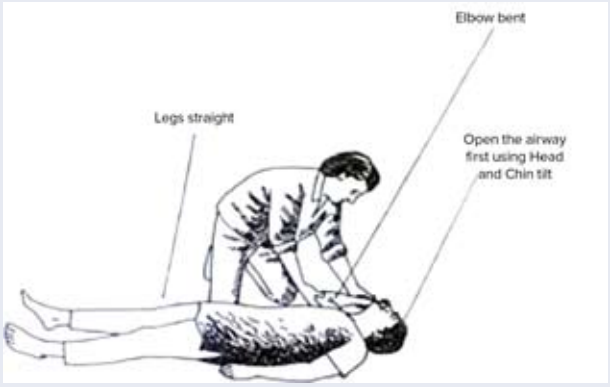


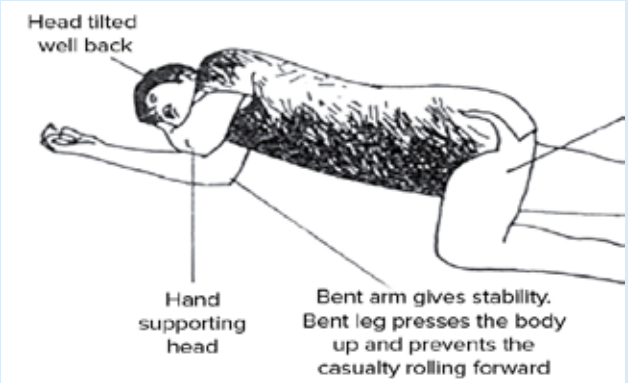
Annexure 4

- Recovery position:

The recovery position is when a person is lying down on their side.

Below is a step-by-step depiction of placing the victim in the **recovery position**.

Step 1	Kneel beside the person, open his/her airway by tilting the head and lifting the chin. Straighten his/her legs. Place the arm nearest to you at right angles to his/her body, elbow bent and move the hand palm to the upper side.	
Step 2	Bring the arm furthest from you across the chest and hold the hand, palm outwards, against the person's cheek.	
Step 3	With your other hand, grasp the thigh furthest from you and pull the knee up, keeping the foot flat on ground.	

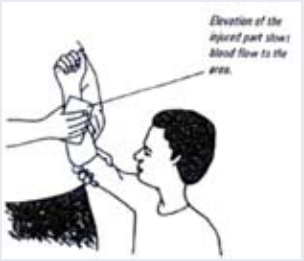
Step 4	Keeping his/her hand pressed against his/her cheek, pull at the thigh to roll the person towards and on to her side.	
Step 5	Tilt the head back to make sure the airway remains open. Adjust the hand under the cheek if necessary, so that the head stays in this tilted position.	
Step 6	Adjust the upper leg, if necessary, so that both the hip and knee are bent at the right angles.	

Infant recovery position: Cradle the infant in your arms, with the head tilted downwards to prevent the child from choking on its tongue or by inhaling vomit. Maintain this position until you get medical help.

The recovery position will help in keeping their airway clear and they will be able to breathe properly. If the victim happens to vomit, this position will ensure that he/she doesn't choke. This position prevents the tongue from falling back and blocking the throat. Since the head is slightly lower than the rest of the body, it allows liquids to drain from the mouth, reducing the risk of choking on fluids or vomit. This position should also be used in fits or seizure after the shaking movements have stopped. (**Caution:** If you suspect that the person has suffered injury to the neck or spine, do not attempt the recovery position.)	

Annexure 5

Trauma specific injuries & management

Type of Injury	Management of the Injury
Bleeding wounds  	▪ Find the source of bleeding, if the bleeding is near the area of the mouth of neck, it is possible that it could cause airway blockage. ▪ Expose the area: Open or remove the clothing over the wound so that you can clearly see it. ▪ Bleeding may be controlled by **Applying direct pressure, Applying pressure bandage, Elevation above level of heart , Pressure over the major arteries** (pressure points) (refer to annexure) ▪ You can use a sterile dressing or a clean piece of cloth for the wounds. ▪ You can add more gauze if blood soaks through, and continue applying pressure. ▪ Do not remove the dressing even when it gets soaked with blood. Instead, add more material and continue pressure. (since this can interfere with the clotting mechanism of the blood vessels) ▪ Do not move limb if you suspect any fractures. Otherwise, elevate the wound higher than the level of the heart. ▪ As soon as bleeding is controlled, apply dressing and observe for shock. Secure IV access and IV fluids. Look & identify life-threatening bleeding
Minor Wounds	If a patient with **a minor** cut or wound reports to you, proceed with the following steps: Ensure the safety of the victim as well as yourself: ▪ Wash your hands well before touching the injured area of the victim. ▪ If the wound is dirty wash it thoroughly with soap and water, then apply firm pressure for around 5 minutes. This will stop most bleeding. ▪ Elevate the wound, above the level of the heart if possible. When bleeding has reduced clean the area with the antiseptic lotion and keep it dry. ▪ Use a sterile dressing to avoid touching the wound directly ▪ Administer a dose of tetanus toxoid injection ▪ Give antibiotic such as amoxicillin 500mg 8 hourly for 5 days if needed. ▪ A deep gaped or jagged wound with exposed fat or muscle will need to be sutured. ▪ Adhesive strips or butterfly tape may hold a minor cut together, but if you cannot easily close the wound, refer as soon as possible. Proper closure within a few hours minimizes scarring and reduces the risk of infection. Refer in case you are not able to manage at the earliest. ▪ For extensive injuries such as lacerations or puncture wounds (knife, bullet, etc.), stabilize the patient and refer.

Type of Injury	Management of the Injury
Head Trauma	*Remember that whenever there is head trauma, you would have to provide prompt stabilization and refer the patient to higher facility where CT and neurological facilities are present (refer annexure to understand the referral pattern)* ▪ A head trauma may cause a temporary loss or altered level of consciousness which occurs after an impact to the skull area (you will notice this when you assess the victim for AVPU) ▪ Some other symptoms that could be present are blurred vision, nausea, vomiting, bleeding from ear nose or throat and confusion ▪ You have to always assume that a person has a spinal injury unless proved otherwise.
Spinal Injury	*You should stabilize the victim by immobilizing and facilitate referral.*
Chest and Abdomen injury	▪ There is a possibility that the victim could have difficulty breathing with injuries to the chest. You should assist the victim's breathing in such cases. ▪ Secure intravenous access and monitor respiratory rate and sPO2 levels continuously. ▪ Monitor and assess the victim over 3-4 hour time period; as they would present to center in stable condition and deteriorate after some time. Victims with rib fracture may slowly develop tension pneumothorax and needs monitoring for the same. (Blunt trauma to chest or abdomen may present without any external injury over skin or as small contusion, but may have injured deep structures such as ribs, pleura in chest and solid organs as liver, kidneys, spleen, etc. in abdomen) ▪ Victims with rib fracture may slowly develop tension pneumothorax and needs monitoring for the same.

Annexure 6

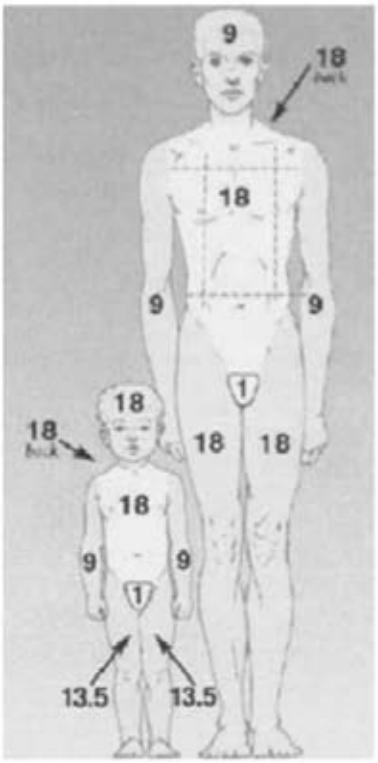
Estimating the burn surface area

The extent of burn injury is best described using the percentage of the **total body surface area (%TBSA)** that is affected by the burn. The measurement of burn surface area is important during the initial management of cases with burns for estimating fluid requirements and determining need for transfer to a burns service. The burn surface can be estimated by either:

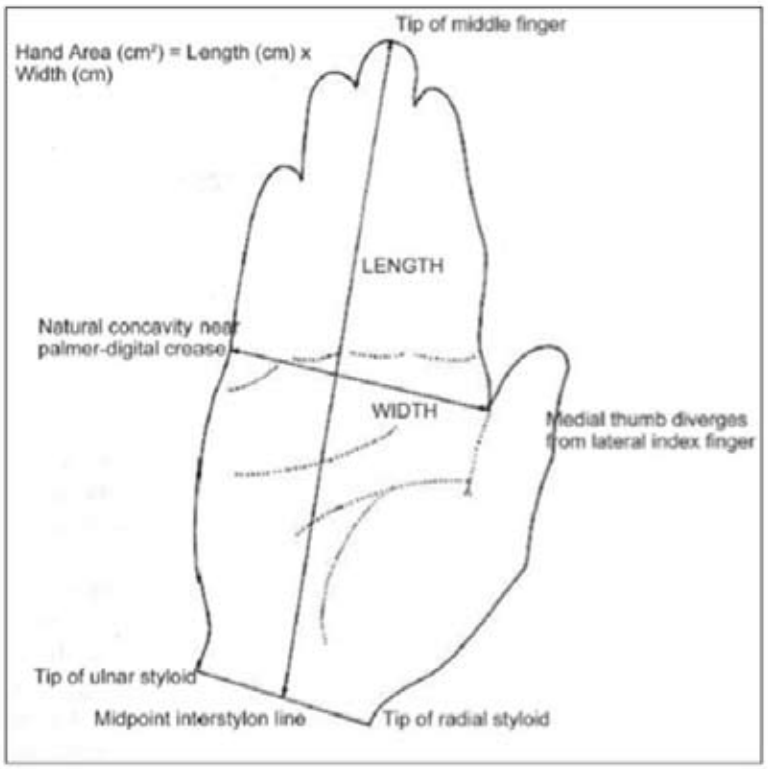
i. Rule of palm

The "**rule of palm**" is a way to estimate the size of a **burn**. The **palm** of the person who is burned (not fingers or wrist area) is about 1% of the body. Use the person's **palm** to measure the body surface area burned.

ii. Percentage of burnt affected body surface area



Note the larger head size and smaller leg size for children compared to adults



Annexure 7

Assessing conscious level of the patient:

At Community and HWC level: AVPU scale is used

A - Alert

V- Responds to **V**erbal stimuli

P- Responds to **P**ainful stimuli

U- **U**nresponsive (unconscious)

If patient is at P or U then consider protecting airway and also intubation as needed

Medical Officers can also utilize Glasgow coma scale (GCS).

Glasgow Coma Scale

The Glasgow Coma Scale (GCS) is a neurological scale, which aims to give a reliable and objective way of recording the conscious state of a person for initial as well as subsequent assessment. A patient is assessed against the criteria of the scale, and the resulting points give a patient score between 3 (indicating deep unconsciousness) and 15 (indicating a fully awake patient).

GLASGOW COMA SCALE	
Eye opening (E)	
Spontaneous	4
To loud voice	3
To pain	2
Nil	1
Best motor response (M)	
Obeys	6
Localizes	5
Withdraws (flexion)	4
Abnormal flexion posturing	3
Extension posturing	2
Nil	1
Verbal response(V)	
Oriented	5
Confused, disoriented	4
Inappropriate words	3
Incomprehensible sounds	2
Nil	1
Coma score= E + M + V	
Minimum	3
Maximum	15

Reference: Longo Dan L., Fauci AS, Kasper Dennis L., Hause Stephen L., Jameson Larry L, Loscalzo Joseph et al Harrison's Manual of Medicine 18th ed. New York: McGraw Hill; 2011

Annexure 8

Short ABCDE table*

	Assess	Act / Intervene / treat
Airway	Patency Protection	Assess & maintain patency by-Simple measures- Position of comfort, head tilt-chin lift, jaw thrust (if cervical injury), suction, airway adjuncts (oropharyngeal / nasopharyngeal airway)
Breathing	Oxygenation – Spo2 Ventilation	Assess Respiratory rate, effort, chest expansion & air movement, lung & airway sounds & SpO2 Assist ventilation if required Commence CPR if patient is unconscious and absence of normal breathing Apply O2 to maintain SpO2 > 95%
Circulation	Perfusion to tissues CRT, Pulse, BP	Assess Skin temperature, color Heart Rate , rhythm Peripheral & central pulses Capillary refill BP Urine Output Monitor vital signs frequently by multi para monitor Action IV cannulation, If SBP < 5th percentile for age in children or < 90 mm of Hg in adults- IV/IO RL or NS 20ml/kg bolus in children or 500ml bolus in adults
Disability	AVPU/ GCS, Pupils Blood glucose	Assess & monitor AVPU/ GCS + pupils If GCS< 9 &/or rapidly deteriorating- ET intubation by emergency physician for airway protection Assess & monitor Blood Glucose level by finger prick test If BGL< 40 mg/dl or unconscious/ confused- Administer IV 50% Glucose 50 ml(if NA- 25% D 100 ml IV) in adults and IV / IO 0.5-1 g/kg (2-4 ml/kg of 25%D or 5-10 ml/kg of 10%D) in children
Exposure	Expose patient for examination	After examination and initial treatment, cover the patient back to prevent hypothermia

**The above table needs to be customized for first responders and community volunteers removing such resources and facilities which are available only at a health care facility. This should be part of training guideline.*

Annexure 9

Types of poisoning and their first aid treatment

The various common types of poisoning and their first aid treatment are mentioned below

Types	Signs and symptoms	Treatment
Acid poisoning ▪ It can be suicidal or homicidal or accidental. ▪ The various common acids used are nitric, sulphuric, hydrochloric, carbolic, oxalic and acetic acid commonly seen in households as phenyl, floor cleaners etc.	▪ Burns on or around the lips. ▪ Burning in the mouth, throat and stomach often followed by heavy vomiting. ▪ Absence of ulcers or injuries in mouth or throat does not rule out corrosive poisoning. ▪ Diarrhoea and intense thirst. ▪ In severe cases patient may be unconscious, signs and symptoms of asphyxia, shock or seizure	**1. General** Same as in general management of poisoning **2. Specific** ▪ Do not induce vomiting. ▪ Do not put Nasogastric tube or try to remove contents from stomach, as it may further cause more corrosive injury. ▪ Shift the casualty immediately to hospital
Alkali poisoning ▪ It can be also suicidal or accidental. ▪ Alkalis commonly used are ammonia, potassium hydroxide and sodium hydroxide, bleachers, detergents washing soda.	▪ Features are mostly similar to acid poisoning. ▪ Membrane of the mouth may be white and swollen. ▪ There may be soapy appearance in the mouth. ▪ Absence of ulcers or injuries in mouth or throat does not rules out corrosive poisoning. ▪ Abdominal pain ▪ Vomiting may contain blood and mucous.	**1. General** **2. Specific:** ▪ Do not induce vomiting. ▪ Do not put Nasogastric tube or try to remove contents from stomach, as it may further cause more corrosive injury. ▪ Shift the patient immediately to hospital.
Common indian plant poisoning **a. Castor oil plant** ▪ Poisoning is common among children.	▪ Pain in throat and abdomen, ▪ Nausea ▪ Vomiting ▪ Diarrhoea	▪ Give plenty of water ▪ NG tube placement and emptying of stomach contents with saline stomach wash would be useful, if patient presents within 3-4 hours after ingestion. ▪ If patient is hemodynamically stable and fully conscious, then give only symptomatic treatment and observe at sub centre level. ▪ Shift to hospital
b. Dhatura (safed dhatura and kala dhatura) ▪ Dried leaves and dried seeds are used as poisoning 	▪ Bitter taste, dry mouth and throat ▪ Burning pain in the stomach ▪ Difficulty in swallowing and talking ▪ Giddiness, ataxia, intoxication ▪ Dry hot skin, rise in temperature ▪ Delirium tries to run away from bed, picks up bed clothes, tries to pull imaginary threads from the tips at his fingers and develops dreadful hallucinations of sight and hearing, convulsions & coma.	

Types	Signs and symptoms	Treatment
c. Aconite: (mitha zahar, dudhia vish) 	▪ Severe burning and tingling of lips, mouth, tongue and throat ▪ Dysphagia ▪ Salivation ▪ Vomiting ▪ Abdominal colic ▪ Vertigo ▪ Muscle spasm and twitching ▪ Impairment of vision	
Mushroom 	▪ Burning of throat and stomach. ▪ Pain in abdomen ▪ Vomiting and diarrhoea ▪ Urine may contain blood ▪ Cyanosis, rapid pulse, convulsions ▪ Headache, giddiness, cra mps, visual disturbances ▪ Coma	

Annexure 10

Referral Slip

Standard referral form with all the required standard information. Along with minimum requirements for information that should be provided with all referral requests, additional information may be provided. This additional information may be based on agreement between the consulting and referred doctor or may be provided based on the need at the time of referral.

Name of the Referring Facility: .....

Address: .....

Telephone: .....

Name of Patient: ..... Age:.....

Next of kin or person responsible in cases involving minors – (Name, Address and Telephone Number): .....

Address: .....

Unique identification No. :.....

Referred on ...../...../..... (dd/mm/yr) at ..... (time) to ....
..... (Name of the facility) for management.

Provisional diagnosis/Key symptoms:

Admitted in the referring facility on ...../...../..... (dd/mm/yr) at .....
..... (time) with **chief complaints** of:

.....

.....

.....

Summary of management (procedures, critical interventions, drugs given for management):

.....

.....

.....

.....

Investigations:

Blood Group:

Hb:

Urine R/E:

Blood Glucose:

Condition at time of referral:

Consciousness:

Temp:

Pulse: BP:

Others (Specify):.....

Reason for referral:

.....

.....

.....

Information on referral provided to the institution referred to: Yes / No

If yes, then name of the person spoken to: .....

Mode of transport for referral: Govt/Outsourced/EMRI/Personal/Others/None.

Signature of referring physician/MO

(Name/Designation/Stamp)

Note:

- A copy of the referral form to be kept at the referring facility.
- Wherever possible, referrals must have prior communication to the receiving facility. This will be to ensure availability of the services, communication about the urgency and other information requirement.
- Information should also be conveyed to patients/ patients' family members (e.g., why they are being referred, information about the specialist appointment, etc)

Counter referral slip (level of facility)

1. The patient ..... (name) referred to us, was diagnosed as .....
2. A copy of discharge slip giving treatment, investigation and follow-up details has been given to the patients.
3. Following 'follow-up' advice needs to be carried out:
    a. Periodic check-up _____ (define weekly/fortnightly/monthly) on following (e.g. BP, Blood sugar etc.) is advised:
    b The patient can be issued the following drugs for a period of 15/30/45/60 days and monitor his/her _____ condition/status every 15/30/45/60 days before issue of drugs.
4. Any other advice

Signature & contact no. of Doctor referring the patient for follow-up

Annexure 11: Essential Medicine List at PHC-HWC

S.No.	Medicine Name	Remarks	Caution (If any)
	Anesthetics Agent		
1	Oxygen gas for inhalation		
2	Lignocaine Injection 2% Lignocaine Topical form 2%		
3	Lignocaine Injection 2% + Adrenaline Injection 1:200000 (5 mcg/ml)		
4	Atropine Injection 0.6 mg/ml Atropine Injection 1 mg/ml		
5	Midazolam Injection 1 mg/ml		
6	Ketamine Injection10 mg/ml	**Schedule X** (prescription shall be in duplicate and one copy of which shall be retained by the licensee for a period of 2 Years).	Should be stored in lock and key
7	Injection Thiopentone 500mg		
8	Bupivacaine Injection (Sensorcain) 0.5mg		
9	Neostigmine Injection 0.5 mg/ml		
10	Vecuronium Powder for Injection 4 mg		
11	Pentazocine Injection 30mg/ml	**Schedule H1** (Separate H1 Register shall be maintained- Name of drug, patient, prescriber and dispensed quantity shall be recorded).	
	Analgesics, antipyretics, non-steroidal anti-inflammatory medicines, medicines used to treat gout and disease modifying agents used in rheumatoid disorders		
12	Asprin (Acetylsalicylic acid) Tablet 150 mg Asprin (Acetylsalicylic acid) Tablet 75 mg		Not to be used in suspected dengue patients and other clinical conditions without prescription
13	Diclofenac Tablet 50 mg Diclofenac Injection 25 mg/ml		
14	Ibuprofen Tablet 200 mg		Not to be used in suspected dengue patients and other clinical conditions without prescription
15	Ibuprofen Oral Liquid 100mg/5ml, 50ml bottle	Recommended by RBSK Program Division	Not to be used in suspected dengue patients and other clinical conditions without prescription

S.No.	Medicine Name	Remarks	Caution (If any)
16	Paracetamol Tablet 500 mg, Paracetamol Tablet 100 mg Paracetamol Syrup 125 mg/5ml Paracetamol Suppository 100 mg		
Anti-allergics and medicines used in anaphylaxis			
17	Levocetirizine Tablet 5mg Levocetrizine Oral liquid 2.5 mg/5 ml (Paediatric Use)		
18	Chlorpheniramine Tablet 4 mg		
19	Dexamethasone Tablet 0.5 mg Dexamethasone Injection 4 mg/ml		
20	Hydrocortisone Succinate Injection 100 mg		
21	Pheniramine Injection 22.75 mg/ml		
22	Prednisolone Tablet 5 mg Prednisolone Oral liquid 5 mg/5 ml		
23	Hydroxyzine oral syrup		
24	Betamethasone Injection 4mg per 1ml in 1ml ampoule		
Anti-dotes and other substances used in poisoning			
25	Activated charcoal		
26	Calcium gluconate Injection 100 mg/ml		
27	Snake venom antiserum Injection		
Anti-convulsants/Anti-epileptics			
28	Magnesium Sulfate Injection (50% solution), 2ml ampoule		
29	Diazepam Oral liquid 2 mg/5 ml Diazepam Injection 5 mg/ml Diazepam Tablet 5mg	Schedule H1 (Separate H1 Register shall be maintained- Name of drug, patient, prescriber and dispensed quantity shall be recorded).	
30	Phenobarbitone Tablet 30 mg Phenobarbitone Oral liquid 20 mg/5 ml		
31	Phenytoin Tablet 50 mg Phenytoin Tablet 300 mg Phenytoin ER Tablet 300 mg Phenytoin Injection 25mg/ml		
32	Sodium valproate Tablet 250 mg Sodium valproate Tablet 500 mg Sodium valproate Syrup each 5ml contains 200mg		
33	Midazolam Nasal Spray	Schedule H1 (Separate H1 Register shall be maintained- Name of drug, patient, prescriber and dispensed quantity shall be recorded).	For emergency purpose

S.No.	Medicine Name	Remarks	Caution (If any)
34	Carbamazepine Tablet 100 mg Carbamazepine Tablet 200 mg		
35	Diphenylhydantoin Tablet 100 mg		
	Intestinal Anthelmintics		
36	Albendazole Tablet 400 mg Albendazole Oral liquid 200 mg/5 ml		
	Anti-filarial		
37	Diethylcarbamazine Tablet 100 mg Diethylcarbamazine Oral liquid 120 mg/5 ml		
	Anti-bacterial		
38	Amoxicillin Capsule 250 mg Amoxicillin Capsule 500 mg Amoxicillin Oral liquid 250 mg/5ml		
39	Amoxicillin 500 mg + Clavulanic acid 125 mg Tablet		
40	Azithromycin Tablet 250 mg Azithromycin Tablet 500 mg Azithromycin Oral liquid 200 mg/5ml		
41	Ciprofloxacin Tablet 250 mg Ciprofloxacin Tablet 500 mg Ciprofloxacin Oral liquid 250 mg/5ml		
42	Cefixime Tablet 200 mg Cefixime Oral liquid 50 mg/5 ml Cefixime Oral liquid 100 mg/5 ml	**Schedule H1** (Separate H1 Register shall be maintained- Name of drug, patient, prescriber and dispensed quantity shall be recorded).	
43	Tab Co-trimoxazole [Sulphamethoxazol 80 mg +Trimethoprim 400 mg] Tab. 20mg trimethoprim + 100mg sulphamethoxazole Co-trimoxazole Oral Liquid [Sulphamethoxazol e 200 mg + Trimethoprim 40 mg/5ml]		
44	Gentamicin Injection 10 mg/ml Gentamicin Injection 80 mg/ml		
45	Doxycycline Capsule 100 mg Doxycycline Dry Syrup 50mg/5 ml		
46	Norfloxacin tab/oral liquid		
47	Penicillin V Tablet 250mg		
48	Benzyl penicillin Powder for Injection 10 lac units		
49	Cefazolin Injection 500 mg Cefazolin Injection 1gm		
50	Cefotaxime Injection 250 Cefotaxime Injection 500 mg Cefotaxime Injection 1 g	**Schedule H1** (Separate H1 Register shall be maintained- Name of drug, patient, prescriber and dispensed quantity shall be recorded).	

S.No.	Medicine Name	Remarks	Caution (If any)
51	Ceftriaxone Injection 250 Ceftriaxone Injection 500 mg Ceftriaxone Injection 1 g	**Schedule H1** (Separate H1 Register shall be maintained- Name of drug, patient, prescriber and dispensed quantity shall be recorded).	
Anti-leprosy medicines			
52	As per current program guidelines (Adults and Pediatrics)		
Anti-tuberculosis medicines			
53	As per current program guidelines (Adults and Pediatrics)		
Anti-fungal medicines			
54	Clotrimazole Pessary 100 mg Clotrimazole Vaginal Tablet Clotrimazole Drops 1% Clotrimazole Cream 1%		
55	Fluconazole Tablet 150 mg		
56	Miconazole ointment Miconazole Tablet		
Anti-protozoal medicines			
57	Metronidazole Tablet 200 mg Metronidazole Tablet 400 mg Metronidazole Oral liquid 200 mg/5 ml		
Anti-malarial medicines			
58	As per program guidelines (Adults and Pediatrics)		
Medicines used in Palliative care			
59	Amitriptyline Tablet 10 mg Amitriptyline Tablet 25 mg		
60	Lactulose Oral liquid 10 g/15 ml		
61	Tramadol capsule 50 mg	**Schedule H1** (Separate H1 Register shall be maintained- Name of drug, patient, prescriber and dispensed quantity shall be recorded).	Should be stored in double lock and key
62	Povidone Iodine Lotion and Ointment		
63	Ethamsylate Tablet		
64	Deriphylline Tablet sustained release		
Anti-parkinsonism medicines			
65	Levodopa (A) + Carbidopa (B) 100 mg (A) + 10 mg (B)		
Anti-anemia medicines			

S.No.	Medicine Name	Remarks	Caution (If any)
66	Ferrous salt 100 mg + Folic acid 500 mcg Tablet Ferrous salt 60mg + Folic acid 500mcg Tablet Ferrous salt 45 mg + Folic acid 100 mcg Tablet Ferrous salt 20 mg + Folic acid 100 mcg Tablet		
67	Folic acid Tablet 5 mg Folic acid Tablet 400 mcg		
68	IFA Syrup		
69	Phytomenadione Injection 10 mg/ml		
Cardiovascular medicines			
70	Clopidogrel Tablet 75 mg		
71	Diltiazem Tablet 60 mg Diltiazem Tablet 90 mg SR		
72	Isosorbide-5- mononitrate Tablet 5 mg		
73	Metoprolol Tablet 25 mg Metoprolol SR Tablet 25 mg Metoprolol SR Tablet 50 mg		
74	Isosorbide dinitrate Tablet 5mg (sublingual)		
75	Dopamine Injection 40 mg/ml		
Anti-hypertensive medicines			
76	Amlodipine Tablet 2.5 mg Amlodipine Tablet 5 mg		
77	Enalapril Tablet 5 mg		
78	Hydrochlorothiazide Tablet 12.5 mg Hydrochlorothiazide Tablet 25 mg		
79	Labetalol Tablet 100 mg Labetalol Injection 5mg/ml		
80	Methyldopa Tablet 250 mg		
81	Telmisartan Tablet 40 mg		
Medicines used in shock and heart failure			
82	Adrenaline Injection 1 mg/ml		
Hypolipidemic medicines			
83	Atorvastatin Tablet 10 mg		
Dermatological medicines (Topical)			
84	Framycetin Cream 0.5%		
85	Silver sulphadiazine Cream 1%		
86	Calamine Lotion		
87	Betamethasone Cream 0.1%		
88	Benzoyl peroxide Gel 2.5%		
89	Benzyl Benzoate ointment/lotion		
90	Mupirocin Ointment		
91	Potassium Permanganate 0.1%		
92	Zinc Oxide cream 10%		
93	Fusidic Acid Cream 5mg/10gm preparation 2% or 20mg per gram Fusidic Acid Cream 2%: 5mg/10mg Preparation		
94	Pemethrin Cream 5%		
Disinfectants and antiseptics			
95	Cetrimide Solution 20% (concentrate for dilution)		

S.No.	Medicine Name	Remarks	Caution (If any)
96	Chlorhexidine Solution 5% (Concentrate for dilution)		
97	Ethyl alcohol (Denatured) Solution 70%		
98	Hydrogen peroxide Solution 6%		
99	Methylrosanilinium chloride (Gentian Violet)		
100	Bleaching powder Containing not less than 30% w/w of available chlorine (as per I.P)		
101	Gama Benzene Hexachloride		
	Diuretics		
102	Furosemide Tablet 40 mg Furosemide Injection 10 mg/ ml		
103	Mannitol Injection 10% Mannitol Injection 20%		
	Ear, nose and throat medicines		
104	Xylometazoline Nasal drops 0.05 % Xylometazoline Nasal drops 0.1 %		
105	Wax solvant ear drops: benzocaine, chlorbutol, paradicholorobenzene, turpentaine oil		
106	Combo ear drop-Chloramphenicol 5% w/v +clotrimazole 1% +Lignocaine hydrochloride 2%		
107	Normal saline nasal drops (.05%w/v)		
108	Boro-Spirit ear drop		
109	Ofloxacin Tablet 200 mg Ofloxacin Tablet 400 mg		
	Gastrointestinal medicines		
110	Omeprazole Capsule 20 mg		
111	Ranitidine Injection		
112	Metoclopramide Tablet 10 mg Metoclopramide Oral liquid 5 mg/5ml Metoclopramide Injection 5 mg/ml		
113	Ondansetron Tablet 4 mg Ondansetron Oral liquid 2 mg/5 ml Ondansetron Injection 2 mg/ml		
114	Domperidone Tablet 10 mg Domperidone Syrup		
115	Hyoscinebutylbromide Tablet 10 mg Hyoscinebutylbromide Injection 20mg/ml		
116	Ispaghula Granules/ Husk/ Powder	**Herbal medicine**	
117	Drotavarin Tablet 500 mg		
118	Bisacodyl Tablet 5 mg Bisacodyl Suppository 5 mg		
119	Oral rehydration salts (ORS)		
120	Zinc sulphate Dispersible Tablet 20 mg Zinc sulphate syrup		
121	Dicyclomine Tablet 10 mg		
122	Senna Powder	**Herbal medicine**	
123	Dioctyl sulfosuccinate sodium		
124	Magnesium Hydroxide liquid		
125	Sucralfate Tablet 10 mg Sucralfate Oral liquid 1 mg/ml		

S.No.	Medicine Name	Remarks	Caution (If any)
126	Hyoscine butylbromide Tablet 500 mg		
	Medicines used in diabetes mellitus		
127	Glimepiride Tablet 2 mg		
128	Metformin Tablet 500 mg Metformin SR Tablet 500 mg		
129	Insulin (Soluble) Injection 40 IU/ml		
130	Premix Insulin 30:70 Injection (Regular:NPH) Injection 40 IU/ml		
131	Glibenclamide Tablet 2.5 mg Glibenclamide Tablet 5 mg		
132	Glucose Packet 75 mg for OGTT Test		
	Thyroid and Anti-thyroid medicines		
133	Levothyroxine Tablet 25 mcg Levothyroxine Tablet 50 mcg Levothyroxine Tablet 100 mcg		
	Vaccines		
134	As per current National programme guidelines		
135	Rabies vaccine		
	Oxytocic & Abortificents Medicines		
136	Misoprostol Tablet 200 mcg		
137	Oxytocin Injection 5 IU/ml		Only where deliveries are conducted
138	Nifedipine Tablet 10 mg		
139	Methylergometrine Injection 0.2 mg/ml		
	Psychotherapeutic Drugs		
140	Alprazolam Tablet 0.25mg	**Schedule H1** (Separate H1 Register shall be maintained- Name of drug, patient, prescriber and dispensed quantity shall be recorded).	
141	Clonazepam Tablet 0.5mg		
142	Olanzapine Tablet 5 mg		
	Medicines acting on the Respiratory tract		
143	Budesonide Inhalation (MDI/DPI) 100 mcg/dose Budesonide Respirator solution for use in nebulizer 0.5 mg/ml		
144	Salbutamol Tablet 2 mg Salbutamol Oral liquid 2 mg/5 ml Salbutamol Respirator solution for use in nebulizer 5mg/ml		
145	Montelukast Syrup Montelukast Tablet		
146	Syrup Dextromethorphan		
147	Syrup Bromhexine Hydrochloride		

S.No.	Medicine Name	Remarks	Caution (If any)
148	Syrup Pheniramine Maleate		
149	Ipratropium Inhalation (MDI/DPI) 20 mcg/dose Ipratropium Respirator solution for use in nebulizer 250 mcg/ml.		
Solutions correcting water, electrolyte disturbances and acid-base disturbances			
150	Ringer lactate Injection		
151	Sodium chloride injection 0.9%		
152	Pediatric solution like Isolyte P, N/2 & N/5		
153	Potassium chloride Oral liquid 500 mg/5 ml		
155	Dextrose 5% Dextrose 25%		
Vitamins and minerals			
156	Ascorbic acid (Vitamin C) Tablet 100 mg		
157	Calcium carbonate Tablet 500 mg		
158	Cholecalciferol Tablet 60000 IU		
159	Pyridoxine Tablet 25 mg Pyridoxine Tablet 50 mg Pyridoxine tablet 100 mg		
160	Vitamin A Oral liquid 100000 IU/ml		
161	B Complex Tablet B Complex Injection		
Ophthalmological Medicines			
162	Lignocaine Eye drop 4%		
163	Tropicamide Drops 1%		
164	Ciprofloxacin Drops 0.3 %		
165	Sodium cromoglycate 2% eye drop		
166	Methylcellulose Eye drops		
Contraceptives			
167	Ethinylestradiol (A) + Levonorgestrel Tablet 0.03 mg (A) + 0.15 mg (B)		
168	Copper bearing intra-uterine device IUCD 380A & 375		
169	Male Condom		
170	Non- hormonal Ormeloxifene (30 mg Tablet)		
171	Emergency Contraceptive Pill Levonorgestrel 1.5 mg		
172	Medroxprogesterone Acetate Injection 150mg		
168	Copper bearing intra-uterine device IUCD 380A & 375		
169	Male Condom		
170	Non- hormonal Ormeloxifene (30 mg Tablet)		
171	Emergency Contraceptive Pill Levonorgestrel 1.5 mg		
172	Medroxprogesterone Acetate Injection 150mg		

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Abbreviation

AB	Ayushman Bharat
ABC	Airway Breathing Circulation
ABCDE	Airway, Breathing, Circulation, Disability, Exposure
ACLS	Advanced Cardiovascular Life Support
ACS	Acute Coronary Syndrome
AED	Automated External Defibrillator
AF	ASHA Facilitator
ALS	Advanced Life support
AMBU	Artificial Manual Breathing Unit
AMIs	Acute myocardial infarctions
ANM	Auxiliary Nurse Midwife
ASHA	Accredited Social Health Activists
ASV	Anti-Snake Venom
AVPU	Alert, Voice, Pain, Unresponsive
AWW	Anganwadi Worker
BGL	Blood Glucose Levels
BLS	Basic Life Support
BP	Blood Pressure
BSA	Burns of Special Areas
BVM	Bag Mask Ventillation
CAB	Circulation, airway, breathing
CCF	Congestive Cardiac Failure

CHC	Community Health Centre
CHO	Community Health Officers
COPD	Chronic Obstructive Pulmonary Disease
CHW	Community Health workers
CMO	Chief Medical Officer
COVID-19	Corona Virus Disease-19
CPR	Cardio-Pulmonary Resuscitation
CRT	Capillary Refill Time
CVAs	Cerebrovascular accidents
DALYs	Disability-adjusted life-years
DBP	Diastolic Blood Pressure
DH	District Hospital
DNA	Deoxyribonucleic Acid
DPR	Detailed Project Report
ECG	Electrocardiogram
EMT	Emergency Medical Technician
FAST	Focused Assessment with Sonography in Trauma
FGD	Focussed Group Discussion
FLWs	Front line workers
FRU	First Referral Unit
GBD	Global Burden of Disease
GCS	Glasgow Coma Scale
GDP	Gross Domestic Product
GoI	Government of India
GRS	Grievance Readressal System
HR	Human Resource
HWC	Health & Wellness Centre
IDSP	Integrated Disease Surveillance Programme
IEC	Information Education Communication
ISBAR	Identity, Situation, Background, Assessment, Recommendation
IV	Intravenous
IV/IO	Intra-venous/ Intra-osseous line
JAS	Jan Arogya Samithi
LMA	Laryngeal Mask airway
MAS	Mahila Arogya Samithi
MOANS	Mask Seal, Obesity, Age, No Teeth, Stiff

MD	NHM Mission Director- National Health Mission
MLC	Medico legal cases
MLP	Mid-Level Providers
MLR	Medico legal report
MO	Medical Officer
MoHFW	Ministry of Health & Family Welfare
MPW	Multi-Purpose Workers
MPW-M	Multipurpose Worker-Male
NCC	National Cadet Corps
NHSRC	National Health Systems Resource Centre
NREGA	National Rural Employment Guarantee Act
NRP	Neonatal Resuscitation Protocol
NS	Normal Saline
OPD	Out Patient Department
ORS	Oral Rehydration Therapy
PAT	Paediatric Assessment Triangle
PHC	Primary Health Centre
PHC-HWC	Health & Wellness Centre- Primary Health Centre
PIP	Program Implementation Plan
PPE	Personal Protective Equipment
PPH	Post- Partum Haemorrhage
PR	Per-Rectally
PRI	Panchayati Raj Institutions
RDT	Rapid Diagnostic Test
RICER	Rest, Ice/Immobilisation, Compression, Elevation , Referral
RIGHT	Reassure, Immobilise, Get to Hospital, Tell
RR	Respiratory Rate
RTI	Road traffic injuries
RL	Ringers Lactate
SAMPLE	Signs & Symptoms, Allergies, Medications, Past Medical History, Last Oral Intake, Events surrounding the injury or illness
SBCC	Social Behaviour Change Communication
SBP	Systolic Blood Pressure
SC	Sub Centre
SHC	Sub- Health Centre
SHC-HWC	Sub Health Centre - Health and Wellness centre
SN	Staff Nurse

SOP	Standard Operating Procedure
SOPs	Standard operating protocols
SpO2	Partial Pressure of Oxygen
TABC	Temperature, Airway, Breathing, Circulation
TBSA	Total Body Surface Area
TOR	Terms of Reference
ULB	Urban Local Bodies
UHC	Universal Health Coverage
UPHC	Urban Primary Health Centre
VHSND	Village Health Sanitation & Nutrition Days
VHSNC	Village Health Sanitation and Nutrition Committee

Namaste!

You are a valuable member of the Ayushman Bharat – Health and Wellness Centre (AB-HWC) team committed to delivering quality comprehensive primary healthcare services to the people of the country.

To reach out to community members about the services at AB-HWCs, do connect to the following social media handles:

- https://instagram.com/ayushmanhwcs
- https://twitter.com/AyushmanHWCs
- https://www.facebook.com/AyushmanHWCs
- https://www.youtube.com/c/NHSRC_MoHFW

National Health Systems Resource Centre

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