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Pediatric Trauma Resuscitation Manual

PTRM

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CHAPTER 2 OUTLINE

INTRODUCTION: TRIAGE AND INITIAL EVALUATION IN TRAUMA

COMPONENTS OF A COMPLETE TRIAGE

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FINAL PHYSIOLOGICAL CATEGORIZATION, AND TREATMENT PRIORITY DECISION

SECONDARY SURVEY AND ADJUNCTS: FOR ASSIGNING A MORE ACCURATE TRIAGE LEVEL

FINAL DISPOSITION FROM EMERGENCY DEPARTMENT AND ROLE OF SAFE TRANSPORT IN ACUTE TRAUMA CARE

SAFE PATIENT TRANSFER AND TRANSPORT

- Types of Patient Transfer and Modes of Transport
- Various Routes: Advantages and Disadvantages
- Prerequisites for Safe Transport
- Trauma Transport Team Personnel: Their Roles, Responsibilities, Qualification, and Experience

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LEARNING OBJECTIVES

- Discussing the unique characteristics of pediatric triage process
- Various components of comprehensive triaging and initial assessments in pediatric trauma
- Discuss the background and need of the safe transport system
- To understand the current types and routes of transport
- To understand and discuss the emergency medical services (EMS) and trauma transport facilities in India—current situation and challenges

INTRODUCTION: TRIAGE AND INITIAL EVALUATION IN TRAUMA

Triage was derived from the French word "trier" which means "to sort". Initial application of its basic principle dates back to early 1800s when French military surgeon, Baron Dominique Jean Larrey in Napoleon's army used to categorize wounded soldiers based on level of sickness, where dangerously wounded persons received initial attention irrespective of their ranks. It was in 1964, when Weinerman, et al., described the first medical emergency department (ED) use of triage, following which multiple triage systems have been developed and validated for clinical use in due course of time.[1] For example, Canadian Triage and Acuity System (CTAS), Manchester Triage System (MTS), Australian Triage System (ATS), Emergency Severity Index (ESI), and Emergency Triage and Treatment (ETAT), where the first four are 5-level triage systems, whereas the last is 3-level triage systems. It has been shown that 5-level triage system has improved sensitivity, specificity, reliability and provides greater discrimination when compared to 3-level triage systems.[2]

The basic objectives of triaging in a hospital or prehospital setting:

- Quick assessment of the patient in a systematic way and identifying the level of injury severity
- Evaluation of the critical physiological derangement and institution of appropriate interventions to correct them
- Continued monitoring/reassessments to identify further abnormalities
- Timely initiation of interventions for better outcome
- Efficient utilization of resources in resource limited settings.

COMPONENTS OF A COMPLETE TRIAGE

Triage is a quick and systematic way to identify the physiological derangements, which invariably helps stabilizing a sick child. The comprehensive pediatric triage process is a structured evaluation tool applicable in any emergency setting. It includes rapid initial assessment by pediatric assessment triangle (PAT), primary survey, secondary survey, and lastly the assignment of triage level or triage-decision **(Flowchart 1)**.

PEDIATRIC ASSESSMENT TRIANGLE

Pediatric assessment triangle can be used to recognize the level of urgency and immediate physiological requirement, by quick audiovisual assessment of the abnormality in ABC (Appearance, work of Breathing and Circulatory status by skin color), which can be performed usually within 30 seconds.[3]

Appearance: General appearance of the child gives an overall idea of physiological functioning of central nervous system (CNS) as well as integrity of vital systems. Appearance and consciousness are often used interchangeably, which can be evaluated by using the given parameters [mnemonics—TICCL (tone, interaction, consolability, cry, look)].

- *Tone:* Spontaneous movement, resisting examination, age-appropriate sit or stand.
- *Interaction:* Appearing alert and engaging appropriately with clinician or caregiver, interacting with people and environment, reaching for toys or objects.
- *Consolability:* Consolable by mother or caregiver.
- *Cry/speech:* Appropriate speech for age/strong cry.
- *Look/gaze:* Toward caretaker/examiner—normal eye contact and visual tracking.

Abnormality in appearance can be due to primary brain dysfunction or cortical dysfunction secondary to many systemic causes such as hypoxia, hypoperfusion, pain, fever, sepsis, and anxiety etc.

Breathing: The respiratory status of the child is assessed by the respiratory rate and efforts (work of breathing), abnormal breath sounds (stridor, grunting, or wheezing), abnormal positioning (sniffing, tripod posture, neck arching, etc.), retractions (suprasternal, intercostal or subcostal retractions, nasal flaring), and head bobbing.

Color: The peripheral skin color reflects the adequacy of overall circulatory status, thus is assessed to identify early signs of shock. Pallor, cyanosis, mottling, or evidence of visible bleeding/rash are to be noted.

Initial impression: After PAT assessment, child is categorized as stable, unstable non-life threatening or unstable life-threatening, depending on whether all the arms of ABC are normal, one arm abnormal or ≥2 limbs abnormal respectively.

Categorization of physiological insufficiency: Also based on arms being normal or abnormal, underlying physiological categorization of major vital-organ systems can also be noted as shown here **(Table 1)**.

Once initial PAT assessment is done, the child should be connected to monitor and oxygen, if unstable, and the emergency response team should be activated as appropriate for the setting before proceeding for more comprehensive steps of primary and secondary survey.

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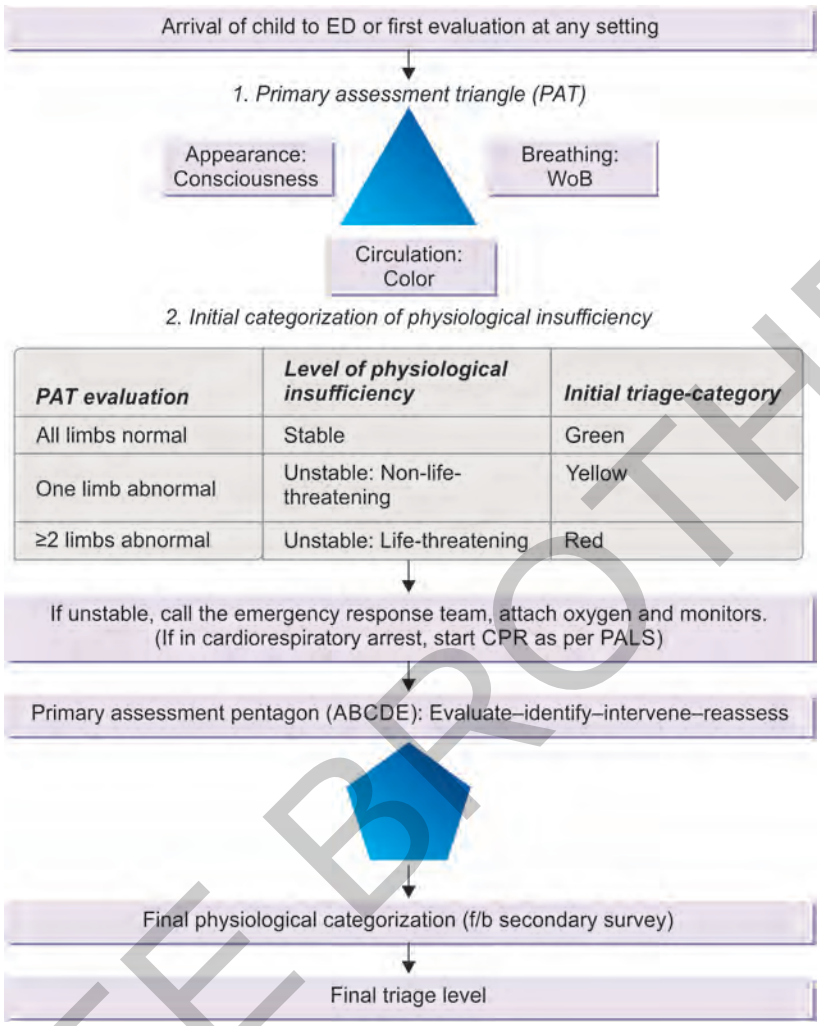
Flowchart 1: Flow of triaging a child in emergency.



(ABCDE: airway, breathing, circulation, disability, and exposure; CPR: cardiopulmonary resuscitation; PALS: pediatric advanced life support; WoB: work of breathing)

TABLE 1: Physiological impression after Initial (PAT) evaluation.

	Likely physiological derangement or primary system insufficiency				
Component of PAT	***Stable***	***Respiratory insufficiency***	***Circulatory insufficiency***	***Primary or secondary brain dysfunction***	***Cardiopulmonary insufficiency or cardiac arrest***
Appearance/consciousness	Normal	Abnormal	Abnormal	Abnormal	Unresponsive
Breathing (WoB)	Normal	Abnormal	Normal	Normal >> abnormal	Gasping or no breathing
Circulation/color	Normal	Normal	Abnormal	Normal >> abnormal	Abnormal (absent pulse = cardiac arrest)

(PAT: pediatric assessment triangle; WoB: work of breathing)

PRIMARY SURVEY

Primary survey is a step-wise approach to identify the physiologically critical abnormalities in airway, breathing, circulation, disability, and exposure (known as ABCDE). It should follow the continuous cycle of evaluate, identify, intervene, and re-evaluate, as and when necessary for life-threatening issues. In ED settings with adequate manpower, all these steps can be performed in a synchronized manner in quick succession.

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FINAL PHYSIOLOGICAL CATEGORIZATION, AND TREATMENT PRIORITY DECISION

After reassuring primary assessment in the ABCDE approach, final physiological impression can be determined depending on severity of each of the three primary or interlinked vital-system insufficiencies which was suspected after initial PAT evaluation **(Table 2)**. This severity-based classification can easily stratify the patients into resuscitation, emergent, urgent, and less or nonurgent categories over 3-level triage as done after initial PAT assessment.

SECONDARY SURVEY AND ADJUNCTS: FOR ASSIGNING A MORE ACCURATE TRIAGE LEVEL

Secondary survey/assessment includes a focused history (SAMPLE—presenting signs/symptoms, allergies, medications, past history, last meal, and events or factors leading to current problem/injuries or its severity), and focused examinations (head to toe survey of all injuries or structural abnormalities, and additional relevant system examinations including use of some bedside adjuncts such as electrocardiogram (ECG), X-ray, point of care ultrasonography (POCUS), blood gas, etc.). This helps to

CASE SCENARIO

Brief case history	A 7-year-old boy was brought to pediatric emergency (PEM) by parents with c/o cupboard falling on the child *4 hours back. He became unresponsive on the way just before reaching the ER*			
Initial rapid (PAT) evaluation:	*Appearance: Unresponsive* *Work of breathing: Increased* *Circulation: Pale looking, no cyanosis* *Initial impression: Unstable—life-threatening* *Interventions:* Call for help and activate your ERS/team → Role allocation to team members, ensure and place in a safe resuscitation bay, attach 100% oxygen source and multipara monitor			
Primary assessment		*Evaluation*	*Identification of critical abnormality*	*Intervention (ongoing)*
A	*Airway*	Look/listen for *(open/maintainable)*	Secretions present, suspect C-spine injury	• *Gentle oronasal suction* • *C-collar application*
B	*Breathing*	*Assess for RR, efforts, air entry, added sounds,* and SpO_2	• *Tachypnea:* RR—40 bpm • *Retractions:* Intercostal • *WoB:* Increased • *Air entry:* Decreased in right side • *Added sound:* Bilateral conducted sounds • SpO_2 = 80% in RA and 96% in NRBM oxygen	• Already on NRBM with 100% oxygen • *Recognize respiratory failure*—(suspicion of hemo/pneumothorax) • *Prepare for needle decompression* f/b ICDT insertion • Keep intubation trolley ready
C	*Circulation*	*Check* heart rate, rhythm, peripheral temperature, CFT, central and peripheral pulse, BP	Tachycardia (HR—148 bpm), normal central pulses, poor peripheral pulses, CFT = 3 seconds, BP <5th centile, low voltage QRS complex visible on cardiac monitor (confirmed by ECG film)	• *Recognize hypotensive shock* • *Obtain two large bore IV lines,* take samples for RBS, blood group/crossmatch • *Bolus of 0.9% saline 20 cc/kg over 5–20 minutes* • Reassess to decide repeat bolus
D	*Disability/ dextrose*	*Check GCS, pupils—size/response; motor activity, Dextrose/RBS*	E2 M4 V2—GCS 8/15, Pupil—B/L 2 mm and RTL+ Motor activity—B/L Hypertonia+, RBS—150 mg%	• *Recognize raised ICP* and start on first line medical measures • *Perform RSI for intubation* • Reassess and treat *as per standard protocol*
E	*Exposure*	*Look for skin color (pallor/mottling/ rash/bruises, active*	Axillary temperature—98°F, pattern marks present over upper chest and abdomen, right thigh swelling present	*Suspicion of femur fracture:* Immobilization • Suspect abdominal/trunk trauma—log-roll to check spine/back injuries

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		bleeding sites, other injuries/deformity. Log-roll for examining back		• *Plan further evaluation with adjuncts (POCUS, X-rays) and injury-specific interventions*
Physiological categorization	Hypotensive shock, respiratory failure, primary brain dysfunction > secondary to shock/hypoxemia			
Secondary assessment	*Signs and symptoms*	• Symptoms—as mentioned in initial presenting history • Signs—tachypnea, increased efforts, altered sensorium, tachycardia, poor pulses, hypotension		
	Allergies	Not known		
	Medications	Nil		
	Past history	Nothing significant		
	Last meal	Had full oral diet 10 hours back		
	Events	History of fall of bookrack on body while playing with siblings at home		
Final triage level (triage-decision)	*Level 1* (immediate resuscitation)	Continue all resuscitative interventions, ongoing reassessment, and interventions as per standard protocols		
Further monitoring and ongoing care: Clinical reassessments, use bedside adjuncts such as POCUS, ECG, X-ray, and other diagnostic investigations, and involve multidisciplinary team as needed				

(CFT: capillary refill test; ICDT: intercostal drainage tube; NRBM: non-rebreather mask; POCUS: point of care ultrasonography; RSI: rapid sequence intubation; WoB: work of breathing)

TABLE 2: Final physiological categorization after combined interpretation of PAT and primary survey.

Physiological system involved	***Stable***	***Respiratory distress***	***Respiratory failure***	***Compensated shock***	***Hypotensive/ Decompensated shock***	***Primary CNS or dysfunction***	***Cardiopulmonary failure or arrest***
Appearance/ consciousness (CNS function)	Normal	Normal	Abnormal	Normal	Abnormal	Abnormal	Abnormal
Breathing (respiratory status)	Normal	Abnormal	Abnormal	Normal	Normal or? Abnormal	Normal	Abnormal
Circulation (CVS status)	Normal	Normal	Normal or? abnormal	Abnormal (with compensated/ normal BP record)	Abnormal (with hypotensive BP record)	Normal	Abnormal (with absent pulse)

(CNS: central nervous system; CVS: cardiovascular system; PAT: pediatric assessment triangle)

assign a more precise and final triage-level (also valid for 5-level triage system) taking in account some additional circumstantial factors or modifiers **(Table 3)**. As per CTAS revised triage system, the level of triage may be modified by first order modifiers (vital signs, pain scales, mechanism of injury, and chronicity of patient) or second order modifiers (specific to the presenting complaint).[6,8]

The **Table 3** also depicts the treatment prioritization categories and its sensitive time-frame, which is practicable both in crowded EDs as well as in individual or mass casualty in out of the hospital settings.

FINAL DISPOSITION FROM EMERGENCY DEPARTMENT AND ROLE OF SAFE TRANSPORT IN ACUTE TRAUMA CARE

As we follow the alphabetical sequence of ABCDE for the initial/primary assessment, the same order can be remembered for further triage, treatment decision, and disposition process by adding the next alphabet "F" which may include **F**ocused history/examinations (secondary assessment), **F**inal triage and treatment decisions, and **F**inal disposition plan.

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TABLE 3: Triage level assignment and treatment prioritization.

Triage level	*Time to medical care*	*Clinical criteria to include*
Level 1: Resuscitation	Immediate	• Respiratory failure, shock, coma. or cardiopulmonary arrest • Any child or infant requiring continuous assessment and intervention to maintain physiological stability, e.g., coma-seizures, moderate-to-severe respiratory distress, unconscious, major burns, trauma, significant bleeding • GCS between 3 and 9
Level 2: Emergent	15 minutes	• Any physiologically unstable child with moderate distress, and altered consciousness with GCS—10–13, dehydration. • Any child/infant who requires comprehensive assessment and multiple interventions • Abnormal vital signs without signs of hypoperfusion or hemodynamic compromise • Fever—temperature >38.5°C, looks unwell • Age <3 months >38.0°C • High intensity mechanism of injuries of general, head, and neck trauma • Acute severe pain • Hypo or hyperglycemia with symptoms • All immunocompromised children
Level 3: Urgent	30 minutes	• Child/infant who is alert, oriented, well hydrated, and minor alterations in vital signs • Febrile child >3–18 months with temperature >38.5°C looks well • Mild respiratory distress • Infant <1 month • Acute moderate pain or chronic severe pain • RBS hypo or hyperglycemia without symptoms • Simple burns, fractures, dental injuries, pneumonia without distress, history of seizure, suicide ideation, ingestion requiring observation only, head trauma alert/vomiting
Level 4: Less urgent	60 minutes	• Patient with vomiting/diarrhea and no dehydration age >2 • Simple lacerations/sprain/strains • Acute mild pain or chronic moderate pain • Alert child with fever and simple complaints such as ear pain, sore throat, or nasal congestion • Head trauma—no symptoms
Level 5: Nonurgent	120 minutes	• Child/infant who is afebrile, alert oriented, well hydrated with normal vital signs • Chronic mild pain • Vomiting alone or diarrhea alone with no suspicion or signs of dehydration • Interventions not usually required other than assessment/discharge instruction

(GCS: Glasgow coma scale; RBS: random blood sugar)
Source: Adopted from Canadian Triage and Acuity System (CTAS) and its revisions.[4-7]

Final-disposition after initial triage and treatment of a trauma patient in both hospital ED or prehospital emergency response setting will be determined by the overall clinical status and severity or mechanism of injury. Only patients with none or minor injuries and stable vitals may be discharged from ED or cleared from the first responder team. For such common disposition scenario, the patient needs to be shifted or transferred to the other designated area within the same ED or hospital, or referred to other facility. In all cases, the referring team and receiving team need to ensure safe transport of the trauma patients for best possible outcome.

SAFE PATIENT TRANSFER AND TRANSPORT

TYPES OF PATIENT TRANSFER AND MODES OF TRANSPORT

The various types or settings of patient transfer needed for trauma victims are prehospital, intrahospital, and interhospital transfer. These three broad categories of medical transfer services may need different modes of transport to serve different purposes, and are often operated and maintained by different agencies, including

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government, public sector, and private agencies in India like many other countries.[9,10]

Prehospital Transport

Prehospital transport refers to the transport of trauma patients from the scene of the incident to a hospital. It is provided by emergency medical services (EMS) or ambulance services.

Prehospital transport modes can be categorized into the following subtypes:

- *Ground ambulance:* This involves the use of road ambulances mostly equipped with basic life support (BLS) and/or advanced life support (ALS) facility, usually operated and facilitated by trained paramedics who provide emergency medical care during transportation as needed.
- *Air ambulance:* Aeromedical transport involves the use of helicopters or fixed-wing aircraft for the rapid transfer of trauma patients, especially in remote or inaccessible areas. Air ambulances are staffed with trained medical personnel capable of providing emergency and critical care during transit.

Intrahospital Transport

Intrahospital transport refers to the movement of patients within the same facility or hospital. The modes of intrahospital transport include:

- *Wheeled stretchers and wheel-chairs:* Usually used for short-distance transfers within the hospital, such as from the emergency room (ER) to the operating room (OR) or radiology department. *Wheel-chairs* are used for relatively stable patients with limited locomotive problems, often from vehicle to OPD/ER, OPD toward, and between wards.
- *Hospital bed and wheeled-trolley beds:* For those patients who require continuous monitoring or are already admitted in a critical condition, hospital beds equipped with and multi-channel monitoring systems are used.
- *Critical care transport:* Utilizing specialized teams and equipment for the transport of critically ill and injured patients within the hospital are often referred to as critical care transport or medical retrieval teams.

Interhospital Transport

Interhospital transport involves the transfer of trauma patients from one healthcare facility to another, often for specific services or a higher level of medical intervention. It can also be conducted through ground ambulance or air ambulance.

VARIOUS ROUTES: ADVANTAGES AND DISADVANTAGES

Each route has its advantages and disadvantages, which should be carefully decided on a one-to-one basis, based on the severity of the injury, the proximity of the appropriate health facility, and areas from and to which the patient is to be transported.

The common routes and their characteristics:

- *Ground transport:*
  Advantages:
  - *Accessibility:* Ground transport is more easily available in both urban and rural regions.
  - *Flexibility:* It can provide access to more rural and remote locations through enlarging road connectivity.
  - *Cost-effectiveness:* Ground transport is more affordable compared to air transport for short-distance patient transfers.

  Disadvantages:
  - *Traffic and delays:* Traffic congestion, and poor condition of roads, can potentially cause delays.
  - *Limited speed:* In comparison to air transport, it takes more time, especially in situations requiring urgent transfer and over long distances.
  - *Terrain limitations:* Challenging terrains, such as mountainous, sea or heavily wooded areas, are challenges for ground transport effectiveness.
- *Air ambulance (helicopter)* **(Fig. 1)**:
  Advantages:
  - *Rapid response:* Air ambulances can rapidly reach remote or inaccessible areas.



Fig. 1: The inside view of a well-equipped air ambulance.

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- *Speed:* It provides fast transport, thus reducing travel time.
- *Critical care capabilities:* It can be equipped with specialized medical equipment and trained professionals, thus delivering specialized care during transport.

Disadvantages:

- *Weather conditions:* Adverse weather conditions, such as heavy rain, winds, or fog/smog can limit its use.
- *Availability:* It varies depending on the country and healthcare system.
- *Cost of transport:* Air transport is generally more expensive compared to other modes, and often requires insurance coverage.

- *Water transport:*

Advantages:

- Water transport, such as boats can reach locations not easily accessible by land. It is useful in coastal regions.

Disadvantages:

- Availability depends on the existing infrastructure.
- Adverse weather sea conditions can impact the safety and feasibility.
- As it takes more time, it may not be suitable for emergency transport.

It is important to note here that the selection of the appropriate route depends on the following factors—the patient's condition, availability of resources, urgency, distance to be travelled, geographic location, and regional guidelines.

PREREQUISITES FOR SAFE TRANSPORT

- Timely access to specialized care services and equipped facilities can greatly improve patient outcomes and recovery.
- All medical transport modes should be adequately equipped with and regularly checked for essential emergency equipment, monitoring facility, oxygen, drugs, and the team of trained staff known as ERT (emergency response team) or dedicated trauma transport team.

TRAUMA TRANSPORT TEAM PERSONNEL: THEIR ROLES, RESPONSIBILITIES, QUALIFICATION, AND EXPERIENCE

- *Emergency medical technicians (EMTs) and paramedics:* They are frontline care providers who deliver prehospital care and provide immediate interventions, immobilize injuries, administer medications, and ensure the patient's safety during transport.
- *Emergency physicians:* They are responsible for overseeing the care of trauma patients by providing initial medical advice, managing airway and ventilation, making critical decisions regarding acute management and ongoing monitoring, and coordinating with other specialists/referral facilities for felt need interventions.
- *Nursing personnel:* They play a vital role in the transport of trauma patients, and provide continuous monitoring of the trauma victims, administer medications, assist the lifesaving procedures if needed, and ensure proper documentation as well as patient comfort and safety during transport.

It is important to note that the qualifications and experience of the personnel involved may vary based on the institute's policy, regional guidelines, trained manpower requirements, and availability and task-based specific roles within the transport team. Regular training about the updates in the management priorities is an integral part to maintain and enhance the skills and knowledge of the team members.

Transport Policy

Transport policy should be a written document, comprising of the following:

- Details of the patient's particulars including the type, mechanism, severity of injury, and present condition of the patient.
- The triage category includes rapid initial assessment findings, vitals, triage decision and interventions, and any changes in the patient's condition during transport.
- Medication given, medications going on, ECG tracings, imaging, and other relevant test reports should be mentioned and a copy may be attached for reference.
- Purpose of referral or transfer, e.g., investigation for further evaluation, specialty services, or next-level care.
- The accompanying physician should have a sound knowledge of BLS, and pediatric and neonatal ALS. If resource permits, the transport team should also include a nurse, and a paramedic or trauma technician to deal with unexpected need of intra-transit emergency interventions.
- There must be proper communication between referring and referral facility in advance, and there must be proper documentation of conversation, with a

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mention of name, designation, and contact number of the person informed.
- Other documents: Informed consent (from the patient's relatives), and health insurance information.

KEY MESSAGES

- Triage is the first and foremost evaluation of any child presenting to emergency.
- It should be done in a structed way with continuous process of evaluate—identify—intervene and reassessment with special importance to cervical spine in trauma.
- Transport of a sick child is one of the component of final disposition of the child.
- Written plan, proforma and proper communication with necessary gadgets is necessary for a successful transport.

CONCLUSION

A structured triage is the need of the hour in all emergency and all the personnel should be trained in the same to stabilize the physiological derangement.

Transport of a sick child is a difficult task with successful transport depending on proper communication, infrastructure, available gadgets and trained personnel.

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Pediatric Trauma Resuscitation Manual
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Introducing the first-ever Pediatric Trauma Resuscitation Manual for South-East Asia—an unrivalled resource by renowned faculty.

We are thrilled to present the pioneering Pediatric Trauma Resuscitation Module, thoughtfully developed by the world's leading faculty, with a keen focus on the unique epidemiology and demographics of injured children in South-East Asia. This comprehensive manual offers a systematic and organized approach to effectively managing pediatric trauma victims, featuring essential diagnostic and management algorithms, as well as visually informative aids.

Covering all aspects of pediatric trauma and emergencies, this manual stands as the ultimate resource for Emergency Physicians entrusted with the care of injured children. Within its pages lies a definitive standard operating procedure for handling common pediatric injuries and resuscitation scenarios within the emergency department.

The Skill Section: Empowering with Core Competencies

The skill section has been meticulously designed to provide Indian medical graduates with vital information on core competencies essential for their medical practice. This section equips healthcare providers with the knowledge and expertise required to confidently address various pediatric trauma cases.

The Radiological Section: A Systematic Approach to Diagnosing and Managing Pediatric Injuries

Navigating the complexities of radiological examinations in pediatric trauma cases can be challenging. However, our manual alleviates this burden with a dedicated radiological section, offering a systematic approach and invaluable guidance for accurately diagnosing and managing pediatric injury victims.

Empowering Healthcare Providers to Make a Positive Difference

Above all, this manual serves as the most valued reference material, empowering healthcare providers to approach pediatric trauma cases with competence and compassion. By equipping them with the necessary skills and knowledge, they can make a profound and positive difference in the lives of injured children and their families.

We invite you to embark on this transformative journey with us, as we take a significant stride towards enhancing pediatric trauma care in South-East Asia. The Pediatric Trauma Resuscitation Manual is your gateway to excellence in emergency care, a milestone achievement that will reshape the way we respond to pediatric trauma cases, ultimately saving precious lives.

Neha Thakur (Rai) MBBS (Hons) MD (Peds) FRCPCH (UK) FACEE MNAMS is an exceptional medical professional with a wealth of expertise in pediatric trauma management and a distinguished record of academic excellence. Currently, she serves as an Associate Professor (Pediatrics), Dr Ram Manohar Lohia Institute of Medical Sciences, Lucknow, Uttar Pradesh, India. Her dedication to research and contribution to the medical field have been acknowledged through numerous awards at both national and international conferences. She has emerged as a prominent Researcher, securing several grants from esteemed funding agencies. As a faculty member of Advanced Trauma Life Support (ATLS) program, she has conducted numerous simulation-based training programs across the country. As Joint Secretary (Central Zone) of Pediatric Emergency Medicine (EMA) and a governing body and Founding Member of the Pediatric Emergency Medicine chapter of the Indian Academy of Pediatrics (IAP), her achievements include the development of the Pediatric Trauma Resuscitation Module, a ground-breaking project funded by ICMR, tailored specifically for children in South-East Asia Region. The core study material of this course is a product of her visionary concept and design, developed in collaboration with renowned international and national faculties.

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