सत्यमेव जयते

NATIONAL HEALTH MISSION
राष्ट्रीय स्वास्थ्य मिशन

Operational and Technical Guidelines on Emergency Care Services at District Hospital

Ministry of Health & Family Welfare
Government of India

Operational and Technical Guidelines on

EMERGENCY CARE SERVICES
AT DISTRICT HOSPITAL

Ministry of Health & Family Welfare
Government of India

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PREFACE

Universal access to equitable, affordable, acceptable and quality care that is accountable and responsive to the needs of the people constitutes Universal health coverage and Ministry of Health and Family Welfare is committed to achieving the same. Emergency care services are utmost essential and at times even lifesaving and come under the umbrella of Country's vision of formulating a comprehensive and resilient health system.

Recent evidence clearly shows an increase in the trend of accidents and trauma cases, along with other non-communicable diseases like stroke, cardiac arrest, etc. An effective emergency care system to tackle and handle these emergencies from the site of incident till assured treatment at the emergency department of a health facility in defined time is the need of the hour.

Government of India has taken various initiatives for providing assured emergency care services to its citizens. For timely referral, the ALS and BLS services under National ambulance services is already functioning. Very recently under Pradhan Mantri Ayushman Bharat Health Infrastructure Mission (PM-ABHIM) and XV-FC, support is being provided to all States/UTs of the Country to fill critical gaps in public health infrastructure especially primary care in both urban and rural areas and critical care facilities in 602 districts.

Strengthening emergency services at District Hospitals includes infrastructure, availability of trained human resource, drugs and equipment to provide a comprehensive range of services. It is thus important that our doctors and nurses placed at the District hospitals and other secondary care level facilities are better trained and equipped to handle emergencies in their casualty department.

To understand the imperatives in realizing this goal, MoHFW constituted an expert group which widely deliberated and recommended processes and protocols which can comprehensively address all medical, surgical emergencies inclusive of trauma related care at District level.

I deeply appreciate the initiative taken by MoHFW, DGHS, NHSRC, AIIMS JPNATC and all the experts from States, INIs and other institutions in preparing the Operational and Technical Guidelines for Emergency Services at District Hospitals. It is hoped that State's Mission Directors and Programme Officers will take advantage of these guidelines and initiate establishment of assured Emergency services in their District Hospitals and other secondary care facilities.

(Rajesh Bhushan)
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FOREWORD

Public healthcare services should be assured and robust enough to meet the aspirations of the people residing in the district. The District hospital is considered as an apex public health institution for providing assured and comprehensive secondary care services in a district. With the launch of NHM , most of our district hospitals are providing the routine general and specialist care but many of them are still lacking in provision of assured management of critical illnesses leading to out of pocket expenditure(OOPE) for the people.

There is a felt need to develop and strengthen Emergency to streamline and provide assured emergency services including resuscitation and saving of lives in severe cases. Ministry of Health & Family Welfare, Government of India is committed to support and facilitate this at all health facilities. The present guideline has been prepared with a focus on secondary level health facilities and contains both Operational and Technical aspects for establishing Emergency. Separately, a primary care guideline for addressing emergencies has also been prepared by MOHFW.

The current guidelines have been formulated with the objective of providing efficient and assured management of medical, surgical, accidental and trauma emergencies at a District Hospital by professionally trained and competent staff. The guideline also ensures preparedness and management for patients of natural calamities, disasters, and mass casualties. It is hoped that primary and secondary care guidelines for emergencies developed by MOHFW will help in meeting the emergency needs of the community.

I acknowledge and appreciate the contribution given by NHM division, DGHS and NHSRC to the Ministry in preparing and finalising these guidelines. I especially acknowledge the proactive role and initiative taken by Dr Himanshu Bhushan in framing these guidelines. I would also like to thank the team of experts from all over the country for their valuable inputs and suggestions. The guideline will be useful not only for program officers but also to the clinicians and other technical officers in the states.

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MESSAGE

Emergency is a situation, which requires urgent medical or surgical intervention to restore normal health, failing which it can result in loss of life or limb and/or permanent disability. Shifting pattern of diseases from Communicable to Non- Communicable diseases over the past years has become major cause of deaths in the country.

Currently in India, most of the assured emergency management services are confined to tertiary level only. A critically ill patient may initially require life-saving measures to be delivered through competent and skilled personnel. Once the emergency management has been done, it may require continuous monitoring and treatment support. Therefore, to ensure timely intervention and better survival, comprehensive emergency services should be made available at secondary level health facilities to reduce the patient burden on tertiary care institutions.

These guidelines have been formulated to bring clarity in organizing/ developing a fully functional Emergency at District Hospitals. The guideline emphasizes the importance of Triage and zoning in the area for easy identification and segregation of patients who require immediate clinical attention and appropriate life saving measures. It is also inclusive of certain algorithms relating to common emergency conditions which present at health facilities.

I thank Shri. Rajesh Bhushan, Secretary, H& FW, Mr. Vikas Sheel, the then AS& MD NHM and Smt. Roli Singh, AS & MD NHM for their continuous guidance and support. The contribution and efforts of NHM division of MoHFW and NHSRC are noteworthy in drafting these guidelines after a wide range of deliberations and consultations with experts. Technical guidance & support of DGHS and his team particularly Dr Anil Manaktala and Dr Tanu Jain is noteworthy. I also thank Dr Rajesh Malhotra, Chief of JPNATC, AIIMS New Delhi and his team, particularly Dr Sanjeev Bhoi and Dr Tej Prakash Sinha. I also acknowledge the contributions of Dr Dhiraj Bhandari Professor Anesthesia & Intensivist, MGIMS Sewagram, Dr Ravi Kirti, Additional Professor and Head, Department of General Medicine, AIIMS Patna, Dr Siddharth Ramji, Director Professor of Paediatrics and Neonatology, MAMC, New Delhi, Dr Praveen Aggarwal, Dr Maneesh Singhal and all other experts for their valuable contribution. Inputs given by PGIMER Chandigarh and state representatives from Director of Health Services, Haryana, Odisha & Tamil Nadu among others in formulating these guidelines are also appreciated.

It is hoped that the Mission Directors, State and District Programme Officers, Specialists and Medical Officers will find the guidelines useful in operationalizing Emergency in their districts. Programme officers should utilize the guidelines in preparing a time bound action plan for establishing Emergency in the district.

(Vishal Chauhan)

Table of Contents

Abbreviations

ABCDE	Airway, Breathing, Circulation, Disability, and Exposure
ABG	Arterial Blood Gas
ALS	Advance Life Support
ACS	Acute coronary syndrome
AHU	Air Handling Unit
AHA	American Health Association
AIIMS	All India Institute of Medical Sciences
AKI	Acute kidney injury
ALS	Advance Life Support
AMBU	Air Mask Bag Unit
AMC	Annual Maintenance Contract
AMI	Acute Myocardial Infarction
ARDS	Acute Respiratory Distress Syndrome
ASA	American Stroke Association
ASV	Anti Snake Venom
ATLS,	Advanced Trauma Life Support
AVPU	Alert, Verbal, Pain, Unresponsive
BCLS	Basic Cardiac Life Support
BGL	Blood Glucose Level
BHT	Bed Head Ticket
BIPAP	Bilevel Positive Airway Pressure
BLS	Basic Life Support
BMW	Biomedical waste
BP	Blood Pressure

BSA	Body Surface Area
BT	Bleeding Time
CBC	Complete Blood Count
CD 4	Cluster of Differentiation 4
CFT	Capillary Filling Time
CHC	Community Health Centre
CKD	Chronic kidney disease
CLD	Chronic Liver Disease Speech difficulties and Time
CO2	Carbon dioxide
COPD	Chronic Obstructive Pulmonary Disorder
COVID	Coronavirus disease
CPAP	Continuous Positive Airway Pressure
CPR	Cardio Pulmonary Resuscitation
CRT	Capillary Refilling Time
CSSD	Central Sterile Supply Department
CT	Computed tomography
CVA	Cerebrovascular Accident
CXR	Chest X-Ray
DALY	Disability Adjusted Life Years
DAMA	Discharge Against Medical Advice
DBP	Diastolic Blood Pressure
DCH	Dedicated Covid Hospitals
DCHC	Dedicated Covid Health centers
DGHS	Directorate General of Human Settlements
DH	District Hospital
DKA	Diabetic Ketoacidosis
DM	Diabetes Mellitus
DNB	Diplomate of National Board
ECG	Electrocardiogram
ECS	Electroconvulsive shock.
ETT	Endotracheal Tube
ECT	Electroconvulsive therapy
EMR	Electronic medical records
EMRI	Emergency Response Services
EMT	Emergency Medical Technician
ENT	Ear, Nose, and Throat
EPAP	Expiratory Positive Airway Pressure
ETP	Effluent Treatment Plant

FAST	Facial drooping, Arm weakness
FBNC	Facility-based newborn care
FIMNCI	Facility- Integrated Management of Neonatal and Childhood Illness
FND	Focal Neurological Deficit
GBD	Global Burden of Disease
GCS	Glasgow Coma Scale
GI	Gastrointestinal
GTB	Greater Trochanteric Bursitis
HDU	High Dependency Units
HHS	Hyperglycemic Hyperosmolar State
HR	Heart Rate
IO	Intraosseous infusion
ICU	Intensive Care Unit
ID	Intradermal
IM	Intra- Muscular
IMEP	Infection Management and Environment Plan
IMNCI	Integrated Management of Neonatal and Childhood Illness
IV	Intra- Venous
INR	International Normalized Ratio
IP	Indian Pharmacopia
IPAP	Inspiratory Positive Airway Pressure
IPHS	Indian Public Health Standards
IPPV	Intermittent positive-pressure ventilation
IT	Information Technology
IU	International Unit
JIPMER	Jawaharlal Institute of Postgraduate Medical Education & Research
JPNATC	Jai Prakash Narayan Apex Trauma Centre
KFT	Kidney Function Test
LAMA	Leave Against Medical Advice
LOC	Level of consciousness
LFT	Liver Function Test
LP	lumbar puncture
MAMC	Maulana Azad Medical College
MI	Myocardial Infarction
MLC	Medicolegal Case
MNCAH	Maternal, Newborn, Child and Adolescent Health and Nutrition
MO	Medical Officer
MONA	Morphine, Oxygen, Nitroglycerin, and Aspirin,

MOEFA	Manually Offered Electronic Fired Alarm
MOHFW	Ministry Of Health And Family Welfare
MRI	Medical Resonance Imaging
MS	Medical Superintendent
Na	Sodium
NABH	National Accreditation Board for Hospital and Healthcare Providers
NALS	Neonatal Advanced Life Support
NBC	National Building Code
NBSU	Newborn Stabilization Unit
NCCT	Non-Contrast Computerised Tomography
NCD	Non Communicable Diseases
NECT	Noncontrast-Enhanced Computed Tomography
NELS	National Emergency Life Support
NHM	National Health Mission
NHSRC	National Health System Resource Center
NIBP	Non-Invasive Blood Pressure
NICU	Neonatal Intensive Care Unit
NIHSS	National Institute of Health Stroke Scale
NITI	National Institution for Transforming India
NIV	Non- Invasive Ventilation
NPO	Nil Per Oral
NQAS	National Quality Assurance Standards
NRP	Neonatal Resuscitation Program
NS	Normal Saline
NSAID	Non Steriodal Anti Inflammatory Drugs
NSSK	Navjaat Shishu Suraksha Karyakram
NSSO	National Sample Survey Organisation
NTG	Nitroglycerine
O2	Oxygen
OOPE	Out Of Pocket Expenditure
OPA	Oropharyngeal airway
OPD	Out Patient Department
OPT	Operation Towel
ORS	Oral rehydration solutions
OT	Operation Theatre
PA	Physician Assistants
PCO2	Partial Pressure of carbon dioxide

PALS	Pediatric Advance Life Support
PAP	Pulmonary Artery Pressure
PEEP	Positive End-Expiratory Pressure
PEFR	Peak Expiratory Flow Rate
PGIMER	Postgraduate Institute of Medical Education and Research
PHC	Primary Healthcare Center
pH	Power of Hydrogen
POCUS	Point of Care Ultrasonography
Pro BNP	Brain Natriuretic Peptide
PCI	Primary Percutaneous Coronary Intervention
UTI	Urinary Tract Infection
USG	Ultrasound Sonography Test
VBG	Venous Blood Gases
VMMC	Vardhaman Mahavir Medical College
PPE	Personal Protective Equipment
PPH	Postpartum hemorrhage
PR	Pulse Rate
PT	Prothrombin time
PTT	Partial thromboplastin time
RBS	Random Blood Sugar
RL	Ringer Lactate
RR	Respiratory Rate
RTA	Road Traffic Accidents
RTI	Road Traffic Injury
RTPCR	Reverse Transcription–Polymerase Chain Reaction
SARS	Severe Acute Respiratory Syndrome
SBC	Single Breath Count
SBP	Systolic Blood Pressure
SC	Subcutaneous
SCAPE	Sympathetic Crashing Acute Pulmonary Edema
SDG	Sustainable Development Goals
SDH	Sub-Divisional Hospital
SE	Standard Error
SEAR	South East Asia Region
SGA	Supraglottic Airway

SMS	Short Message Service
SNCU	Sick Newborn Care Unit
SOFA	Sequential Organ Failure Assessment
SOP	Standard Operating Procedures
SPO2	Oxygen saturation
SR	Sinus Rhythm
STEMI	ST-elevation myocardial infarction
TDS	Three times a day
TIA	Transient Ischemic Attack
TT	Thrombin Time
UPT	Urine Pregnancy Test
WBCT	Whole Blood Clotting Time
WHA	World Health Assembly
WHO	World Health Organization

Introduction

An emergency condition is defined as “a condition manifesting itself by 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 individual’s health or life [or the health of an unborn child] in serious jeopardy, serious impairment to bodily functions, or serious dysfunction of bodily organs.”

Patients present at the Emergency Department of a hospital, with a wide range of illnesses that include Medical emergencies (e.g. Cardiac arrest, Respiratory failure, Stroke, Bites, Burns, Poisoning, etc.),Surgical emergencies (such as Acute abdominal pain, Appendicitis, Perforation Peritonitis, Gangrene, etc.), Trauma-related emergencies (including Road Traffic crash and other injuries such as Burns, Gunshot wounds, Drowning, Electrocution, Major falls, etc.), Maternity and birth related emergencies (e.g. Eclampsia, Obstructed labour, PPH, etc.), emergencies related to infant and children or ‘undifferentiated’ patients- for which the cause may not be known immediately.

Emergency presentations constitute the 15 leading causes of death and disability-adjusted life years (DALYs) globally. It is to note that the emergency usage rate in low-income countries is about 8 visits per 1000 population as compared to high-income countries with 264 visits per 1000 population.[1] Emergency care system is the key to achieving Sustainable Development Goal (SDG) targets on universal health coverage, road safety, maternal and child health, non-communicable diseases, infectious diseases, disasters, and violence. The lack of access to timely emergency care has been recognized by the World Health Organization (WHO) as a cause of extensive and serious public health problems. The 72nd World Health Assembly (WHA) in 2019 emphasized that timeliness is an essential component of quality and that millions of deaths and long-term disabilities from injuries, infections, mental disorders, and other emergency conditions could be prevented each year if Emergency care system (ECS) existed and patients reach them in time.[2]

The World Bank Disease Control Priorities Project also estimates that the sound organization of Emergency care system (ECS) has the potential to address over half of the deaths and a third of disabilities in low- and middle-income countries.[3] Developing ECS does not necessarily involve a lot of finance outlay, rather it is more of a restructuring, reorganization, training, retraining, protocols, checklists and integration of the various levels of healthcare systems to talk a common language of systems that address emergency care in a timely manner with an aim to save limbs and lives by delivering quality care.

Despite tremendous improvement in health care delivery in the South East Asia Region (SEAR) over the past decades, emergency-related deaths due to Non-Communicable Diseases (NCDs) and injuries have increased tremendously while infections, maternal and infant-related emergencies remain an important cause of mortality in this region. Among all WHO regions, emergency care systems are underdeveloped in many SEAR countries and contribute to 90% of deaths and 84% of Disability Adjusted Life Years (DALYs) owing to emergency conditions.[1]

WHO has projected the rise in the burden of various diseases causing death in South East Asia Region (SEAR) between 2015 and 2030. The projection shows a significant decrease in mortality from communicable, maternal, perinatal and nutritional causes from 25.2% to 16.1%. However, there is a projected rise in deaths due to non-communicable diseases (NCD) from 63.5% in 2015 to 72% in 2030, which is a cause for concern. Injuries as a cause of death are 6th in the list of common causes of death and are responsible for 11.4% of all deaths in SEAR.[4]

Many of the patients with these conditions whether related to Communicable diseases including infectious outbreak (e.g. COVID-19, SARS etc.), existing malaria, diarrheal diseases and viral infections like dengue that require emergency services, Maternal, Perinatal or Non-communicable diseases (e.g. Cardiovascular or respiratory, others), or Injuries (e.g. Road Crashes, falls, self-harm, burns etc.) are likely to look for and avail Emergency Services as the first point of contact or in turn would require to be referred to centers that have such emergency services available.

Maternal, Newborn, Child, Adolescent health (MNCAH) related events also form a significant percentage of attendees at the emergency. Common causes of maternal mortality and "near misses" that require visits to emergency services are hemorrhage, hypertensive disease and infection, most of which are preventable by known interventions. It is estimated that 10-15% pregnancies develop life threatening complications and such women need to be rushed to emergency departments of hospitals.[5] Also, the top most cause of under-five deaths is complications of prematurity (pre term birth, intrapartum related complications) followed by pneumonia and most of, if not all, need emergency services.[6] Emergency departments in hospitals also receive and treat sick newborns suffering from common illness like neonatal sepsis, meningitis, respiratory distress and children with severe pneumonia, febrile illness like meningitis, malaria, surgical emergencies and injuries.

In India, Road Injuries, Self-harm, fall and other unintentional injuries are one of the main causes for morbidity (3814.56 DALYs per 100,000 population) and mortality (67.93 per 100,000 population).[7] Most of these are catered to by the trauma and emergency services at the various levels of the health systems.

An estimate of the country-specific road traffic fatality rates per 100,000 population in 2013 and 2016 showed that while many countries were able to decrease fatality rates, few countries including India showed an increase in their rates from 16.6% in 2013 to 22.6 % in 2016.[8] This underlines the need for countries to develop robust integrated trauma and emergency services and provide their populations with increased access to such services.

Currently in India, most of the emergency services are confined to the tertiary level only with limited access to secondary care and assured advanced referral transport systems. The absence of organized emergency care at primary and secondary health care level has a significant adverse effect on health outcomes. Therefore, to ensure timely intervention and better survival, comprehensive emergency services should be made available at primary, secondary and tertiary level with robust referral and transport network.

Comprehensive emergency services include rapid assessment and triage, timely provision of appropriate interventions including resuscitation and stabilization, and prompt referral to the nearest appropriate health facility where indicated. . As per one of the estimates, more than 50% of total deaths and 40% of total burden of disease in Low Middle Income Countries could

be averted with pre-hospital and emergency care. Therefore, it is necessary to ensure the availability of comprehensive emergency services on a 24x7 basis at all level of health facilities.

Recently, a study was carried out by the Department of Emergency Medicine JPNATC, AIIMS, New Delhi, and NITI Aayog to assess the prevailing status of emergency and trauma care at government and private hospital settings of India to understand the existing gaps and provide a framework for further improvement and the needed policy direction. The study reported that among all patients presenting annually to the health facility, 9-13% were emergency and injury cases with 19-24% of admissions in government hospitals and 31-39% admission in private hospitals. At District Hospitals, live observations revealed that emergency cases account for 10-12% of all OPD patients on a given day. The top three spectra of cases for the adult patients were fever, pain abdomen and trauma, and RTIs. Regarding pediatric cases, fever, diarrhea, and respiratory distress were the common conditions to be reported in an emergency.[9, 10]

There is a felt need to develop and strengthen Emergency to streamline and provide assured emergency services including resuscitation and saving of lives in severe cases. Strengthening emergency services at District Hospitals includes strengthening of infrastructure, availability of trained human resource, drugs, and equipment to provide a comprehensive range of emergency services.

The document aims to provide guidance to the state as well as district program managers, decision makers and clinical service providers to plan and provide assured emergency care at the District Hospital/ SDH. The "operational and technical guidelines on management of common emergencies, burns and trauma care at primary care level" strengthens the delivery of integrated primary care management of common emergencies at Health and Wellness Centre level and to ensure the continuum of care and assured definitive care at higher facilities, the current guidelines aims to strengthen the secondary level emergency services.

The key objectives of the guideline include:

- To develop an integrated Emergency Care Service System which can comprehensively address all medical, surgical emergencies inclusive of trauma related care.
- To provide technical guidance and protocols on common emergency conditions.
- To provide a systematic approach to manage acute and potentially life-threatening conditions.
- To strengthen Emergency Services at secondary care level by providing Infrastructure, HR, Drugs and Equipment as per the need assessment.
- Implementing quality assurance through a robust mechanism of governance for effective provision of emergency services.

PART – I

Role of Emergency Services

Advances in medical care and technology have expanded the scope of what has been the traditional domain of emergency services. These services are no longer limited to actual in-hospital treatment from arrival to stabilization; instead, they now include pre-hospital care and transportation as well. The major functions of an emergency are as follows:

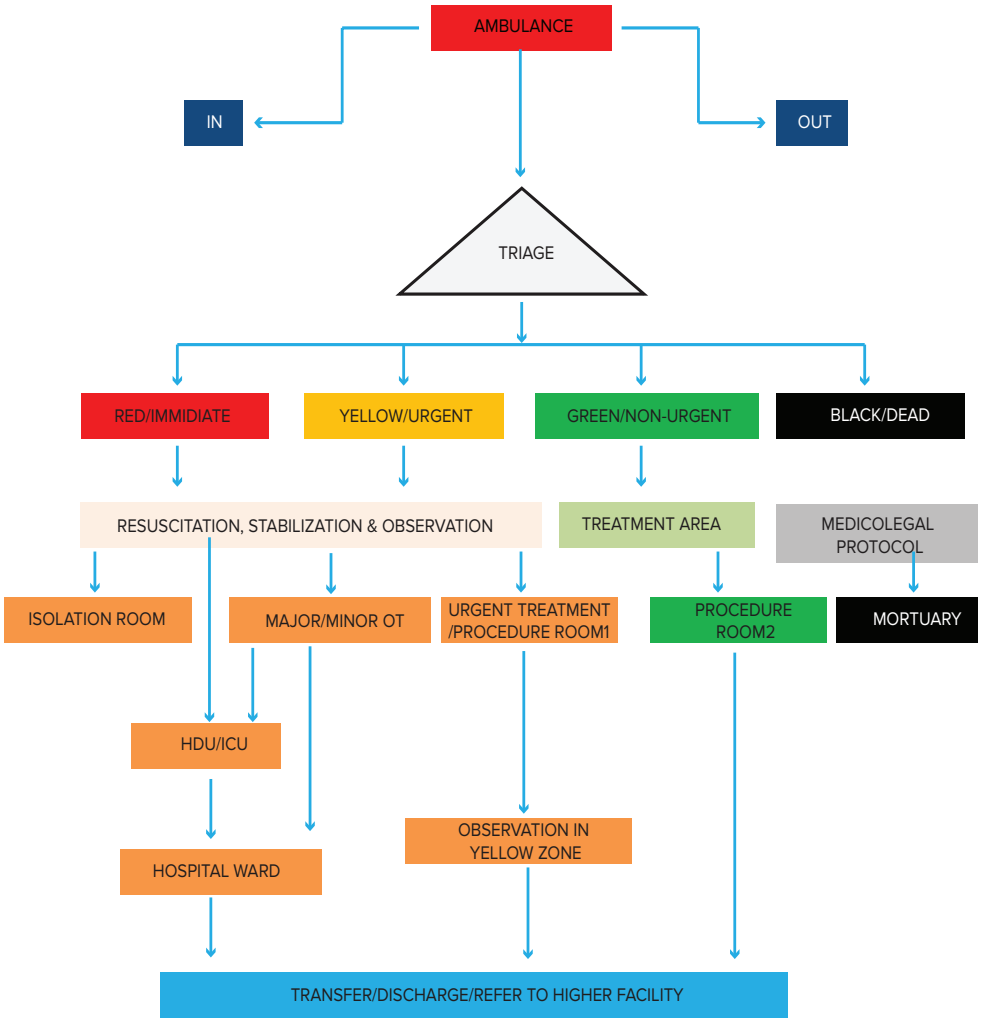
1. To prioritize care for individuals who require immediate clinical attention through effective triage and to provide appropriate lifesaving care.
2. To provide efficient and assured management of medical, surgical, and accidental emergency services by professionally trained and competent staff.
3. To rapidly resuscitate and stabilise critically ill patients and make timely referral in case comprehensive emergency services are unavailable at the current facility.
4. To ensure preparedness and management for patients of natural calamities, disasters and mass casualties.
5. To strengthen pre-hospital care by proper coordination between Ambulance call centre and first responders.
6. To establish linkages with centralized call centres and EMTs in ambulances for ensuring assured emergency care during transit.
7. To ensure readiness of the emergency services for receiving the patients in transit.
8. To maintain records, registers, forensic material (including sample preservation and chain of custody) as evidence in case of medico legal cases.

Availability of high-quality emergency services should be ensured round the clock i.e. 24*7

Managing Patient Flow

While conceptualizing the Emergency, it is crucial to consider the patient flow. The Security guard/hospital attendant should be trained to direct patients toward the Triage area. The hospital attendants should support the patients on trolley/stretchers or wheelchairs and take them immediately to triage area and assist to shift the patient to other care zones. The flow of patient should be as per the algorithm in ***Figure 1.***

Figure.1: Flow of patient in the emergency



Wherever needed, medicolegal protocol should be followed before discharge, referral, handing over

Infrastructure

The present guideline gives a suggestive layout, ideal for setting up an Emergency of a 300 bedded district hospital.

However, there might also be an existing District Hospital with Emergency already in place. Many of such emergencies might have space constraints and the current layout may not be feasible. It is therefore important to plan restructuring/remodelling of the current infrastructure facility of the existing emergency, since adding new infrastructure might be difficult. What is important is to ensure the suggested flow. (Figure 1) At-least the core areas of Emergency i.e. Red, Yellow and Green Zones along with the flow of the services must be maintained as indicated in the guideline. All other support areas like Emergency OT, Lab, Blood services, Plaster room etc. can be linked with the Emergency unit of the district hospital.

It is advisable that the services of the architect with the expertise in hospital planning may be taken to plan an improvement in the existing infrastructure of the health facility for providing assured Emergency care.

General considerations while building the Emergency:

- Depending on the type and size of the hospital (with a varying bed capacity of DH or SDH) the area of Emergency might vary. Some of the common areas like the waiting areas, corridors, dirty utility areas, disaster management area, faculty/staff room etc. may be altered as per availability of space.
- While establishing emergency services in a district hospital, the linkages with newly sanctioned critical care blocks also needs to be considered by planners like administrators, architects, clinicians etc. This is important because deployment of HR will remain a challenge if the emergency and critical care services are dislocated and not properly linked.
- The layout plan and flow of services of the emergency care guidelines and IPHS are synchronized. While framing the design it is pertinent to see the layout plans of emergency setup as depicted in IPHS 2022 for the various bed capacities of hospitals. This will help planners in synchronizing the flow and load of the services with a comprehensive and holistic approach.

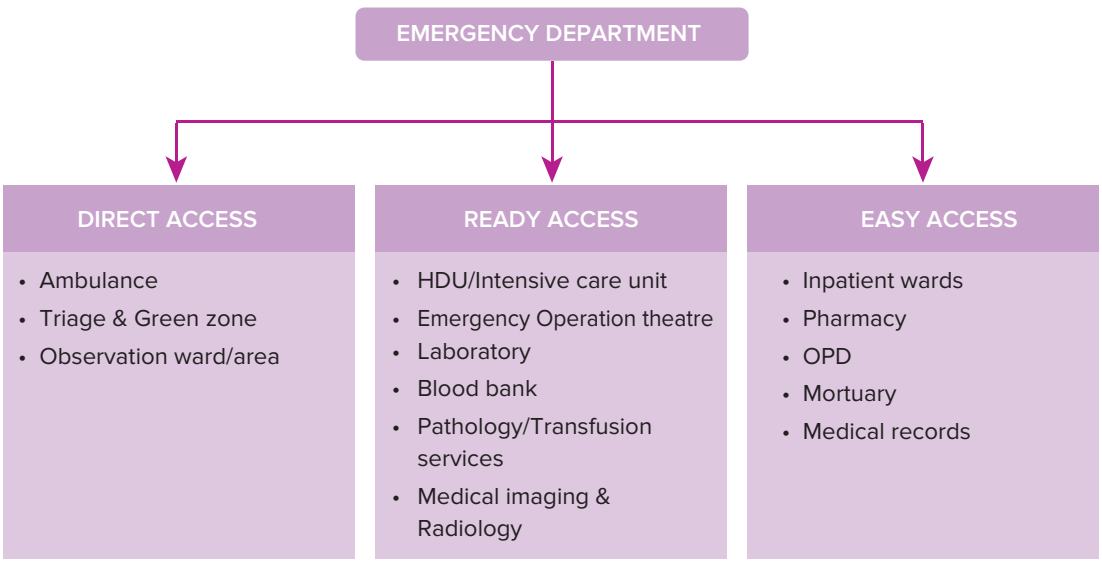
Design considerations (*Annexure IV*):

Once the critical and support services required along with its flow are decided, it is important to consider the various design parameters to provide effective emergency services. Location and access to emergency should be a prime consideration while planning and designing:

- **Location:** The Emergency should be located at the most visible and accessible place of the hospital preferably in the outermost zone that is readily accessible to patient/ attendants. It should have direct entrance for ambulance and other vehicles. Emergency should be connected to the Labour room, Emergency OT, Blood bank/storage, HDU/ICU, Surgical wards, other inpatient wards, Mechanized laundry and CSSD etc. It should be located preferably on ground floor. In case the space on ground floor is limited, Green Zone and Emergency OT can be placed on first floor and should be accessible through lift as well as the ramp. Toilets and washrooms should not be placed directly above the Emergency OT.
- **Area recommended:** The optimum area required for setting up an emergency in a district hospital will depend upon the expected volume of Emergency OPD (about 10% of general OPD), prospective plans to initiate DNB courses (about 30 beds, which include HDU & ICU beds will be required for initiating DNB in Emergency Medicine) and various areas that provide emergency services. So, in the present guideline, any fixed area for emergency has not been defined. It is important to ensure that the processes and flow for assured management of emergency services exist even if the area is small.
- **Access:** The planning of emergency services should be such that it gives priority access to the patients attending the emergency and facilitates early management. The entrance area of the Emergency should have an easy ambulance approach with a unidirectional flow with adequate space for free passage of vehicles and covered area for alighting patients. Similarly, patients coming to the emergency who need immediate attention should have hassle free direct access to the triage area (friendly for differently abled). Emergency design should allow rapid access to essential areas with minimum cross traffic.

Green zone or observation ward should be planned in a way to give access to the patients without disturbing the critical care areas.

It is thus important to categorize various areas of Emergency as directly or immediately accessible, readily accessible, and easily accessible based on urgency of access to different areas:



- There should be proximity between the Triage, Resuscitation area, Procedure rooms, Diagnostic services and Operation Theatre for patients coming in ambulances, as staff and patients may need to be swiftly moved from one place to another.

- Blood bank, Radiological imaging, Laboratory and other diagnostic services must be readily accessible from Emergency.
- There should be an elevator (if required) next to emergency for taking patients to OT/ HDU/ICU/wards.

Beds in Emergency:

- All the general and pediatric beds used in emergency should be movable (with wheels, foldable/collapsible side-rails and in-built IV fluid stand) for easy shifting of patients when required. Additionally, open care radiant warmers and movable trolley beds should be available for care of neonates and general emergency cases respectively.
- Size of pediatric beds will be same as adult beds so that if vacant, adult patients can utilize it.
- For segregation and easy identification, wall against pediatric beds could be painted with bright colors or cartoon characters. However, while coloring, it should be kept in mind that some colors like red/pink, yellow and blue are inappropriate and can interfere with the clinician's assessment of patients' pallor (anemia), icterus (jaundice) and cyanosis etc.
- Separate well-equipped resuscitation bay for each bed should be maintained in the red zone.

Type of Hospital	DH 50 beds	DH 100 beds	DH 200 beds	DH 300 beds	DH 400 beds	DH 500 beds	SDH 100 beds
Red Zone	2	3	5	6	10	10	3
Yellow Zone	2	5	10	12	15	20	5
Isolation Beds	1	1	2	2	4	4	1
Paediatric Beds	2	2	4	6	8	10	2
Total Number of Emergency Beds	**7**	**11**	**21**	**26**	**37**	**44**	**11**

Provision of Additional Beds

The IPHS 2022 has considered requirement of the total number of beds in a district, and it also provisions for addition of beds during the times of emergency/disaster. However, states can still propose for additional beds, depending on the disease burden, program requirements, etc. Any such addition of beds can only be considered if the Bed Occupancy Rate is more than 70%. This will ensure optimal utilization of bed. Accordingly, provision of commensurate human resource, logistic support system should also be ensured.

Area Wise Specifications

Specifications for different areas in emergency are as follows:

1. Entrance:

- Emergency should preferably have a dedicated entry and an exit (independent of main OPD entry with limited access to patient attendants.
- There should be clearly visible signage indicating the direction to Emergency. Signage should be well marked, illuminated and visible, even from the level of the wheelchair, for ease of navigation.
- Ambulance and car parking should be close to the entrance, well illuminated and available exclusively for patients, their relatives and the staff.

- The flooring of circulation areas such as corridors, lifts, ramps, staircases, and other common spaces should be anti-skid and non-slippery. The size of corridors, ramps, and stairs should be conducive to the manoeuvrability of wheeled equipment. Corridors should be at least 3m wide. Corridors should follow fire safety norms and should be wide enough to accommodate two passing trolleys easily along with some additional space for equipment. All two-way swing doors or doors in general circulation areas should be provided with vision panels giving visibility from a height of 800 mm to 1500 mm. Also, there should be clear headroom of at least 2100 mm height above the tactile guiding blocks. This will enable both the wheelchair user and the ambulatory disabled to be noticed by a person on the opposite side and hence prevent him/her from being accidentally struck by the door. Ramps shall have a slope of 1:15 to 1:18 and should be checked for Manoeuvrability of beds and trolleys at turning points.

2. Reception & Triage Area

- The area should be accessible preferably by two separate entrances; one for patients arriving by the ambulance and the other for walk-in patients. Both entrances should direct the patient flow towards the Reception/Triage area. For walk in patient, there should be a separate exit and a waiting area.
- The Reception & Triage area should have clear vision of both the waiting room and the ambulance entrance.
- This area should be designed in such a way that it can be easily accessed by wheel chair bound or otherwise disabled patients.
- Access to red and yellow zone should be restricted.
- There should be direct communication between the Reception/Triage area and the Nursing Station in the yellow/red zones.
- The Reception/Clerical office should have access to network ports, plug points for telephones (mobile), computer/internet, photocopier, computer printers and storage space for stationery, water cooler dispenser with disposable tumbler and medical records.

3. Registration

- Every patient coming to emergency needs to be registered. Registration however can be done after initial assessment of the patient.
- Registration desk should also handle visitors & their enquiries.
- The registration clerk should be proficient in entry of various data elements for the Emergency.
- Computerized registration system with mechanism to collect feedback (e.g. For Mera Aspataal), and sending SMS for next appointment &follow-ups, is recommended. A space/ cabin should be marked for registration.

4. Communication Room

- This room, wherever available, will help in coordinating the transmission of information from the ambulance to the Emergency staff. This helps the Emergency to be in readiness to receive & effectively manage patients being brought.
- This also sends advance information about the cases which are referred out so that the facility is in readiness to receive them as required.

5. Procedure Rooms I & II

- Emergency should have 2 procedure rooms.
- Procedure room I: located near green zone for patients with minor issues who can be treated with drugs, injectable, dressing and/or suturing.

- Procedure room II: located near red and yellow zone for serious cases requiring continuous monitoring and supervision. These patients need invasive bedside procedures such as lumbar puncture, chest tube insertion, pleural tap, ascetic tap, bladder catheterization, etc.

6. Plaster Room

- The plaster room allows for the application of Plaster of Paris (POP) and other splints for closed reduction of displaced fractures or dislocations. It should be easily accessible from the emergency.

7. Nursing Station

- The main nursing station should be between Red & Yellow zone.
- The station should provide an uninterrupted view of patients.
- Nursing station should have adequate space for table, chair, space for keeping records/ files etc., and provision of writing and work benches.

8. Counseling room

- An area designated for examination, evidence collection, counseling and treatment/ management of survivors of gender-based violence/Medico-legal cases such as Rape should be present. This area should have 2 rooms i.e. one for counseling and another for examination and evidence collection with facility for washroom and changing room. Adequate privacy should be maintained for such sensitive areas.

9. Isolation Room

- This room should be present at the end of the Red zone with area demarcated for barrier nursing, which includes facility for changing/putting up sterile gown, masks, shoes, caps etc. before entering the patient area
- There should not be any direct access to this room
- The isolation room should have a negative air pressure so that if a door is opened, the air gets sucked in. A high-power exhaust facing towards sky must be operational at ceiling/ roof height.

10. OT complex of Emergency

- This complex can be used to perform all major and minor emergency surgeries/procedures and should be readily available round the clock.
- 2 OTs in Sterile zone i.e. one minor and one major OT can be provisioned in the complex.
- The OT complex should have a dedicated emergency autoclave area, store room and a small nursing station in the clean zone.
- 2 changing rooms in clean zone i.e. one male and one female and toilet facilities (for male, female and a gender neutral) should also be provisioned.
- A proper hand over of patients, information and all critical equipment must be ensured at every change of shift in OT.

11. Specialist Room

- This room is meant for senior faculty and staff. It should be equipped with facility for computer, phone and relevant literature and books.
- This room will also have SOPs for critical care procedures, cleaning/infection prevention protocols and other relevant and important documents.

12. Doctor, Nurse and Technician room

- This is a rest room with facility of lockers to keep personal belongings. Every Emergency should have a designated staff room for doctors, nurses and technicians with provision

of basic amenities like individual lockers, intercom, tea and coffee machine, water cooler etc.

13. Store Room

- Store room in service area of Emergency can be used to keep drugs, injectable, consumables and linen with maximum stock of 5-7 days. The indent should be based on consumption with weekly receipt of supplies from the main store. This helps in keeping service area free from unnecessary piling of cartons and packets, which otherwise become a barrier in adhering to cleanliness protocols.
- Store room I is at the end of red & yellow zones for keeping consumables, drugs/medicines and small equipment.
- Store room II is in front of yellow zone, for keeping linen and other necessary items.
- One small store room inside the Emergency OT complex for keeping the sterile equipment, instruments and linens as per need.

14. Dirty Utility Room

- This is a dedicated room that is accessible from all clinical areas for keeping contaminated/ used equipment and contaminated/soiled linens.
- This room has a pass box (Hatch Box) from where all the equipment & linens can be sent directly to CSSD/Mechanized laundry in a covered trolley through a dirty corridor. The box can also be used for passing Bio-medical waste for disposal.
- Hand washing facility with deep sink should be available here.

15. Waiting area

- There should be 2 dedicated waiting areas in the Emergency. One near the entrance for relatives and attendants and another near the Lab, Plaster room, Radiology and X-ray room for patients being managed in the Emergency.
- This area must have access to toilets, public telephones and other public utilities such as water cooler with adequate circulation space.

16. Police control room

- The provision of this room is for round the clock availability and presence of Police personnel to support Medical Officers in the smooth discharge of duties.
- The Police support is also required to record and coordinate medico legal cases coming to the hospital.
- During a disaster or mass casualty, this room helps in coordinating relief work and assisting staff in smooth delivery of services. Necessary information regarding the services being provided in Police Control Room may be provided.

17. Janitors Room/Housekeeping

- It should have a basin, water facility for washing and adequate space for keeping mops, broom and cleaning materials. The flooring should be non-slippery and stain resistant.

18. Toilets

- There should be sufficient number of clean & dry disable friendly, male, female and gender neutral washrooms.

19. Disaster Management Area *(Annexure V)*

- Emergency should have an open area earmarked for management of patients affected during disaster/natural calamity.

- Such area should have multiple direct accesses to the road/main gate and internal connectivity to emergency area to facilitate quick staff movement.
- It should have multi-channel ports with facility for oxygen and suction. It should also have electrical points nearby for connecting various life-saving equipment and monitors.

20. Decontamination Area

- An area earmarked for decontaminating human beings exposed to hazardous material like chemicals, radioactive substances and other infectious Materials.
- It should be in vicinity of the Disaster Management area and should have facility for hot/ warm showers for male, female and gender neutral separately. There should be space for bathing, dress changing and a small store for keeping the preventive protective gears/ equipment.
- Area above the drain should be netted and the drain should be connected only to Effluent Treatment Plant (ETP) and not to the municipal drain to ensure segregation of contaminated water from main drainage.

Support Services for Emergency

<table>
<tr><th>Clinical Support Services</th><th>Other Support Services</th></tr>
<tr><td>Lab facility – Readily available Point of Care test as per “Free Diagnostic Service Initiative” (FDSI) guidelines by GoI with an assured linkages for essential round the clock lab services through Integrated lab of the DH.</td><td rowspan="2">For maintaining appropriate supplies of sterile equipment, instruments and linen, every emergency should have assured linkages with CSSD & laundry services.
The CSSD is responsible for:
• Systematic collection and transport of dirty & sterile equipment/instrument and linen.
• Defining the methods for segregation, transportation, disinfecting, cleaning and sterilization of equipment/instrument and linen</td></tr>
<tr><td>Blood bank/ Blood Storage Centre – Assured linkages for essential round the clock blood services either within the Emergency or can be linked with district Blood Bank/Blood Storage Centre.</td></tr>
<tr><td>Radiology services – For urgent Point of Care USG, X-ray, CT-scan, MRI either within the Emergency or with linkages to the radiology area of the hospital.</td><td rowspan="3">Janitor’s Room/Housekeeping: for day to day maintenance & cleaning services.

Biomedical Waste Management: Adherence to Bio-medical Waste Management Rules, 2018 &IMEP

Security services:
• Entire Emergency area should be continuously monitored by electronic surveillance to safeguard the wellbeing of patients and staff. While putting surveillance, the patients’ right to privacy and dignity needs to be ensured.
• Security personnel should properly man all entry and exit gates.
• Each security point should be identified and duty/work expected by guards at these points need to be specified and monitored.
The precise details of security features should be designed in conjunction with a security risk assessment for the specific site.</td></tr>
<tr><td>Plaster Room: The plaster room allows for the application of Plaster of Paris (POP) and other splints for closed reduction of displaced fractures or dislocations. It should be easily accessible from the emergency.</td></tr>
</table>

Other infrastructural considerations:

- **Sign Boards:** Illuminated, disabled friendly signage is required to ensure visibility at night. Signage should be visible even from the level of the wheelchair for ease of navigation. The signage should also be displayed in local languages, along with the use of graphic and character display. The signboards should indicate the direction of the Emergency from major thoroughfares (E.g. a white cross on a red background with the word "Emergency Services" is recommended).
- **Fire Safety:** Provisions laid down in National building code 2016 (4.5.2-subdivision C-1) shall establish the minimum requirements for a reasonable degree of safety from fire emergencies in hospitals, such that the probability of injury and loss of life from the effects of fire is reduced. All healthcare facilities shall be so designed, constructed, maintained and operated to minimize the possibility of a Fire emergency requiring the evacuation of occupants, as safety of hospital occupants cannot be assured adequately by depending on evacuation alone. Hence measures shall be taken to limit the development and spread of fire by providing appropriate arrangements within the hospital through adequate staffing & careful development of operative and maintenance procedures consisting of:
  (1) Design and Construction;
  (2) Provision of fire detection, alarm and extinguishment;
  (3) Fire Prevention
  (4) Planning and Training programs for Isolation of Fire; and,
  (5) Transfer of occupants to a place of ***comparative safety*** or evacuation of the occupants to achieve ***ultimate safety***.
- **Seismic safety:** All New hospital buildings or hospital buildings being retrofitted in seismic zone IV and V, and hospital buildings in wind zones with basic wind speed 42 m/s or more, shall be instrumented with proper mechanism prescribed in NBC.
  - ✓ **Safer and functional Hospital**: - One of the main concerns regarding the safety of hospitals is that hospital structures (i.e. the buildings) are themselves vulnerable to collapsing in the face of extreme forces (such as those experienced during earthquakes). Therefore, to ensure the safety of hospitals and achieve the goal of 'safer and functional hospitals', mitigation measures (as presented in NBC) need to be undertaken in a timely manner.
  - ✓ **Post-Earthquake Assessment of Hospital Structures** Hospital buildings shall be inspected by competent licensed engineers after every damaging earthquake to document damages (if any) to Structural Element (SEs) and Non-structural Element (NSE) s of the buildings, along with recommendations for detailed study and suitable retrofitting as found necessary.
- **Physiological Monitors:** Beds in yellow zone should have access to a physiological monitor, which should include ECG, Non-Invasive Blood Pressure (NIBP), Temperature and SpO_2.
- **Lighting:** Each examination light should have a power output of 30,000 lux to illuminate a field size of at least 150mm.
- **Service Panels:** Service panels should be equipped with Centralized oxygen and suction outlets along with sockets. All medical gases should be internally piped through manifold room of the hospital, to all patient care areas.
- **Doors:** All doors must be of sufficient size to accommodate and easily pass a full hospital bed/trolley. The main door should have the capacity to accommodate two beds simultaneously.

- **Corridors:** In general, the total corridor area within the Emergency should be minimized to optimize the use of space. Corridors should be of adequate width to allow the cross passage of two hospital beds or a hospital bed and linen trolley without difficulty. The trolleys or beds should not block corridors. There should be adequate space for free movement of trolleys to and fro from consulting rooms.
- **Air Conditioning:** The emergency should have an air circulating system which allows recirculation and periodic fresh air flow. Wherever feasible, Air Handling Units (AHUs) preferably ductless can be planned.
- **Information/Communications Support:** As there is high usage of telecommunication and information technology in Emergency situations, telephones with the directory of the important contacts listed should be available at all staff stations and consultation areas. Direct communication should be available between the ambulance service and the communication room of emergency. A data entry operator should be available at the communication room round the clock.
- **Hand Washing Facilities:** Adequate hand washing facilities should be available for staff working in the emergency.
- **Clean Electric Power supply:** The public health facilities should have access to adequate, affordable and reliable electricity supply. Distribution of electric load along with load balancing to various equipment and installations in a facility is very important since overloading at any point can result in mishaps like electric fire hazard or can damage the equipment. Similarly, fluctuation in voltage also adversely affects the equipment and hence automatic voltage regulators which regulate fluctuating input power voltage and maintain constant output voltage should be provided. So, putting electrical installation is a specialized job and must be given due importance to ensure proper care with reduced risks to the patient. ***(Annexure V)***
- **Emergency Power**: Must be available for all lights in the Triage, Resuscitation area, Procedure rooms, OT complex and Isolation room. In the event of a total power failure, sufficient space and power points should be available to enable a backup system.
- **Wall Finish:** Wall surfaces in areas, which may come in contact with mobile equipment, should be reinforced since hospital beds, ambulance trolleys, and wheelchairs may cause damage to walls.
- **Floor Covering:** The floor covering in all patient care areas and corridors should have non-slippery surface, impermeable to water/body fluids and easy to clean. The floor of the emergency room should be made of light-colored anti-skid vitrified tiles or natural stone of wide size (e.g. 2'x2') with seamless joints. Bed stops should be fitted to the floor to prevent the bed head from coming into contact with and damaging fittings, monitors, etc.
- **Wall Clocks:** A wall clock should be visible in all clinical and waiting areas. Time displayed on all clocks should be synchronized
- **Wall charts (algorithms and protocols) of common conditions as quick reference :** Need to be kept in a laminated folder for easy access.

Managing Emergencies

Triage

- Triage is a process of sorting patients after their initial assessment and prioritizing them for treatment according to their clinical condition.
- Quick initial assessment of patients coming to Emergency is vital for saving lives and reducing morbidity.
- A dedicated staff nurse trained in triage and resuscitation should be available 24*7 in the triage area. They should be working under the supervision of a Medical Officer. They should possess quick assessment skills and seek help when patients requiring urgent resuscitation arrive in the emergency.
- Hospitals having more than 300 beds should also have Polytrauma Units for specialized monitoring and treatment of Polytrauma cases. In all other hospitals, the Emergency and general HDUs should be capable to manage such cases.
- Cases which require Obstetric or Gynaecological care should go directly to the labour room for their emergency management. If reporting to general emergency, they should be sent to the respective area without any delay. Wide awareness in this regard needs to be generated.
- Pregnant women and gynaecological cases reporting with trauma (fracture, fall, RTA), animal bites, burn etc. should be managed at Emergency itself. After receiving the first line of treatment and stabilization at Emergency, they should be referred to the respective area (if required).
- **All children** attending an emergency care setting should be assessed immediately upon arrival and receive an initial triage and required management by a competent appropriately trained nurse or doctor. This will help in promptly identifying immediately the life threatening conditions presented in emergency.
- **All sick newborns (0-28 days)** should be directed to SNCU for emergency care, if such units are functional. Each functional SNCU should organise a space for receiving neonates with emergencies. This area should have a radiant warmer and an emergency trolley with required set of equipment and essential drugs. Those babies with symptoms of gasping/ apnea/cardiac arrest needs to be resuscitated in the emergency area and ensure the baby is warm throughout the transfer.

- The most common triaging method is the 4-level color coded system
  (1) Red - Immediate
  (2) Yellow - Urgent
  (3) Green - Non- Urgent
  (4) Black–Dead

Patients are triaged into Red, Yellow & Green zones as per triage protocol for adult and paediatric cases attached in ***Annexure XV.***

Red area (Resuscitation area):

This area is the most critical part of any emergency room/ emergency care facility/emergency department, which serves acutely ill or severely injured. In all red triage category patients, whole focus is to save life without any delay. Patients in red area need to be managed on priority above all yellow or green triage patients.

Once the emergency case reaches the health facility, definitive care should ideally be initiated within 1 hour.

All the equipment, crash cart, drugs and other supplies are made available next to the red bed area to save critical time. Each red bed is equipped with multi parameter monitor, portable ventilator, defibrillator and other life saving devices/ equipment with adequate power supply, oxygen supply, suction and medical gas supply (on similar lines of ICU beds). An open hall concept with ceiling-mounted hanging curtains and IV stands needs to be adopted to avoid congestion on the floor.

One bed is always kept in readiness once the patient's resuscitation is completed the patient is shifted to another red bed in red area and further process is carried out from there.

- A security personnel present at the entrance will control the entry to this zone.
- A medical officer/trained staff nurse should always be available in the red zone.
- ABCD management, Resuscitation, Basic and Advanced life support, etc. should be performed here.
- Activities like airway management (Bag and mask ventilation, intubation/supraglottic airway device insertion+/- mechanical ventilation), Suctioning, O_2 administration, cricothyroidotomy, Pulse oximetry, CPR, IV cannulation, Fluid resuscitation, Administration of vasoactive drugs (Nor adrenaline, Adrenaline, Atropine etc.), Blood products and Gastric lavage can be undertaken in the red zone.
- Vitals like Blood pressure, Heart rate, Respiratory rate, SpO_2 and Temperature should be monitored.
- Blood tests, X-ray chests and other investigations can be done after initial resuscitation and stabilization. However, some of the tests like ABG, Blood Sugar etc. may be required immediately.
- After stabilization of patient's condition, patient should be shifted to yellow/green zone or to HDU/ICU or referred to a higher centre (if required). If the patient is dead, the dead body should be shifted to mortuary.
- Patients who may not have presented with severe symptoms but deteriorated (Respiratory distress, Hypotension, Excessive bleeding, decrease in level of consciousness, Loss of pulses after limb injury) while receiving the treatment may also require to be shifted to this area.

Yellow area (Observation area)

This area is to cater to all patients who require observation, monitoring and or investigation along with carrying out needed treatment (all yellow triage patients). This area caters the patients who are having potential to deteriorate, so they require monitoring, oxygen supply, suction, medical

gas, power supply similar to red with one crash cart (But no ventilator, defibrillator) but these beds are having capabilities to be utilized as red beds whenever in need during any mass casualty/disaster scenarios. IV fluid need to be hanging from ceiling, care need to be taken not to congest the floor, with open hall concept, with hanging curtain partition to maintain privacy. In event of a patient deteriorating in the yellow area, the patient needs to be re-triaged and shifted to red zone for further management.

- Activities like IV cannulation, fluid resuscitation, and administration of blood products can be undertaken in the yellow zone. Vitals like blood pressure, heart rate, respiratory rate, SpO_2 and temperature should be monitored.
- Once the patient is stabilized (out of danger) in red zone, he/she should then be shifted to yellow zone (YZ) i.e. step down I area for continuous observation and treatment.
- Once the person is well stabilized, a decision needs to be taken by MO along with the discussion with concerned specialists on duty to shift to HDU/ICU of the hospital or admit/discharge/refer to higher facility.
- As hypothermia is a common symptom/sign, a radiant warmer is essential for temperature monitoring and management. So, the radiant warmer should be kept in both red and yellow zone to receive sick infants (older than 1 month), as they may not be eligible for admission to the SNCU or NICU and needs to be stabilized before being transferred/referred.

Green area

This area caters to all those patients who require no observation, minimal intervention like suturing, pain management, dressing, injectable etc. and can be discharged safely. This area can provide medications/injections with arrangement of chairs and few stretchers/beds for patients.

Dead/Black area

- This area is for keeping dead bodies till they are handed over to the patient's family or transferred to the mortuary. Efforts should always be taken to transfer the body at the earliest, since the black zone is not supposed to be a storage/preservation area for dead bodies.
- MOs need to complete Medico legal protocols (legal documentation) for MLC cases before sending the dead body to the mortuary.
- Entry should be restricted in this area.
- Dignified handling of the deceased body and restricted entry to the area needs to be ensured.

Planning for Assured Emergency Services

The nearest referral centres and available referral transport should be identified and mapped across Health and Wellness Centres. A directory of contact details of facilities should be maintained. Each HWC should have mapped all secondary care facilities providing assured emergency care. Every district should have the capacity and capability to provide assured emergency services at their designated secondary care facilities i.e. DH, SDH and/or CHC's.

The District Hospital being the hub of health care needs to provide it comprehensively. Managing the immediate emergencies is only the beginning. Ensuring continuum of care in a safe and high-quality manner is paramount while planning for setting up emergency/casualty in a District Hospital.

It has four important components:

1. Assured referral transport

It is critical that all Emergency cases be safely transported from the site of emergency to an adequately resourced emergency facility within the golden hour. All referrals should be coordinated for assured services. It is important to communicate with the receiving facilities to ensure the readiness to receive the patient. National Ambulance Services along with the centralized call centres in most states, are functional and may need strengthening in some states. The EMTs in the ambulance, while giving emergency treatment should also coordinate with the Referral Hospital about patient's condition, who is under transit. This will help EMTs in getting any specific advice for better management and the hospital will be in readiness to receive the patient.

2. Adequately resourced Emergency with professionally trained staff

Emergency cases brought to these facilities should receive high quality assured and prompt management. This includes appropriate triage, resuscitation if required, and management by adequately trained staff, emergency drugs, equipment and a supportive infrastructure along with linkages with support services (Radiology, Lab Services, Critical Care etc.)

3. Intra and inter facility transfer

Patients who need to be transferred to critical service areas like HDU, ICU, PICU etc. within the same hospital or to the other hospital, needs a proper transport system in place. In ideal settings, oxygen, monitors (ECG, NIBP & SpO_2) and transport ventilators (for patient require

IPPV) should be available. However, if the transport ventilator is not available, at least a manual bag resuscitator or bag mask assembly with oxygen for giving ventilation with or without PEEP valve is needed for transporting a patient.

Such transfer will require the following systems to work but not limited to these-

- After initial stabilization of the physiological parameters to the best possible over a short period of time, the benefits of making an early transfer of the patient to a definitive care facility must be weighed against the risk of holding the patient back to the current facility. This can be considered even with the ongoing resuscitation and stabilization during the transport. The transport capabilities in terms of infrastructure (advanced ambulance), manpower (Trained paramedics) needs to be weighed-in, while making above decision.
- While referring a patient, please ensure that ambulance is in readiness and a referral slip with patient details is handed over to EMTs in the ambulance.
- Pre-transport coordination and communication with the receiving facility and information and counselling with patient's relatives should be done.
- Personnel required for transport: wherever feasible and available, some personnel trained in advanced life support or similar skills should accompany the patient.

4. Critical Care facilities

Most of the patients will be managed and discharged from the Emergency itself. However, few of them will require further monitoring and management in a critical care unit like HDU/ICU. Therefore, every district hospital must have access to high quality HDU, ICU or Hybrid HDU (having both ventilator and non-ventilator beds). Thus, it is suggested that a district hospital must include this in their plan.

Principles for Planning Emergency Services in Secondary Care

- As time is of essence in the management of these patients, the location of the Emergency should be such that there is no barrier for rapid access to ambulances and other vehicles. The movement of these patients within the facility should not be restricted with general hospital traffic.
- The structure of the emergency should have a clearly demarcated Triage with RED, Yellow, and Green zones for patient management and clear linkages with services such as Radiology, Plaster room, Minor OT, Suturing room etc. Details are provided in the section under “Infrastructure”.
- For planning purpose it should be assumed that the patient load in an emergency will be about 10% of the OPD footfall. Therefore, a facility with an OPD load of 1000 patient should expect 100 cases in Emergency in a day.
- IPHS sets standards for the number of beds at public health facilities (e.g. 26 beds for the emergency in a 300 bedded district hospital), where there are space and/or capacity constraints, there should be a minimum of 6 in red zone, 12 in yellow zone, 6 paediatric bed, 2 isolation bed and a demarcated green area with facilities for minor procedures, dressings etc in emergency units.
- All staff working in Emergency should have adequate training (including refresher training to manage cases effectively) this will include basic life support skills (NELS etc.) and other lifesaving procedures as relevant.
- Quality Improvement through government approved accredited programs (National Quality Assurance Standards) must also necessarily include Emergency services in its ambit. This will provide opportunity for both internal and external peer reviewed Quality Assurance.
- Accurate and systematic record keeping is essential in Emergency as many of these are part of MLC. Therefore, the use of electronic records and well-developed IT systems are highly desirable and essential capacity building for such Human Resource should be done.
- Systems for clinical governance will be effective to assure high quality services. This will include regular monitoring and audits (e.g. Early warning signs, adverse events reporting, Near miss audit)
- Disaster Management and Preparedness Response: As mentioned earlier, it is pertinent for the district to have a preparedness plan for its hospitals for managing disasters. The hospital should also designate a nodal officer, preferably the casualty/emergency in-charge who will ensure that all required actions are taken to implement the plan for managing

such unforeseen incidences. Regular monitoring must be done to ensure availability of buffer stock of various consumables and their periodic replenishment, training of various stakeholders such as doctors, paramedical staff and security personnel, mock-drills including inter-departmental drills, adequate human resource and rapidly available ambulance services.

Critical Care

Critically ill patients requiring highly skilled lifesaving medical & surgical aid and nursing care will be admitted here. This will include the continuing management of major surgical, accidents and trauma and medical cases such as head injuries, severe haemorrhage, acute coronary syndrome, altered mental level, poisoning etc. All critical care units (HDU/ICU) should have linkages with Emergency care unit in the DH, so that the patients requiring continuous monitoring can be shifted to HDU/ICU, if required.

Generally, HDU beds are for patients with single organ failure where any specialist can monitor and manage. ICU beds are for patients with multiple organ failure and life is at imminent threat requiring ventilator support with backup for super and multispecialty care. An isolated area for immune compromised patients with regulated air pressure should be made available. So, every DH should have a hybrid critical care area (HDU +ICU) with both ventilatory and non-ventilatory beds.

This critical care unit should be located close to the support services like Imaging and Laboratory so that the staff and ancillaries could be shared. Easy and convenient access from emergency is also essential. Nursing station should be placed in such a way that patients are visible from the nursing station. The unit will also need other specialized services such as piped suction and medical gas supply, uninterrupted electric supply, heating, ventilation and air handling unit. For further details, 'Operational guidelines for HDU/ICU at a District Hospital' can be referred to.

Space requirements for each type of bed are as following:

Type of bed	Floor space per bed	Space between head end and wall	Space between Foot end and wall	Space between center of two adjacent beds
ICU bed	25-30 m^2	0.9 m	1.2 m	3.5 m
Paediatric ICU bed	12 m^2			
HDU bed	20-24 m^2			

Human Resource and Capacity Building

As per Indian Public Health Standards, the number of specialists, medical officers, staff nurse, security and supporting staff which may be positioned in the emergency department is as follows:

Human Resource	DH 50 beds	DH 100 beds	DH 200 beds	DH 300 beds	DH 400 beds	DH 500 beds	SDH 100 beds
Specialists	-	1 D	1 D	1 D	1	2	2
Medical officer	3	3	3	3	3	6	6
Staff Nurses	6	9	21	21	24	24	9
Cleaning staff	3	3	3	3	3	3	3

Emergency services require dedicated and experienced staff on a 24*7 basis. IPHS has laid down recommendations for each category of staff for District Hospitals of different beds strengths (including Emergency staff). Staffing in Emergency should be in line with these norms.

Core Team	Non - Core Team (Support staff)
Comprising of: • Emergency physician/Anaesthesiologists/ Intensivists/doctors/MO's • Nurses and EMTs • Support staff Core team will be supported by other specialists like Anaesthesiologists, Intensivists, Physicians, Surgeons, Paediatricians, Orthopaedic surgeon, Eye and ENT specialist, Radiologist, Super specialists e.g. Neurosurgeons. Also Pharmacists, Lab and other technicians as required. In the emergency, the number of core team will vary depending upon the bed strength of the health facility.	Comprising of: • Health Care Assistants • Orderlies & Porters • Guards • Housekeeping & Cleaning staff

CAPACITY BUILDING

- The doctors, nurses, paramedics posted in Emergency, HDU, ICU needs to be trained in Critical & Intensive Care. Such staff that has acquired designated qualification and are utilizing their skills by serving in these areas can be considered for additional increment or incentives by the State/District.
- Training packages for new born,& Paediatric age group:
  - ✓ **Newborn:** NRP module, Revised NSSK Package, Facility-based management of sick newborn for SNCU staff and NBSU staff
  - ✓ **Children**: Emergency triage and treatment training package, Facility Based management of sick children (erstwhile FIMNCI package) both participant and facilitators draft manual available. These packages are to be conducted for doctors and nurses together.
- Hospital Management should ensure that all those working in Emergency are provided training in emergency care.

	Core team	Non core team
Essential:	1. Basic Life Support (Cardiac& Trauma) (Triage, recognition and management of critically ill) 2. Advance Life support (Cardiac & Trauma) 3. Triage 4. Recognition and Management of the critically ill 5. Infection Control 6. Facility based care of sick new born care (include BLS) 7. Soft communication skills 8. National Emergency Life Support (NELS)	1. Triage 2. BLS 3. Patient support & transport 4. Soft Communication skills
Desirable:	Disaster Management	Disaster Management

Conducting Training

Every Doctor, staff nurse, EMT or any other health professional involved in emergency care must undergo 1 week NELS training as per MoHFW guidelines.

In continuation of the same till the pre service teaching and training with adequate duration of the course and curriculum is being achieved by the healthcare professionals in the emergency setup., the state and district program officers should organise a short duration training for emergency and critical care so that the doctors, nurses and paramedics are oriented before they are posted in an emergency or any other critical area like HDU/ICU etc.

Equipment

For effective functioning of an Emergency, a specific set of equipment will be required. The list of such equipment is placed at ***Annexure-VII, VIII & IX.*** All the equipment purchased should be covered under comprehensive equipment maintenance programme or 3-5 years Annual Maintenance Contract (AMC). A checklist needs to be maintained on supplies and equipment; they should be checked before the end of every shift and beginning of every shift. Also, there is a need to maintain the checklist of non-functional equipment and consumed supplies and should be communicated during handovers.

Quality Policy

It is important to practice evidence based technical protocols in emergency to help in efficient delivery of emergency services and minimize the risk of hospital acquired infections. Both technical quality and service quality must be ensured. Some of the important components of high-quality care are discussed below:

Infection Control Protocol

- Careful hand washing practices
- Standard precautions
- Use of PPE (Personal Protective Equipment)
- Segregation and safe transportation of biomedical waste
- Cleaning methods (e.g. sequence of rooms, correct use of equipment, dilution of cleaning agents, cleaning process, frequency of cleaning etc.) for housekeeping staff & cleaning staff. They should also be oriented on protocols of cleaning in protective, clean & sterile zones present in Emergency ***(Annexure-X).***
- The supervisory rounds for cleaning & housekeeping must be undertaken with every change of shift.
- It is important that the quality of routine cleaning as defined in the hospital cleaning protocol must be strictly adhered to.

Indicators

To assess the quality of services being provided, following indicators may be used:

1. Core Indicators

(a) Proportion of red patient triaged out of the total emergency cases in a month

(b) Proportion of CPR performed in declared dead patient out of the total declared dead patient in a month

(c) Proportion of LAMA cases out of the total emergency cases in a month

(d) Proportion of mortality out of the total emergency cases in a month

(e) Average time spent by red triaged patient in Emergency: Time of arrival in ED - Time of disposition/admission/shifting to OT/shifting to ICU/shifting to ICU/referral/LAMA/ discharge/total the total emergency cases in a month

(f) Proportion of red triaged patient referred to higher informed facility out of the total red triage emergency cases in a month

2. Workload indicators

- ✓ Average number of patients attending emergency in a month.
- ✓ Total number of patients admitted in the hospital through emergency in a month.
- ✓ Number of patients Referred out per month.
- ✓ Number of patients Referred in per month.
- ✓ Disease wise classification of patients attending emergency as per scope of services (e.g.: chest pain, shortness of breath, seizures, poisoning, animal bites, road traffic injuries, acute abdomen, burns etc.).

3. Performance indicators

- ✓ Total CPR done in a month. (C/I for doing CPR- mutilated, beheaded, walk-in patient)
- ✓ Proportion of yellow triaged patient were re-triaged to red in the emergency
- ✓ Proportion of chest pain patients for whom ECG was performed.
- ✓ Proportion of shortness of breath cases for whom oxygen support was given.
- ✓ Proportion of fracture/dislocation cases for whom closed reduction was performed.

- ✓ Proportion of poisoning cases for whom gastric lavage was performed.
- ✓ Proportion of stroke cases for whom CT scan was performed
- ✓ Proportions of head injury cases for whom CT scan was performed
- ✓ Proportion of chest pain patient received thrombolysis
- ✓ Total number of teleconsultations done in one month
- ✓ Number of under 5 children detected with danger signs out of the total reported under 5 children
- ✓ Proportion of children under 5 referred to higher facility out of the total children under 5 reported to emergency care
- ✓ % Survival, within 24 hours of admission in emergency, in the following groups in the total number of under 5 detected with danger signs in emergency-
  - 0-1 months (data from SNCU)
  - Under 5 yrs of age

4. Patient Service Quality Indicators

- ✓ Time to shifting - This indicator shows the number of patients shifted to respective wards/ICUs/HDUs within 8 hours of admission under concerned department out of total admissions in that department.
- ✓ Unplanned re-attendance rate - This indicator includes patients who return to Emergency within seven days of the original attendance and are classified as an unplanned re-attendance
- ✓ Patient satisfaction surveys - Patient satisfaction surveys should be conducted regularly on a sample of patients to assess service quality. Patient satisfaction can also be assessed by feedback through “Mera Asptaal” application.
- ✓ Equity Indicators **-** Proportion of BPL patients managed in the Emergency.

5. Efficiency Indicators

The facility should measure efficiency indicators monthly ensuring state/national benchmark. The following indicator should be measured:

- ✓ **Time to treatment:** This indicator applies to all the patients coming to emergency. It shows the time taken from arrival to seeing a doctor and nurse who will start the treatment for the patient’s condition.
- ✓ **Response time** of consultant (Sr. Doctor) and time taken for investigation.
- ✓ **Time to initial assessment-** This indicator only applies to patients who arrive by ambulance. It measures the length of time from arrival into emergency to when an initial clinical assessment is completed. The aim is to achieve less than 15 minutes.
- ✓ **Average Turnaround time:** Average time a patient stays at the emergency observation bed
- ✓ **Response time of Ambulance-** It’s the time between receiving the call for ambulance service and the ambulance arrival at the desired location.

6. Outreach/referral indicators

- ✓ Percentage of referred patients without referral slips.

Records and Registers

Following manual or computerized records shall be maintained at Emergency of DH:

1. Patient admission register
2. Patient Shifting/ Referral register
3. Discharge register
4. M.L.C Register (at least three copies each)
5. Nurses Handover register (handing and taking over of critical equipments and emergency drugs in every shift change)
6. Blood Bank register
7. Laboratory investigation register
8. Mortuary Book & Death register
9. Narcotic register
10. Stock and indent registers for medicines and consumables
11. Log book of emergency calls made to on call doctors (time of call, staff name and signature, reason for which call made, time of attendance of emergency)
12. Attendance registers for all categories of staff.

All members of the health care team are responsible for ensuring that records are:

- Complete, accurate and legible
- Current, written at the time of patient contact whenever possible
- Signed, with the date, time, name and position of the person making the entry.

Monitoring and Supervision

Various functions and infrastructure suggested in the guideline needs to be maintained for ensuring quality in service delivery; this can only be ensured through regular monitoring and supervision. The complex needs to be run with a zero tolerance for non-adherence. During rounds, all the supervisory staff needs to follow protocols before entering the complex. Exclusive responsibility of ensuring this lies with the in-charge/supervisor.

- State and District Program officers to see the layout plan, general functioning and quality parameters.
- Periodic rounds by Hospital In-charge/MS for general overview on functioning and adherence to quality parameter.
- Daily rounds by Hospital Manager and Matron to oversee general functioning, adherence to quality parameters and identify issues being faced in the Emergency (if any) and corrective actions.
- Rounds by In-charge/Supervisor for Emergency for monitoring of quality parameters as defined under Quality and mentoring of staff to ensure adherence to various protocols.

The following activities need to be supervised by the In-charge:

- Adherence to technical protocols and flow process as indicated in the guidelines.
- Restriction of unnecessary entry into the complex with adherence to shoe change, PPE and hand hygiene protocols of all staff and attendants
- Ensuring that Triaging, Initial assessment, treatment and prompt referral are being strictly adhered.
- Number of linen items, bags, trays should be clearly mentioned in the records duly signed by in-charge/nurses/ward boy.
- Functionality and regular cleaning of all equipment being used in Emergency for autoclave/ washing as per indicators along with records of inventory, manufacture details, AMC/CMC etc.
- Downtime of equipment & stock out rate of emergency medicines to be checked
- A monitoring checklist is placed at ***Annexure-XIII.***

Operationalizing the existing Emergency

The purpose of this guideline is not only to further strengthen the Emergency but also to maintain the layout, flow, processes, and protocols and monitor the quality parameters as defined in these guidelines for the desired outcome.

There can be a situation where the space is less, and under such circumstances, options need to be explored for either vertical extension to fit the indicated processes for ensuring quality. Supervisory and monitoring rounds are equally important both for in-house and outsourced units and as such it is important that the capacity building of both staff needs to be undertaken and prioritized.

The hospital in-charge and supervisors should also define the pathways for critical care service areas. This will ensure smooth functioning of hospital OTs, HDUs, ICUs, Emergency and other such critical care areas.

Standard Protocols for Emergency

The following protocols need to be adhered for Emergency:

1. Receiving the patient
2. Triage& Resuscitation (if required)
3. Registering the patient
4. Identification of patient
5. Initial assessment of patient
6. Reassessment of patient
7. Shifting/transfer of patient within hospital
8. Referral of patients
9. Discharge of the patient
10. Patient care protocols
11. Medico-legal cases
12. Handing and taking over of critical equipment
13. Protocol to ensure safety of the patients' belongings
14. Zero Tolerance for Violence on Healthcare Professionals and Clinical Establishment
15. Clinical protocols for common critical conditions (Snake bite, Shock, Cardiac arrest, Burns, Poisoning, Trauma, Injuries etc.)

1. Receiving the Patient

Responsibility: Security Guard/Hospital attendant

Protocol:

- Any unknown case brought to the emergency; a proper entry about the unknown case needs to be recorded while the treatment is ongoing.
- Availability of wheelchairs and stretchers should be ensured at the receiving area of emergency.
- Whenever a non-ambulatory patient reaches the emergency door, the on-duty hospital attendant should shift the patient to a stretcher or wheel chair depending on patient's condition with the help of the security guard and transfer the patient to the Triage Area

- In case of walk-in patients, patients walk in directly to the Triage area.

2. Triaging & Resuscitation

Responsibility: Triage Nurse, Medical Officer. Even the guards and attendants posted in Emergency should be oriented to move the cases faster with emergency signs, so that urgent attention to critical and seriously ill patients is not missed.

Protocol:

- Quick initial assessment of patients coming to Emergency is vital for saving lives and reducing morbidity and mortality. *(Annexure XV)*
- A dedicated staff nurse trained in triage and resuscitation should be available 24*7 in the triage area. She/He should be working under the supervision of a Medical Officer.
- They should possess quick assessment and resuscitation skills and seek help when patients requiring urgent resuscitation arrive in the emergency.

3. Registration of Patient

Purpose: To provide 24 × 7 dedicated services to the patient coming for emergency care.

Responsibility: *Registration clerk*

Emergency Patient Registration:

- All patients coming to emergency should be registered at emergency registration counter which must be present near to triage and must function 24*7. However, in case of critical patients, care must be provided immediately and should not be delayed for the want of registration
- The registration form is filled by the triage nurse mentioning the following details: Name, age, sex, address, contact number, time of admission, presenting complaint, triage category, MLC- applicable or NA.
- The registration clerk at the desk then registers the patient as per the details listed in the registration forms and generates an Emergency registration number of the patient.
- For medico legal cases, MLC is mentioned on the Emergency card.
- During OPD hours, after the initial assessment, if a non-critical patient walks into an emergency, they should be directed to go to the concerned OPD after registration at the general OPD registration counter of the hospital. Whereas during odd hours or holidays all patients walking into hospital are to be registered at the emergency registration counter (except in those hospitals where an evening OPD is functional).
- For referred patients, the same is mentioned on the referral slip along with details of facility from where the patient is referred and reason for referral. It should include details of diagnosis, major findings and treatment given. Contact details of the referrer should also be provided. Referral slip if available should be retained in hospital records.
- In addition to Emergency registration number, a centralized MLC number separately identifies all the medico-legal cases. MLC number is provided either manually at the registration counter or generated online.
- The doctor on duty, with the help of nursing staff on duty, sends the information to the police control room for all the medico legal cases.
    - ✓ All unidentified patients are registered as medico legal cases and the information regarding this is sent to the police. Once the patient is identified, information is updated in the records.
    - ✓ After doctors' assessment, a provisional diagnosis is entered in the Emergency card by the concerned doctor both for MLC and non-MLC cases.

- ✓ Admission papers, if patient needs to be admitted in the hospital, will be made as per the hospital's policy- with details such as provisional diagnosis, department under which patient would be admitted, treating specialist, ward number & bed number.

4. Identification of the Patient

Responsibility: Any hospital staff concerned with patient management e.g.: doctor, staff nurse, lab technician and registration clerk.

The staff should ensure patient identification at all times. For example before

- Any consultation
- Administering any medication
- While collecting sample in the phlebotomy area
- Any procedure/intervention (identifying the correct side of limb/organ prior to intervention)
- *A triage band* is given to the patient at the time of registration with his/her registration number mentioned on it. The band must be checked before any consultation, investigation, procedure and administration of medication. Patient name and parent/spouse name is also asked to confirm the patient's identification.

5. Initial Assessment of Patient

Responsibility: Doctor on duty, nurse on duty.

- Doctor on duty assesses all the patients coming to the Emergency.
- In case the doctor is not immediately available the patient is assessed by staff nurse on duty and then seen by the doctor as soon as possible.
- Vital signs are recorded by the doctor/nurse immediately for patients in the red zone and within five minutes of arrival for patients in the yellow zone and then every 30 minutes or more frequently in both red and yellow zones as per the clinical need. If there is facility, critically sick patients must be continuously monitored through multi-para monitors.
- Doctor on duty, may seek specialist opinion if required.
- In case of verbal or telephonic orders, they are duly verified and noted prior to implementation.
- Initial assessment includes
  - ✓ Detailed history taking
  - ✓ General examination
  - ✓ Systemic examination as indicated from history
- The initial assessment should lead to formulation of working/provisional diagnosis.
- A documented plan of care is made after this.
- In case the patient needs referral to a higher center, findings of initial assessment are captured in the Emergency admission record and patient is stabilized before referral.
- All the patient records are dated, timed, named and signed by the concerned person.

6. Reassessment of Patient

Responsibility: Doctor on duty, staff nurse, concerned specialist

- All the critical (red) patients are kept under observation in the observation area/room. These patients are reassessed by the doctor on duty every 30 minutes or as and when required. The purpose of reassessment is to monitor vitals, any new complaints/ deterioration of condition etc. that needs to be addressed appropriately and immediately, so that proper interventions are done in time.

- All non-critical (yellow) patients are reassessed every 4 hours or as and when required.
- All admitted patients are reassessed by the specialist of concerned specialty at least once during each shift.
- If an admitted patient is to be referred, decision to refer is taken in consultation with the concerned specialist, however in life threatening conditions the doctor on duty can refer the patient on his own and then inform the concerned specialist. However, before referral of such cases, resuscitation and stabilization should be undertaken for critically ill patients.
- All the notes on patient's records are to be dated, timed, named and signed by the concerned doctor.

7. Shifting/Transfer of Patient within Hospital

Responsibility: Doctor on duty, concerned specialist

Protocol:

- The doctor on duty should take regular rounds of the patients admitted in the Emergency every 4 hours or more frequently as per the clinical need of the patient and to take the disposal decision regarding further management of the patient such as shifting in HDU/ICU/OT/Ward or discharge/referral. The same should however, be taken in consultation with the concerned department/specialist.
- Patient should be disposed from emergency as early as possible. Moreover, no patients should be kept in the red zone for more than 12 hours and in the yellow zone for more than 24 hours. The purpose is to ensure that emergency beds are available for new patients who are coming with acute illness.
- While shifting of the patient, hand over between different service areas should be done and records pertaining to the same should be maintained.

8. Referral of Patients

8.1 Refer in patients

Referred – To the Emergency

Responsibility: Doctor on duty, staff nurse on duty

Protocol:

- All the patients referred from periphery and other institutes are promptly treated at the hospital if the services to be provided are within the scope of the Emergency care unit.
- If the services required are not available at the emergency unit of the facility, then these patients/attendants are informed about the situation and given advice about alternative facilities for management. Then the protocol for referred out patient is followed (see below).
- All the referred in patients are registered in the hospital and a call log regarding referrals to the facilities from referring facilities are maintained by nursing staff on the shift duty.

8.2 Referral Out from Emergency

Responsibility: Doctor on duty, concerned specialist

Protocol:

- If the doctor on duty decides that the patient requires referral to a higher center for further management he/she should contact the concerned specialist on telephone or through a written communication. If required, the specialist doctor should visit the patient to assess the clinical condition of the patient and then take a decision to refer the patient, if needed.

- If the patient's condition is unstable, they should be stabilized in the emergency before being referred out.
- The doctor on duty should inform the hospital to which the patient is being referred.
- In case of unavailability of beds at the referral hospital, alternatives are explained to the relatives of the patient and a decision made accordingly.
- The EMT should accompany a critical patient in the ambulance, during transport.
- A fully filled standardized referral card is provided to the patient/attendant at the time of referral with details of the reason for referral, investigations done if any and treatment provided so far.
- The ambulance should be fully equipped with resuscitation equipment along with experienced and suitably trained emergency medical technician.

9. Discharge of the Patient

Responsibility: Doctor on duty, concerned specialist

Protocol:

- Discharge process is discussed with the patient and the family.
- The doctor discharging the patient should document further management instructions in the discharge note.
- Discharge summary is prepared on a standardized format and signed by the concerned doctor.
- The discharge summary should contain:
  - ✓ Diagnosis
  - ✓ Significant findings
  - ✓ Investigations results
  - ✓ Management at the facility including details of the procedures performed (if any),
  - ✓ Further medication and instructions to be followed
  - ✓ Instructions for next follow up.

9.1 Discharge Against Medical Advice/Discharge on Request:

Responsibility: Doctor on duty, concerned specialist

Protocol:

- In case the patients and relatives wish to get discharged from the hospital before complete recovery, this will be respected.
- The doctor on duty/specialist discusses the potential risk and consequences of taking DAMA/DOR for the patient. The patient, relatives, concerned doctor and the nurse on duty sign the consent for 'discharge against medical advice'.
- A discharge summary is handed over to the patient/relative with the medical advice and it is mentioned on the discharge card that patient is being discharged against medical advice.

9.2 Absconded Patient

Responsibility: Doctor on duty, Concerned Specialist, Staff

Protocol:

- If an inpatient is noticed having left the emergency care unit or is missing from anywhere in the hospital premises, without informing any concerned staff member/doctor on duty, then he/she will be marked as absconded from hospital and this information will be

mentioned in the patient record. One time contact with the absconded cases from the emergency should be attempted.

10. Patient Care Protocols

Purpose: To provide a standardised protocol to be followed in case of critical patients kept under observation and to ensure that all the equipment's are functional at all times.

Responsibility: Doctor on Duty, Nurse on Duty

Procedure:

- Initial Assessment of the patient should be done as per the initial assessment protocols already described.
- The doctor on duty should reassess the patient every 30 minutes or more frequently as per patient's condition.
- Decision should be taken to admit, shift, discharge or refer the patient within four hours.
- The staff nurse on duty should also monitor the patient as per doctor's instructions.
- All the investigations (Laboratory, Radiology, etc.) should be done as soon as possible and reports should be made available on priority.
- The call log of consultations taken by MO on duty from emergency in-charge or specialists is maintained by nursing staff on shift duty.
- Doctors and nurses should follow ethical code of conduct and adhere to universal precautions.
- Proper handover of patients with complete documentation should be done as the shift changes.
- Drugs and equipment should be checked and handed over at the change of every shift.
- Infection control and waste management protocols should be strictly followed.
- Hygiene and sanitation should be maintained e.g. routine cleaning and decontamination of equipment after every use.

The detailed TORs of the Emergency staff recruited at Emergency Department is placed at Annexure VI

11. Medico- Legal Cases

A medico legal case is a case of injury/illness where the attending doctor after eliciting a comprehensive history and examining the patient, considers that investigation by the law enforcement agencies is essential to establish the case of the incident in accordance with law. The police control room needs to be informed when a patient is brought to the hospital/ admitted and there is a history of:

- ✓ Accident, homicide, suicide, infanticide, poisoning, machinery related injury (industrial and vehicular accidents), assault, strangulation, sexual offences, criminal abortion, burns, mass casualty and any other cases in which foul play is suspected.
- ✓ All the Medical officers and service providers working in the emergency department should be well-versed with Guidelines& Protocols for Medico-legal care for survivors/ victims of sexual violence

Intimation of Medico-Legal Cases to the Police:

Purpose: To intimate the police regarding all the medico legal cases in a uniform format and to comply with statutory requirements as mandated by the law.

Responsibility: Doctor preparing the medico legal report

Protocol:

- The privacy of the patient should be ensured first.

- The doctor on duty examines the patient and prepares a medico legal report preferably in computerized format. In case, the doctor is unable to provide computerized report immediately, a manual report should be provided to the patient and the computerized report should be provided within one week.
- The police control room is intimated giving brief details of the case in a written format.
- The reporting time and date is also mentioned in the detailed report given to the police.
- MLC police information form is filled in triplicate and original copy is handed over to the police, the duplicate one is given to the patient and one copy is retained in the hospital record.
- A receiving is taken from the police person who has been informed regarding the case.
- Wherever required, relevant specimens are collected, sealed and handed over to the police authorities. A receipt of the items sealed and handed over to the police is made. The patient's case file is stamped as 'medico-legal case'.

12. Handing and taking over of critical equipment

Every emergency should have equipment that are clean and ready for use at all point of time. This helps in providing timely and assured services. So, with each change of the shift, a handing and taking over register for recording operational status of critical equipment like oxygen, suction, multi para monitors, ECG's, defibrillators etc. should be in place. With change in the shift the nurses need to sign in the handing and taking over register. This also helps in ownership and accountability.

13. Safety of Patient's Belongings

Responsibility: Staff nurse on duty and/or the attendant

Protocol:

- Patients are advised to leave all valuables at home or send them home upon admission to the hospital; this includes jewellery, cash etc.
- Signature of the relative is taken upon handing over of patient belongings.
- If attendant is not available the nurse on duty should keep the valuables under lock and key. They should not be left at the patient's bedside.
- A receipt is provided for collection of items upon discharge.
- Patient should be informed about taking care of their belongings, e.g. - mobile phones etc.

14. Zero Tolerance for Violence on Healthcare Professionals and Clinical Establishment

Violence against healthcare professionals at their workplace is very common now-a-days. Almost every doctor is worried about violence at his/her workplace, and very few doctors are trained to avoid or deal with such situations. It is a real concerning scenario, because violence in emergency care area not only hampers service delivery to the patients but is also dangerous to the service providers, leading to fatal outcomes. Hence, there is an urgent need for an understanding that violence in an emergency care unit or hospital/clinic or against the medical fraternity is a criminal offence and has zero tolerance in any form in any civilized society. It is also desired that the Administration department of all hospitals/clinical establishments must maintain a zero-tolerance policy, especially for its emergency care unit and implement it. Emergency area should have information displayed about the criminal offence against any act of violence towards health care service providers.

As effective communication skill plays a key role in averting or handling such situations, it is imperative to impart soft skills training to the doctors as part of their medical training and hence, train them in interpersonal skills, so that the incidences of violence can be prevented to the maximum possible.

15. Clinical protocols for common critical conditions

Effective and efficient investigation and management of Emergencies in a timely manner requires availability of a team of well-trained staff, paramedics and doctors along with necessary infrastructure or supplies in an emergency care.

Placed below is a table indicating some of the common emergencies categorised under various specialties which may come to a district hospital or any other public health facility providing secondary care services. The list is not exhaustive.

Some other common emergency conditions have also been dealt in the upcoming emergency and critical care training curriculum for medical officers. The prime objective of the emergency is live saving and stabilizing the patient. After initial stabilization, the patient should be transferred to definitive care depending upon the symptoms or differential diagnosis, where the treatment can be initiated.

Many of such emergencies will need further specialized care for which specialists if available at DH, should be called or else after stabilizing the patient he/she should be referred to an appropriate higher level health facility where such specialties are available.

It is important to understand that all care required for the patient may not be possible at emergency department by medical officer, so specialist consultation, transfer to appropriate care facility with timely referral needs to be undertaken for specific cases.

List of emergency conditions			
Cardiovascular Emergencies • Acute Coronary Syndrome/MI • Acute Chest Pain • Arrhythmias • Congestive Heart Failure • Acute Pulmonary Embolism • Accelerated Hypertension/ Hypertensive Crisis ***Haematological Emergencies*** • Severe Anaemia • Bleeding disorders	***Respiratory Emergencies*** • Acute Dyspnoea • Acute Respiratory Distress Syndrome (ARDS) • Acute asthmatic attack/Acute exacerbation of COPD • Severe Respiratory distress- Pneumothorax etc. • Acute Anaphylactic Attack • Haemoptysis • Stridor and Croup • (Pediatric)	***Gastrointestinal Emergencies*** • Bleeding PR/Malena • Acute Abdomen • Acute Appendicitis • Acute Cholecystitis • Severe Jaundice • Hematemesis • Ascites/Anasarca • Acute Gastroenteritis with or without dehydration • Hepatic Encephalopathy • Intestinal Obstruction	***Neurological & Psychiatric Emergencies*** • Sudden Onset Paralysis- Paraplegia/ Hemiplegia • TIA/Syncope • Severe Headache • Altered sensorium • Panic Attacks • Status Epilepticus/ Febrile Seizures • Acute Psychoses or Extreme Agitation • Behavioural Abnormalities- Suicidal/Homicidal
Dental Emergencies • Maxillofacial Trauma • Acute Dental Pain	***ENT Emergencies*** • Sudden loss of hearing • Foreign body in pharynx/nose • Fracture of nose • Ear discharge • Quinsy • Epistaxis	***Urological Emergencies*** • Acute Urinary Retention/Anuria • Haematuria • Dysuria • Fournier's Gangrene • Paraphimosis • Priapism • Acute testicular pain/ Torsion of testes	***Miscellaneous*** • Unconscious patient • Shock • Sudden onset Neck Stiffness • Animal/Insect bites

List of emergency conditions			
Ophthalmological Emergencies • Acute Painful Red Eye • Sudden Painless visual loss • Foreign Body in eye • Trauma • Orbital Cellulitis • Chemical Injury to eye • Black Eye	***Nephrological Emergencies*** • Acute Renal Failure/ AKI/Acute on Chronic Renal Failure • Nephrotic Syndrome with acute kidney injury ***Medical Emergencies*** • Diabetic Coma/DKA • High Grade Fever with or without rashes/chills	***Obstetrics & Gynaecological Emergencies*** • Abnormal Vaginal Bleeding • Menorrhagia • Acute Lower Abdominal (Pelvic)Pain • Bleeding in pregnancy • Ruptured Ectopic Pregnancy • Eclampsia • Criminal Abortion	***Burns, Trauma & Accidents*** • Road Traffic Accidents/ Injury at work • Spinal injury • Polytrauma • Tendon Injury • Degloved Injuries • Fractures • Burns • Drowning and Near Drowning • Foreign Body Ingestion/Choking • Poisoning • Drug overdose • Sexual and Physical Assault • Needle Stick Injury • Gunshot injuries

The guidelines summarize and evaluate available evidence with the aim of assisting healthcare professionals in selecting the best management strategies and facilitate decision making for an individual patient with a given condition. However, the final decisions concerning an individual patient must be made by the responsible healthcare professional(s) in consultation with the patient and caregiver as appropriate. This guideline provides systematic step by step algorithms for the management of the following emergency clinical conditions as detailed in ***Annexure III.***

The algorithms provided in the guidelines aims to quickly identify, stabilise, and transfer both adult and paediatric cases from the emergency area to the appropriate department in order to provide assured definitive care in accordance with the respective programme such as F-IMNCI.

ADULT ALGORITHM	PAEDATRIC ALGORITHM
1. Acute abdomen	16. Trauma
2. Altered mental state	17. Scorpion Sting
3. Known diabetic patient	18. Snake bite
4. DKA	19. CPR in adults
5. HHS	20. Pyschiatric, alcohol-related & opioid & benzodiazepine related emergencies
6. Sepsis	21. Shock in child without SAM
7. Shock in adults	22. Shock in child with SAM
8. Seizure	23. Asthma in children less than 12 yrs
9. Suspected acute stroke	24. Children with cough or difficult breathing
10. Shortness of breath	25. Acute asthma in older children (5-12 yrs)
11. Acute severe asthma in adults	26. Sick neonates
12. COPD	27. Diarrhoea in children
13. Pulmonary Edema	28. CPR in an unresponsive child
14. Anaphylaxis	29. Seizure in pediatric age group
15. Chest pain	

It is imperative to note that these algorithms are dynamic and will need regular review (e.g. every two years) and updating in light of emerging evidences and technological advancement.

Surge Management in Emergency/ Casualty Department

Emergency departments in most of the public health care facilities are faced with the challenge of ensuring access to assured and quality emergency care during times when demand exceeds available resources. This becomes very challenging in case a disaster, mass casualty or an epidemic occurs which may overwhelm the emergency department by excessive surge in incoming emergency cases. Such situations hamper the smooth running of department and can pose delay in providing critical emergency care services to the patients. There are generally two situations in which emergency departments expect a surge in inflow of patients. These are Mass Casualty Incidents or Mass casualty events. Both situation are elaborated below:-

Mass Casualty Incidents

Such incidents take place in the vicinity of the hospital/health facility or within the facility itself wherein the emergency department may receive a large number of patients that need to be evaluated, stabilized, referred to a higher facility or managed within the hospital. Local resources of the hospital/medical facility are put under stress and patients are triaged with the aim of identifying the patients with the most life threatening injuries to be treated first. This calls for mobilizing of adequate medical, nursing and support staff, the creation of surge capacity and incorporation of sufficient material resources to provide initial triage, evaluation and solutions. Ideally the hospitals should be in readiness to manage mass casualty incidents on their own and with their inhouse resources by adequate planning for managing surge.

Mass Casualty Events

In this situation the victim load is more than the capacity of the hospital and hence at times adequate care may be compromised. Thus, in such a situation, one should try to do whatever best is possible for the maximum number of victims within the available resources. Triaging is focused on managing patients with the greatest possibility of survival. A critically ill victim of disaster, who under normal circumstances would receive maximum care using maximum resources of the hospital, would be low on priority in receiving adequate care in mass casualty situation so that available resources can be utilized for the maximum number of patients.[1]

All emergency departments of district hospitals should have a plan to manage surge to remained prepared for any such conditions that may arise.

Role of the Emergency Department

All Emergency Departments should have an ED response plan which is incorporated within the hospital disaster plan and co-ordinated with district disaster management protocols. the ED plan must be a simple, flexible, comprehensive and adaptable to various disaster settings.

1 Provider Course Manual for Doctors, National Emergency Life Support. Ministry of Health and Family Welfare [internet]2022 [Cited 2022,June 30] Available from : https://main.mohfw.gov.in/sites/default/files/Provider%20course%20manual%20for%20Doctors.pdf

Hospital along with emergency department needs to develop and maintain outpatient and inpatient surge capacity for the triage, treatment, and tracking of patients at the facility or in alternative sites of care during outbreaks, hazardous chemicals exposures, and mass casualty incidents. Surge capacity is a measurable representation of ability to manage a sudden influx of patients. The important elements of the ED plan include:-

1. Procedure for plan activation
2. Mobilization protocol in coordination with local authorities
3. Description of roles and responsibilities (job action cards)
4. Triage criteria Life support
5. Priorities for definitive care.

For a well-planned process to manage surge/crowd in emergency department following inputs are required:-

- **Staff**: Nurses, Physicians, Paramedics and support staff. Training of all the hospital staff in basic resuscitation, dressing, wound care and similar first aid so that the potential can be utilised when needed. The emergency medical teams (EMT) from adjacent facilities if available can be summoned.
- **Supplies**: Including equipment like monitors, defibrillators, ventilators, wheelchairs and trolleys and emergency medications, oxygen supply and consumables. As a principle, 10% of equipment, medication and other sundry articles should be kept in reserve.
- **Space**: Additional space or open area, with built in suction and oxygen ports as well as electrical supply should be kept as a reserve area and can be converted into temporary area for triage and emergency care in case of any mass incidence. Bed counts, percentage of beds occupied should be regularly monitored on a daily basis.
- **Systems**: Policies and procedures that integrate departments within the healthcare facility, communication plan and transportation plan. The SoPs should be available with the hospital staff at all times and co-ordination through activities such as mock drills can be built suggestive plan of SoPs are placed at Annexure VI. [2]

2 Christian, Michael. Surge Management for Critical Care Leaders. [internet] 2010[cited 2022 June 30] Available from : https://www.researchgate.net/publication/294735989_Surge_Management_for_Critical_Care_Leaders

Crowd Management

Many a times, unforeseen circumstances, may cause crowding at the hospital premises causing alarming and potentially violent situations. Emergency Departments in particular, are a high risk setting for workplace violence occurring against health care workers and doctors working at the forefront, especially the junior doctors and residents, who bear the brunt of such events.[3] Sporadic incidents of mobs arriving at hospital premises after verbal violence between doctors and patients' attendants to create nuisance have been reported from across the nation. Patient dissatisfaction due to inefficient service systems such as long waiting time, overcrowding, less staff or resources, and disagreement with the medical plan may instigate episodes of violence. In such situations, doctors are primarily exposed to an outburst from the patients and their attendants.[4]

It is therefore important to have designated protocols in place so that such circumstances can be prevented from occurring in order to make the workplace safe for healthcare workers.

To prevent such incidents from occurring and to tackle these in case the situation arises, should be an important objective while planning the operationalization of emergency care services. The risk management approach of risk identification, assessment, categorization, analysis, and monitoring can be adopted while planning. Identification of the cause as to why these incidents occur commonly is the mainstay to prevent and manage such situations effectively. Evidence suggests that the most incidents of workplace violence occur when the emergency care services are crowded and overburdened and/or short staffed.[5] The patients presenting in emergency care settings are vulnerable, sometimes intoxicated or not in a lucid state and require immediate attention; therefore, soft skills in communicating effectively to prevent miscommunication which may otherwise lead to verbal as well as physical violence; play an important role. Even in stressful situations, the attending doctors, nurses and paramedics should communicate and convey the patient situation and steps being taken to the attendants in a bid to build confidence and help prevent any untoward incident.

Arguments in Emergency Department are not desirable; rather effective communication of the service providers mostly calm down agitated attendants of the patients. Some important things to consider while planning the operationalization of emergency care services to reduce the risks of workplace violence through crowd management are:

3 Singh G, Singh A, Chaturvedi S, Khan S. Workplace violence against resident doctors: A multicentric study from government medical colleges of Uttar Pradesh. Indian J Public Health 2019;63:143-6.

4 Kumar M, Verma M, Das T, Pardeshi G, Kishore J, Padmanandan A. A study of workplace violence experienced by doctors and associated risk factors in a tertiary care hospital of south Delhi, India. J Clin Diagnostic Res 2016;10:LC06-10.

5 Kumari A, Kaur T, Ranjan P, Chopra S, Sarkar S, Baitha U. Workplace violence against doctors: Characteristics, risk factors, and mitigation strategies. J Postgrad Med. 2020 Jul-Sep;66(3):149-154. doi: 10.4103/jpgm.JPGM_96_20. PMID: 32675451; PMCID: PMC7542052.

A. **Security, safety and quality assessment:** It is imperative that the hospital administration performs security and safety assessment of the premises, on an annual basis in terms of the functioning of emergency department, closely observing the flow of services in emergency area, availability of equipment, drugs and other supplies, clinical and prescription audits to check quality of emergency care being provided in order to identify the potential areas requiring additional security measures. Identifiable hazards during the assessment should be promptly removed or substituted, so that risks can be reduced.

B. **Security Personnel:** Provision of security in form of security personnel at the entrance of hospital gate as well as Infront of the emergency premises is a must. The security team should be competent and skilled in managing the crowd, and only one attendant should be allowed to enter the emergency premises with the patient. He/she should also be trained in communicating effectively with the crowd and diffusing a potentially violent situation.

C. **Engineering controls**: Security infrastructure like barricades, card-based entries, safe rooms, alarm buttons in each room, central alarm system, etc. can be installed in the emergency area to strengthen security measures. Additionally, the emergency premises should be under strict 24-hour CCTV surveillance, to ensure continuous monitoring of the premises, and taking prompt actions such as alerting and deploying police personnel at the site of the incident.

D. **Role of District Authorities:** Ensuring such untoward incidents do not occur and peace prevails in the district is the collective responsibility of the district administration and not just the hospital authorities. Providing physical presence of police personnel in the form of a designated police outpost, a hotline for reporting the incidents, defining the action points according to risk stratificaction, etc., are a few measures which can be undertaken by district authorities

E. **Training the Healthcare Workers:** Communication is crucial in volatile circumstances and needs to be clear, crisp and effective when providing emergency care in healthcare settings. Most of the incidents of workplace violence begin with miscommunication. In addition to the security measures being undertaken, it is equally important to build capacity of hospital staff for tackling such situations. Training on interpersonal communication, and other soft skills, mock drills and scenario-based trainings at frequent intervals can be adopted for the same to orient staff on skills like de-escalation techniques, avoiding working alone, mitigation techniques etc.[6]

F. **Reporting and Response**: In case any kind of workplace violence occurs, ensuring an FIR is registered against the perpetrators, as well as necessary legal action is taken against them should be responsibility of the hospital administration. In addition to that immediate first aid and psychological support to the healthcare worker should be assured. Warning should be displayed in the premises regarding the legal implications of violence against healthcare workers.

Any local measures, which the hospital seems is necessary to prevent workplace violence and manage crowd effectively can be undertaken in order to ensure the services run smoothly and healthcare delivery does not suffer.

6 Occupational Safety and Health Administration (OSHA) 2015. Preventing Workplace Violence: A Road Map For Healthcare Facilities [Internet]. 2015[cited 2021, July 1]. Avalable from: https://osha.washington.edu/sites/default/files/documents/Caring%20for%20Caregivers%20Report.pdf

PART – II
ANNEXURES

Annexure I

Initial Assessment and Management of patient in emergency care unit

ABCDE table

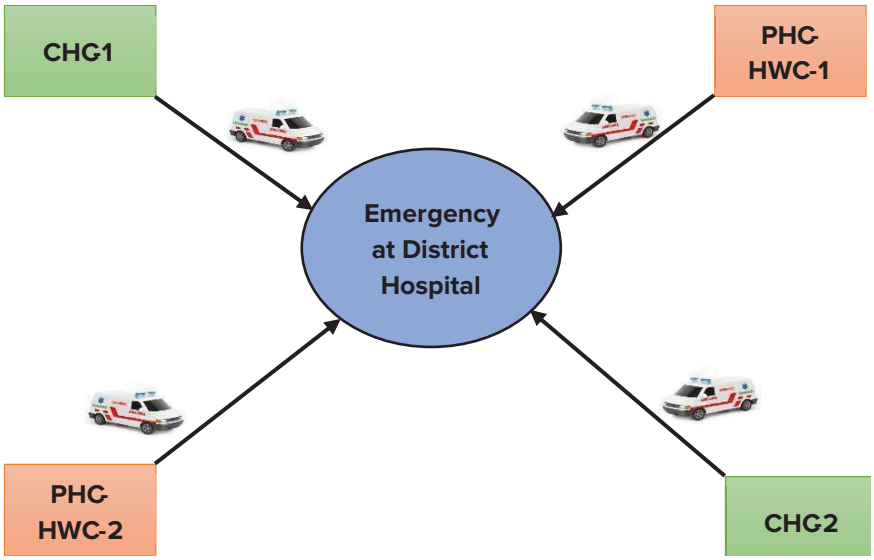
	Assess	Act/ Intervene/ treat
Airway	Protection of patency	Assess & maintain patency by simple measures- Position of comfort, head tilt-chin lift, jaw thrust (if cervical injury), inspect mouth & remove any secretions/ blood/foreign body if visible, apply suction, airway adjuncts (oropharyngeal/ nasopharyngeal airway)
Breathing	Oxygenation – SpO_2 Ventilation	Assess Respiratory rate, effort, chest expansion & air movement, lung & airway sounds & SpO_2 Assist ventilation if required Commence CPR if patient is unconscious and absence of normal breathing Apply O_2 to maintain SpO_2 > 94%
Circulation	Perfusion to tissues CRT, Pulse, BP	**Assess** • Skin temperature, colour • Heart Rate, rhythm Peripheral & central pulses Capillary refill • BP • Urine Output • Monitor vital signs frequently by multi para monitor **Action** • IV cannulation • If SBP <95th percentile for age in children or < 90 mm of Hg in adults- IV/Intra Osseous RL or NS 20 ml/kg bolus in children or 500 ml or 30 ml/kg bolus in adults.
Disability	AVPU/GCS, Pupils, Blood glucose (BGL)	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/ Intra Osseous 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 to prevent hypothermia

Annexure II

General Principles

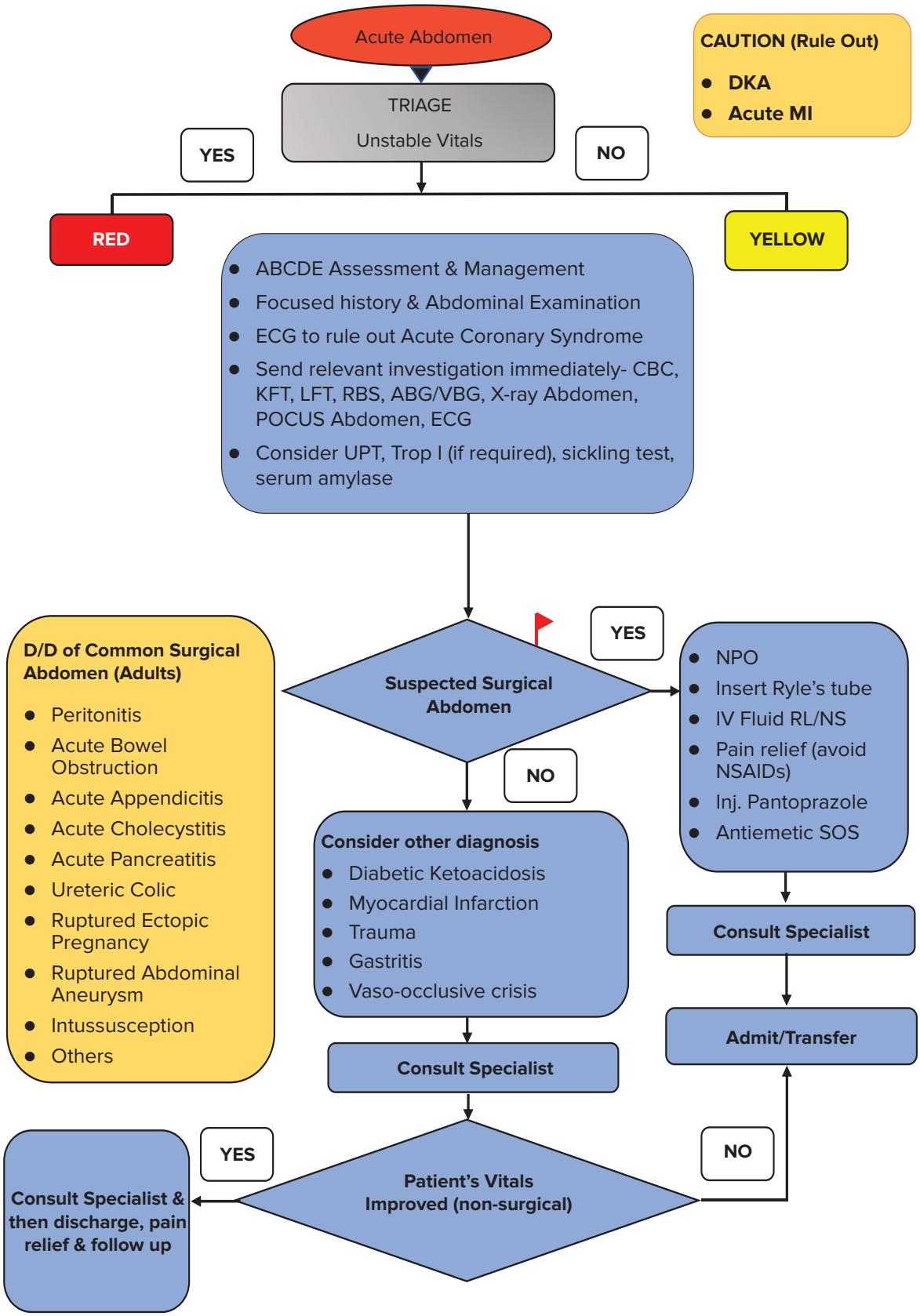
- Saving the life, limb and organ of the patient should be the ultimate aim of the healthcare practitioners in the Emergency.
- All patients visiting emergency should be properly triaged, shifted and adequately managed in respective areas.
- For all critically ill patients, ABCDE protocol should be followed.
- Every unconscious patient should be categorized as critical and shifted to Red zone of the Emergency.
- Mapping of the facilities providing 24*7 Emergency Services should be done in the districts and the critical cases should be referred directly from the lower-level facility to these mapped facilities.
- For time dependent conditions like STEMI, Stroke, Sepsis, Accidents, Trauma and Snake bite, immediate management at lower facilities should be to recognize, resuscitate and refer to the mapped facilities.
- All patients in red and yellow zone need to be consulted by the expert/specialists in emergency. All red patients need to be admitted on priority basis, if facilities are available or else refer after initial stabilization. Those yellow patients who need treatment and observation must be admitted.
- A specialist should be consulted, whenever admit or transfer decision is made.
- One-week training in NELS is mandatory besides Emergency & Critical Care Training.

Mapping of Facility

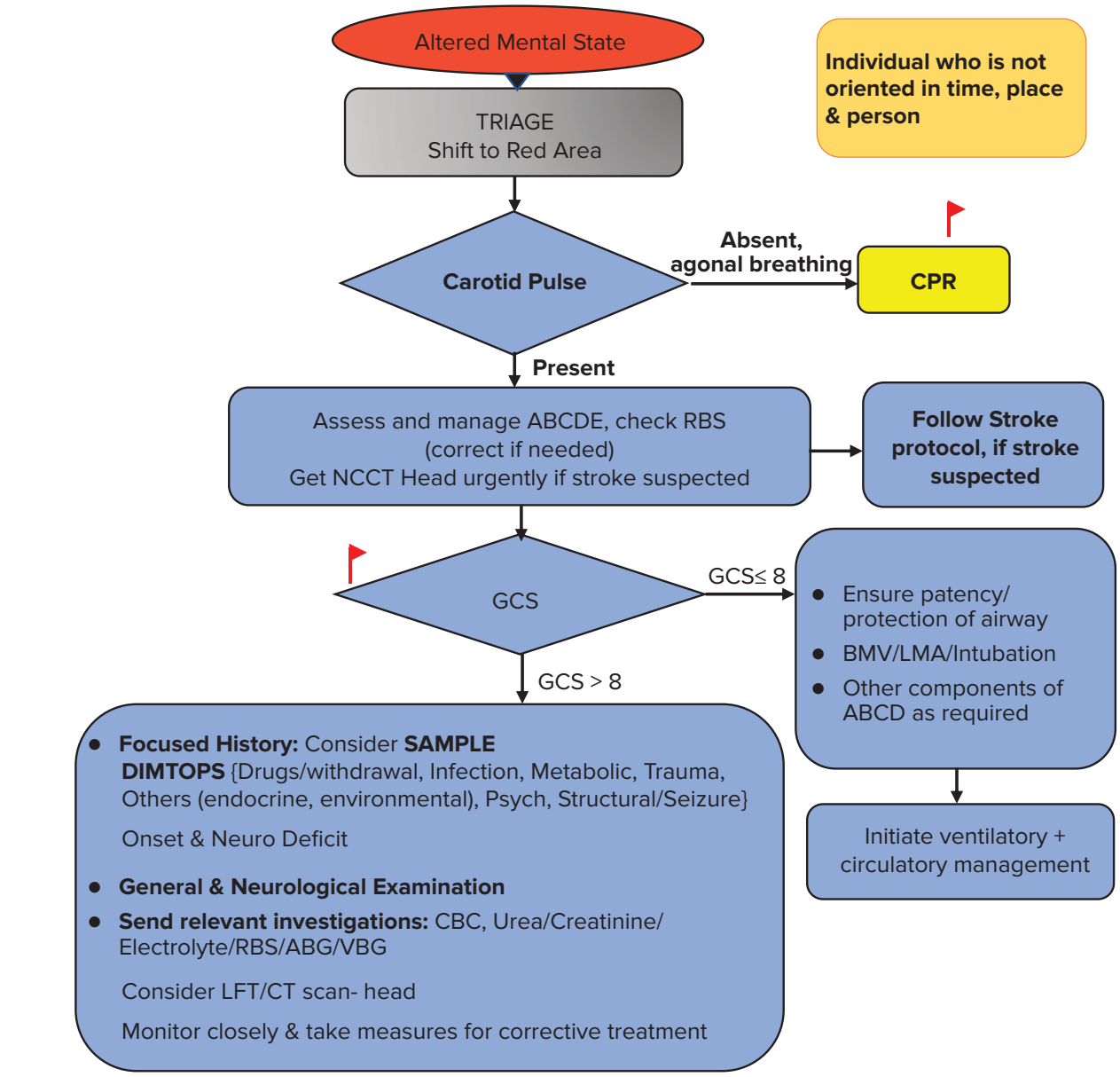


Annexure III

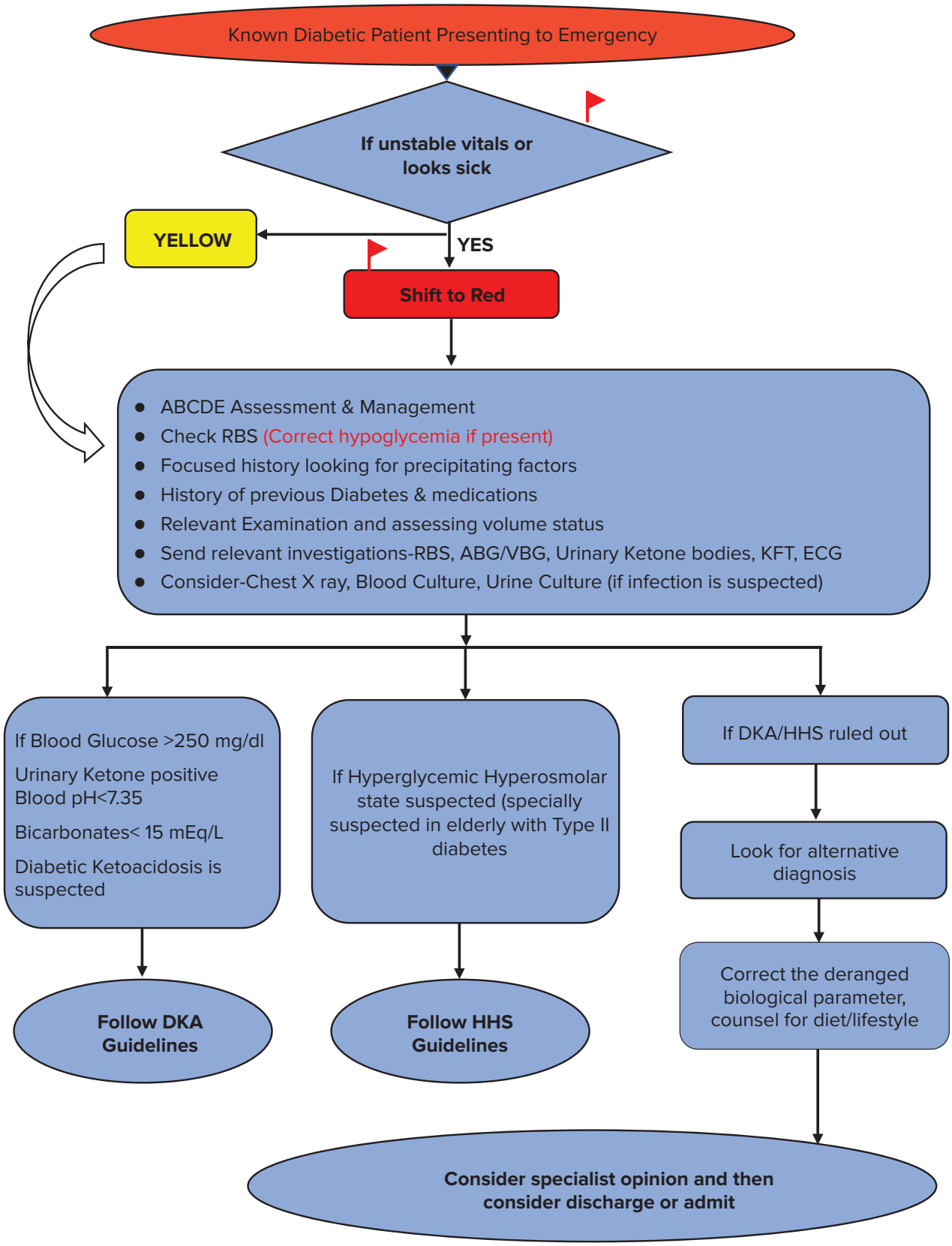
1. Algorithm for the management of Acute Abdomen



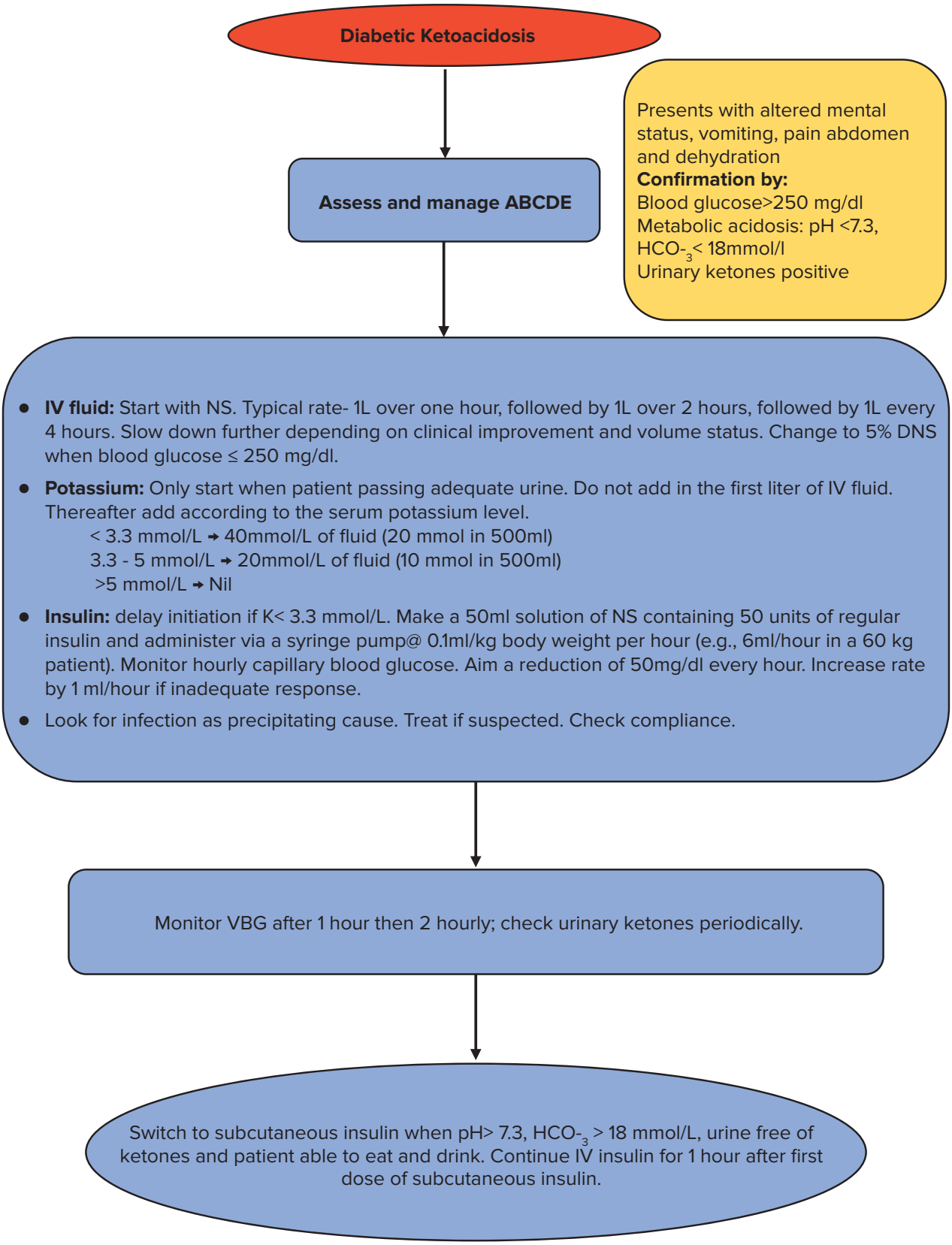
2. Algorithm for the management of Altered Mental State



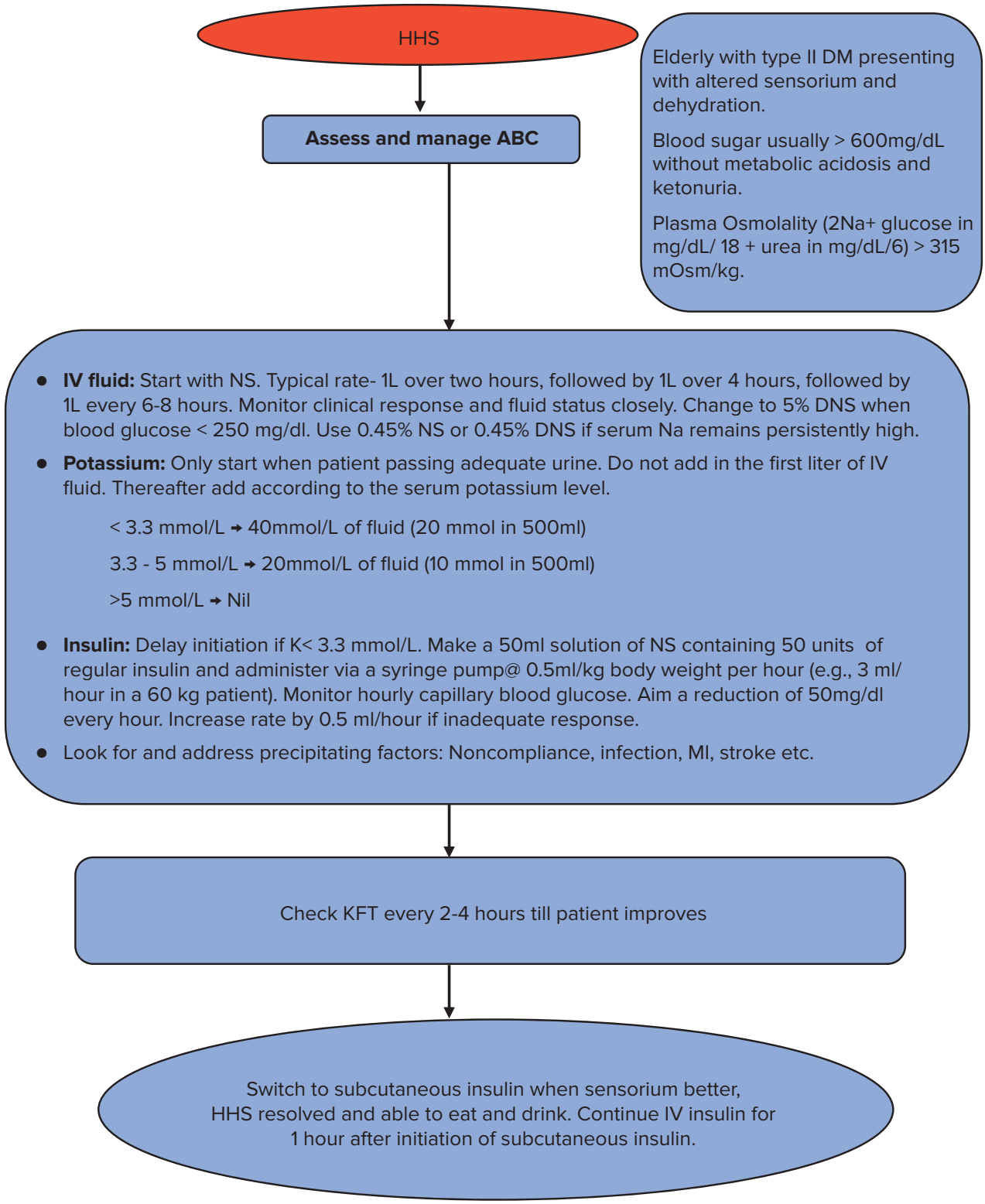
3. Algorithm for the management of known Diabetic Patient Presenting to Emergency



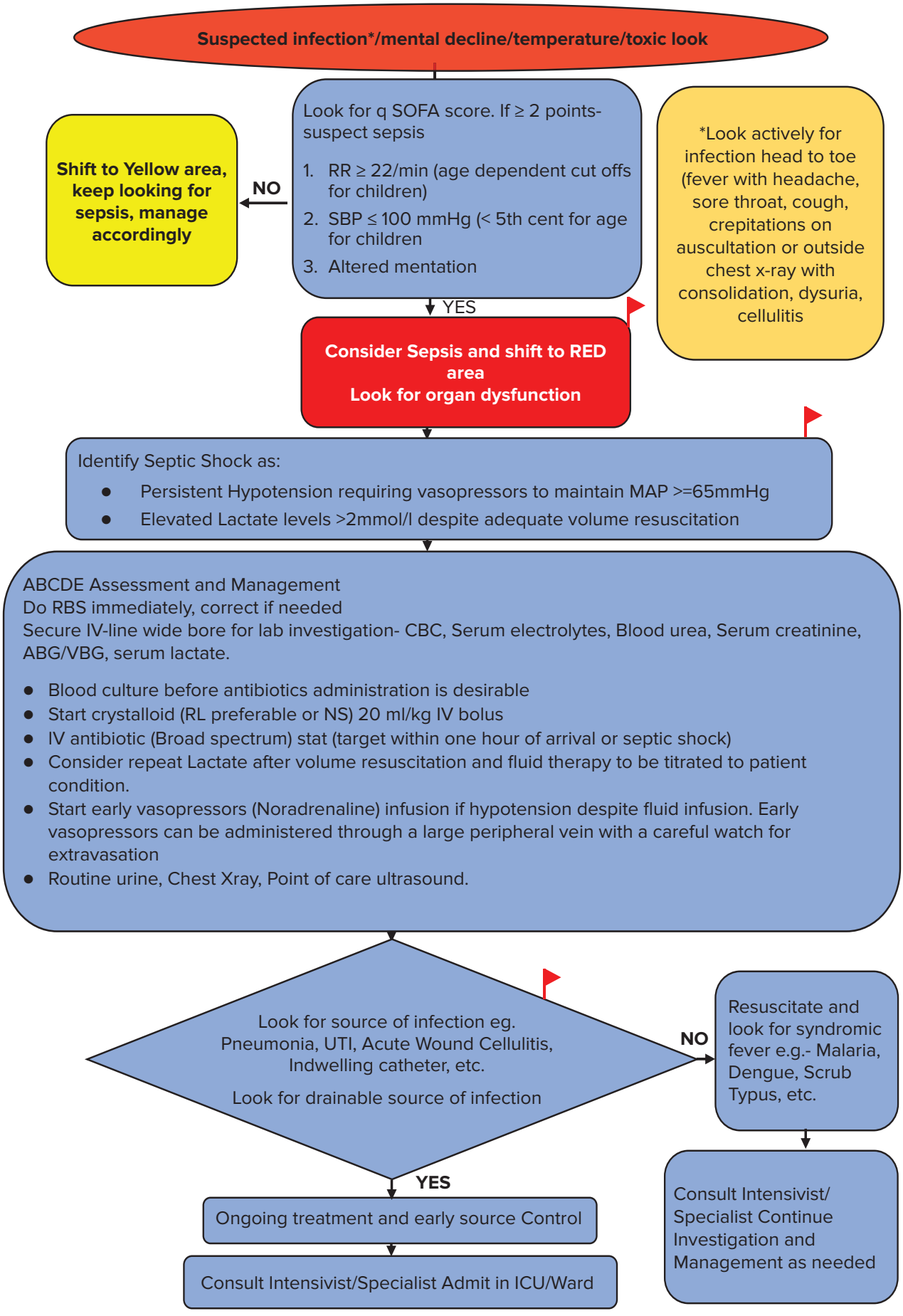
4. Algorithm for the management of Diabetic Ketoacidosis



5. Algorithm for the management of Hyperosmolar Hyperglycemic State (HHS)



6. Algorithm for the Management of Sepsis



7. Algorithm for the Management of Shock in Adults

Recognition of Shock

Shift to RED Area

Clinical Features of Shock

Suspect shock in a patient with combination of altered hemodynamic parameters + clinical & lab picture of decreased tissue perfusion

1. Hemodynamics:

Hypotension (SBP< 90mmHg or more than 40 mmHg decrease in previously hypertensive patient, MAP < 60)

2. Clinical:

Altered sensorium, decreased urine output, tachypnoea, cold clammy extremities

3. Lab:

Metabolic acidosis, high base deficit, elevated lactate level

Assess & manage ABCDE

A- Airway patency & protection

B- ensure adequate oxygenation with SpO_2 target ≅94%, oxygen therapy

C- secure, maintain adequate perfusion with fluids and/ or vasoactive drugs (wide bore IV access, crystalloid, Noradrenaline)

Hypovolemic shock

Cold + clammy skin

CRT > 4sec

H/o acute fluid loss (diarrhea, vomiting, bleeding)

Cardiogenic shock
Respiratory distress + B/L Crepts + raised JVP + abnormal ECG + Chest X-ray (Pulmonary embolism)

With ongoing resuscitation, identify **Cause of Shock:** Focused history + relevant examination & investigation

Identify & treat immediate life-threatening conditions like tension pneumothorax, anaphylactic shock, pericardial tamponade, acute MI with cardiogenic shock, life threatening hemorrhage

Investigation: CBC, ABG/VBG, KFT, Lactate, RBS, cardiac enzymes, ECG, X-Ray chest, POCUS

	Hypovolemic	Cardiogenic	Distributive	Obstructive
Preload	↔ (early) or ↓ late	↑/↔	↔/↓	PE Tension ↔/ ↓ PT ↑
Cardiac Pump	↔ early or ↓ (late)	↓	↑ (or ↓) occasionally	↔/ ↓
Afterload	↑ SVR	↑ SVR	↓	↑

Hypovolemic

- Hemorrhagic (trauma, GI bleed, PPH)
- Non-hemorrhagic (GI, Burns, third space)

Cardiogenic

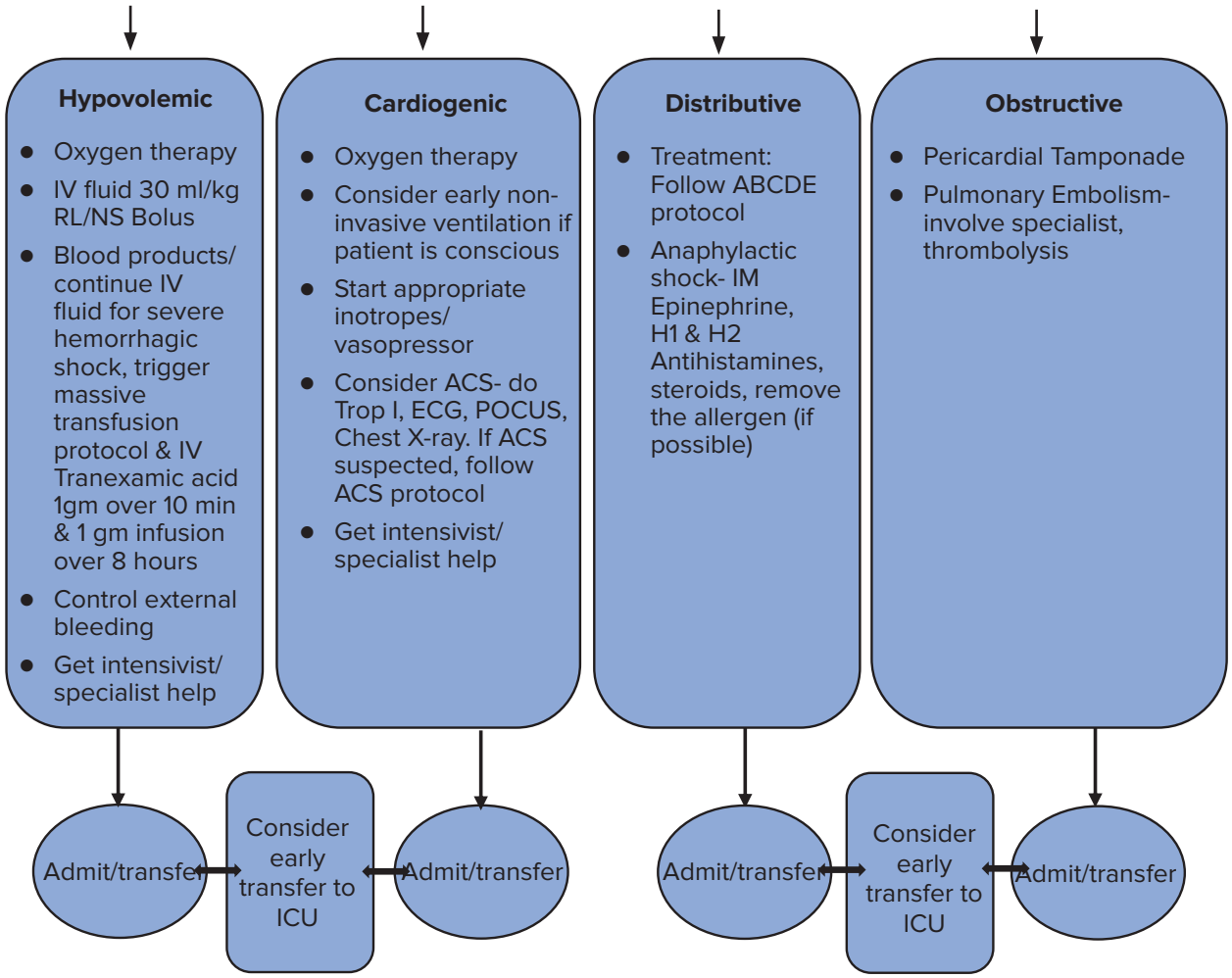
- Cardiomyopathy (ACS, ACHF, Myocarditis)
- Arrhythmogenic (tachycardia, bradycardia)
- Valvular congenital

Distributive

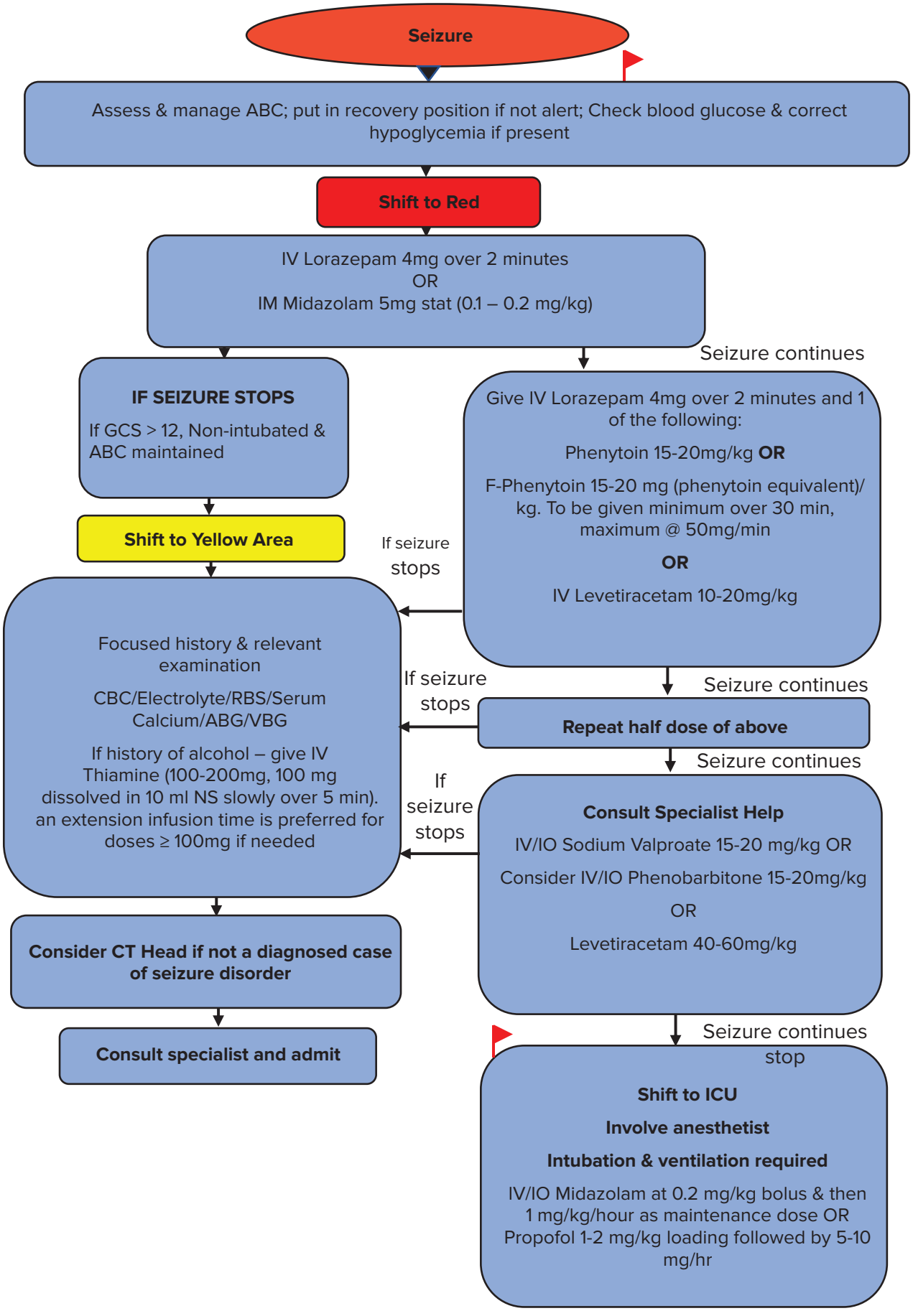
- Septic: follow septic shock guidelines
- Non-septic (anaphylactic, neurogenic)

Obstructive

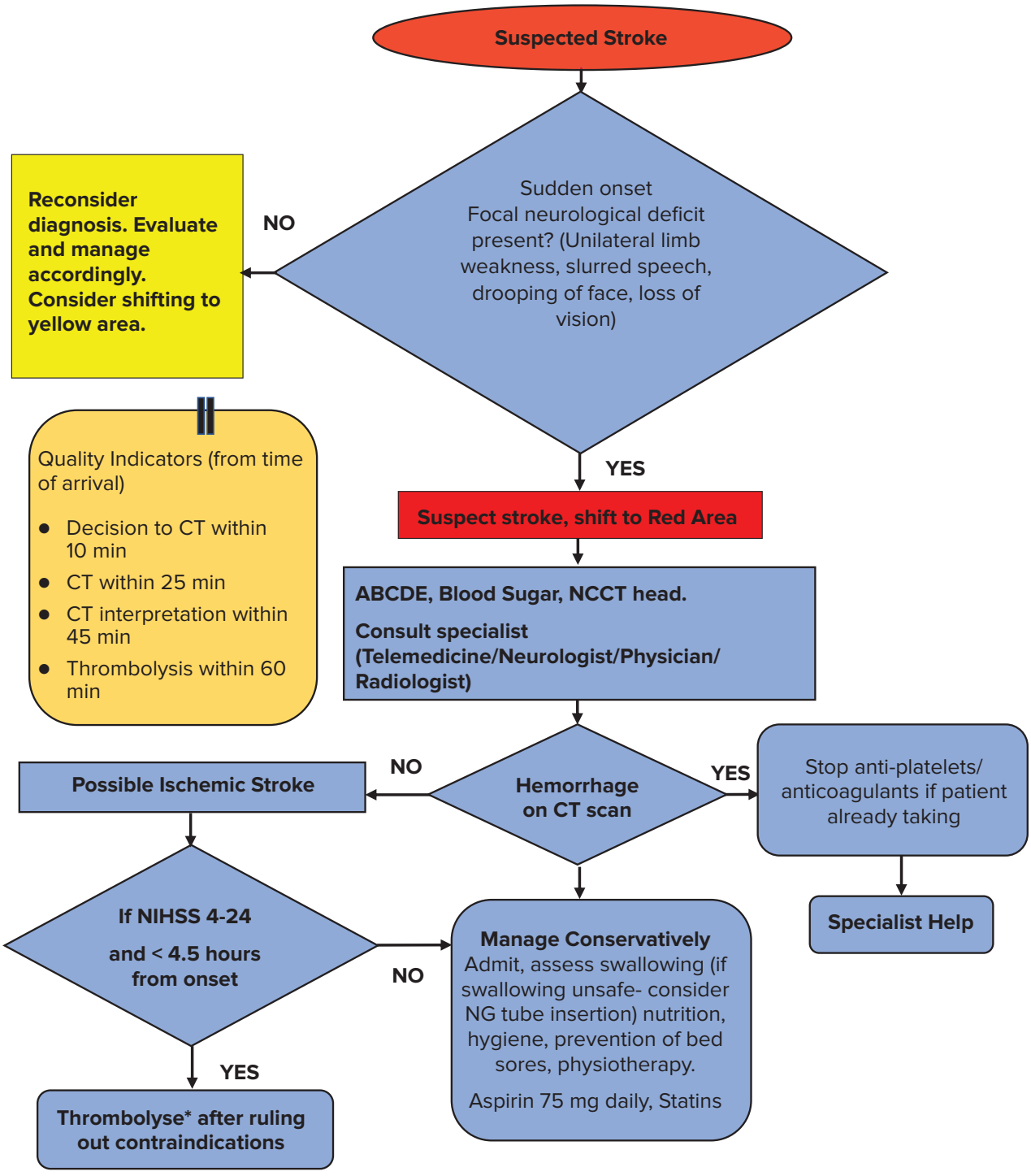
- Tension pneumothorax (Clinical diagnosis- follow trauma guidelines, early needle decompression followed by chest drain)


Hypovolemic
Oxygen therapy
IV fluid 30 ml/kg RL/NS Bolus
Blood products/ continue IV fluid for severe hemorrhagic shock, trigger massive transfusion protocol & IV Tranexamic acid 1gm over 10 min & 1 gm infusion over 8 hours
Control external bleeding
Get intensivist/ specialist help
Cardiogenic
Oxygen therapy
Consider early non-invasive ventilation if patient is conscious
Start appropriate inotropes/ vasopressor
Consider ACS- do Trop I, ECG, POCUS, Chest X-ray. If ACS suspected, follow ACS protocol
Get intensivist/ specialist help
Distributive
Treatment: Follow ABCDE protocol
Anaphylactic shock- IM Epinephrine, H1 & H2 Antihistamines, steroids, remove the allergen (if possible)
Obstructive
Pericardial Tamponade
Pulmonary Embolism- involve specialist, thrombolysis
Admit/transfer
Consider early transfer to ICU
Admit/transfer
Admit/transfer
Consider early transfer to ICU
Admit/transfer

8. Algorithm for the management of Seizure in adults



9. Algorithm for the management of Suspected Stroke



*Thrombolysis- if BP<180/100, give Tenectaplase 0.25mg/kg single bolus or Alteplase- dose-0.9 mg/kg max 90 milligram, 10% dose IV bolus over 1 min and reminder is infused over 1 hr in 50ml NS. Tenectaplase is the preferred choice.

If BP > 180/100, lower BP and then consider thrombolysis.

NATIONAL INSTITUTES OF HEALTH STROKE SCALE (NIHSS)*

Item	Title	Responses and Scores
1a	Level of consciousness	0- alert
		1- drowsy
		2-obtunded
		3- coma/unresponsive
1b	Orientation questions (2)	0- answer both correctly
		1- answer one correctly
		2- answer neither correctly
1c	Response to commands (2)	0- performs both tasks correctly
		1- performs one task correctly
		0- performs neither
2	Gaze	0- normal horizontal movements
		1- partial gaze palsy
		2- complete gaze palsy
3	Visual fields	0- no visual field detect
		1-partial hemianopia
		2- complete hemianopia
		3- bilateral hemianopia
4	Facial movement	0- normal
		1- minor facial weakness
		2- partial facial weakness
		3- complete unilateral palsy
5	Major function (arm) a. Left b. Right	0- no drift
		1- drift before 10 seconds
		2- falls before 10 seconds
		3- no effort against gravity
		4- no movements
6	Major function (leg a. Left b. Right	0- no drift
		1- drift before 5 seconds
		2- falls before 5 seconds
		3- no effort against gravity
		4- no movements
7	Limb ataxia	0- no ataxia
		1- ataxia in 1 limb
		2- ataxia in 2 limbs
8	Sensory	0- no sensory loss
		1- mild sensory loss
		2- severe sensory loss
9	Language	0- normal
		1- mild aphasia
		2- severe aphasia
		3- mute or global aphasia

Item	Title	Responses and Scores
10	Articulation	0- normal
		1- mild dysarthria
		2- severe dysarthria
11	Extinction or inattention	0- absent
		1- mild loss (1 sensory modality lost)
		2- severe loss (2 sensory modalities lost)

Score	Stroke Severity
0	No stroke symptoms
1-4	Minor stroke
5-15	Moderate stroke
16-20	Moderate to severe stroke
21-42	Severe stroke

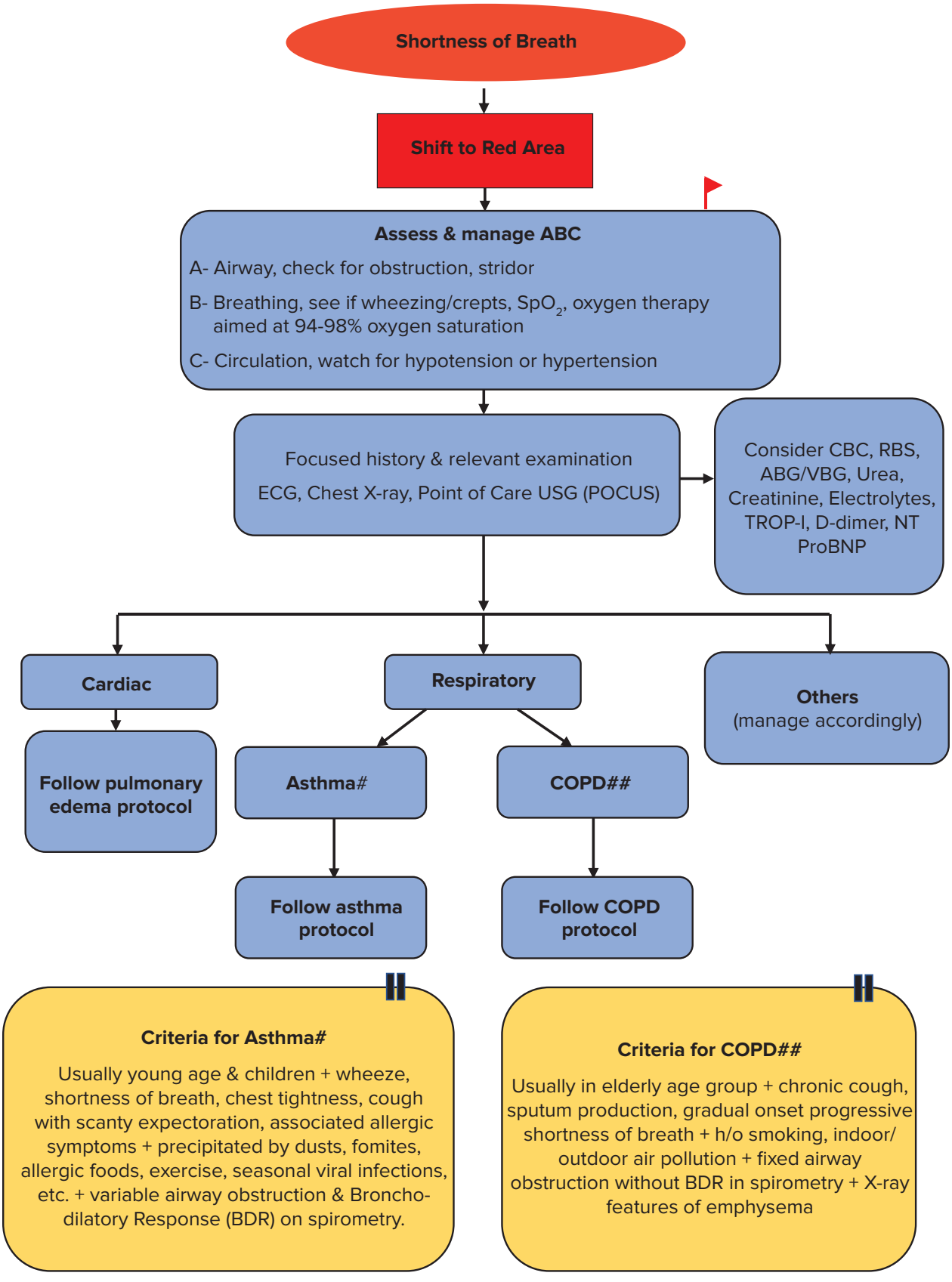
Scoring range is 0-42 points.

The higher the number, the greater the severity.

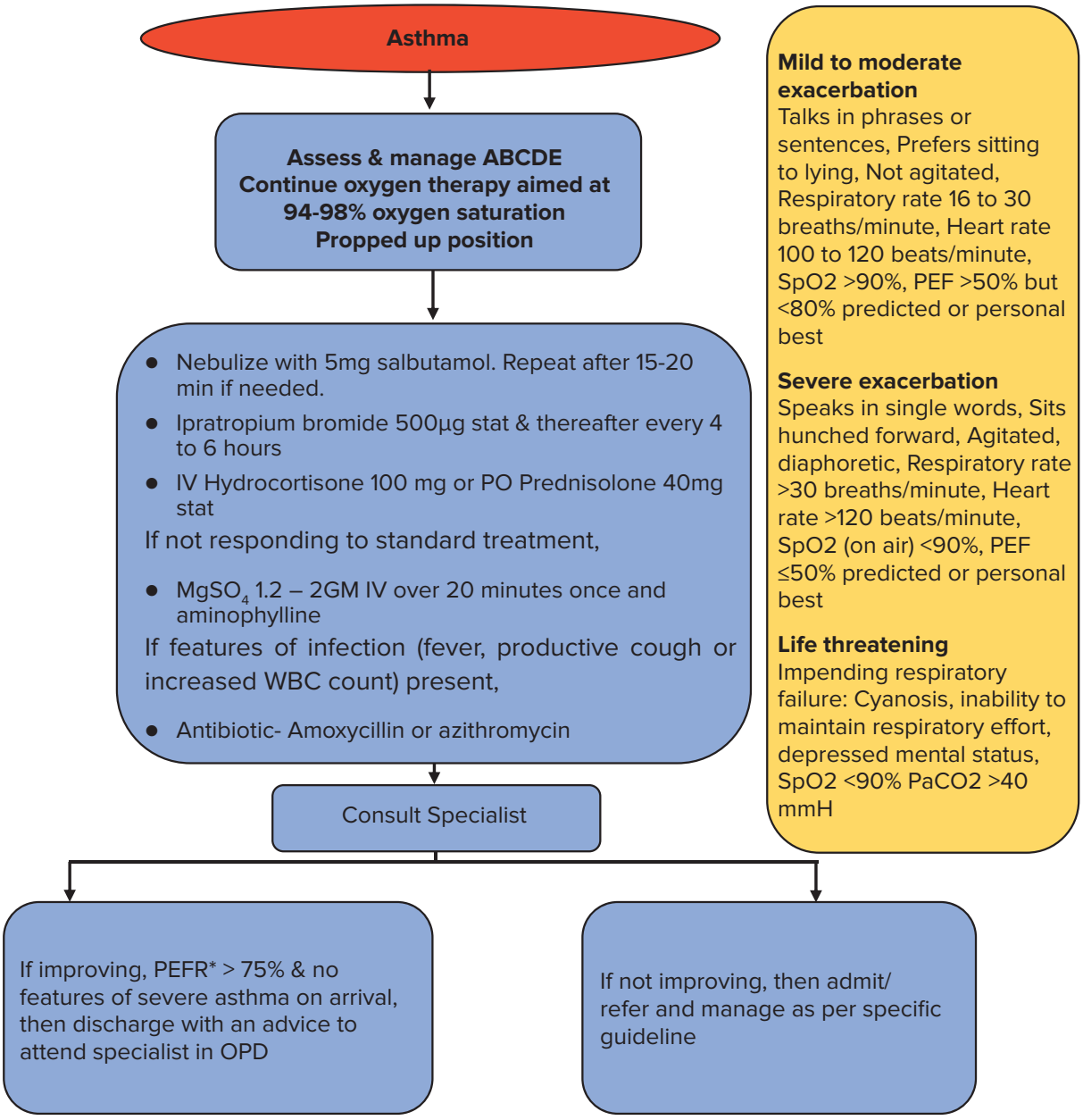
Blood Pressure management in Acute Stroke

Before starting thrombolysis if, **SBP>185 or diastolic > 110 mmHg**	**Labetalol 10-20 mg IV over 1-2 mins,** **Nicardipine 5mg/hr, titrate up by 2.5 mg/hr at 5-15 minute intervals, max dose 15mg/hr.** **If BP does not decline and remains >185/110 do not give thrombolytic agent**
Monitor BP evert 15 minutes during thrombolysis treatment and then for another 2 hours, then every 30 mins for 6 hrs, and every hour for 16 hours	
Systolic 180-230 mmHg or diastolic 105-120 mmHg	Labetalol 10 mg IV over 1-2 mins, may repeat every 10-20 mins, max dose 300 mg or Labetalol 10 mg IV followed by an infusion at 2-8 mg/min
Systolic >230 mmHg or diastolic 121-140 mmHg	Labetalol 10 mg IV over 1-2 mins, may repeat every 10-20 mins, max dose 300 mg or Labetalol 10 mg IV followed by an infusion at 2-8 mg/min

10. Algorithm for the management of Shortness of Breath



11. Algorithm for the management of Acute Severe Asthma in Adults



Peak Expiratory Flow Rate (PEFR)

Serial measurements of Peak Expiratory Flow Rate (PEFR) is a key component in asthma disease assessment and response to therapy in emergency department.

Initial Assessment

PEFR>=40% (of percentage predicted) → mild to moderate asthma

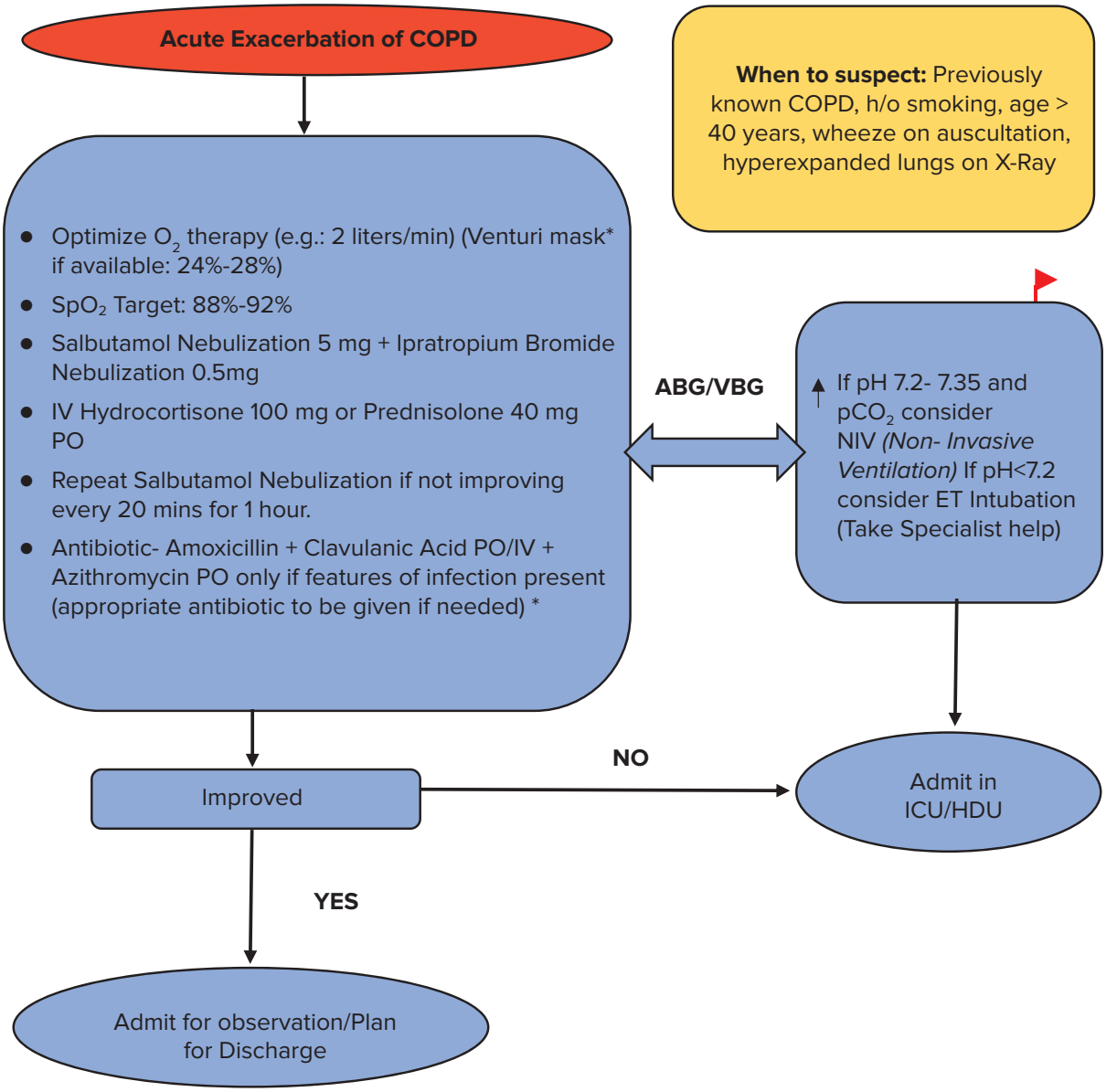
PEFR<40% (of percentage predicted) → severe asthma

Disposition

	Good	Incomplete Response	Poor response
PEFR (% predicted/personal best)	>70%	>40% to < 69%	< 40%

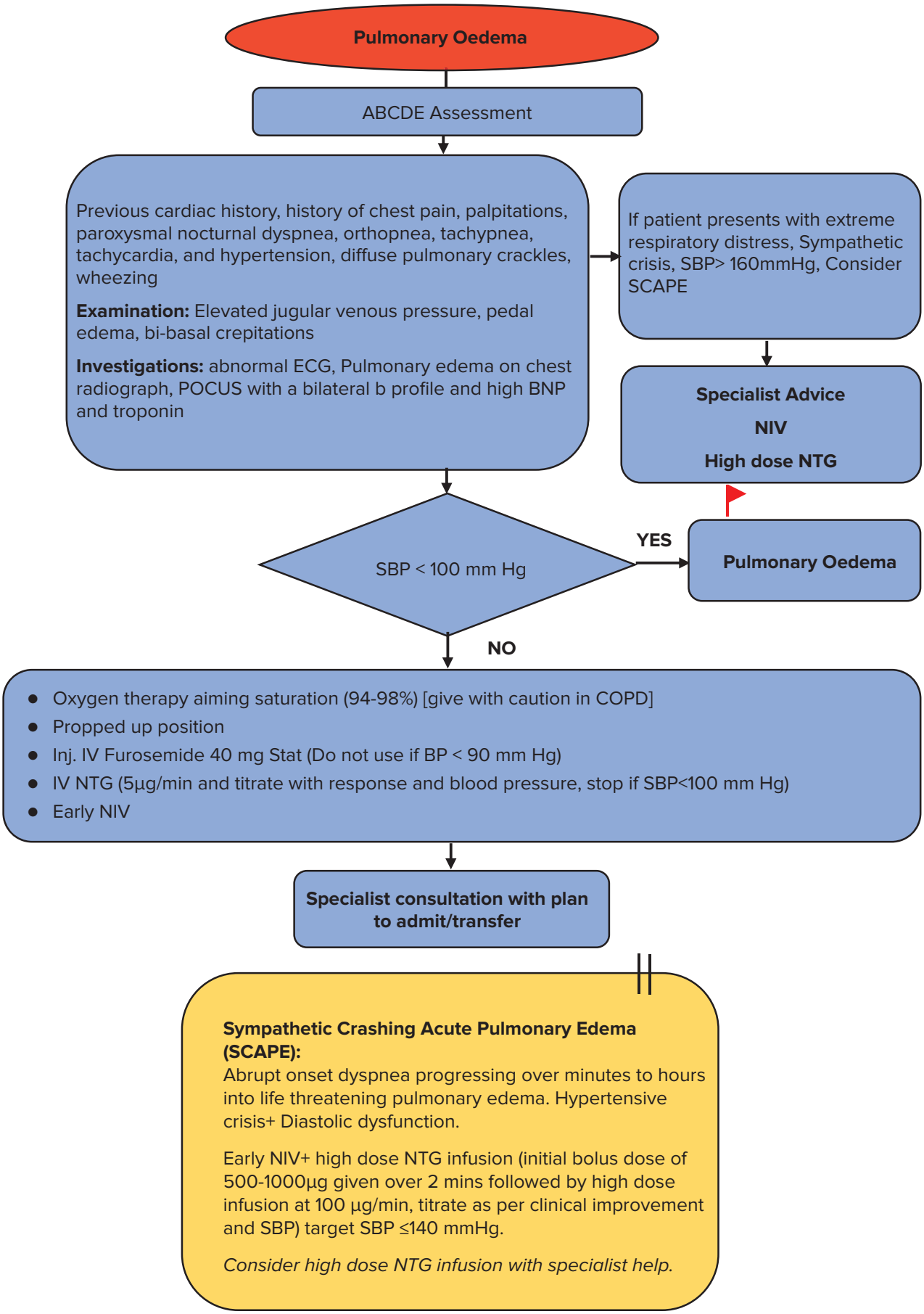
Peak Flow Meter

12. Algorithm for the management of Acute Exacerbation of Chronic Obstructive Pulmonary Disease

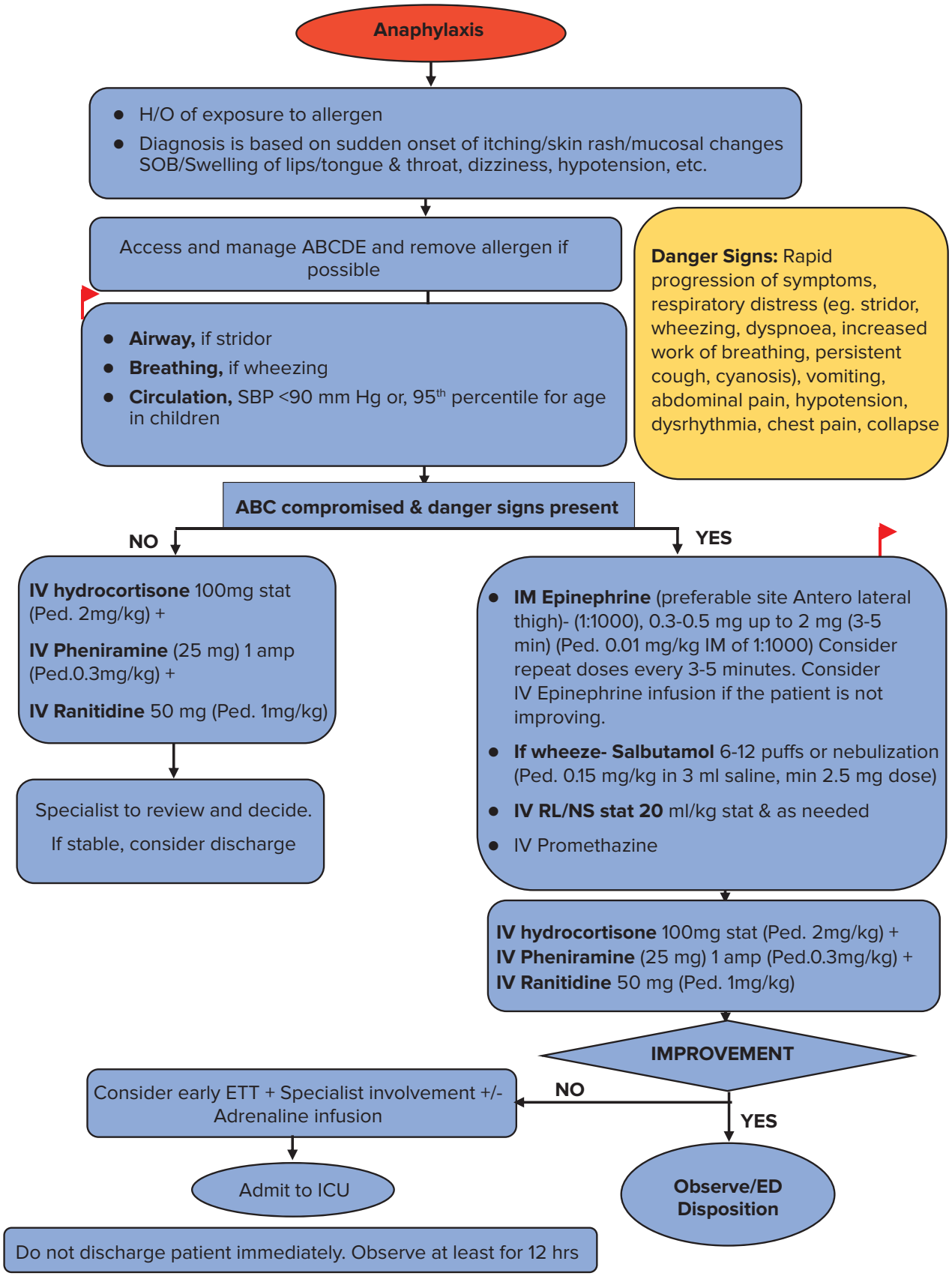


Venturi Mask Valves*

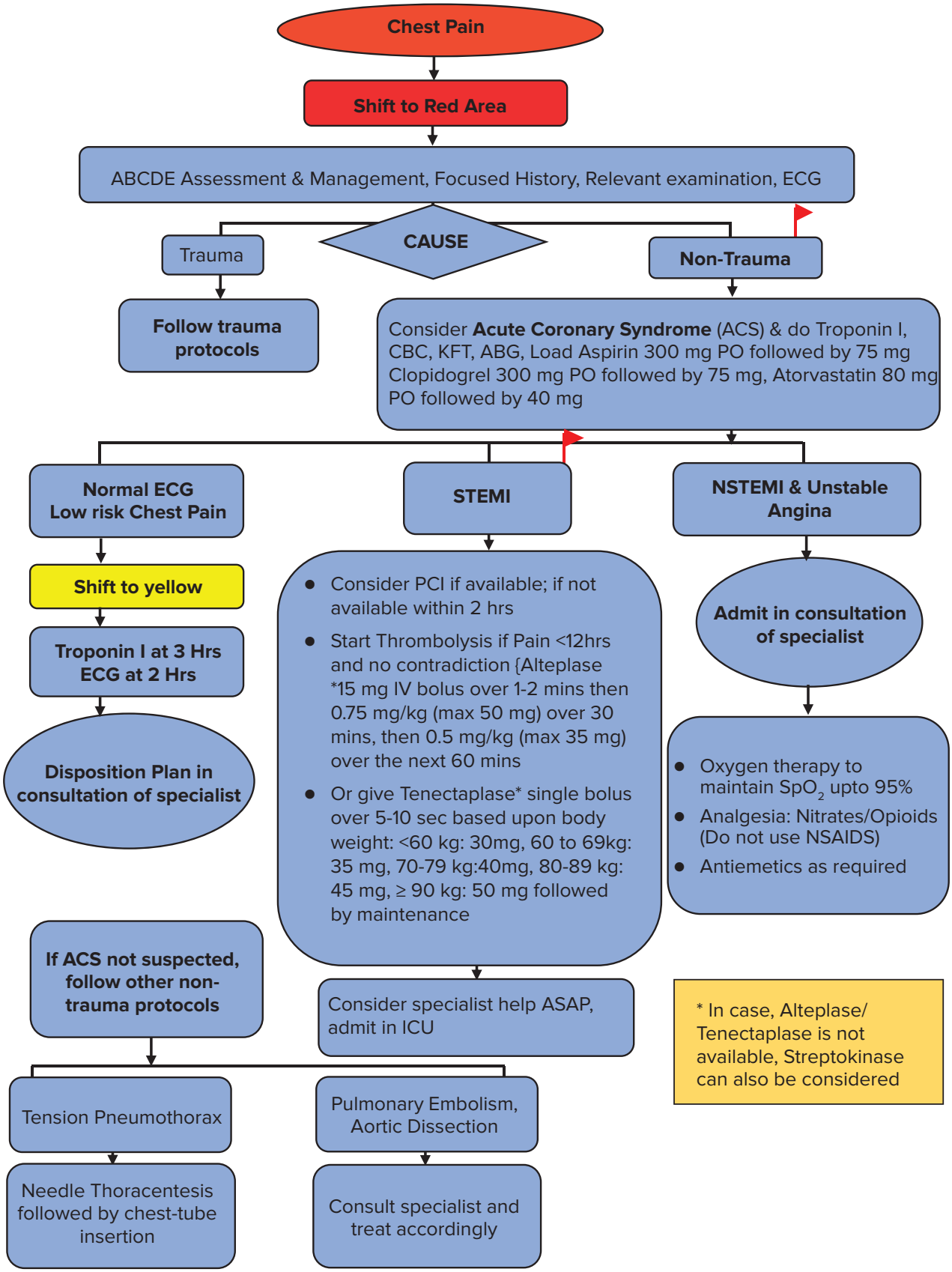
13. Algorithm for the management of Pulmonary Oedema



14. Algorithm for the Management of Anaphylaxis



15. Algorithm for the management of Chest pain



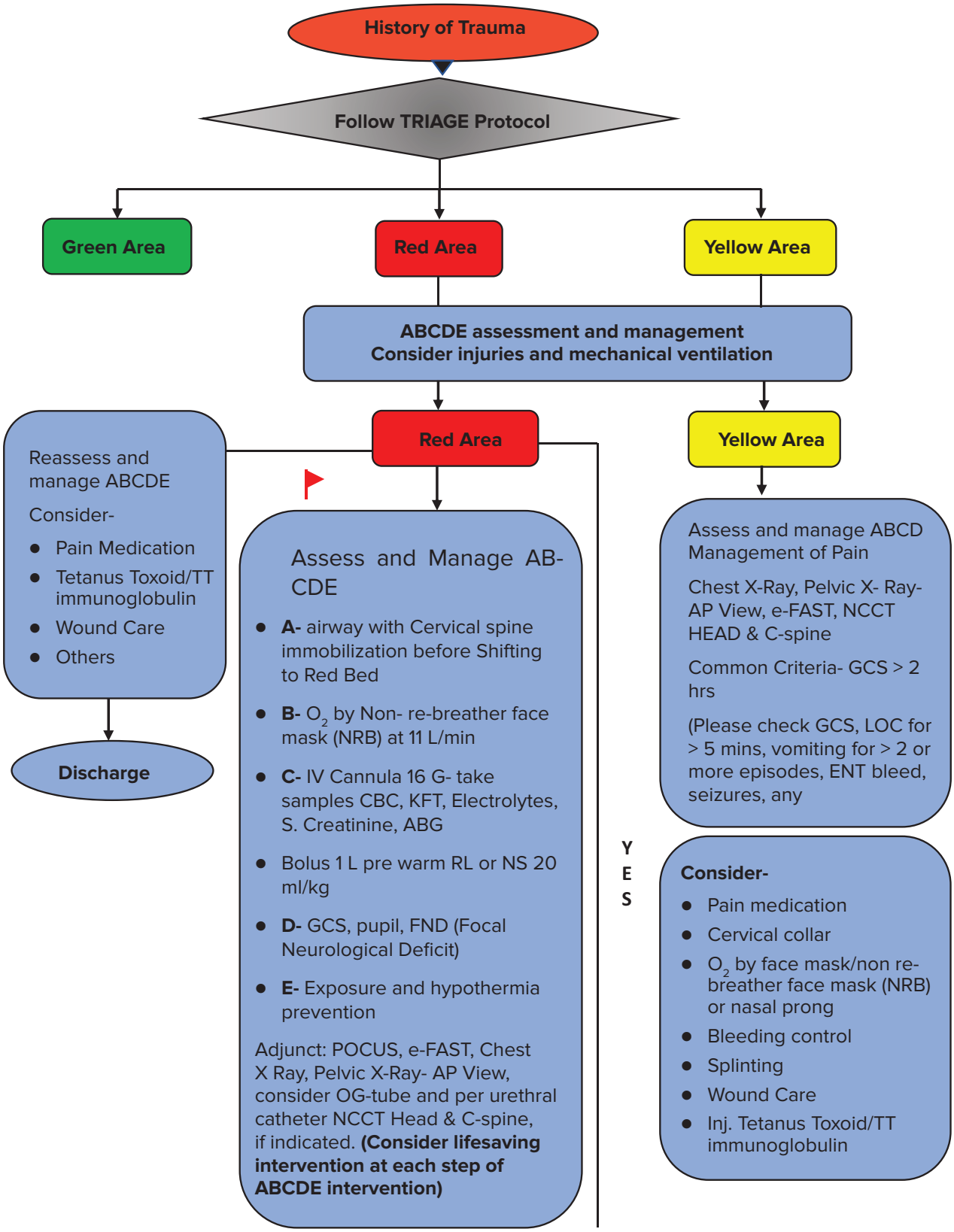
HEART score for chest pain patients

History (Anamnesis)	**Highly suspicious**	**2**
	Moderately suspicious	**1**
	Slightly suspicious	**0**
ECG	**Significant ST-deviation**	**2**
	Non-specific repolarisation disturbance/LBBB/PM	**1**
	Normal	**0**
Age	**≥ 65 years**	**2**
	45-65 years	**1**
	≤ 45 years	**0**
Risk factors	**≥ 3 risk factors *or* history of atherosclerotic disease**	**2**
	1 or 2 risk factors	**1**
	No risk factors known	**0**
Troponin	**≥ 3x normal limit**	**2**
	1-3x normal limit	**1**
	≤ normal limit	**0**

Risk factors for the atherosclerotic disease:

- Hypercholesterolemia
- Hypertension
- Diabetes Mellitus
- Cigarette smoking
- Positive family history
- Obesity (BMI>30)

16. Algorithm for the management of Trauma



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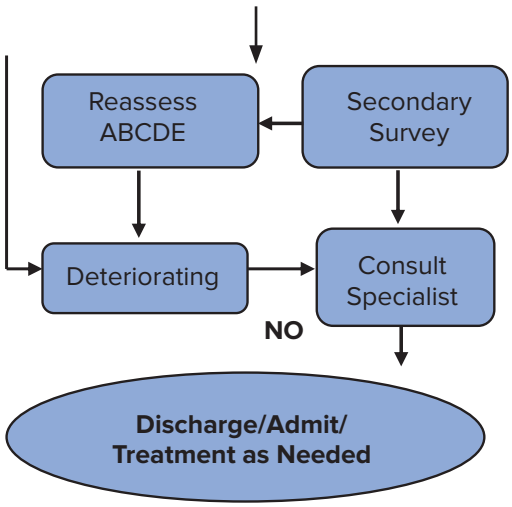
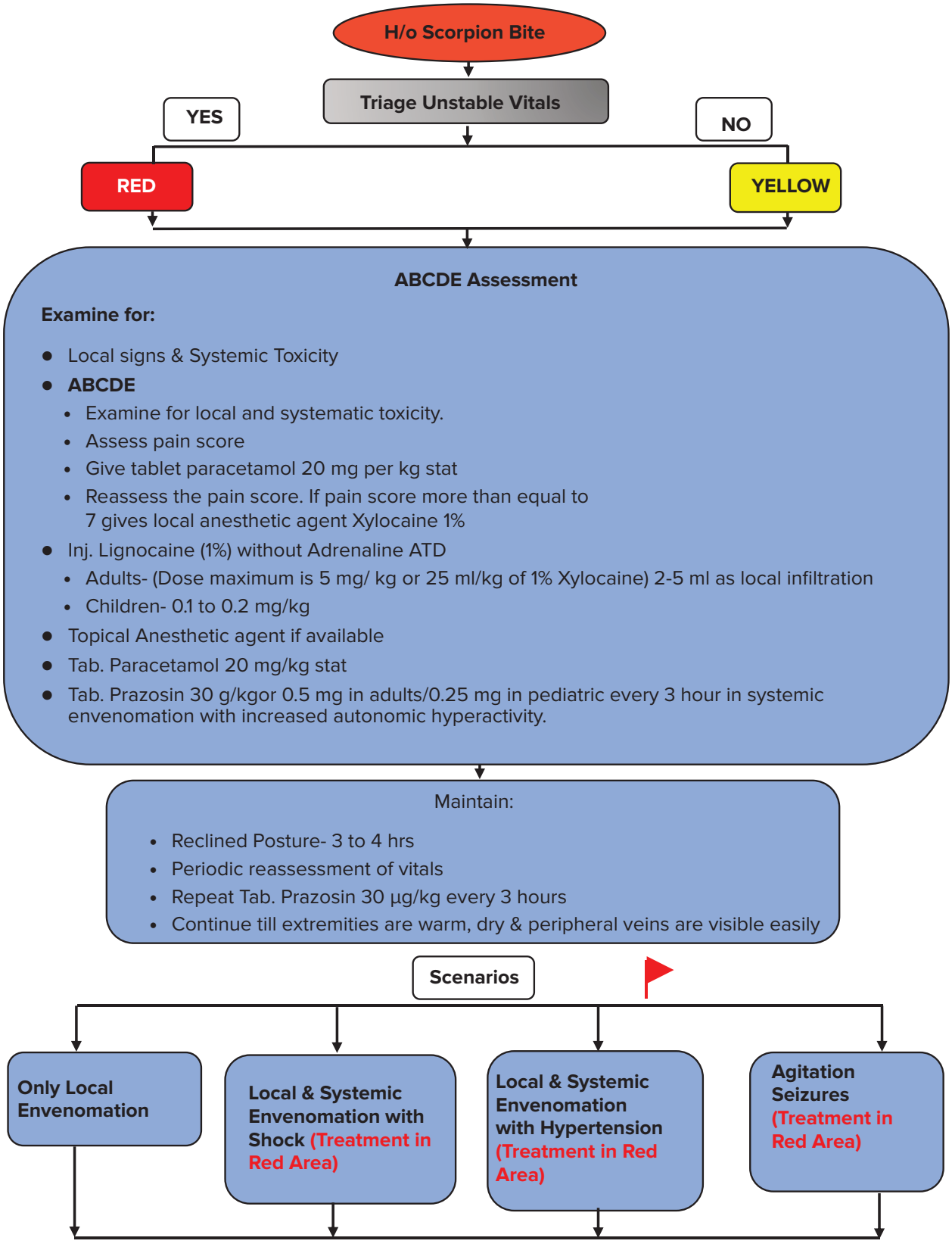


e-FAST- Extended Focused Assessment with Sonography for Trauma

17. Algorithm for Scorpion Sting



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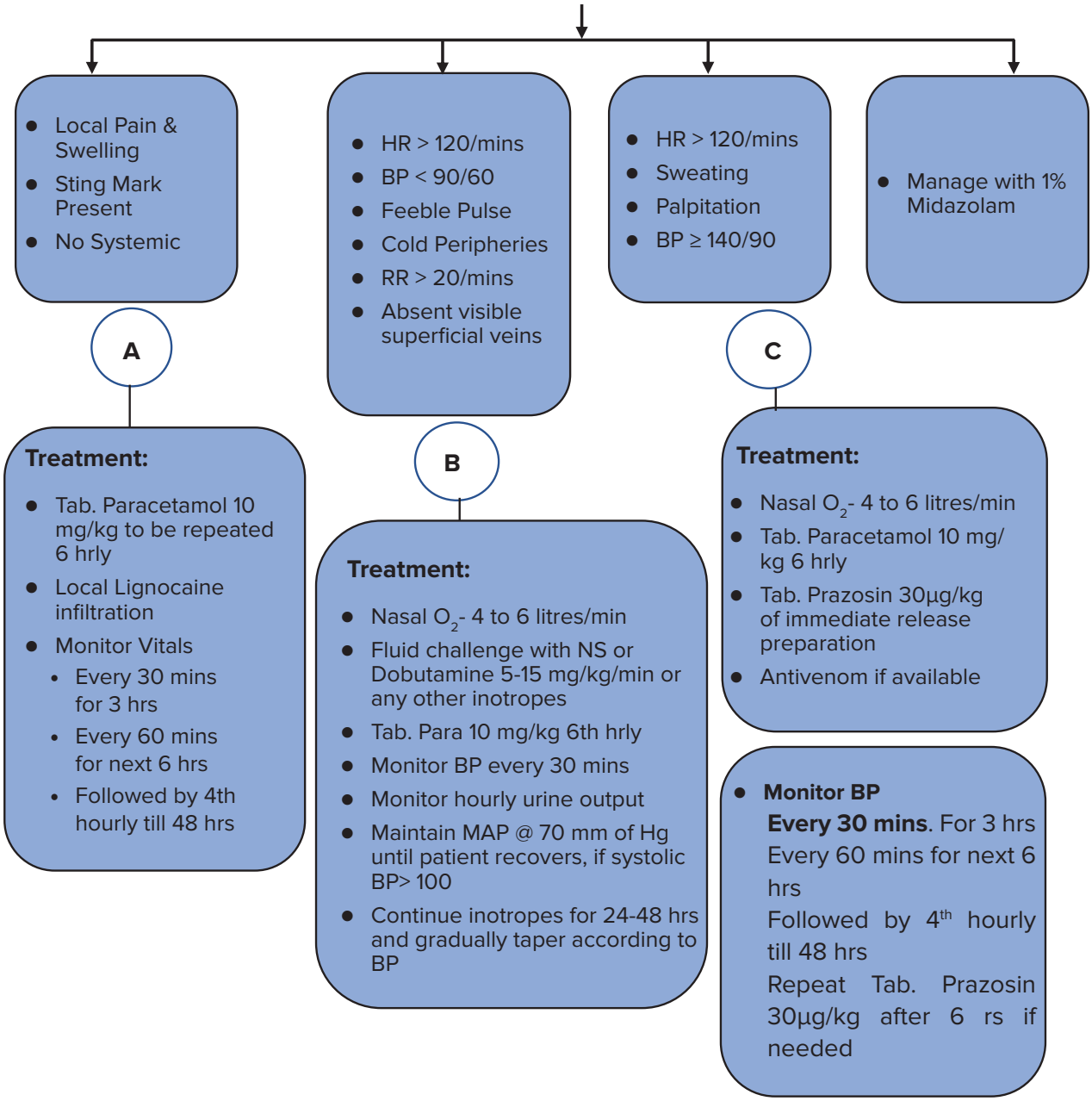
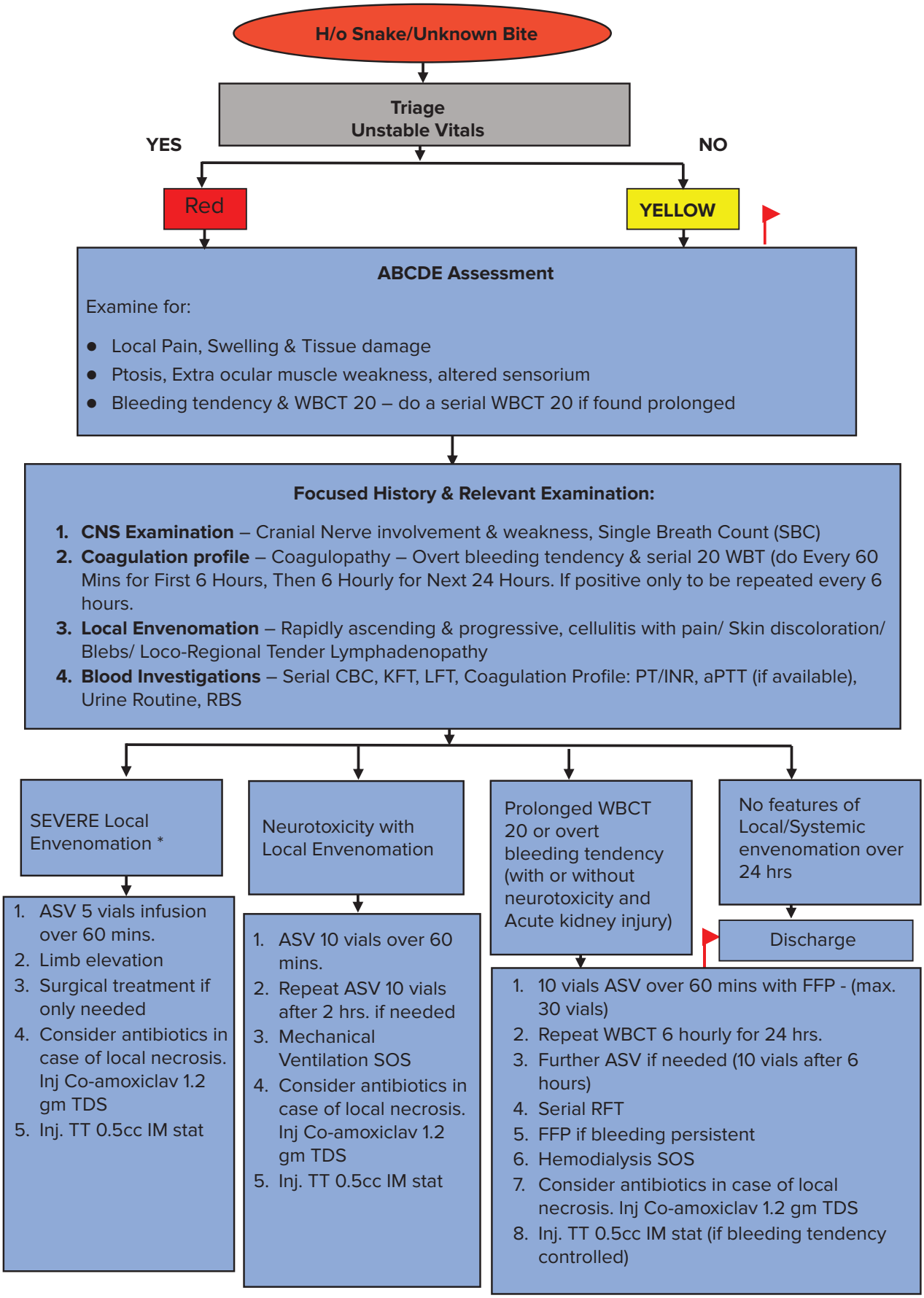


Indian scorpion bite in 66 to 90% case will have local effects only and only in 10 to 33 % cases will have systemic toxicity.

Grades of envenomation:

- *Grade or Class I- Local effects only*
- *Grade or Class II- Systemic autonomic effects (parasympathomimetic and/or sympathomimetic)*
- *Grade or Class III- Evidence of cardiotoxicity including heart failure with acute pulmonary edema or cardiogenic shock with hypotension*
- *Grade or Class IV- Progressive cardiogenic shock with coma, seizures, or other manifestations of multisystem organ failure such as acute kidney or liver injury*

18. Algorithm for Snake Bite



SEVERE LOCAL ENVENOMATION

- Severe current, local swelling involving more than half of the bitten limb (in the absence of a tourniquet) within 48 hr of the bite.
- Severe swelling after bites on the digits (toes and especially fingers) after a bite from a known necrotic species.
- Rapid extension of swelling (for example beyond the waist or ankle within a few hours of bites on the hands or feet).
- Enlarged tender lymph node draining bitten limb.
- Bites over face or abdomen

Before ASV administration give 0.25 mg of adrenaline subcutaneously.

ASV requirement should be guided by ongoing signs of envenomation in vasculotoxic snake bite and knowing species of snake. Sometimes victims arrive late after the bite, often after several days, usually with acute kidney injury. Determine current venom activity such as bleeding in case of viper in envenomation. Perform 20 WBCT and determine if any coagulopathy is present then administer ASV. If no coagulopathy is evident, treat kidney injury, if any.

In patients with neuroparalytic envenomation (ptosis, respiratory failure etc.)

- Continue respiratory support until recovery.
- Give 10 vials of ASV on arrival and if no improvement within one hour repeats 10 vias of ASV (No more than vials of ASV).
- No further ASV and Atropine Neostigmine (AN) infusion is required ONLY to reverse the Ptosis. Ptosis in Common Krait bite is due to presynaptic blockage, further ASV and Neostigmine dose beyond 2 doses (max dose is 20 vials, 2 doses 1 hr apart) cannot reverse it since regeneration is a natural process and may take 4-5 days. Both ASV and AN injection should be stopped when the initial syndrome of pharyngeal muscle paralysis over.

Pediatric cases: ASV diluted in 5-10 ml per Kg wt of normal saline (limit dilution volume up to 2000 ml to avoid fluid overload).

Pregnancy: No change in policy.

Note: WBCT has poor sensitivity of 40% but good specificity of 100% in detecting coagulopathy.

Anti – Snake Venom Reactions

Anaphylaxis can be of rapid onset and life-threatening, monitor closely after giving ASV

Look for:

- Urticaria, itching, fever, chills,
- Nausea, vomiting, diarrhoea, abdominal cramps,
- Tachycardia, hypotension, bronchospasm and angio-oedema

At the first sign of any of these

- **ASV to be discontinued**
- Give dose of 0.5 mg (0.01mg/kg) of adrenalin 1:1000

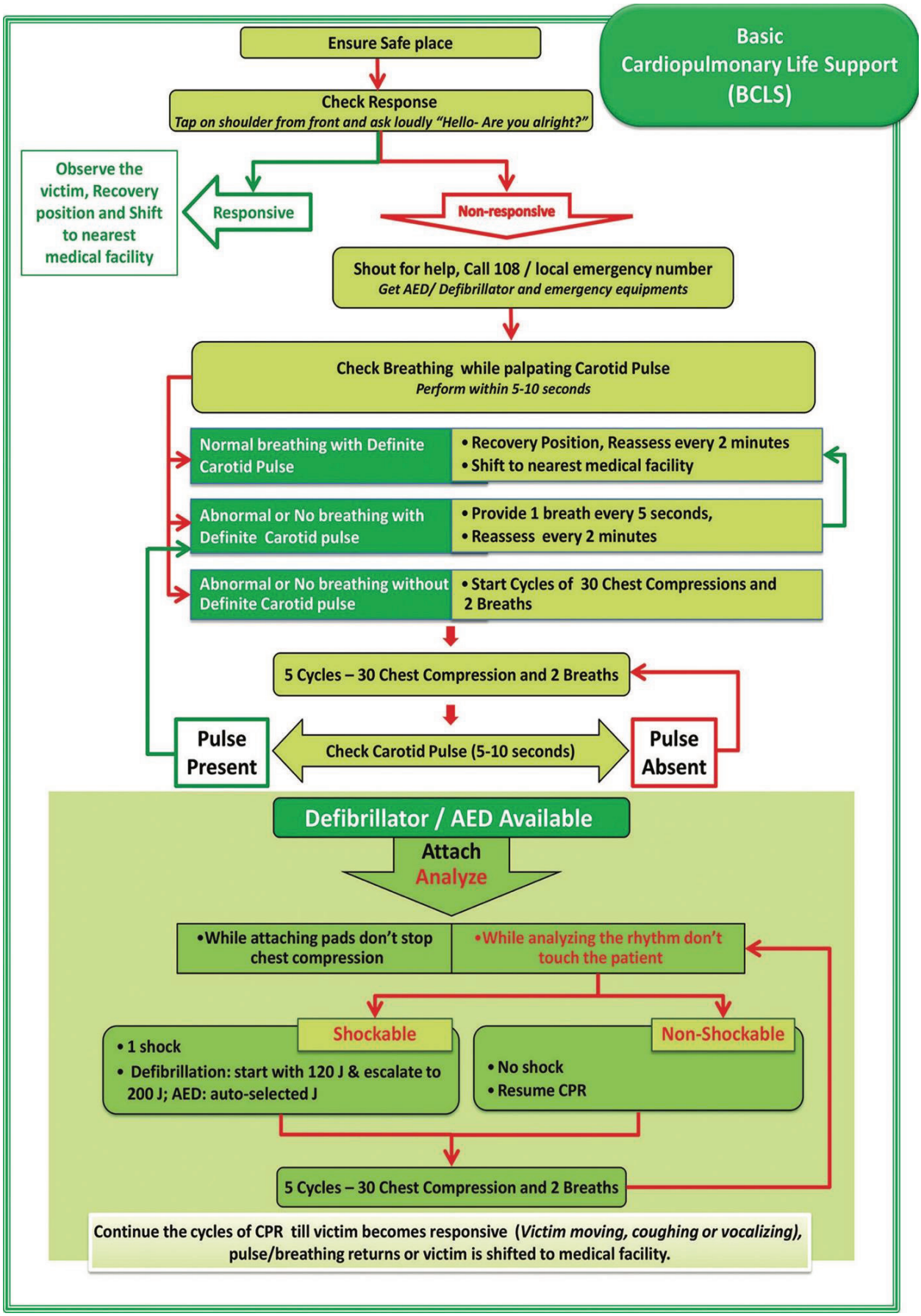
- A second dose of 0.5 mg (0.01mg/kg) of adrenalin 1: 1000 IV is given. This can be repeated for a third and final occasion but in the vast majority of reactions, 2 doses of adrenaline will be sufficient in children.
- ***If there is hypotension or hemodynamic instability, IV fluids should be given. Once the patient has recovered, the ASV can be restarted slowly for 10-15 minutes, keeping the patient under close observation. Then the normal drip rate should be resumed.***

In case of **asthmatic symptoms**, give salbutamol bronchodilator.

- After adrenaline, give intravenous antihistamine anti-H1 blocker (e.g. chlorphenamine maleate, adults 10 mg, children 0.2 mg/kg intravenously) and hydrocortisone (adults 100 mg, children 2 mg/kg body weight).
- Anaphylactic shock unresponsive to adrenaline to adrenaline is treated by laying patient supine, legs elevated, and giving intravenous volume replacement (0.9% saline, adults 1-2 litres rapidly).
- Consider intravenous adrenaline infusion (adults 1 mg/1.0 ml of 0.1% solution in 250 ml IV fluid) infused at 15-60 drops/min using micro-dropper burette chamber, or dopamine.
- Unresponsive bronchospasm or angioedema is treated with optimal nebulised/inhaled and/or parental bronchodilator and oxygen.

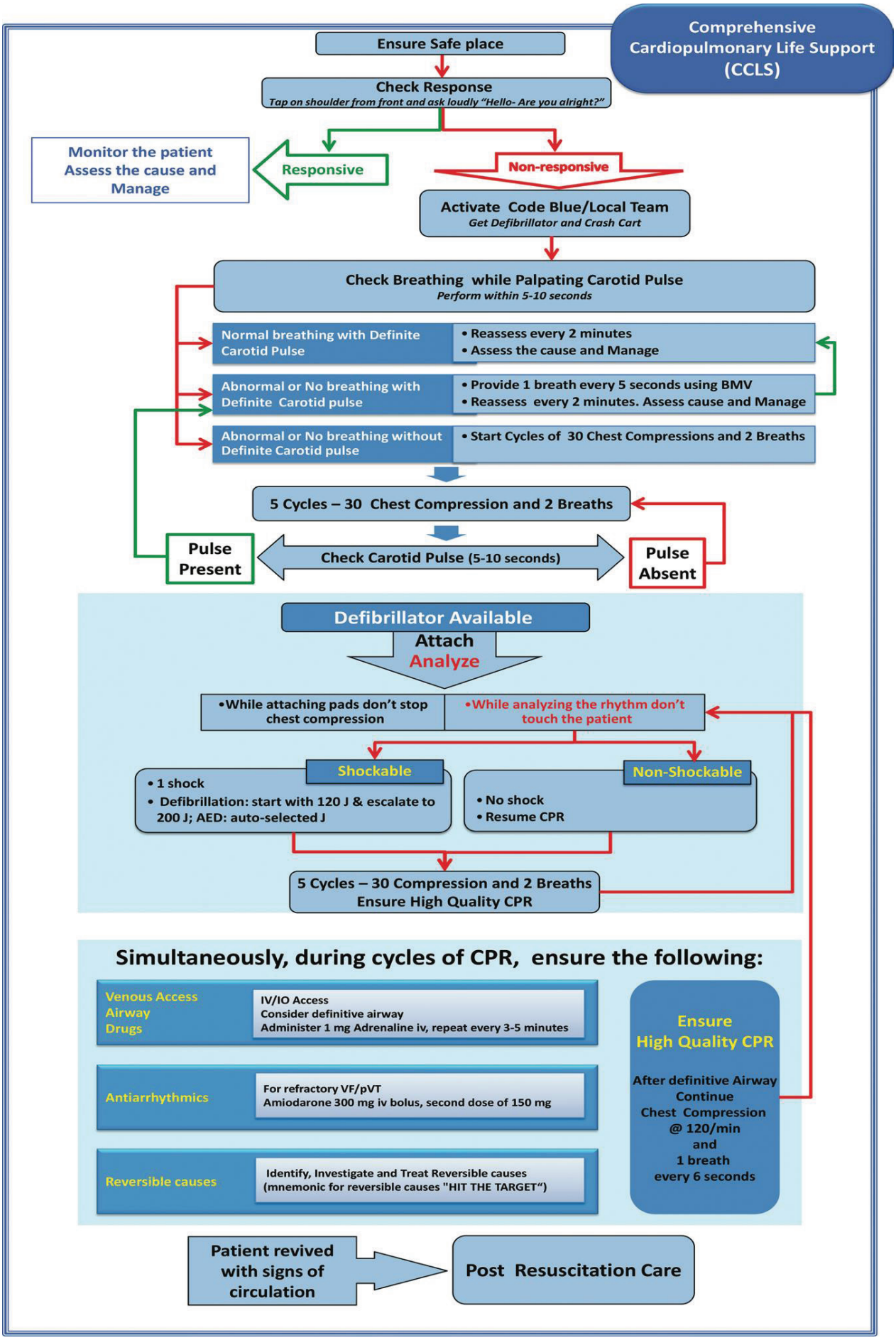
Late Serum sickness reactions occur after 5 to 7 days can be easily treated with an oral steroid such as prednisolone, adults 5 mg 6 hourly, paediatric dose 0.7 mg/kg/day. Oral Antihistaminic provide additional symptomatic relief.

19. Algorithm for Basic Cardiopulmonary Life Support (BCLS)



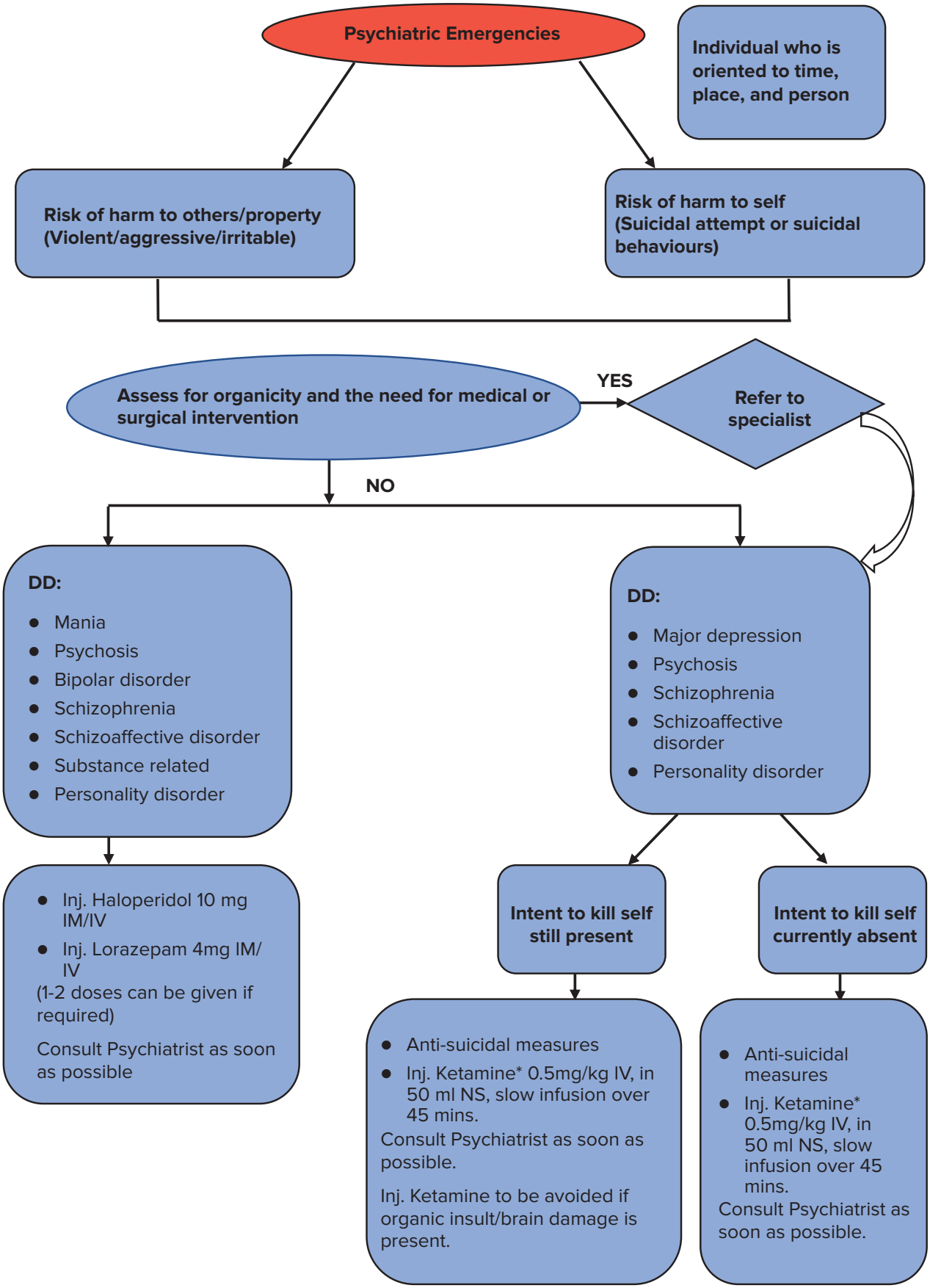
Source: *Garg R, Ahmed SM, Kapoor MC, Mishra BB, Rao SC, Kalandoor MV, et al. Basic cardiopulmonary life support (BCLS) for cardiopulmonary resuscitation by trained paramedics and medics outside the hospital. Indian J Anaesth 2017;61:874-82.*

Algorithm for Comprehensive Cardiopulmonary Life Support (CCLS)

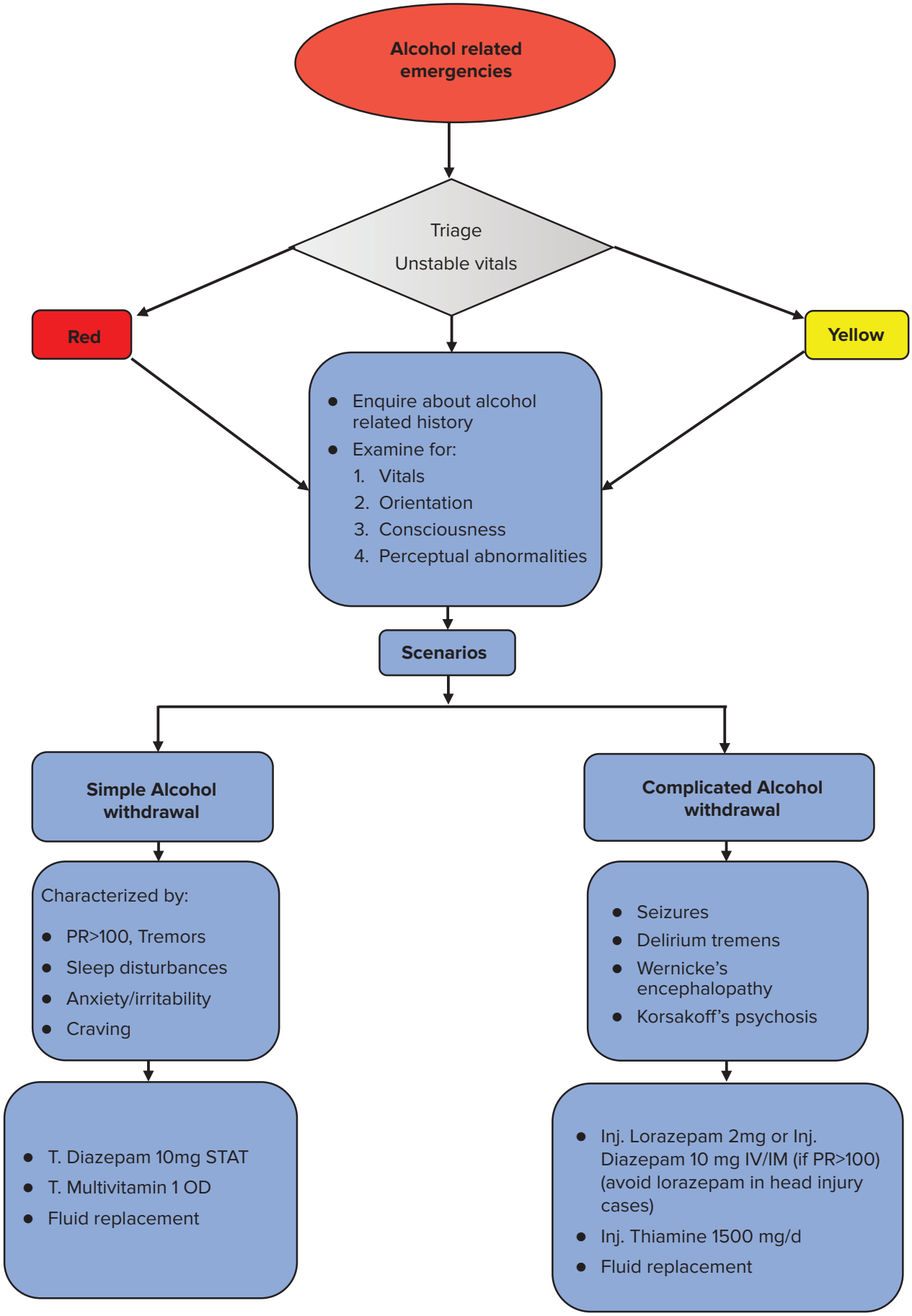


Source: *Garg R, Ahmed SM, Kapoor MC, Rao SC, Mishra BB, Kalandoor MV, et al. Comprehensive cardiopulmonary life support (CCLS) for cardiopulmonary resuscitation by trained paramedics and medics inside the hospital. Indian J Anaesth 2017;61:883-94.*

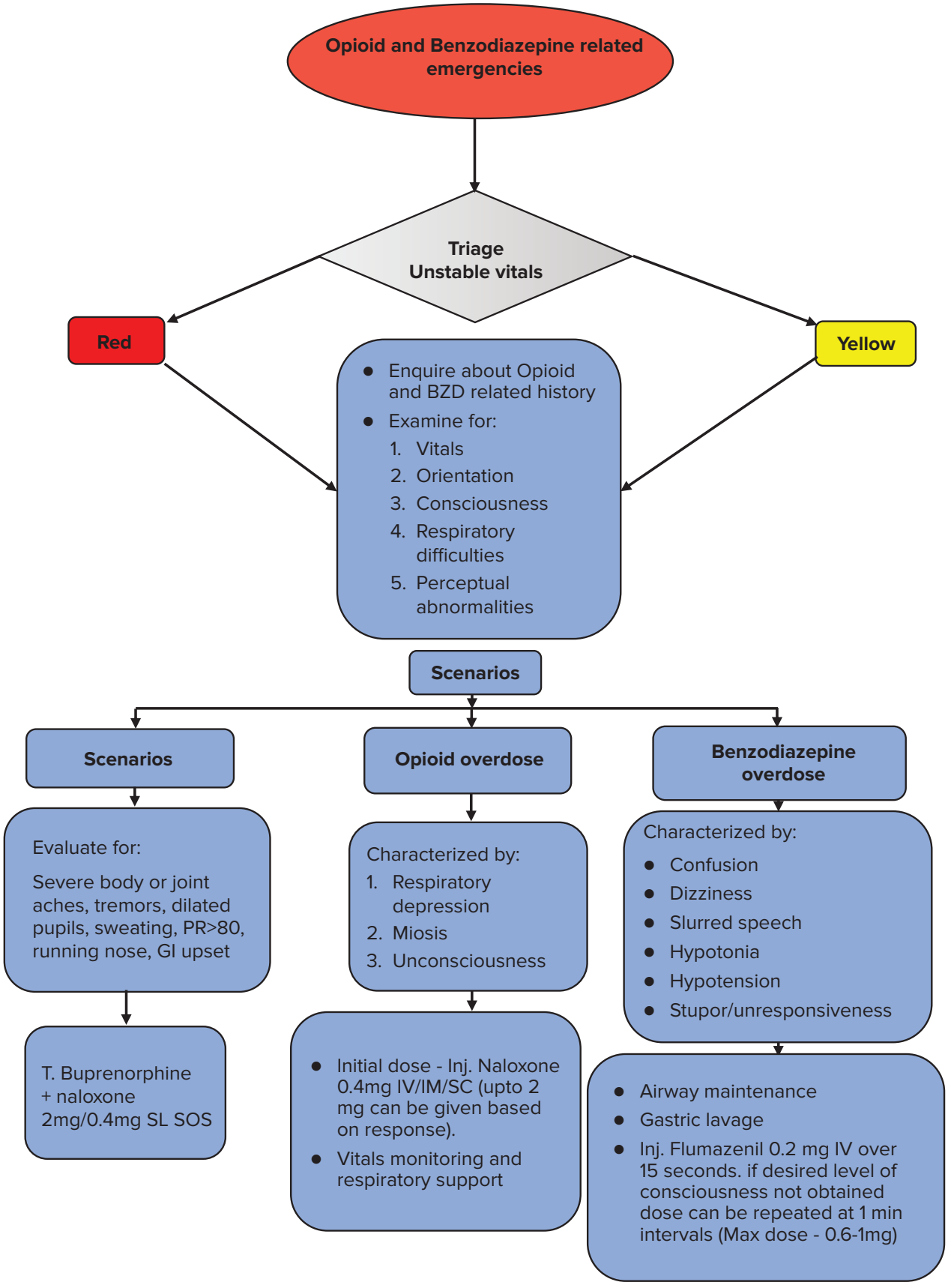
20. Algorithm for the Management of Psychiatric Emergencies



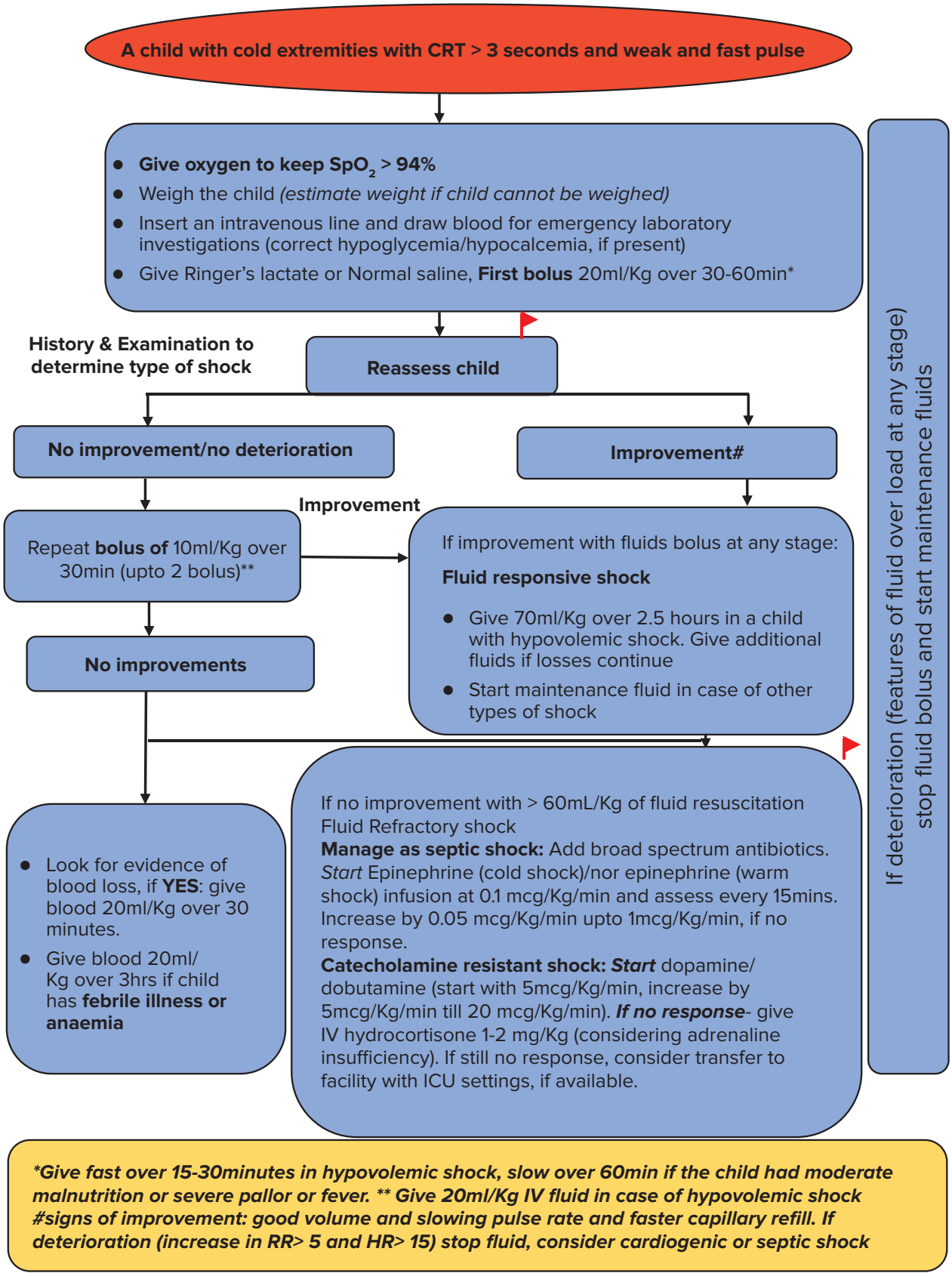
Algorithm for the Management of Alcohol-related Emergencies



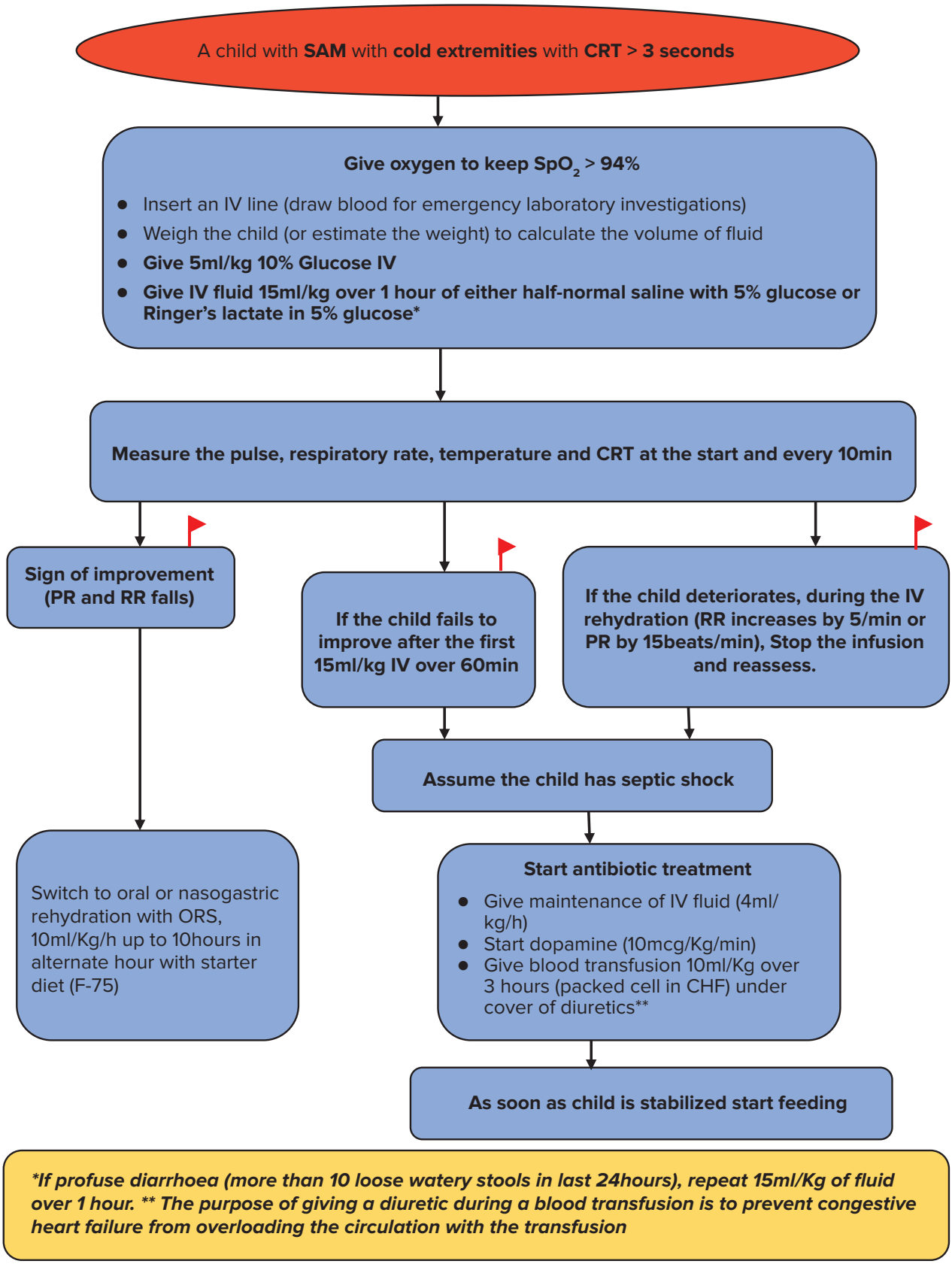
Algorithm for the Management of Opioid & Benzodiazepine-related Emergencies



21. Algorithm for the management of Shock in child without Severe Acute Malnutrition

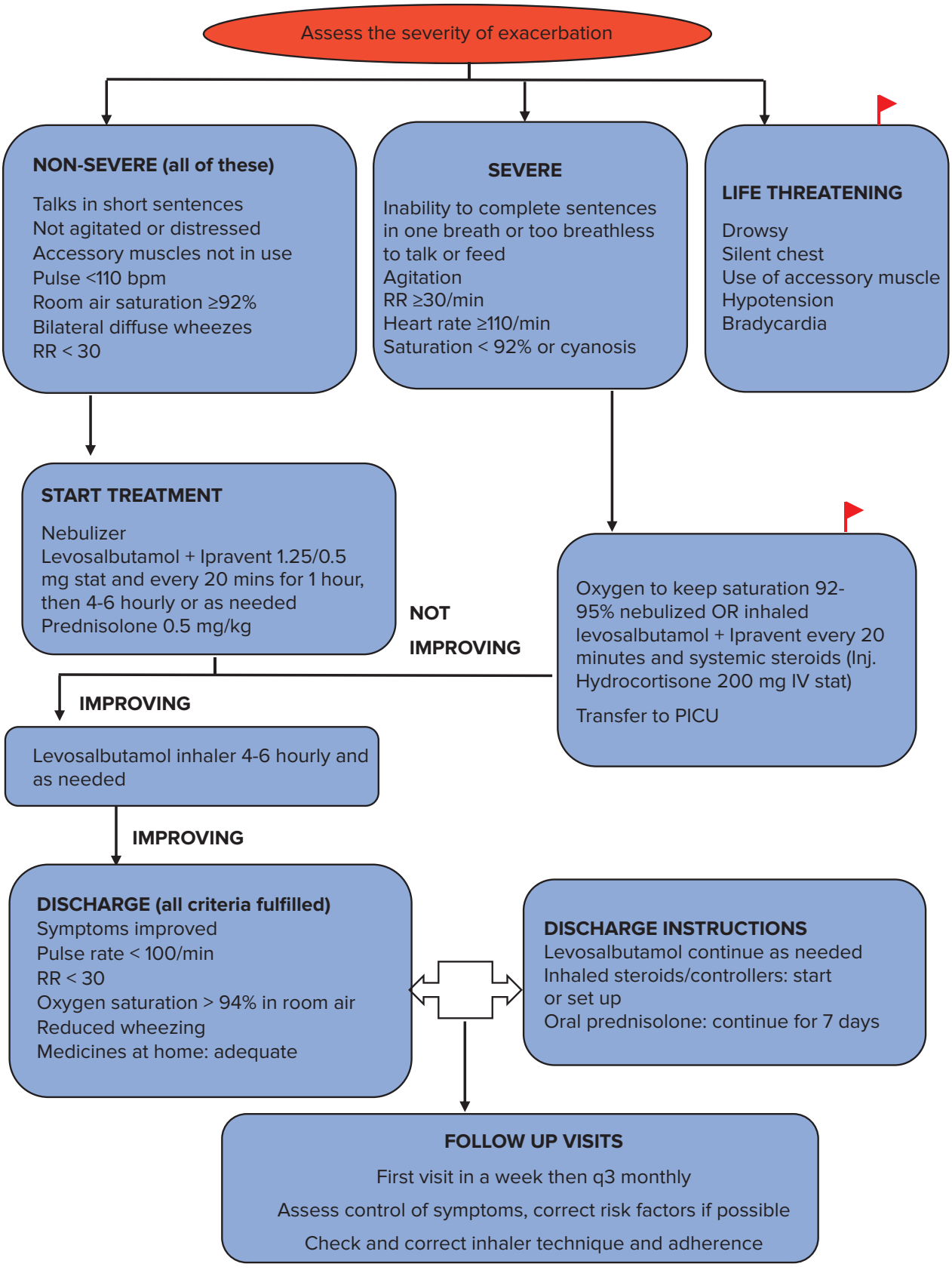


22. Algorithm for the management of Shock in child with Severe Acute Malnutrition

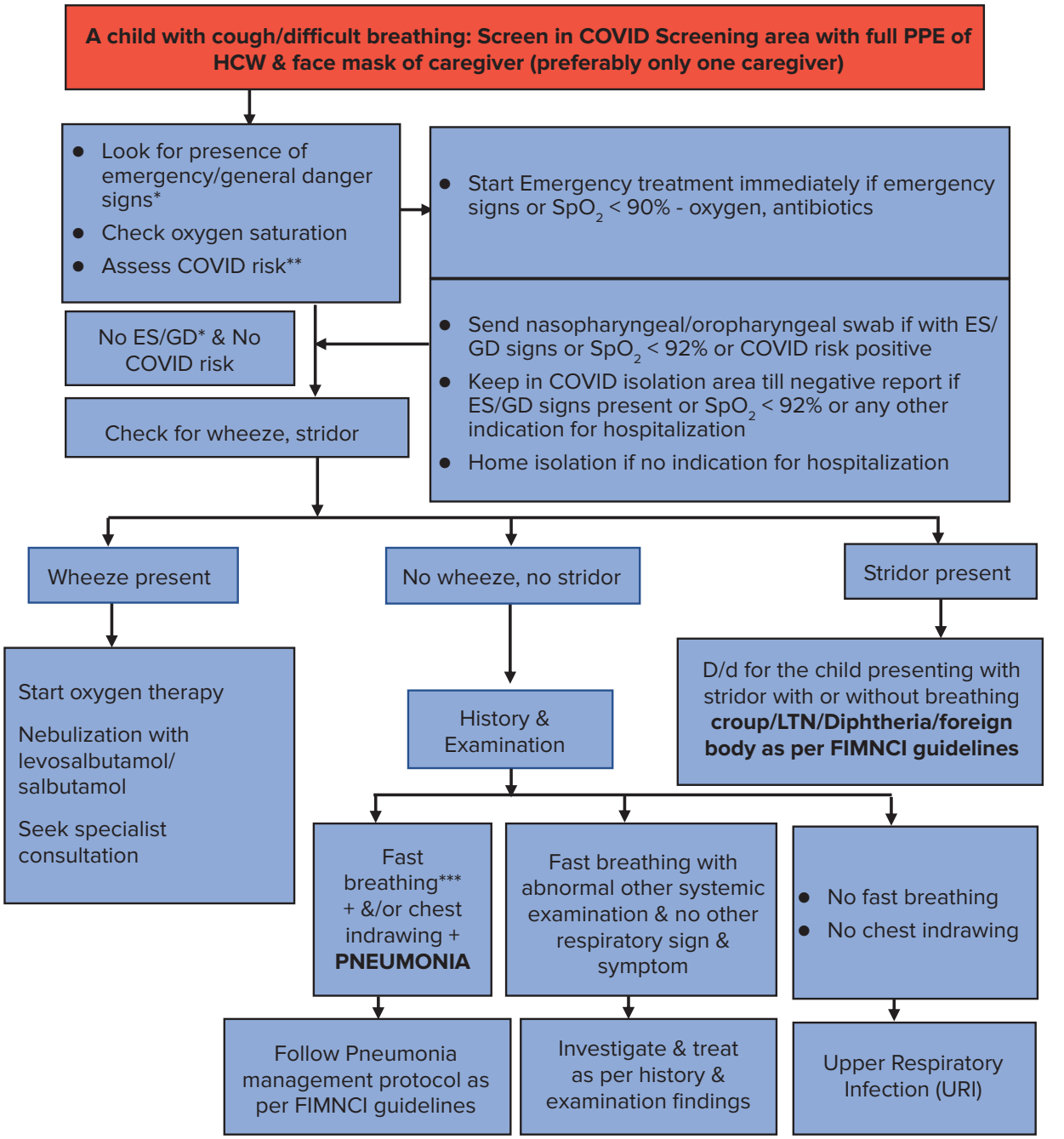


If profuse diarrhoea (more than 10 loose watery stools in last 24hours), repeat 15ml/Kg of fluid over 1 hour. ** The purpose of giving a diuretic during a blood transfusion is to prevent congestive heart failure from overloading the circulation with the transfusion

23. Algorithm for the management of asthma exacerbations for children < 12 years



24. Algorithm for Management of Children with Cough/ Difficult Breathing

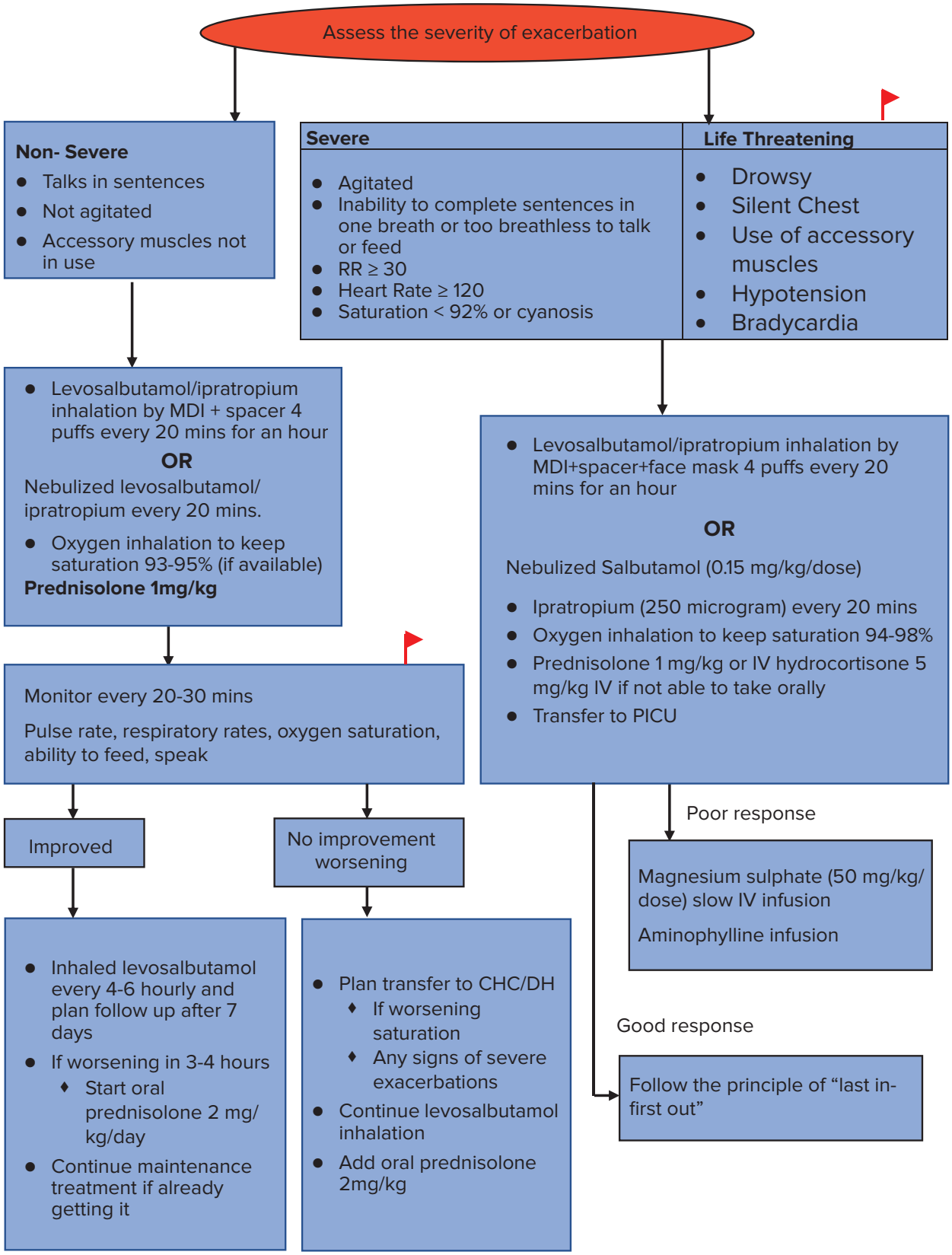


*Emergency sign/Danger sign: not breathing at all or gasping, obstructed breathing/central cyanosis/ oxygen saturation < 90%, severe respiratory distress, shock, coma, convulsions, inability to breastfeed or drink

**Fever with cough or loss of smell/taste or difficulty in breathing of less than 10 days or history of contact with COVID in last two weeks

***Fast breathing: ≥60 breaths/min in a child aged <2months; ≥50 breaths/min in a child aged from 2months up to 12months; ≥40breath/min in a child aged from 1 year up to 5 years

25. Algorithm for Management of acute asthma in older children (5-12 years)



26. Algorithm for the Management of Sick Neonates

Sick Neonates

Assess TABCDE
Temperature: Maintain euthermia; KMC/warm clothing/radiant warmer
Airway: Look for airway patency, maintain airway; place a shoulder roll
Breathing: Look for respiratory distress/failure; Start oxygen by nasal prongs if distress; Intubate if respiratory failure
Circulation: Look for CFT, peripheral pulses; Give IV fluid bolus NS 10ml/kg, if CFT ≥ 3sec
Dextrose: Look for seizures; give 10% dextrose 2ml/kg, if blood sugar < 40 mg/dl
Exposure: Examine thoroughly after exposing, look for jaundice
Get Calcium (preferably ionized calcium), ABG, mother's and baby's blood group, CBC, CRP

- Focused history & examination
- Refer to SNCU for further management

Before transport

- Maintain temperature
- Ensure euglycemia: Give feed/dextrose/IV Fluid
- If active seizures present, give injection phenobarbitone 20mg/kg slow IV stat, followed by 3-5 mg/kg/day maintenance
- If sepsis suspected, give 1st dose of IV Antibiotic (IV Ceftriaxone 50 mg/kg)
- Inform investigation reports to the referral facility

RED

Identification of sick neonate

- Hypothermia temperature <36 degree Celsius
- Apnea or gasping respiration
- Severe respiratory distress, RR >70/min with severe retractions, grunt
- Central cyanosis
- Shock (cold periphery, CFT >3sec, weak & thready pulses
- Coma, convulsions or encephalopathy

YELLOW

- Cold stress temperature 36.0 to 36.4° Celsius
- Respiratory distress, RR>60/min, no retractions
- Irritable/restless/lethargy
- Abdominal distension
- Severe pallor
- Severe jaundice
- Bleeding from any site
- Major congenital malformation
- Birth weight <1800 grams or >4000gms

Management of apneic/gasping neonate (at birth or anytime during neonatal period)

- Place the baby under radiant warmer
- Position with neck slightly extended, suction, maintain airway; stimulate
- Still apneic, HR <100/min --- attach SpO_2 monitor, start bag & mask ventilation at 40-60 breaths/min (can be started with room air)
- Assess for efficacy of bag & mask ventilation after 5 breaths using ventilatory corrective steps*
- Reassess after 45-60 seconds of effective bag & mask ventilation

  Prefer to intubate at this point

  Still apneic, HR < 60/min, start chest compression at rate 90/min of compressions with 30/min of ventilation

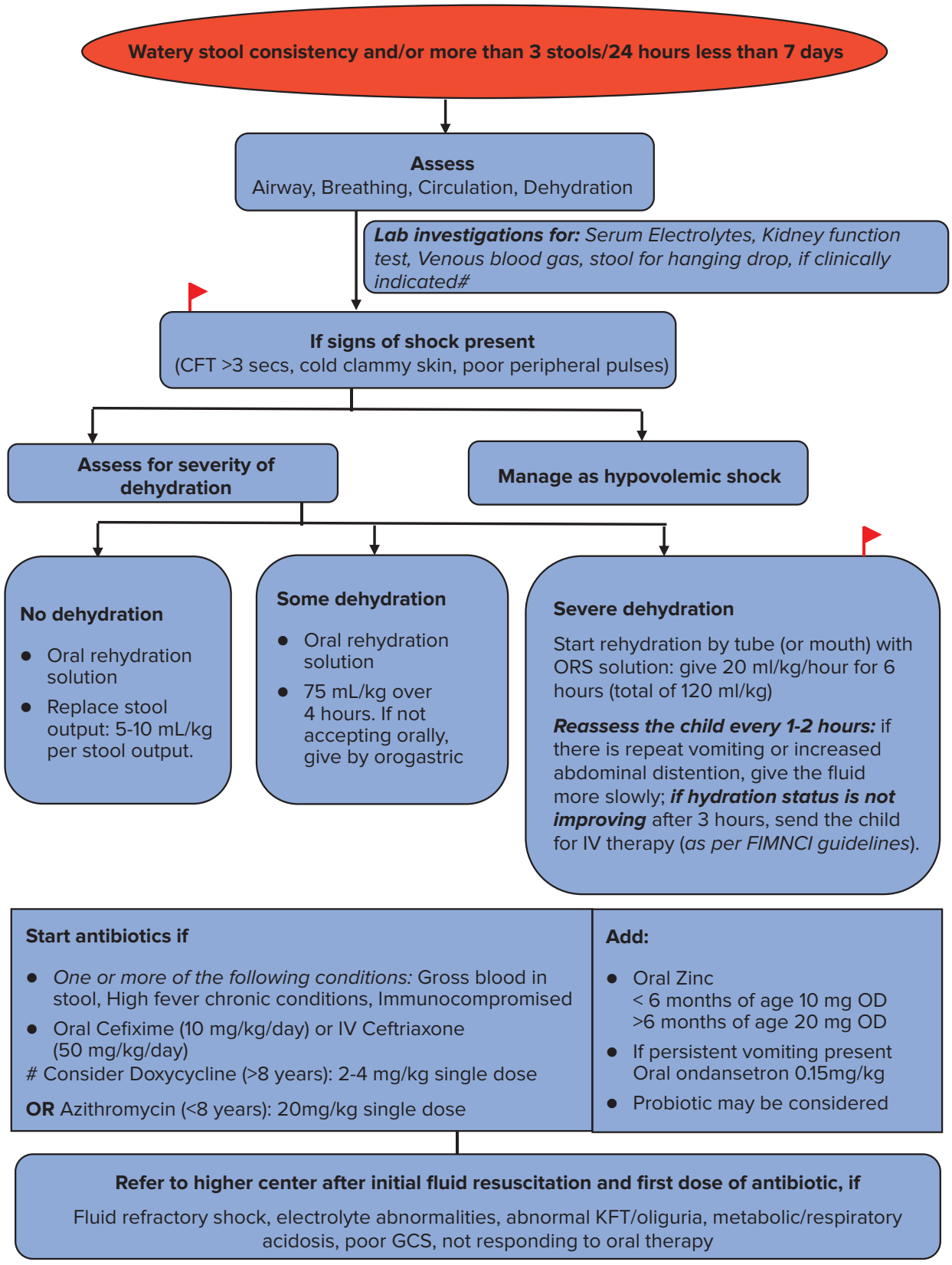
  Still apneic, HR > 60/min, continue bag & mask ventilation
- Reassess after 30 seconds

  Still apneic, HR < 60/min--- give injection epinephrine 1:10,000 dilution, 0.1-0.3 ml/kg IV

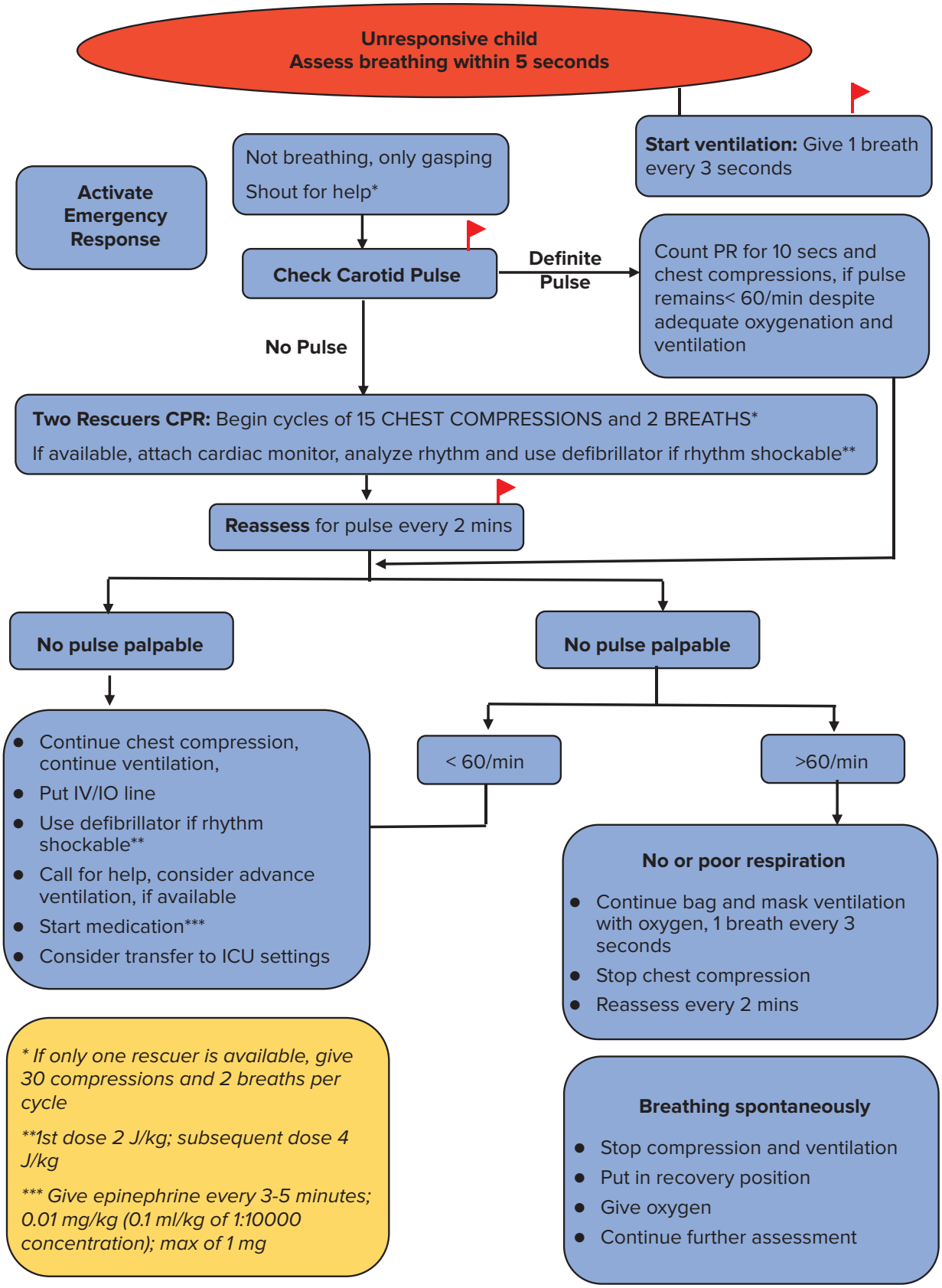
  Transfer to appropriate facility for ventilatory care

**Reapply mask, reposition head, suction mouth & nose, open infant's mouth, increase pressure every few breaths until bilateral breath sounds & chest rise evident. Use alternative airway-endotracheal tube or laryngeal mask airway.*

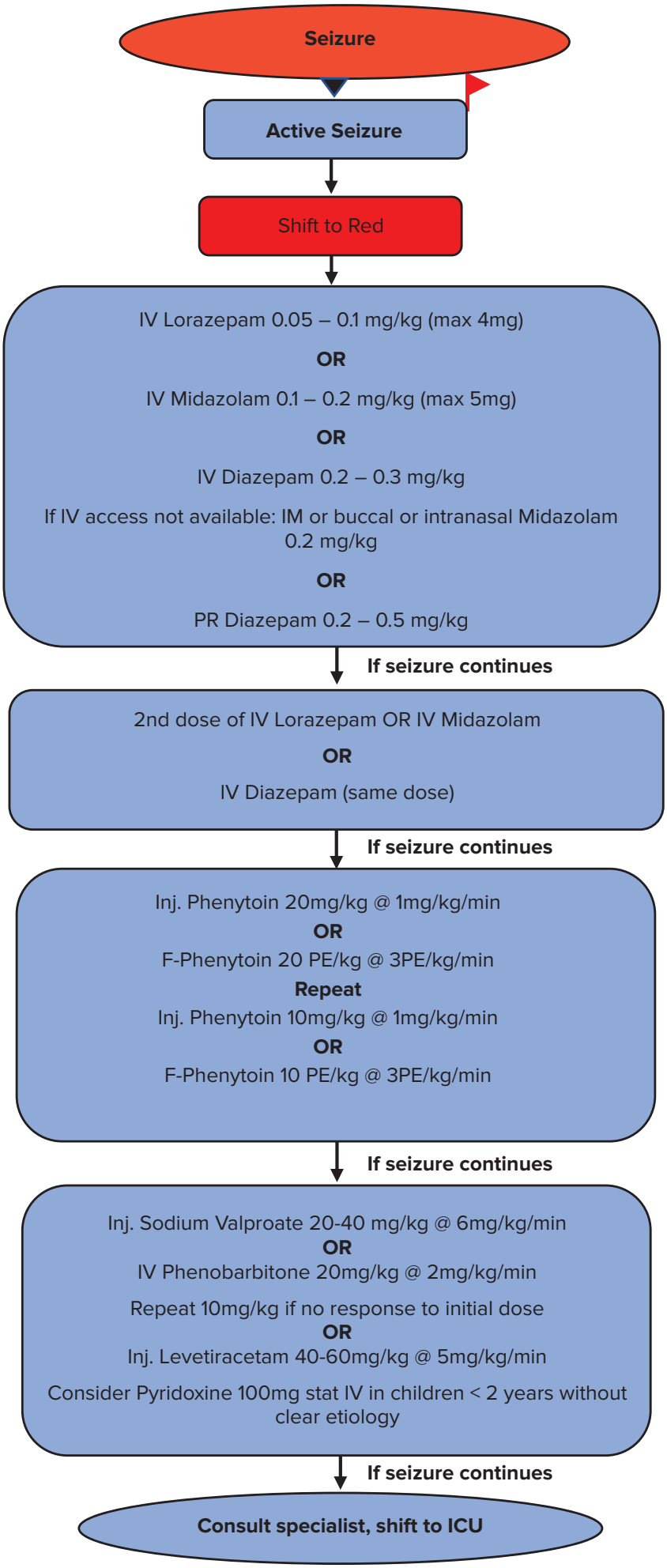
27. Algorithm for management of Diarrhea in children



28. Algorithm for Cardiopulmonary Resuscitation for an unresponsive child



29. Algorithm for the management of Seizure



Annexure IV

Emergency area layout plan

Annexure V

Disaster Management and Preparedness

It is pertinent for every health facility to have a preparedness plan for managing disasters. The plan shall include formation of a disaster management committee, identification of high-risk areas and a well-functioning emergency unit with an open space nearby that can be quickly cordoned off for managing heavy load of patients. Regular monitoring must be done to ensure availability of buffer stock of various consumables; their periodic replenishment, training of various stakeholders such as doctors, paramedical staff; security personnel, mock-drills including inter-departmental drills, adequate human resource and rapidly available ambulance services. The hospital should also designate a nodal officer, preferably the casualty/emergency in-charge who will ensure that all required actions are taken to implement the plan for managing such unforeseen incidences. With a well-structured disaster management plan and well-trained response team, any kind of disaster can be managed effectively and efficiently.

Fire safety Norms

Provisions laid down in National building code 2016 (4.5.2-subdivision C-1) establish the minimum requirements for a reasonable degree of safety from fire emergencies in hospitals, such that the probability of injury and loss of life from the effects of fire are reduced. All healthcare facilities shall be so designed, constructed, maintained and operated as to minimize the possibility of a Fire emergency requiring the evacuation of occupants, as safety of hospital occupants cannot be assured adequately by depending on evacuation alone. Hence measures shall be taken to limit the development and spread of a fire by providing appropriate arrangements within the hospital through adequate staffing & careful development of operative and maintenance procedures consisting of:

(1) Design and Construction;

(2) Provision of Detection, Alarm and Fire Extinguishment;

(3) Fire Prevention

(4) Planning and Training programs for Isolation of Fire; and,

(5) Transfer of occupants to a place of comparative safety or evacuation of the occupants to achieve ultimate safety.

Expected Levels of Fire Safety in Hospitals

Hospitals shall provision for two levels of safety within their premises:

(1) **Comparative Safety**: It is protection against heat and smoke within the hospital premises, where removal of the occupants outside the premises is not feasible and/or possible. Comparative Safety may be achieved through (a) Compartmentation (b) Fire Resistant wall integrated in the Flooring (c) Fire Resistant Door of approved rating (d) Pressurized Lobby, Corridor, Staircase (e) Pressurized Shaft (All vertical openings) (f) Refuge Area (g) Independent Ventilation system(h) Fire Dampers (i) Automatic Sprinkler System(j) Automatic Detection System(k) Manual Call Point(l) First Aid(m) Fire Fighting Appliances (n) Fire Alarm System (o) Alternate Power Supply (p) Public Address System (q) Signage (r) Fire Exit Drills and orders.

(2) **Ultimate Safety**: It is the complete removal of the occupants from the affected area to an assembly point outside the hospital building. Ultimate Safety may be achieved through: (a) Compartmentation (b) Fire Resistant Door of approved rating (c) Protected Lobby,

Corridor, Staircase and Shaft (d) Public Address System(e) Signage, fire evacuation maps (f) Fire Drills and orders.

Open space

(1) Hospitals shall make provisions for sufficient open space in and around the hospital building to facilitate the free movement of patients and emergency/fire vehicles.

(2) These open spaces shall be kept free of obstructions and shall be motorable.

(3) Adequate passage way & clearance for fire fighting vehicles to enter the hospital premises shall be provided.

(4) The width of such entrances shall not be less than 4.5 mtrs with clear head room not less than 5 mtrs.

(5) The width of the access road shall be a minimum of 6 mtrs.

(6) A turning radius of 9 mtrs shall be provided for fire tender movement.

(7) The covering slab of storage/static water tank shall be able to withstand the total vehicular load of 45 tonnes equally divided as a four point load (if the slab forms a part of path/ drive way).

(8) The open space around the building shall not be used for parking and/or any other purpose.

(9) The Setback area shall be a minimum 4.5 mtrs.

(10) The width of the main street on which the hospital building abuts shall not be less than 12mtrs & when one end of that street shall join another street, the street shall not be less than 12 mtr wide.

(11) The roads shall not be terminated in dead ends.

Instructions for Fire Safety for Hospital Staff Instructions for Personal Safety

All Hospital Staff should know:

(1) The location of MOEFA push button fire alarm boxes. They should read the operating instructions.

(2) Location of the fire extinguishers, hose reel, etc. provided on their respective floors.

(3) The nearest exit from their work area,

(4) Their assembly point.

Matters to be reported to the Fire officer

(1) If any exit door/route is obstructed by loose materials, goods, boxes, etc.

(2) If any staircase door, lift lobby door does not close automatically, or does not close completely.

(3) If any push button fire alarm point or fire extinguisher is obstructed, damaged or Apparently out of order.

Instructions for Fire Incidents

During any fire incident in the hospital premises, staff should:

(1) Break the glass of the nearest fire alarm (if they are the first ones to discover the fire)

(2) Attack the fire with fire extinguishers/hose reel provided on the floor.

Earthquake Safety Provisions

All New hospital buildings or hospital buildings being retrofitted in seismic zone IV and V, and hospital buildings in wind zones with basic wind speed 42 m/s or more, shall be instrumented with proper mechanism prescribed in NBC.

Safer and functional Hospital

One of the main concerns with regard to the safety of hospitals is that hospital structures (i.e. the buildings) are themselves vulnerable to collapse in the face of extreme forces (such as those experienced during earthquakes). Therefore, to ensure the safety of hospitals and achieve the goal of 'safer and functional hospitals', mitigation measures (as presented in NBC) need to be undertaken in a programmatic manner by the Ministry of Health on an urgent basis.

Post-Earthquake Assessment of Hospital Structures

Hospital buildings shall be inspected by competent licensed engineers after every damaging earthquake to document damages (if any) to Structural Element (SEs) and Non-Structural Element (NSE)s of the buildings, along with recommendations for detailed study and suitable retrofitting as found necessary.

Clean electricity

a. Two number of earthing should be there at each electrical installation. Copper plate earthing should be preferred.
b. Provision of surge protection/suppressor should be there. Surge suppressors are rated according to size of voltage spike they can handle, so only units of high enough joules rating to protect the equipment should be used.
c. Load calculation should be proper, accordingly the distribution, electrical switchgear rating, circuitry, cabling and electrical installation should be there.
d. The size of cabling and wiring should be about 1.5 times or more to the actual electrical load calculated.
e. Adequate powers back up with another source such as DG, Photovoltaic etc should be there in synchronization with the first source.
f. Some places which are very important, provision of uninterrupted power supply should be there.
g. Phase sequence should be proper as for motorized load.
h. Load monitoring should be there. to avoid any overloading
i. A lot of motorized as well as semiconductor material devices are there hence provision of power factor improvement should be there.
j. All the Connection and joint should be tight with proper size of thumbing.
k. Balancing of electrical load should be proper and monitored via measuring devices.
l. Suitable place should be selected for electrical installation.
m. Sensitive equipment should be provided with proper rating UPS for extra safety against disturbances as voltage spike and noise.
n. The Electrical Switch Room shall be housed in a dedicated room/cupboard located on the ground floor and in association with an external wall and shall have internal access. The room shall be located so that it does not present difficulties for services distribution from adjoining spaces or rooms and it shall be located so as to provide for economic distribution of services. The main switchboard shall be of metal clad cubicle design to approved standards and regulations. Each switchgear assembly shall have sufficient spare capacity. Electronic surge protection shall be provided on the incoming mains.

Preparedness during pandemics/mass casualties

Emergency department is a common hospital access point for all patients with emergency condition and a site of immediate response during any outbreak of infectious origin, mass causalities, CBRN injuries, epidemic and pandemics.

In order to prevent the spread of Infection during any outbreak and minimize the cross infection in the emergency department, the existing triage system may be modified to a “condition triage system” in which the suspected cases with symptoms needs to be screened based on the symptoms, prior to the entry in the emergency department. However, such provisions need to be introduced only in special circumstances and emergencies.

What is important for any critical area including emergency is the adherence to Infection Prevention Protocol and Universal Precautions. Even during emergency, epidemics and pandemic, such special provisions should always be in line with the relevant government prevailing policies and directives. It is also suggested that while planning, there should be a provision of separate entry and exit in the infrastructural design.

Annexure VI

Terms of Reference

In charge Specialist - Emergency Department

Roles & Responsibilities:

1. Being the team leader for Emergency department he/she has to supervise & guide all the team members as well as handle technical & administrative functions of the department.
2. Guide the team on management of cases coming to or admitted in Emergency Department.
3. Take daily rounds both morning & evening and additional rounds as per the need.
4. Monitor/lead the reporting to police for medico-legal cases.
5. Lead/Supervise the clinical record keeping for the emergency department.
6. Monitoring the performance of all staff members, including administrative staff, nurses, technicians, and physicians.
7. Developing and implementing Standard Operating Procedures for improving patient care delivery and carry-on Quality Initiatives in the department.
8. Ensuring SOPs and plans for surge management, crowd management and during disaster are in place.
9. Conducting regular departmental meetings to discuss patient care issues and identify potential problems and implement solutions.
10. Organizing regular CMEs and periodic capacity building of staff working in ED on critical care protocols.
11. Routinely check all the registers maintained by the staff for proper data entries.
12. Regular review of Logistics & stocks ensuring timely indents are made as per the requirement.
13. Review the performance of ED and conduct periodic audits.
14. Organizing/conducting mock drills for managing disaster and mass casualties.
15. Any other job as per the exigencies of work.

Medical Officer - Emergency Department

Roles & Responsibilities:

1. Quick triaging & initial assessment and resuscitation of the patients coming to the Emergency department.
2. Promptly perform all clinical work required for saving patients life till he/she is transferred to a definite care/required department.
3. Timely inform the specialist and seek consultation whenever required.
4. Assess, intervene, and reassess for the patient's condition at regular intervals to see the response of patient to the provided treatment.

5. Check for the continuous supply maintenance in order to avoid any kind of stock outs.
6. Supervise the on-duty staff and guide them as per the need.
7. Promptly perform/ensure all the procedures and investigations required are done in case of emergencies.
8. Monitor the shifting/transfer and discharge of the patient as per the laid down protocol and ensure completion of patient records form and referral slip at the time of discharge/ shift/referral to other units/Higher center.
9. Referral of patients in and out from the Emergency Department mentioning the reason for referral and giving referral slip as per the case.
10. Explain the relatives about the condition of the patient including potential risks and consequences at all the times.
11. Intimating the police regarding all the medico-legal cases in a uniform format and to comply with statutory requirements as mandated by the law.
12. To take charge of the patients from the Medical officer on previous duty and give proper detailed handover to the next Medical Officer at the time of getting relieved from the duty.
13. To assist Incharge Emergency in preparation of duty rosters, deployment and any other task if required.
14. Organizing & attending CMEs periodically and going through updated GOI guidelines.
15. To perform all other jobs as may be assigned due to exigencies of work.

Staff Nurse - Emergency Department

Roles & Responsibilities

1. Quick initial assessment as well as triaging of the patients coming to emergency & informing doctors for help and support as and when required.
2. Guiding and supervising the work of cleaning staff, Guards & other staff, to undertake procedures as per protocol.
3. Handing & taking over for operational status of critical equipment, drugs, assigned patients etc. with every change of shifts.
4. To assist the Emergency team in any lifesaving procedures as well as all other procedures performed as per the patient's condition and timely administration of the medicines as prescribed by the medical officer.
5. Recording of vital signs immediately of patients in red area and within 5 minutes of arrival in yellow zone and then every 30 minutes or more frequently in both red and yellow zones as per the clinical need.
6. Reassess/Periodic monitoring of the patient kept under observation to detect any complications and support the Medical officer in calling up the Specialist whenever required.
7. Setting up procedure trays, Emergency Drug trays, tray for managing anaphylactic shock, dressing trolleys & preparation of the patients for emergency surgeries.
8. Write the day/night reports legibly & maintain all the registers reflecting all important factors.

9. To procure stationery (Consent forms, nurse notes, doctor's sheet, MLC register. Death forms etc.) in the Emergency Department.
10. Notify any untoward incident following the process of incident reporting & taking corrective actions for the same under the guidance of the Emergency Incharge & Nursing Head.
11. Participation in continuous training programs.
12. Follow infection control & various hospital policies and ensure all Infection Control Policies are in place
13. Any other task assigned by the Medical officer or the Nursing Incharge of the Emergency department.

Annexure VII

List of Equipment Required in Emergency

Emergency Resuscitation Trolley

Every Emergency should have a resuscitation trolley/crash cart made according to the following guidelines:

Top	First Drawer
Defibrillator	Inj. Atropine 1 mg/10 ml (10)
Electrodes (chest leads)	Inj. Adenosine 6 mg/2 cc (10)
Suction machine	Inj. Calcium Gluconate 1 gm/10 ml (10)
Adult and pediatric Ambu bags	Inj. Adrenaline 1 : 10,000/10 ml (10)
Stethoscope	Inj. Dexamethasone 4 mg/1 ml (5)
CPR book	Inj. Digoxin 0.5 mg/2 ml (1)
On the side of the crash cart: Oxygen cylinder with one regular Type B cylinder	Tongue blades (5)
	Oxygen wrench
	Thermal paper

Second Drawer	Third Drawer
Inj. Dextrose 10%, 25%, 50% (5 each)	Inj. Furosemide 40 mg/10 ml (2)
Inj. Amiodarone 150 mg/3 ml (2)	Inj. Magnesium sulfate 5gm/10ml (2)
Inj. Nitroglycerine 50 mg/10 ml (5)	
Inj. Sodium bicarb 8.4%/50 ml (10)	
Inj. Dopamine 400 mg/10 ml (5)	
Suction tubing (2)	
Suction catheter (8 F, 10 F, 12 F, 14 F) (5)	

Fourth Drawer	Fifth Drawer
Gloves 6-1/2 (3)	Laryngoscope handle
Gloves 7-1/2 (3)	Miller Blade (00, 0, 1, 2, 3, 4) (1 each)
Tape	Macintosh Blade (0, 1, 2, 3, 4, 5) (1 each)
IV Canula (24 G. 22 G. 20 G. 18 G. 16 G, 14 G) (5 each)	ET Tubes (3, 3.5, 4, 4.5, 5, 5.5, 6, 6.6, 7,7.5) (5 each)
Tourniquet (1)	Airways (0.0, 0, 1, 2, 3, 4, 5) (1 each)
Alcohol Swabs	Batteries D, C, AA, AAA, A23, 9V, button (3 each)
Syringes (3 ml, 5 ml, 10 ml, 20 ml, 50 ml) (2 each)	**Sixth Drawer**
Needles (18G, 21G, 23G, 25G, 30G) (10 each)	D5½ NS 250 cc (1)
Conductivity gel	Lactated Ringers 500 cc (2)
Inj. Normal Saline 50 ml (2)	NaCl 0.9% 500 cc (2)
	IV tubing (5)

List of these equipment for both new born and paediatric

Equipment	0-5 months (3-6 kg)	6-12 months (4-9 kg)	1-3 years (10-15 kg)	4-7 years (16-20 kg)
AIRWAY AND BREATHING				
Laryngoscope	Straight blade	Straight blade	Child Macintosh	Child Macintosh
Uncuffed tracheal tube	2.5-3.5	3.5-4.0	4.0-5.0	5.0-6.0
Suction catheter (French gauge)	6	8	10/12	
CIRCULATION				
IV Cannula	24/22	22	22/18	20/16
Central venous cannula triple lumen (in FR)	20	20	18	18
OTHER EQUIPMENT				
Nasogastric tube	8	10	10-12	12
Urinary catheter[a]	5 feeding tube	5 feeding tube/F8	Foley 8	Foley 10
Sizes in French gauge, which are equivalent and indicate the circumference of the tube in millimeters.				

Annexure VIII

Requirements for One Red Area (6 adult and 6 pediatric beds)

Sl. No.	Item	Number
1.	Crash cart (with supplies: Emergency Drugs, ET Tube, OPA, Laryngoscope with blade, syringes, IV Canula, IV Set)	2 (1 each adult and paediatric per 6 bed)
2.	Laryngoscope set with Battery	4 (2 sets each for adult and paediatric per 6 bed)
3.	AMBU Bag (250ml, 500ml, 750ml, 1000ml, 1500ml)	5
4.	Multipara Monitor (to monitor Heart Rate, BP, SpO_2, ECG, Temp.)	12 (1 each for adult and paediatric bed) and 2 portable units
5.	Portable/Transport Ventilator with Non Invasive ventilation capability	16 (12 for adult and paediatric + 2 for transport for adult and paediatric each + 2 as reserve in case of brakeage/repair/rundown)
6.	NIV machine with mask (portable)	4 for red area
7.	Manual Defibrillator with pacing capability	2
8.	Oxygen, Suction point and humidifier (central pipeline supply)	12 (1 set for each bed)
9.	Oxygen Cylinder Type B (to be used during Transporting the patients for investigation or shifting)	8 (3 for adult and paediatric bed each and 2 as reserve for filling and rotation purposes)
10.	Suction Machine manual (foot operated)	2 (1 each for adult and paediatric)
11.	Medicine Trolley	2 (1 each for adult and paediatric)
12.	IV Stand hanging from top/roof	12 (1 for each bed)
13.	Pressure bag	12 (1 for each bed)
14.	Warmer (warm air blower to prevent hypothermia)	12 (1 for each bed)
15.	Fluid warming Cabinet	1 for whole Emergency department
16.	Portable Ultrasound Machine with 1-large convex, 1-Linear, 1-cardiac probe	One machine with appropriate probes for all age groups
17.	Portable X ray	1 for whole Emergency department
18.	Infusion pump	18 (2 for each red bed)
19.	BMW (Black, Red, Yellow Bucket, Needle Destroyer)	1 set in each area
20.	Ultrasonic Nebulizer	4 for Emergency Department
21.	Broselows paediatric emergency tape	3 (1 for red, yellow and triage each)
22.	ECG machine	2 (1 for red and yellow each)
23.	Transport Monitor	8 (4 in red area (2 for adult and 2 for paediatric) and 4 in yellow area(2 for adult and 2 for paediatric))
24.	Resuscitation bed	12 beds
25.	Hanging Curtain	1 set for each bed
26.	Partition curtain	3 sets
27.	ED blood storage unit	1 in whole ED

Red Area Supplies

Airway	Breathing	Circulation	Miscellaneous
• OPA • ET Tube • Adjustable Cervical Collar • Tracheotomy kit	• Oxygen Mask • O_2 Mask with Nebulizer • Chest tube (30,32 Fr for Adult & 16,18,20 Fr for kids) • Chest tube water-seal drainage Bag • AMBU	• IV Cannula (16G mainly for Adults, also keep pediatric & other sizes • Tegaderm • Pressure Monitoring (PMO) Line • IV Fluid • Foleys Catheter • Urine collection Bag • Blood Transfusion tubing Set (BT set) • IV Set • Syringes • Blood sampling Vials • Saturation probe • Pulse oximeter • Suturing Set	• Blanket • Bed Sheet • OPT • Gloves • Shoe Cover • Gown • Mask • CSSD Drum • Wooden Splints & other splints Bandages • ECG • X-ray machine • USG • Bone marrow aspiration needle • LP needle

Annexure IX

Requirements for one Yellow Area (12 beds)

Sl. No.	Item	Number
1.	Crash cart (with supplies: Emergency Drugs, ET Tube, OPA, Laryngoscope with blade, syringes, IV Canula, IV Set) Please note, separate Crash cart is needed for paediatric patient	1 set with supplies (Adult) 1 set with supplies (paediatric)
2.	Laryngoscope set with Battery (2 Adult 2 Paediatric set)	4 sets
3.	AMBU Bag (250 ml, 500 ml, 750 ml, 1000 ml, 1500 ml)	1 each
4.	Multipara Monitor (to monitor Heart Rate, BP, $SpO_{2,}$ ECG, Temp.)	12 (1 per bed)
5.	Oxygen & Suction point (central pipeline supply)	24 oxygen and 24 suction (2-Oxygen, 2-suction for each bed)
6.	Oxygen Cylinder Type B (to be used during Transporting the patients for investigation or shifting)	12 (1 cylinder for each bed)
7.	Suction Machine manual (foot operated)	1
8.	Medicine Trolley	2 for 12 beds
9.	IV Stand hanging from top/roof	12 (1 for each bed)
10.	Portable Ultrasound Machine with 1-large convex, 1-Linear, 1-cardiac probe	One machine with appropriate probes for all age groups
11.	Infusion pump	1 each for 12 beds
12.	BMW (Black, Red, Yellow Bucket, Needle Destroyer,	1 set
13.	Ultrasonic Nebulizer	2 set

Yellow Area Requirements

Airway	Breathing	Circulation	Miscellaneous
OPA	Oxygen Mask	IV Cannula & Tegaderm	Blanket
Cervical Collar	O_2 Mask with Nebuliser	IV Set	Bed Sheet
		BT Set	OPT
		PMO Line	Gloves
		IV Fluid	Mask
		Foleys Catheter	Shoe Cover
		Urine collection Bag	Gown
		Syringes	Wooden Splints & other splints
		Sampling Vials	Bandages, cotton
			CSSD Drum

Annexure X

Cleaning Schedule

Functional Area	Frequency of cleaning	Level of cleaning/ disinfection	Method of cleaning/disinfection	Evaluation/auditing frequency
High Risk Area: Emergency	Once in two hours and spot cleaning as required	Cleaning and Intermediate level disinfection	Cleaning with soap & detergent plus disinfection with alcohol compound, hydrogen peroxide	Daily by designated supervisor Weekly review by Emergency in-charge Monthly auditing by infection control team.

Activities	Frequency	Agent Used
Red zone	Once in two hours and as and when required	Damp Mop with detergent and water/0.5% chlorine
Mopping. (Care to be taken in case of special epoxy flooring)	Once in two hours and after every procedure	Damp mop with detergent and water/ 0.5% chlorine
Cleaning of Instruments	After every procedure	Disinfection, detergent & water followed by sterilization
Yellow zone	Three times in a day and spot cleaning as required	Damp Mop with detergent and water/0.5% chlorine
Cleaning of equipment like monitors, ventilators, infant warmers/ baby cribs etc or other equipment/ furniture.	Once in four hours or as & when required	Damp Mopping, dry, Disinfect with 70% isopropyl alcohol/ 2% glutaraldehyde
Cleaning of jars (humidifier, suction etc), tubes (bag & mask, suction etc)	After every use	Disinfect with 70% isopropyl alcohol/ 2% glutaraldehyde then wash with detergent and water
Doctor's/ nurses/ technician room	Two times in a day and/or as and when required	Detergent & water
Washroom & wash basins cleaning	Once in two hours and/or as & when Required	Wash with Soap & water, then dry, wipe 0.5% chlorine
Store rooms	Once in a day	Detergent & water
Emergency ward	Once in four hours	Damp Mop with detergent and water/0.5% chlorine
Cleaning, stretcher, trolley, wheel chair	Clean after each use	Damp mop with detergent/alcohol and water Or 0.5% chlorine/70% Isopropyl Alcohol

Activities	Frequency	Agent Used
Cleaning of Mops (in Separate mop cleaning area)	After every use	Soak in clean water with bleaching powder 0.5% for 30 minutes. Wash again with detergent and water to remove the bleach
Dirty Utility room	Once in 6 hours	Damp Mop with detergent and water/0.5% chlorine
Removal of soiled linen	As and when required	Send to mechanized laundry
Cleaning of urine pots and bedpans	After each use and between change of patients e.g. old one discharged and new patient admitted	Disinfect with 70% isopropyl alcohol/ 2% glutaraldehyde
Waste Management	Thrice a day and more when bags are 3/4th full present in Dirty Utility area	As per BMW rules, 2016

Annexure XI

Emergency Drug List

Sl. No.	Drug	Formulation	Strength
1	10% dextrose Dextrose IV	Injection	5% w/v, 500 ml
2	Adenosine Phosphate	Injection	3 mg/ml
3	Adrenaline	Injection	1 mg/ml (1:1000)
4	Alprazolam	Tablet	0.25 mg
5	Alteplase	Injection powder	50 mg
6	Amikacin	Injection	500 mg/2 ml
7	Aminophylline	Injection	25 mg/ml
8	Amiodarone	Injection	50 mg/ml (3 ml ampoule)
9	Amoxicillin + clavulanic acid	Injection	500 +100 mg
10	Ampicillin Sodium	Injection powder	500 mg/ml
11	Anti Rabies Immunoglobulin	Injection	3000 IU/ml
12	Anti Rabies vaccine	Injection ID	2.5 IU/0.5 ml
13	Antisnake venom Snake venom antiserum injection: a. Soluble/Liquid Polyvalent b. Lyophilized polyvalent	Injection	10 ml vial
14	Artemether	Injection	80 mg/ml, 1 ml amp
15	Artesunate	Injection	60 mg/ml
16	Atropine Sulphate	Eye Ointment	1%
17	Atropine	Injection (sulphate)	0.5 mg/ml 0.6 mg/ml, 1mg/ml
18	Benzathine penicillin	Injection powder	6 lacs IU vial
19	Benzathine penicillin	Injection powder	12 lacs IU vial
20	Budesonide	Nebulizer solution	15 ml vial
21	Calamine lotion	Lotion	8%
22	Calcium gluconate	Injection	100 mg/ml, 1mg,IV 10ml amp
23	Cefotaxime	Injection	250 mg, 500 mg
24	Ceftriaxone Powder (sodium)	Injection powder	250 mg, 500 mg, 1 g vial
25	Cetrizine	Tablet, suspension	10 mg, 5mg, 5 mg/ml,60 ml
26	Charcoal activated	Tablet	250 mg
27	Ciprofloxacin	Injection IV	200 mg/100 ml
28	Ciprofloxacin	Eye Drops	0.30%
29	Dexamethasone Disodium	Injection	4 mg/ml
30	Diazepam	Injection	5 mg/ml
31	Diclofenac	Injection	25 mg/ml
32	Digoxin	Injection	0.25 mg/ml
33	Diltiazem	Injection	5 mg/ml
34	Dobutamine	Injection	125 mg/5 ml, 50 mg/ml
35	Dopamine Hydrochloride	Injection	40 mg/ml
36	Etophylline + Theophylline	Injection	169.4 mg + 56.6 mg/2 ml
37	Furosemide	Injection	10 mg/ml
38	Gentamycin Sulphate	Injection	40 mg/ml, 2 ml vial

Sl. No.	Drug	Formulation	Strength
39	Glucose with sodium chloride/ saline	Injectable solution	5% glucose + 0.9% sodium chloride
40	Glucose/dextrose	Injectable solution	5%, isotonic
41	Glucose/dextrose	Injectable solution	10% isotonic
42	Glucose/dextrose	Injectable	25%
43	Glycerin	Solution	500 gm bottle
44	Glycerine trinitrate	Tablet (sublingual)	500 mcg
45	Glycerine trinitrate Nitro Glycerine	Injection	5 mg/ml
46	Haloperidol	Injection	5 mg
47	Heparin sodium	Injection	5000 IU/ml, 1000 IU
48	Hydrocortisone Sodium Succinate	Powder for injection	100 mg vial
49	Hyoscine butyl bromide	Injection	20 mg/ml
50	Ibuprofen	Tablet	400 mg
51	Insulin (soluble)	Injection	40 IU/ml
52	Intermediate-acting insulin (Lente)	Injection	40 IU/ml
53	Ipratropium bromide – aerosol		Nebulizer Solution
54	Isosorbidedinitrate	Tablet (sublingual)	5 mg, 10 mg
55	Isosorbidemononitrate	Tablet	20 mg (SR), 30 mg, 10 mg
56	Lignocaine Hydrochloride	Jelly sterile	2%
57	Lignocaine Hydrochloride	Injection	2%, 4% w/v, 5% w/v
58	Lorazepam	Injection	2 mg/ml, 1 mg/ml
59	Magnesium sulphate	Injection	500 mg/ml
60	Mannitol	Injectable solution	20%, 10%
61	Metoclopramide Hydrochloride	Injection	5 mg/ml
62	Metronidazole	Injection	500 mg/100 ml, 5 mg/ml
63	Morphine Sulphate	Injection	10 mg/ml
64	Naloxone Hydrochloride	Injection	400 mcg
65	Neostigmine	Injection	500 mcg/ml
66	Normal saline	Injection	0.9%
67	Ondansetron	Injection	2 mg/ml
68	Oral Rehydration Salts	Powder for solution	As per IP
69	Oxygen Medicinal Gas	Inhalation	
70	Oxytocin	Injection	5 IU in 1 ml ampoule, 10 IU/ml
71	Pantoprazole	Injection	40 mg
72	Paracetamol	Tablet	500 mg, 650 mg
73	Paracetamol	Syrup	100 mg/5 ml, 125 mg/5 ml
74	Paracetamol	Injection	150 mg/ml
75	Pheniramine maleate	Injection	22.75 mg/ml
76	Phenobarbitone	Injection	200 mg/ml
77	Phenytoin	Injection (sodium)	50 mg/ml, 25 mg/ml
78	Plasma Volume Expander	Injection	500 ml
79	Potassium chloride	Injectable solution	11.2% in 20 ml, 150 mg/ml
80	Potassium permanganate	Aqueous solution	1 : 10 000

Sl. No.	Drug	Formulation	Strength
81	Povidone iodine	Solution	5%, 4-10%
82	Povidone iodine	Ointment	5%
83	Pralidoxime (PAM)	Injection	1 gm vial
84	Prochlorperazine	Injection	12.5 mg/ml
85	Promethazine	Syrup	5 mg/5 ml
86	Promethazine Hydrochloride	Injection	25 mg/ml, 50 mg/ml
87	Quinine (Dihydrochloride)	Injection	300 mg/ml, 2 ml ampoule
88	Ranitidine	Injection	25 mg/ml
89	Ringer lactate	Injectable IV solution	
90	Ringer's Lactate		
91	Salbutamol Sulphate	Nebulizer solution	5 mg/ml
92	Saline	Nasal Drops	0.60%, 0.05% w/v
93	Silver sulfadiazine	Cream	1%, 2-4%
94	Sodium bicarbonate	Injectable IV solution	7.50%
95	Sodium Carboxymethyl Cellulose	Eye Drops	0.5% w/v
96	Sodium chloride	Injectable solution	0.9% isotonic
97	Tenectaplase	Injection powder	30 mg/40 mg
98	Tetanus vaccine	Injection	0.5 ml Ampoule
99	Thiopentone Sodium	Injection Powder	0.5 g
100	Tramadol Hydrochloride	Tablet, capsule	50 mg
101	Tramadol Hydrochloride	Injection	50 mg/ml
102	Tropicamide + Phenylepherine	Eye Drops	0.8% + 5%
103	Vitamin K	Injection	10 mg/ml, 1 ml ampoule
104	Water for injection	Injection	5 ml ampoule
105	Xylometazoline	Nasal Drops	0.05%,
106	Tranexamic acid	Injection	100 mg/ml
107	Midazolam	Injection	5 mg/ml, 1 mg/ml
108	Sodium Valproate	Injection	100 mg/ml
109	levetiracetam	Injection	100 mg/ml
110	Ketamine	Injection	50 mg/ml, 2 ml vial, 10 mg/ml
111	Thiamine	Injection	100 mg/ml, 10 ml vial
112	Buprenorphine + Naloxone	Tablet	2 mg + 0.4 mg
113	Flumazenil	Injection	0.5 mg/ml, 5 ml vial

Annexure XII

Sample Format for Monitoring and Supervision of Emergency

Area: Emergency

Employees/HR

Designation (as applicable)	Name
Emergency medicine	
Medical officer	
EMT	
Staff Nurse	
Staff Nurse for isolation room	
Cleaning staff	
Others	

Registers/Records to be maintained

Sl. No	Name of The Register	Key Information Recorded In The Register	Frequency of Updating	Person Responsible	Supervisor
1	Patient admission register				
2	Treatment register (all the diagnostic & investigation results)				
3	Handing over & taking over register				
4	Blood Bank/Lab Investigation Book				
5	Discharge register				
6	Stock and indent registers for medicines and consumables				
7	Downtime of Critical Equipment				
8	Stock out rate of Drugs				

Cleaning Protocol

Sl. No.	Sub areas	Number	Frequency of Cleaning	Material Used to Clean	Person Responsible
1	Triage area				
2	Beds				
3	Bed sheet				
4	Equipment				
5	Isolation room				
6	Store Room				
7	Patient's toilet				

Performance Chart

Sl. No	Indicators	Previous month	Current month
1	Total Number of Patients attended at Emergency		
2	Number Referral IN		
3	Number Referral OUT		
4	Number Of cases attended during night (8 PM to 8 AM)		
5	Number Of cases attended during Day (8AM to 8 PM)		
6	LAMA Rate		
7	No. of live saving cases treated for snake bite, COMA/unresponsive, cardiac arrest, poisoning, RTA, shock, seizure, stroke, dog bite cases		
8	No. of emergency surgeries done		
Sl. No.	**Pediatric Indicators**	**Previous month**	**Current month**
1	Number of under 5 detected with danger signs out of the total reported under 5		
2	Number & percentage of young infant (upto 2 months) detected with danger signs out of the total Number of under 5 detected with danger signs		
3	Number of In-patient admissions or referrals out of total number of under 5 detected with danger signs		
4	% survival in the following groups in the total number of under 5 detected with danger signs in emergency- a) 0-2 months b) More than 2m to under 5 age group		

Annexure XIII

Ambulance Services

Ambulance services provide emergency medical response and they should have appropriate equipment and a trained emergency paramedical on board. Ambulance Services are of two types: The Basic Life Support (BLS) and the Advanced Life Support Ambulances (ALS).

Basic Life Support

The BLS "scoop and run" ambulance would be the basic model for all emergency rescue services. The BLS Ambulance must have a trained paramedic round the clock with ability to manage splints, blood transfusion if needed, and administering intravenous drugs and electrolytes under tele-guidance. BLS services provide: Obstetrics, trauma care, burns, poisoning, cardiovascular, other medical emergencies, surgical emergencies and ophthalmic emergencies. There should be direct linkage between higher facilities (DH/Medical College) to lower Facilities (PHC/CHC/SC) through a call centre providing assured services.

Advanced Life Support

Advanced Life Support (ALS) ambulances have all the features of the above- but in addition provide ventilator support. ALS is currently being used mainly for inter-facility transfers of critical patients requiring ventilator support and linking DH and sub-district hospitals with medical colleges.

Annexure XIV

Referral Slip

This is 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:_____
Years: _____

Next of kin or Person Responsible in cases involving minors – (name, Address and Telephone Number):_____

Address:_____

Unique identification No.: _____

Referred on ____/____/_____ (d/m/yr) at _____ (time) to _____ (Name of the facility) for management.

Provisional Diagnosis ( )/under evaluation ( )

Admitted in the referring facility on ___/___/____(d/m/yr.) at _____ (time) with **chief complaints** of :

_____

_____

_____

Summary of Management (Procedures, Critical Interventions, Drugs given for Management):

_____

_____

Investigations:

Blood Group		Pulse		Condition at time of Referral	
Hb		Respiratory Rate		Consciousness (AVPU)	
Urine R/E		Pulse		Temperature	
Blood Glucose		BP		SpO_2	

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/ALS/BLS/PTV/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)

Annexure XV

Triage protocol

Triage Form for District Hospital, Emergency Department

Name: _____ Age: _____ Sex: ☐M ☐F

OPD No.: _____ Date & Time of Examination: _____

Triage Nurse/officer Name _____

Signature_____

TRIAGE

RED Physiology Criteria >>
(If any one of these mentioned vital criteria is present on the assessment) >>

A	Noisy Breathing/Stridor; Angioedema Active seizures	C	Radial Pulse - Present / Absent; Pulse<50 or >120/min; SBP <90 mm Hg or >220mm Hg; Capillary refill >2 sec Shock index > 1
B	Talking incomplete sentence; RR<10 or >22/min; SPO2 <90%	D	Altered sensorium, Responding only to pain on AVPU-Scale of GCS ≤ 12 C-Spine Injury with Single Breath count ≤ 15

Non- Trauma

Symptoms/ History/ Exam finding based

RED	1. Breathlessness / Pallor with Edema 2. Active Bleeding (Hematemesis, Hemoptysis, Epistaxis, Hematuria, etc) 3. Active seizures 4. H/o Fainting / Syncope 5. Fever with Delirium 6. Poisoning with unstable vital sign 7. Snake / Scorpion bite 8. Burn >20% BSA (Burn of special areas) 9. Hanging /Drowning / Electrocution / Heat Stroke
YELLOW	1. Post-seizure stage 2. Pain abdomen / Loose motions (>3episodes) 3. Painful Bleeding P/R 4. H/o Bleeding 5. Pallor/ Known Anaemia for Transfusion 6. Fever with Headache/ chest Pain / Jaundice 7. Fever in patient on chemotherapy / HIV Patients / Diabetic patients 8. Drug overdose, Poisoning with stable vital signs 9. Painful swelling / wound 10. Headache, dizziness 11. Unable to pass stool 12.Unable to pass urine
GREEN	1. Minor symptoms of existing illness 2. Fitness urticaria / Skin rash 3. Fever 4. For medico-legal examination 5. Minor conditions and low risk conditions (cough, cold, etc.)

Trauma

	Injuries identified	Mechanism of injury
RED	1. Gun-shot wound 2. Major Vascular injury 3. Stab wounds (Head/Neck/Chest/Abdomen/Groin) 4. Multiple injuries 5. Open fractures excluding fractures of hand and feet 6. Two or more long bone fracture 7. Pelvic fracture 8. Visible neck swelling 9. Suspected sexual assault 10. Flail chest with paradoxical respiration 11. Chest trauma with • Surgical Emphysema • Seat Belt Mark • CCT Positive 12. Traumatic Amputation	1. Fall from • >3 times height of patient • >5 stairs 2. Roll over vehicle 3. Co-passenger death 4. Ejection from vehicle 5. Railway track injuries 6. Steering wheel injury 7. Prolonged extrication time from vehicle 8. Roll over vehicle 9. Stuck between 2 heavy vehicles
YELLOW	1. Minor Head Injury 2. Open or closed fractures of hand & feet 3. Isolated long bone fracture 4. GCS-15 with - • Alcohol • Anticoagulant • LOC and vomiting • Nasal & ENT bleed • Limb Weakness	1. Suspected abuse (Child/Women/Elderly) 2. Significant assault
GREEN	1. Abrasions 2. Lacerations 3. Isolated fracture of small bones of hand and foot 4. Contusions and Bruises	

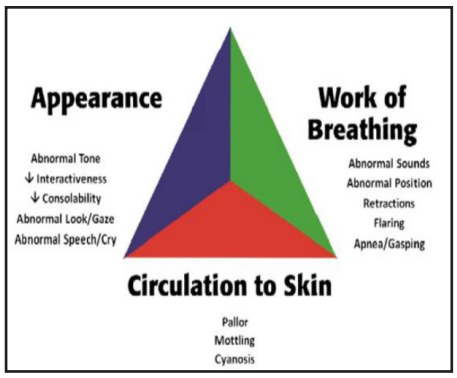
TRIAGE FORM for paediatric cases

Date & Time of Arrival: _____ **OPD No:** _____

Patient Name: _____

Age: _____ **Gender:** _____ **Wt:** _____

Chief Complaint:



Vital Signs:

Temperature: ^{0}F

Pulse rate: _____/min, CFT-_____

Respiratory rate: _____/min, SpO_2 _____%

Blood Pressure: _____ mmHg

Dx: _____ mg%

AVPU: Alert/Responds to voice/Responds to pain/Unresponsive

Dehydration: Lethargic/Irritable; Sunken eyes;

Skin pinch normal/goes back slowly/goes back very slowly

Clinical Priority:

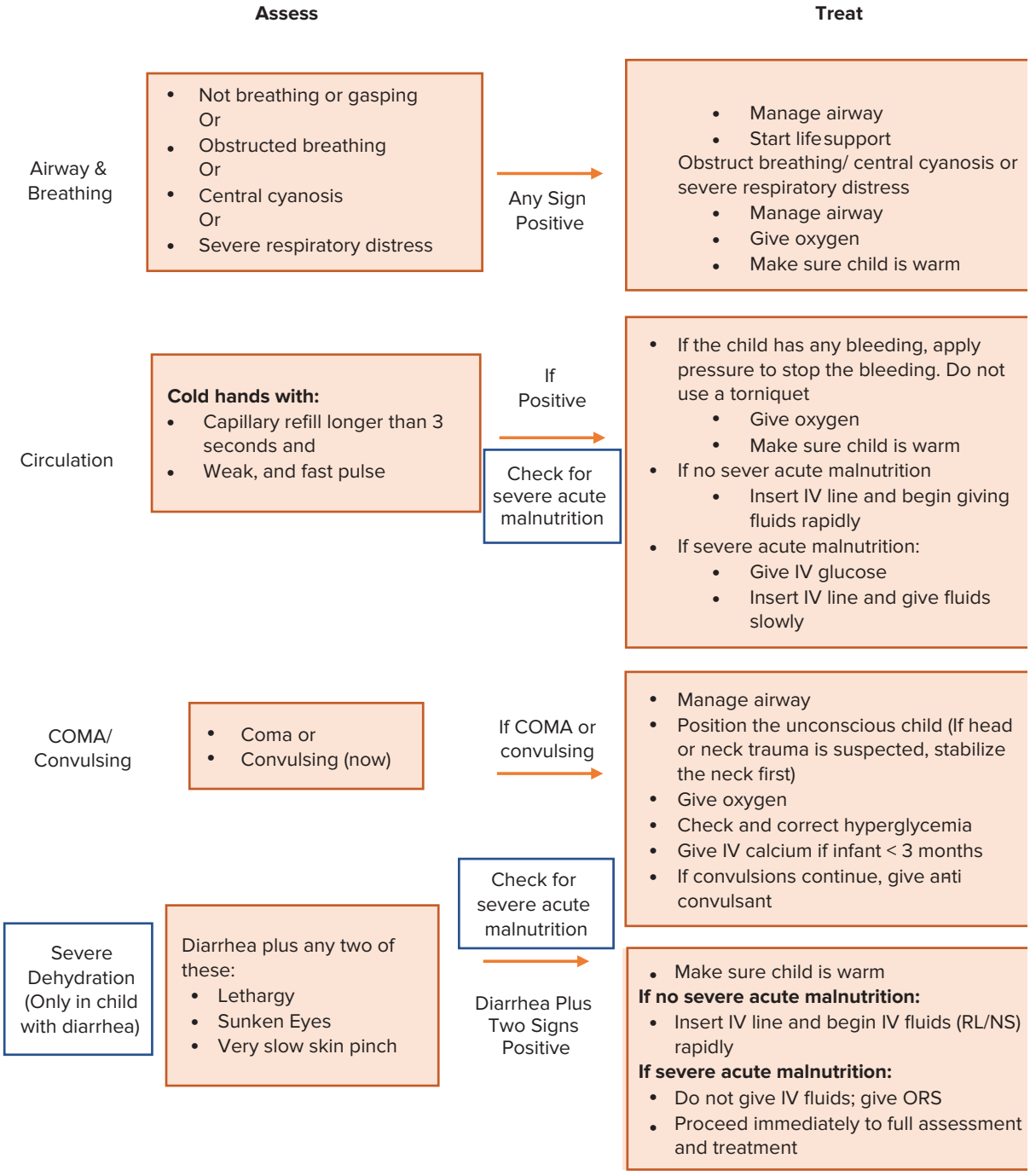
Red **Yellow** **Green**

_____ _____

Name & Signature of Nurse: **Date & Time of Triage Finish:**

Red (Should be seen without delay)	Yellow (Should be seen within 30 minutes)	Green (Should be seen within 60 min)
Apnea/Gasping respiration	Age < 2 months	No emergency or priority signs
Airway obstruction	High fever	
Severe respiratory distress	Severe trauma or urgent surgical conditions	
Central cyanosis	Severe pallor	
CFT>3sec	Poisoning	
Weak and fast pulse	Severe pain	
Child not responding to voice	Lethargy/restless/irritable	
Severe Dehydration	Urgent referrals from other facility	
	Severe malnutrition	
	Major burn	
	Edema of both feet	

Triage for all sick children:



Note: If a child has trauma or other surgical problems, get surgical help, or follow surgical guidelines

Non-Urgent: Proceed with assessment and further treatment according to the child's priorityW

Triage Nurse/officer Name _____

Signature _____

Clinical Addendum

Contraindications to Thrombolytic/Fibrinolytic Therapy in acute ST-Segment Elevation Myocardial Infarction

Absolute contraindications

Any prior intracranial haemorrhage

Known structural cerebral vascular lesion (e.g., arteriovenous malformation)

Known intracranial neoplasm

Ischemic stroke within 3 months except within last 4.5 hours

Active internal bleeding (excluding menses)

Suspected aortic dissection or pericarditis

Relative contraindications

Severe uncontrolled blood pressure (>180/100 mm Hg)

History of chronic, severe, poorly controlled hypertension

History of prior ischemic stroke >3 mo. or known intracranial pathology not covered in contraindications

Current use of anticoagulants with known INR >2–3

Known bleeding diathesis

Recent trauma (past 2 wk.)

Prolonged CPR (>10 min)

Major surgery (<3 wk.)

No compressible vascular punctures (including subclavian and internal jugular central lines)

Recent internal bleeding (within 2–4 wk.)

Patients treated previously with streptokinase should not receive streptokinase a second time

Pregnancy

Active peptic ulcer disease

Other medical conditions likely to increase risk of bleeding (e.g., diabetic retinopathy)

American Heart Association (AHA)/American Stroke Association (ASA) 2013 Inclusion/Exclusion Criteria for IV Recombinant Tissue Plasminogen Activator (rtPA) in Acute Ischemic Stroke

Exclusion Criterion	
Significant head trauma or prior stroke in previous 3 mo.	
Symptoms suggested sub Arachnoid haemorrhage	
Arterial puncture at non-compressible site ≤7d ago	
History of pervious intracranial haemorrhage	
Intracranial neoplasm, arteriovenous malformation, or aneurysm*	
Seizure with positive residual neurologic impairment thought to be due to seizure	
Recent intracranial or intraspinal injury	
Pre-treatment SBP > 185 mmHg or DBP > 110 mmHg despite therapy	
Active internal bleeding	
Platelet count < 100,000 mm^3	If patient has no history of thrombocytopenia, rtPA should be stopped if the platelet count is < 100,000 mm^3
Use of heparin within preceding 48 hrs and a prolonged activated aPTT greater than upper limit of normal	
INR > 1.7 or PTT > 15 sec.	Oral anticoagulant use in and of itself is not a contraindication to rtPA. If patient is not taking oral anticoagulant or heparin, rtPA may be given before this lab result is available, however rtPA should be stopped if these lab tests come back elevated above normal limit.
Current use of direct thrombin inhibitors or direct factor Xa inhibitors with elevated sensitive laboratory tests (such as Aptt, INR, platelet count, and ecann clotting time (ECT) thrombin time (TT); or appropriate factor Xa activity assays)	
Blood glucose levels < 50 milligrams/dl (2.7 mmol/L)	
Non-contrast enhanced CT (NECT) demonstrate multilobular infarction (hypodensity> 1/3 cerebral hemisphere)	Do not five rtPA if CT shows intracranial haemorrhage or neoplasm.
Relative Exclusion Criterion	
Only minor or rapidly improving stroke symptoms stroke symptoms (clearing spontaneously)	Some patients may have a lower NIHSS score but have a potentially disabling conditions (e.g. aphasia, hernianopia). Some studies have shown poor outcomes for untreated minor strokes.
Pregnancy	No randomised control trials have been published regarding safety or efficacy of rtPA for ischemic stroke in pregnancy. Case series have reported mixed results.
Seizure at onset with postictal residual neurological impairments	rtPA can be given if the residual impairment are thought to be secondary to the stroke as opposed to the seizure
Major surgery or serious trauma within preceding 14 d	
Previous GI or Urinary tract haemorrhage within preceding 21 d.	

Previous myocardial infarction within preceding 3 mo.	Rationale for this criterion was a statement indicating that myocardial rupture can result if rtPA is given within a few days of acute myocardial infarction.
Former Exclusion Criterion from 2007 AHA/ASA Guidelines	
Evidence of acute trauma (fracture)	
Failure of the patient or responsible party to understand the risks and benefits of, and alternatives to, the proposed treatment after a full discussion	

Paediatric vitals chart

Age group	Weight range (kg)	Heart Rate (beats/min.)	Blood Pressure (mmHg)	Respiratory Rate (breath/min.)	Urinary Output (ml/kg/hr)
Infant (0-12 mo.)	0-10	< 160	>60	< 60	2.0
Toddler (1-2 yrs.)	10-14	< 150	>70	< 40	1.5
Preschool (3-5 yrs.)	14-18	< 140	>75	< 35	1.0
School Age (6-12 yrs.)	18-36	< 120	>80	< 30	1.0
Adolescent (≥13 yrs.)	36-70	< 100	>90	< 30	0.5

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