

## The 2015 Academic College of Emergency Experts in India's INDO-US Joint Working Group White Paper on Establishing an Academic Department and Training Pediatric Emergency Medicine Specialists in India

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The concept of pediatric emergency medicine (PEM) is virtually nonexistent in India. Suboptimally organized prehospital services substantially hinder the evaluation, management, and subsequent transport of the acutely ill and/or injured child to an appropriate facility. Furthermore, the management of the ill child at the hospital level is often provided by overburdened providers who, by virtue of their training, lack experience in the skills required to effectively manage pediatric emergencies. Finally, the care of the traumatized child often requires the involvement of providers trained in different specialities, which further impedes timely access to appropriate care. The recent recognition of Doctor of Medicine (MD) in Emergency Medicine (EM) as an approved discipline of study as per the Indian Medical Council Act provides an unprecedented opportunity to introduce PEM as a formal academic program in India. PEM has to be developed as a 3-year superspeciality course (in PEM) after completion of MD/Diplomate of National Board (DNB) Pediatrics or MD/DNB in EM. The National Board of Examinations (NBE) that accredits and administers postgraduate and postdoctoral programs in India also needs to develop an academic program – DNB in PEM. The goals of such a program would be to impart theoretical knowledge, training in the appropriate skills and procedures, development of communication and counseling techniques, and research. In this paper, the Joint Working Group of the Academic College of Emergency Experts in India (JWG-ACEE-India) gives its recommendations for starting 3-year DM/DNB in PEM, including the curriculum, infrastructure, staffing, and training in India. This is an attempt to provide a uniform framework and a set of guiding principles to start PEM as a structured superspeciality to enhance emergency care for Indian children.

**Key Words:** *India, Pediatric emergency medicine, White paper.*

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The United Nations adopted the eight Millennium Development Goals (MDGs) in the year 2000 with the aim of global development. MDG 4 specifically targets the reduction of childhood mortality by two thirds by 2015. The Sustainable Development Goals (SDGs) will replace the MDGs later in 2015; Goal 4 of the Draft SDGs is to ensure healthy lives and promote the well being for all people of all ages. The fact sheet by the World Health Organization (WHO) in 2013 reported 6.6 million deaths under 5 years of age globally. Most of these deaths are from preventable causes, the leading ones being pneumonia, prematurity, diarrhea, and malaria [1]. These statistics, unfortunately, have not been showing much improvement, especially in low income, developing countries. Primary prevention is certainly a strategy that works but a large number of these

patients require hospitalization.

An improvement in emergency hospital care significantly reduces inpatient mortality rates. Clarke, *et al.* [2] have demonstrated that an improvement in short term mortality can be achieved by small changes including; a designated area for emergency care, staff allocation to improve triage, the presence of simple medical equipment such as pulse oximetry and thermometry, and training. WHO and the United Nations Children's Fund (UNICEF) have also incorporated a strengthened emergency care in the concept of Integrated Management of Childhood Illnesses [3]. However, Emergency medicine (EM) in India has recently gained acceptance as a specialty. Currently there are 24 medical colleges that offer 48 MD seats in emergency medicine

and are recognized by the Government of India as per the Indian Medical Council (IMC) Act. Additionally, there are 66 Diplomate of National Board (DNB) seats of the National Board of Examination (NBE) in 20 accredited hospitals for emergency medicine. The introduction of these programs has created a momentum for development of academic standards, faculty development, and accreditation standards for quality EM services in the country. In contrast, pediatric emergency medicine (PEM) is still in its infancy in India. This is not dissimilar to many countries that have an unstructured approach to the evaluation of the ill and injured child. Indeed, deficits in areas such as triaging, or managing disasters and trauma along with prolonged waiting times in emergency departments (ED) secondary to the lack of comprehensive emergency team services adversely affect the outcomes of children requiring emergency management [4]. As majority of the mortality occurs in the first 24-48 h of hospital admission in the ED itself; it is imperative that efforts to strengthen the pediatric emergency care infrastructure be pursued [5]. This white paper aims to provide a status update on the the current state of PEM in India and also suggests a model for establishing PEM largely based on what is currently being practiced in the USA.

#### **PEDIATRIC EMERGENCY CARE: INDIAN SCENARIO**

The pediatric ED in India is not an ED in the true sense. An initial study from a leading pediatrics center in Northern India showed that fever was the most common presenting complaint and upper respiratory tract infection and acute gastroenteritis were the two most common illnesses that required an ED evaluation [6]. Residents in the pediatric ER screen all the patients and manage minor illnesses as well; however, they are overburdened in a majority of instances. There are substantial gaps in; (a) the prehospital arena including lack of adequately trained ambulance personnel and appropriately equipped ambulances, (b) inadequate in-hospital triage systems, (c) lack of formal training in the evaluation and management of pediatric trauma leading to a lack of skilled medical personnel including nursing and other support services, and (d) availability of evidence-based patient management protocols.

#### **Prehospital Services in India**

The medical system in India constitutes a multitude of private and public sector organizations that are managed at different levels; however, the coordination within the system is lacking. The emergency transport system of patients is mostly by private vehicles ranging from bullock carts to autorickshaws to cars and patients are often transported by family members or relatives [7].

Roads are often congested, which adds to the delay in accessing hospital services. Thus, the basic tenets of managing the ABCs, *i.e.*, airway, breathing, and circulation of patients in an acute emergency is delayed. Verma, *et al.* [8] reported an average delay of 168 min (~3 h) in reaching the trauma facility. Most of these children were accompanied by their fathers, or both the parents, and not by any trained prehospital transport team. Few states at present have their centralized emergency ambulance system, *e.g.* Delhi, the capital of India, has Centralized Accident and Trauma Services (CATS) but the number of ambulances are inadequate to meet the current demand and many of the ambulances do not have the age-appropriate equipment. Furthermore, prehospital services vary substantially among different states and do not have a universal phone number. The basic principle of transport, *i.e.*, transport of the “right patient to the right hospital” is often not followed and as a result, patients arrive at a place where appropriate facilities are unavailable. This is especially true for trauma victims, both adult and pediatric.

Ramanujam, *et al.* [9] reported that half of the trauma victims reporting to the ED actually received no prehospital care. Pallavisarjii, *et al.* [10] in their study from Southern India documented the lack of adequate skills among laypersons, including police, taxi drivers, and primary and middle school teachers, to handle an emergency although most of them revealed a willingness to learn these skills. Roy, *et al.* [7] suggested training informal service providers who exist such as traffic police and taxi drivers in prehospital emergency medical service (EMS). Joshi, *et al.* [11] emphasized the need of Integrated Emergency Communication Response Service in India and proposed a model for development in the country.

#### **Hospital Emergency Care System**

Most of the pediatric emergencies, including tertiary-care teaching hospitals, are managed by pediatric residents who are trained in pediatric medical care that often excludes trauma training. Many of these pediatric providers are overburdened and simultaneously manage non-emergent conditions such as upper respiratory infections and acute gastroenteritis without dehydration [6]. Dedicated triage teams are unavailable in pediatric ED. As a result, the management of sick patients is delayed, thus adversely affecting the outcome. According to a systematic review by Rowe, *et al.* [12], Triage Nurse Ordering was an effective intervention in mitigating overcrowding in ED and it reduced the length of stay in the ED substantially [12]. Triage is especially important in the context of mass casualties and disasters.

Quick survey using Pediatric Assessment Triangle (PAT) from Pediatric Advanced Life Support guidelines can be used to identify life-threatening illnesses. Combination of certain simple clinical signs can identify hypoxemia in an emergency and help in prioritizing patients [13]. The availability of simple bedside tests such as pulse oxymetry can be a useful and cost-effective adjunct to improve emergency care [14]. Certain clinical scores such as “signs of inflammation in children that kill (SICK),” and “temperature, oxygen saturation, pulse rate, respiratory rate, saturation and seizures (TOPRS)” have been validated in Indian children and used for the purpose of triaging [15,16].

### **Pediatric Disaster Management**

Large volumes of incoming patients involved in natural disasters such as earthquakes and tsunamis or unnatural disasters such as terrorist attacks can immediately overwhelm even the most advanced and resourced setting. Children are likely to suffer even more for multiple reasons: Children may arrive unaccompanied, inexperience of the staff in the pediatric emergency setting, inadequate infrastructure including equipment, the need for subspecialists such as dedicated trauma surgeons, orthopedicians, burn specialists, and pediatric residents who are the first line providers and who often have no experience in these specialties and hence, no exposure to handle these situations. The International Pediatric Association (IPA) started “training of trainers” on a worldwide level with the aim to manage children during disasters. The Indian Academy of Pediatrics formed a National Task Force on “Child at Risk” and the first report by the “Disaster Management Committee” was published in the year 2005. It emphasized the coordinated efforts of the government, along with nongovernment agencies (NGOs), the Red Cross, armed forces, international agencies, UNICEF, *etc* [17,18]. This was the first ever effort from India in the field of disaster management; however, further efforts in this direction are urgently needed.

### **USA MODEL OF PEM TRAINING PROGRAM**

Since the recognition of PEM as a separate field in pediatrics and EM in the 1980s, fellowship programs have evolved and continue to evolve both in terms of the structure and quality in which PEM training is conducted. Many EM programs were established prior to that decade yet none devoted more than 8 weeks of training for pediatric surgical and medical emergencies, which was considered as the weakest link [19]. As the programs were gradually established, core competencies evolved within a decade to address the needed skills to complete the requirements for this nascent specialty [20-22].

Residency graduates from pediatrics or EM training programs in the USA are eligible to apply for PEM fellowship, with clearly defined difference in duration of training and requirements for scholarly activities to successfully achieve fellowship completion. In 1990, the American Board of Emergency Medicine (ABEM) and the American Board of Pediatrics (ABP) sought the approval of the American Board of Medical Specialties (ABMS) to recognize PEM as a subspecialty requiring independent certification. The request was granted in 1991 and the first exam was conducted in 1992 [23,24]. In 1998, PEM became a fully accredited training course by the Accreditation Council of Graduate Medical Education (ACGME) that shaped the final outlook of a three year training program that included a mandatory 1-year research component for pediatricians. However, applicants from EM residency programs have a 2-year training program compared to the 3 years for pediatric residency-trained applicants. Fellowship programs (if accepting fellows from both boards) are required to establish two separate formal curricula to address the differences in training experience [25]. ACGME also defined the program role, faculty responsibility, and facility requirements in creating an environment that would help the trainees to achieve their educational goal. These steps helped to develop the scope of training and create its goals and objectives that are being implemented in many training programs in the USA at present.

### **Rotations**

Clinical rotations have gone through many iterations and multiple revisions to help create the ideal experience for trainees to acquire the needed knowledge, experience, and ability to manage children in acute care settings [22]. The clinical experience includes four main domains (teaching, consulting, administrative, and research training) that fellows in PEM are exposed to, through the three years of training. Research training and clinical pediatric ED are in the form of 12 one-month blocks spread throughout training to meet the required educational experience.

Other rotations are scheduled and planned to address the much-needed exposure (when available) to medical and surgical subspecialties (anesthesia, adult emergencies, orthopedic surgery, pediatric intensive care, EMS, pediatric radiology, toxicology, trauma, ultrasound, administration and risk management). Although different programs vary in their structure and design they all share a common core of essential rotations in trauma, orthopedic surgery, pediatric ED, anesthesia, intensive care, EMS, and adult emergencies. Furthermore, programs require fellows to be certified in

Advanced Trauma Life Support (ATLS), Neonatal Advanced Life Support (NALS), Pediatric Basic (PBLs), and Advanced Life Support (PALS).

### **Pediatric Emergency Services in the USA**

The need for prehospital care was first recognized with a joint landmark report in 1966 when the National Academy of Science (NAS) and the National Research Council (NRC) highlighted trauma as the leading cause for disability and death for persons 1-37 years of age in the USA [26]. Prior to that report, ambulance services were inconsistent, privately-owned, and lacked appropriate equipment and training specifically designed to meet pediatric demands. During the 1970s, the EMS system grew to its general form with increasing national awareness of the benefits of reducing morbidity and mortality of the adult population. The Emergency Medical Service Systems Act of 1973 changed the shape of medical practice by recognizing this need for developing comprehensive, area-wide emergency medical systems that are well-funded and well-connected [27]. This law also mandated the development of local plans and provided funding for the initial establishment of operational systems, the conduct of research in emergency medical techniques and devices, expansion of acceptable existing systems, creation of adequate communications systems, and the providing of appropriate education for emergency medical personnel. By the 1980s, the system realized the gap of care for children when Seidel, *et al.* [28] published that needs of children in prehospital settings were not met that potentially contributed to higher mortality rates when compared to adults. Within the same period, curricula were established to train EMS personnel in pediatric care and pediatric surgeons took the lead in establishing specialized prehospital trauma care for children. These steps have helped shape the initial steps in creating regional EMS systems for the decades that followed and the Institute of Medicine (IOM) published its report on prehospital and hospital care for children that provided some insight of the current shortfalls in the system [24]. Finally, the current system recognizes a multilevel of care tailored to the individual needs of the children transported (first responders, emergency medical technician (EMT)-basic, EMT-intermediate, EMT-paramedic). Each of these levels exercise different abilities and equipments that are essential to manage the target population referred by the central command of the regional EMS system. Despite all these steps, the current system still needs improvement of coordination between hospitals and prehospital care, improvement of disaster preparedness, and the establishment of an evidence-base for assessing as to how the specialty is evolving to meet the current needs.

### **PEDIATRIC EMERGENCY TRAINING PROGRAM IN INDIA**

Current lacunae in pediatric emergency care underscore the need for incorporation of PEM training program in our medical education and training system. The Medical Council of India (MCI) has already recognized a 3-year MD course in EM in 24 medical colleges across the country. Children are physiologically, developmentally and emotionally, substantially different from adults and it is increasingly being recognized that providers need to be trained to meet those special needs. We are about to have MCI-recognized postgraduate degree and diploma courses in pediatric emergency medicine. It is imperative that a well structured postdoctoral superspecialty training program in pediatric EM is developed to enhance the emergency care for India's children.

#### **Current Training in India**

Comprehensive management of the patient and taking care of surgical, orthopedic, ophthalmologic, otolaryngologic, dermatologic, and gynecological emergencies in pediatric ED are lacking. No consideration is given to the child's psychiatric and psychological needs in the ED. Specialists are usually on call and attend pediatric patients only when called – this adversely impacts care due to lack of access to adequately-trained subspecialists. Expertise and skills related to basic life- and limb-saving procedures such as the use of and access to alternate emergency airways, foreign body removal, thoracostomy, suturing, and splinting, to name a few, are not being taught. Defined protocols for standardized evidence-based evaluation, management, and disposition of children treated in EDs are lacking. Preparedness for multiple casualties and disasters is another domain that is under-emphasized and hence, under-resourced with many institutions being under-prepared.

#### **Academic Model for Pediatric Emergency Training in India**

After the initiation of MCI recognized residency programs in the discipline of EM (MD in EM), it is essential for the MCI to recognize the need for a superspecialty in PEM. Rising patient volume in pediatric emergency centers across the country re-emphasizes the importance of starting DM and DNB programs (3 years, including examination) in PEM in recognized medical colleges and hospitals. Such institutions with diverse and high-volume patient population are the ideal sites in India for initiating DM programs in PEM.

The Academic College of Emergency Experts in India (ACEE INDIA) is an INDO-US Emergency and Trauma Collaborative initiative that has started a 1-year

capacity-building training program in PEM, with the objective of introducing the concepts of PEM for those providers who may be interested in pursuing PEM as a career. The essential qualification for this program is MD/DNB in Pediatrics, MD/DNB in EM or a Fellow of ACEE INDIA. The College is actively working toward its vision of starting DM and DNB in PEM. The Joint Working Group of ACEE INDIA proposes the guidelines for development of such a program. A MD/DNB program in PEM should have the following components:

- Knowledge – Imparted through departmental teaching activities such as seminars, lectures, journal clubs, and self directed learning
- Clinical skills – Imparted through the apprentice model and rotational postings in different disciplines
- Communication skills – Imparted through formal trainings and rotational postings in day-to-day practice
- Undertaking research by undertaking thesis – Protocol writing in the first year, research and thesis completion in the second year
- Encouraging publication of research work
- Scholarship and excellence in professional work.

### Eligibility Criteria

It has been proposed that a medical graduate who has completed a 3-year course of MD/DNB in Pediatrics or MD/DNB in EM shall be eligible for DM or DNB course in PEM [29].

### Core Curriculum and Rotations

The accredited programs should develop specific residency rotations and predefined aims and learning objectives. Suggested core content for the residency program has been given in **Table I**. The curriculum should be directly influenced by the epidemiology of pediatric emergencies in India. For instance, the toxicology curriculum will need to focus on locally prevalent ingestions such as organophosphates and hydrocarbons (kerosene) rather than tricyclic antidepressants, which are more common in the USA. Infectious diseases, which constitute a large and diverse volume in children should have a tropical perspective. Pediatric trauma and unintentional injuries, largely a neglected domain, constitute a huge burden of morbidity and mortality [30]. The rotations should include residency training in trauma and pediatric surgery wards and the gaining of expertise in managing various trauma mechanisms such as motor vehicle crashes, falls, and blunt and orthopedic injuries. Burns and electrocution injuries are also common in both urban and rural settings;

**TABLE I** SUGGESTED DISCIPLINES IN PEDIATRIC EMERGENCY CURRICULUM

Adolescent OPDs* and wards (or medicine OPDs and wards)	Orthopedics
Anesthesia	Otorhinolaryngology
Burns	Pain clinic
Dermatology and Venereology	Pediatric Cardiology
Disaster wards (if available)	Pediatric Emergency Department
Forensic Medicine	Pediatric Intensive Care
Infectious Diseases	Pediatric Nephrology
Gastroenterology	Pediatric Surgery
Neurosurgery	Psychiatry
Obstetrics and Gynecology	Radiology
Ophthalmology	Trauma
	Toxicology

\*OPDs: Outpatient departments

hence, rotations should include burns and plastic surgery wards too [31,32]. Adolescents are a specialized group of the population who have different needs altogether. Gynecological problems in females as well as sexually transmitted diseases and psychiatric and psychological problems need to be recognized; hence, a rotation in the departments of Obstetrics and gynecology and Psychiatry becomes mandatory. Child maltreatment and sexual abuse are prevalent in society and often go unrecognized in pediatric emergencies [33]. Sensitization of pediatric emergency residents to these conditions and rotation in psychiatry medicine also need to be incorporated in the curriculum.

The 3-year curriculum in PEM should include rotations in various departments as shown in **Table II**. Specific objectives need to be developed and validated for each rotation. A few examples of these objectives are depicted in **Table III**. An objective evaluation of skills should be required in the form of maintenance of a procedure “logbook” for all trainees. Along with a record of participation in the teaching activities in the department, presentations made, case-record maintenance, procedures learnt and performed, counseling skills and the right attitude toward patients and relatives should be kept. **Table IV** gives the description of the topics that need to be incorporated in PEM DM curriculum. The core text book for PEM should be Fleisher and Ludwig’s *Textbook of Pediatric Emergency Medicine*. Apart from this, Tintinalli’s *Textbook of Emergency Medicine*, and Goldfrank’s *Toxicologic Emergencies* should be used as reference books. However, these will need to be supplemented with other pertinent texts, especially those written for Indian conditions.

**TABLE II** SUGGESTED ROTATIONS FOR A 3-YEAR RESIDENCY PROGRAM

<i>First year</i>	<i>Second year</i>	<i>Third year</i>
Pediatric ED* (3 mo)	PICU** (2 mo)	Obstetrics and gynecology (1 mo)
Labor room (1 mo)	Orthopedic trauma (2 mo)	Neonatology (1 mo)
Anesthesia (2 mo)	Pediatric surgery (2 mo)	Pediatric ED (5 mo)
Neonatology (2 mo)	Ophthalmology (1 mo)	Elective posting (2 mo)
PICU (2 mo)	Otolaryngorhinology (1 mo)	Psychiatry (1 mo)
Forensic (1 mo)	Burns (1 mo)	Radiology (1 mo)
Dermatology and VD*** (1 mo)	Adult casualty (1 mo)	Disaster wards (1 mo)
	Pediatric ED (2 mo)	

\*ED: Emergency Department; \*\*PICU: Pediatric intensive care unit; \*\*\*VD: Venereal Diseases.

**TABLE III** OBJECTIVES IN VARIOUS ROTATIONS

<i>Anesthesia</i>	<i>Orthopedics</i>
Learn airway management; Drugs during various procedures and intubation; Pain management	Learn splinting and immobilization, Suspect and manage common pediatric fractures
<i>PICU</i>	<i>Surgery</i>
Develop expertise in putting various lines; Learn initiation of ventilation; Management of electrolyte emergencies	Learn suturing; Identify common surgical emergencies such as intussusceptions, peritonitis, and perforation
<i>Forensic</i>	<i>Obstetrics and Gynecology</i>
Common poisonings, bites, and stings prevalent in that area	Management of teenage pregnancy, ectopic pregnancy, and sexually transmitted diseases
<i>Radiology</i>	<i>Neurosurgery and Neurotrauma</i>
Ultrasound (add-on training in emergency and ICU*)	Management of head trauma, raised intracranial tension, and shunt complications

\*ICU: Intensive care unit.

## Research

Research in the form of thesis should be a mandatory requirement for partial fulfillment of the DM course. Apart from that, acceptance or publication of at least one paper in journals and one presentation in conference should be part of the eligibility criteria for appearing in the examination. This is being done for MD courses too. Setting of such high academically-oriented standards will help future emergency pediatricians to have the aptitude of research [34,35].

## Faculty/Staff

A minimum of three faculty members, namely, a professor, an associate professor, and an assistant professor would be required for starting the DM program. A similar staff and academic criteria need to be evolved for DNB program. Since the specialty is still in the evolving stage, special consideration may be given with regard to the qualification for the faculty posts, *e.g.*,

for the post of Assistant Professor, 3 years of post-PG experience out of which 2 years in managing pediatric emergencies from a recognized medical college should suffice. Detailed guidelines for each post need to be adopted keeping in view the roadmap for program development.

Faculty development should include exchange programs with established centers in the developed world and distance learning by telemedicine and teleconferencing. INDO-US Emergency and Trauma Collaborative provides an excellent opportunity for pediatricians who wish to establish and pursue PEM in the public and private sectors as exchange programs.

## Infrastructure

### *Bed strength*

As per the existing norms of recognition to start a DM program, a pediatric emergency unit with a minimum of 20 beds should be available for PEM.

### Equipment

**Table V** gives a comprehensive list of the equipments needed in a setup providing DM course in PEM for the purpose of patient care, training, and research.

### Mandatory Courses and Skills

As ED is constantly dealing with sick patients, the development of resuscitative skills becomes important. Certification in Neonatal Advanced Life Support (NALS), Pediatric Advanced Life Support (PALS), Advanced Trauma Life Support (ATLS), and Advanced Cardiac Life Support (ACLS) should be a mandatory part of the training program. Equivalent courses from India Neonatal Resuscitation Program by the National Neonatology Forum of India, Indian Academy of Pediatrics – Advanced Life Support should be recognized for the residency program. During their rotations in the concerned specialties, PEM residents should receive training in skills such as airway management, vascular access, wound management, incision and drainage, foreign body removal, and suturing and splinting. **Table VI** enlists the competencies that a DM candidate pursuing the training should acquire during his or her 3-year training program. Ultrasound in emergency, a noninvasive bedside test, is a useful adjunct for airway management, central line placement, identification of fluid and air in various cavities requiring emergency management such as the pneumothorax, pericardial tamponade, and hemoperitoneum [36-38]. A few standardized courses are available in India, and collaboration with such skill schools is needed to provide training in ED ultrasound for establishing the diagnosis and performing therapeutic procedures.

### Assessment

Formative assessment should be carried out during the three years of training program, which should be made a part of internal assessment. Summative assessment of both theory and clinical practice should be done at the end of 3 years. The grading or marking system may be used for successful completion of the course.

Theory examination should consist of three question papers. These should be:

- *Paper I:* Basic Sciences as applied to PEM
- *Paper II:* Systemic PEM (abdominal, gastrointestinal, respiratory, cardiac, renal, and endocrinologic emergencies)
- *Paper III:* Systemic PEM (orthopedic, ophthalmic, ear, nose, and throat (ENT), surgical, hematologic, oncologic, psychiatric, and behavioral emergencies).

**TABLE IV** THE 3-YEAR CURRICULUM FOR PEM DM TRAINING PROGRAM

Neonatal Advanced Life Support Guidelines	Anaesthesia, analgesia, and sedation
Pediatric Advanced Life Support Guidelines	Mechanical ventilation in ED
Advanced Trauma Life Support Guidelines	Transport of sick patient
	Biological and chemical warfare and terrorism
Symptom-based approach	
<i>General</i>	<i>Nervous system</i>
Pallor	Seizures
Cyanosis	Syncope
Lymphadenopathy	Coma
Jaundice	Weakness
Petechiae	Ataxia
Rashes	Headache
Edema	<i>Renal</i>
Fever	Oliguria
<i>Gastrointestinal</i>	Dysuria
Abdominal pain	Hematuria
Abdominal distension	Endocrine
Diarrhea	Polyuria
Dehydration	Polydypsia
GI bleed	<i>Orthopedic</i>
<i>Respiratory</i>	Trauma
Sore throat Cough	Joint swelling
Wheezy child	Joint pain
Respiratory distress	<i>Ophthalmic</i>
Apnea	Red eye
Cyanosis	Eye discharge
Chest pain	Eye pain
<i>Cardiovascular</i>	Squint
Palpitations	<i>ENT*</i>
Murmurs	Hearing loss
Hypertension	Ear pain
<i>Gynecologic</i>	<i>Miscellaneous</i>
Vaginal bleeding	Foreign body
Vaginal discharge	Shock
Oligomenorrhea and polymenorrhea	
<i>System-wise emergencies</i>	
Abdominal emergencies	Neurologic emergencies
Adolescent and gynecologic emergencies	Neurosurgical emergencies
Bites and toxins	Orthopedic emergencies—
Burns	Nontraumatic
Cardiac emergencies	Orthopedic emergencies—
Child abuse	Traumatic
Dermatologic emergencies	Oncologic emergencies
Dental emergencies	Ophthalmologic emergencies
Electrolyte abnormalities	Otolaryngologic emergencies
Environmental emergencies	Psychiatric emergencies
Hematology emergencies	Psychologic emergencies
Infectious diseases	Respiratory emergencies
Metabolic emergencies	Renal emergencies
Minor injuries	Surgical emergencies
Musculoskeletal trauma	Transplant emergencies
Neonatal emergencies	Thoracic emergencies
	Urologic emergencies

\*ENT: Ear, nose, and throat

**TABLE V** LIST OF EQUIPMENTS IN PEDIATRIC EMERGENCY MEDICINE

Total beds 20, including 6 ICU* beds	Drug crash carts 4
Central oxygen and suction 20	Syringe pumps 20
Vital sign monitors 7	Phototherapy machine 1
Central monitor connected to 6 beds	Open care resuscitation trolley 1
Defibrillator 1	Endotracheal tubes of all sizes
Ventilators 6 (2 neonatal and 4 pediatric)	Ambubags 10
Bubble CPAP** 2	Laryngoscopes with pediatric and neonatal blades 10
Transport ventilator 1	Broselow pediatric emergency tape 10
Portable pulse oxymeters 3	Chest tubes of all sizes
Portable x-ray machine 1	Central lines of all sizes
Portable ultrasound machine with pediatric ECHO*** probe 1	Cervical collars
Point of care arterial blood gas and electrolytes machine 1	Spine boards
Ultrasonic nebulizers 4	Splints
Portable suction machine 2	Glucometers with compatible glucosticks
Resuscitation trolley 2	Essential drugs
	Infant warmers 3

\*ICU: Intensive care unit; \*\*CPAP: Continuous positive airway pressure; \*\*\*ECHO: Echocardiogram.

**TABLE VI** PROCEDURAL SKILLS IN PEDIATRIC EMERGENCY MEDICINE

Neonatal resuscitation	Pleural tap and chest tube insertion
Pediatric resuscitation	Pericardiocentesis
Resuscitation in trauma victim	Lumbar puncture
Management of basic and advanced airway	Focus abdominal sonography for trauma
Central venous line insertion	Topical anesthesia and direct wound infiltration
Arterial line insertion	Suturing
Peripherally inserted central line	Splinting of musculoskeletal injuries
Umbilical venous catheterization	Close reduction of dislocations
Intraosseous line	Zipper injury management
Defibrillation/cardioversion	Reduction of torted testes
Foreign body removal (ear, nose)	Reduction of nursemaid elbow
Hair tourniquet removal	Incision and drainage (abscess, paronychia, and felon)
Removal of rings	Drainage of subungual hematoma
Nasogastric tube placement	Drainage of septal hematoma, nasal packing
Gastric lavage	Fundus examination
Bladder catheterization suprapubic bladder aspiration	Interpretation of x-rays, ECG*, CT** scan, and MRI***
Reduction of incarcerated inguinal hernia	Transportation of sick patients
Rectal prolapse	
Evaluation of VP**** shunt	

\*ECG: Electrocardiogram; \*\*CT: Computed tomography; \*\*\*MRI: Magnetic resonance imaging; \*\*\*\*VP: Ventriculoperitoneal.

The distribution of these three papers may be made on organ systems and procedures/highly focused areas only. In each paper, 10% weightage may be given to recent advances.

The practical examination should have:

- Objective structured clinical examination (OSCE)
- Cases (four).



Cases should focus on communication, management, and demonstration of clinical skills so as to examine all the four domains of education.

The practical examination should incorporate assessment tools that offer high reliability and validity.

- Tables with viva voce on procedures, instruments, x rays, electrocardiogram (ECG), arterial blood gases, and clinical photographs
- Procedures on simulators.

#### Assessors

A minimum of four examiners with experience of imparting teaching, training, and assessment of postgraduates in EM and pediatric emergencies from MCI/NBE recognized colleges should be assessing the candidate. Ideally, all examiners should have prior exposure and formal training in the assessment tools. As it is a new specialty, qualified faculty might not be available in the initial years; efforts be made to create a pool of examiners/assessors with 8 years of post-PG standing in teaching and training and in imparting formal training in assessment.

#### KEY RECOMMENDATIONS

The Joint Working Group of the Academic College of Emergency Experts in India (JWG ACEE INDIA) proposes the following recommendations to start MCI recognized DM/DNB course in PEM in India. The aim is to produce trained and skilled pediatric emergency physicians to provide the standard of care that is at par with the Western world and to improve overall childhood mortality and morbidity.

- PEM should be recognized as a superspecialty as per provisions of the Indian Medical Council Act and a 3 year MD/DNB program in PEM should be started in recognized medical colleges and institutes
- MD/DNB pediatrics or MD/DNB in EM should be considered as an essential qualification to be eligible for this course
- A 20-bedded pediatric emergency unit should be earmarked where resuscitation and treatment of sick patients may be carried out
- Faculty requirement should be a minimum of three faculty members, namely, a professor, an associate professor, and an assistant professor for starting a PEM MD/DNB program
- Since the faculty fulfilling the mandatory teaching requirement may not be available in the initial stages, relaxation may be given to begin with. For example, 3

years of post-PG experience out of which 2 years in managing pediatric emergencies from a recognized medical college should suffice for the post of Assistant Professor

- Faculty should be a fulltime faculty dedicated to pediatric ED
- Adequate infrastructure and equipment as enlisted should be available for starting the course
- Residents pursuing DM course in PEM should have a defined rotational plan to have an exposure to all the related specialties
- Residents should acquire the mandatory procedural skills and a logbook should be maintained by the department for the same
- To promote research among residents, thesis should be a mandatory requirement toward fulfilling the DM/DNB course
- Assessment of theoretical as well as clinical skills should be done by at least three formative assessments during the residency training and a final summative assessment at the end of three years by a panel of assessors.

#### CONCLUSION

The Academic College of Emergency Experts in India (ACEE-INDIA) is working incessantly to strengthen EM training in India. The MCI has recognized MD in EM as a specialty and now, it is time to move a step ahead. The Joint Working Group of ACEE INDIA proposes to start DM/DNB course in PEM as superspecialty in MCI-recognized medical colleges. Through this paper, a structured curriculum has been provided to start such a course so that well-trained, competent, and skilled pediatric emergency physicians are produced who can manage all the types of pediatric emergencies.

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