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European Board of Paediatrics

European Board of Emergency Medicine

THE EUROPEAN SYLLABUS

IN PAEDIATRIC EMERGENCY MEDICINE

A document of the Working Group on Paediatric Emergency Medicine approved by the European Academy of Paediatrics/paediatric section of the UEMS (10 Dec. 2011), and the UEMS section/European Board of Emergency Medicine (4 Nov. 2011)

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1. PREFACE

Paediatric Emergency Medicine is a relatively new and rapidly evolving specialty for Europe, as in other parts of the world it is well established as a Board certified paediatric subspecialty. The first Paediatric Emergency Medicine fellowship training programme began in 1981 at the Children's Hospital of Pennsylvania – USA. Presently there are 48 US, 9 Canadian, 1 UK (National) and 8 Australian programmes for advanced Paediatric Emergency Medicine training recognised by their national bodies.

In Europe in recent years, Paediatric Emergency Medicine has been growing in many countries, even if very heterogeneously. In the United Kingdom this subspecialty has received official recognition by the Specialist Training Authority (2003). In Italy, in Spain and in France, Paediatric Emergency Medicine is not yet a Board recognised specialty but Paediatric Emergency Medicine is practised by an increasing number of Paediatricians in 3rd level Paediatric Emergency Departments. In all these countries, Paediatric Emergency Medicine Societies were founded with the purpose of improving the level of care for acutely ill and injured children. Annual scientific meetings are held in each of these countries. However, the concept of Paediatric Emergency Medicine has not been yet perceived as a need by other European countries such as Germany and Austria where continuity of care still relies upon the primary care paediatricians. Thus, this syllabus is offered as a guideline to countries which are interested in introducing Paediatric Emergency Medicine as a subspecialty.

In Europe, many paediatricians with a deeper knowledge and a wider experience in Paediatric Emergency topics practise their skills and apply their expertise within the framework of a paediatric specialised accredited tertiary care unit, department or hospital. The Emergency Medicine physicians too, see and manage children in Emergency Departments in many countries. It is thus evident that there is no absolute homogeneity between these two different routes of training, and it may therefore not be appropriate that they should have the common title of Paediatric Emergency Physicians (PEPs). Indeed, this would be misleading and could cause potential confusion.

The Emergency Physicians with additional qualification in Paediatric Emergency Medicine are able to see and treat Emergency Department patients of all ages, thereby improving the care of children in general Emergency Departments, but Paediatricians with qualification in Paediatric Emergency Medicine have their clinical practice in the Emergency Departments restricted to children.

Paediatricians with additional qualification in Paediatric Emergency Medicine are able to see and treat children who are hospital inpatients and outpatients as well as those who attend the Paediatric Emergency Department, but the clinical practice of Emergency Medicine physicians with qualification in Paediatric Emergency Medicine is restricted to the Emergency Department.

Thus, the form and duration of the training in PEM would be slightly different according to the background of the trainee, as is explained in chapter 4.2.3 of this Syllabus.

2. INTRODUCTION

2.1. The subspecialty of Paediatric Emergency Medicine

An Emergency Medicine Paediatrician is a trained paediatrician or emergency physician who has specialised in the management of acutely ill and injured children. This recommended syllabus for Paediatric Emergency Medicine is intended to supplement the Common Trunk Curriculum for paediatricians,[1] and Emergency Medicine training for specialists in emergency medicine.[2]

2.2. The European Syllabus for Paediatric Emergency Medicine

"*Curriculum*" is defined in the Dictionary of Education as "a general over-all plan of the content or specific materials of instruction that the school should offer the student by way of qualifying the student for graduation or certification". Thus, the curriculum is the road map that explains how the physician who has completed basic paediatric or emergency medicine training can ultimately develop into a skilled paediatric emergency medicine specialist.[3] The details of the delivery of the assessment and delivery of the training programmes are touched upon in the latter part of this document in appendix 1 and will be detailed in a unified document, the Models for the Delivery of Training in PEM, to be submitted in 2012. The ways in which these current models of training for training in PEM are as appendix 2 in this document.

"*Syllabus*" is the list of competences and skills that should have been acquired by a certified Paediatric Emergency Medicine physician. This document includes the European Training syllabus in Paediatric Emergency Medicine.

In general terms, the ultimate aims of the syllabus are to:

- enhance the level of care for acutely ill and injured children
- establish clearly defined standards of knowledge and skills required to practice Paediatric Emergency Medicine.
- define and harmonise training programmes in Paediatric Emergency Medicine within and between different European countries, under the auspices of both the European Board of Paediatrics and European Board of Emergency Medicine
- foster the development of a European network of proficient tertiary care centres for Paediatric Emergency Medicine by this means
- advance the European contribution to international scientific progress in the field of Paediatric Emergency Medicine

This document defines the aims of training, the contents and the duration of the training programme. The basic requirements for entering such a programme and a spectrum of required qualifications for training centres and tutors are included in appendix 1.

3. COMPETENCIES, KNOWLEDGE, AND SKILLS

3.1. Core Competencies of the European Paediatric Emergency Physician

Some of the competencies identified in this syllabus are those required by any paediatrician and physician having paediatric experience, whilst others are more specific to the practice of Emergency Medicine. However, it is accepted that the levels of competence required of a Paediatric Emergency Physician in specialised areas of medical practice should be limited to those which determine whether urgent or immediate more specialist referral is appropriate. Emergency Medicine complements and does not seek to compete with other hospital medical disciplines.

The areas of competency in Paediatric Emergency Medicine, as previously defined,[4] are:

- *Care of children*
- *Medical knowledge*
- *Communication, collaboration and interpersonal skills*
- *Professionalism, ethical and legal issues*
- *Organisational planning and service management skills*
- *Education and research*

The PEPs will have generic skills in managing children and their carers. They include:

3.1.1. Patient Care

Paediatric Emergency Physicians care for children with a wide range of pathology from the life threatening to the self limiting and from age 0 to up to 18 years, according to local policy. The attendance and number of these children is unpredictable and they mostly present with symptoms rather than diagnoses. Therefore the provision of care needs to be prioritised, and this is a dynamic process. The approach to the child is global rather than organ specific. Child care includes physical, mental and social aspects. It focuses on initial care until discharge or referral to other health professionals. Family and child patient education and public health aspects must be considered in all cases. The PEPs should ensure that there is optimal care for the child in the paediatric emergency department (PED), and work with colleagues and other professionals in the hospital and beyond it to provide care in the best interests of the child including their biological, physical and social needs. The influence of the age, developmental, gender, disability, cultural and economic implications of their situation are considered as part of the holistic assessment of every child at their presentation. The PEPs needs to advocate a healthy lifestyle for their patients, understand their duties in relation to child protection and have effective communication skills especially in the setting of complex family and medical conditions.

To ensure for the care of children, PEPs must be cognisant of the following:

3.1.1.1. Triage

PEPs must know the principles of triage which is the process of the allocation and medical prioritisation of care for the pre-hospital setting, the Paediatric Emergency department and in the event of mass casualties, as in a major incident. It is based mainly on the evaluation of vital parameters and key symptoms to prioritise and categorise patients according to severity of injury or illness, prognosis and availability of resources.

3.1.1.2. Primary assessment and stabilisation of life threatening conditions

The ABCDE approach must be the primary assessment tool for all patients and does not require a diagnostic work-up. It is a structured approach with which to identify and resuscitate the critically ill and injured. PEPs must be able to assess, establish and maintain: Airway [A], Breathing [B], Circulation [C], Disability [D] and Exposure [E] of the patient.

The PEPs should be able to provide neonatal and paediatric life support, lead the resuscitation team and advise the resuscitation team if required and liaise effectively with other teams such as intensive care and anaesthetic services. The PEPs should be able to take a leadership role in the setting of major incidents in context of the overall major incident plan for the hospital. The PEPs should be able to undertake the efficient assessment, management and decision making in an environment of a large number of patients with rapidly changing priorities, in terms of resuscitation cases, as well as the running of the rest of the department.

3.1.1.3. Focused medical history

PEPs must focus the initial medical history on presenting complaints and on clinical findings as well as on conditions requiring immediate care.

There should be sufficient breadth and depth of information gathering to allow accurate formulation of the presenting problem, in the context of a busy PED setting. The scope of the consultation should allow relevant biological, psychological, educational and social factors to be taken into account. The manner of undertaking this should allow the patient to feel able to talk about any difficult or emotional issues, and for the PEPs to use skills in anticipating and responding to unease or unwillingness to the consultation. They should be sensitive to the needs of family and carers when appropriate.

3.1.1.3. Secondary assessment and immediate clinical management

PEPs must perform secondary assessment with a timely diagnostic work-up focusing on the need for early action. Clinical management must also include further aspects of health (physical, mental and social). The features of undifferentiated illness which suggest serious or unusual pathology must be recognised and the appropriate steps taken with the necessary degree of urgency of response. Information from other relevant professionals, e.g. those working in education, social work or others who see the child in a variety of settings should be gathered when relevant to the child's condition and overall well-being so that a composite and coherent plan of management can be achieved.

3.1.1.4. Clinical decision making

PEPs must be able to make clinical decisions including:

- *re-triage*
- *immediate and/or definitive care provided in the ED*
- *planning for admission or discharge*

This means that the PED specialist should be able to approach new situations needing good clinical judgement with an analytical and informed mind, make decisions on the most likely diagnosis and discuss effectively with the patient and carers and with other colleagues in the context of investigation and management, and be able to recognise and manage case histories which support life threatening or unusual pathology.

3.1.1.5. Clinical documentation

PEPs must make contemporaneous medical records which focus on:

- *relevant medical history*
- *main complaints and abnormal findings*
- *provisional diagnosis and planned investigations*
- *results of investigations*
- *treatment*
- *conclusions and management decisions*
- *family and child information.*

The PEPs must have effective communication skills which include being able to produce written communications for a range of audiences, for patients and their families, colleagues and other professionals. The PEPs must be able to produce reports as required by legal bodies such as courts and be able to present them in these contexts when duty bound to do so. The PEPs will also develop skills in presenting information relevant to clinical practice for a range of different audiences, as well as being able to write clear and succinct medical notes.

3.1.1.6. Re-evaluation and further management

PEPs must perform continuous re-evaluation of the child, with adjustment of the provisional diagnosis and care when it becomes necessary.

The PEPs will need to formulate plans for the management of the child, particularly in complex cases, work with the patients and their carers to help them agree and follow the plans, use pathways of care when appropriate and to review and modify management plans in place as appropriate. The PEPs should know when to seek assistance from other senior colleagues or other services when beneficial to the care of the child.

3.1.2. Medical Knowledge and Clinical Skills

PEPs need to acquire the knowledge and skills described in sections 3.2, 3.3, 3.4 and 3.5.

3.1.3. Communication, Collaboration and Interpersonal Skills

Paediatric Emergency Medicine is practised in difficult and challenging environments. Effective communication is essential for safe care and for building and maintaining good relationships avoiding barriers such as emotions, stress and prejudices. PEPs must be able to use both verbal and non-verbal communication skills, as well as information and communication technology.

PEPs must be able to demonstrate communication and interpersonal skills that include the following:

3.1.3.1. Patients and relatives

PEPs should give special attention to involving the family and the child in decision-making, seeking informed consent for diagnostic and therapeutic procedures, sharing information, breaking bad news, giving advice and recommendations on discharge and also communicating with populations with language barriers.

3.1.3.2. Colleagues and other health care providers
Important skills for a PEP are sharing information on patient care, working as a member or the leader of a team, referring and transferring patients.

3.1.3.3. Other care providers such as the police, the fire department and social services
PEPs must give attention to respecting patient confidentiality.

3.1.3.4. Mass media and the general public
PEPs must be able to interact with the mass media in a constructive way, giving correct information to the public and at the same time respecting the privacy of the patient.

3.1.4. Professionalism and other Ethical and Legal Issues

3.1.4.1. Professional behaviour and attributes
The general professional behaviour and attributes of PEPs must not be adversely influenced by working in stressful circumstances and with a diverse patient population. They must learn to identify their educational needs and to work within their own limitations. They must be able to self-motivate even at times of stress or discomfort. They must recognise their own as well as system errors and value participation in the peer review process.[5]

3.1.4.2. Working within a team or as a leader of a team
PEPs must understand the role of colleagues in other specialities and must be able to lead or to work effectively even in a new or large team often under considerable stress.

3.1.4.3. Delegation and referral
PEPs must understand the responsibilities and potential consequences of delegating, referring to a colleague in another discipline or transferring the patient to another doctor, health care professional or health care setting.

3.1.4.4. Patient confidentiality
PEPs must understand the law regarding patient confidentiality and data protection. They must know what confidentiality problems arise when dealing with relatives, the police, EMS communication, telephone discussions and the media.

3.1.4.5. Autonomy and informed consent
PEPs must respect the right of competent patients to be fully involved in decisions about their care. They must also value the right of competent children to refuse clinical procedures or treatment. They must understand how the ethical principles of autonomy and informed consent affect emergency practitioners.

3.1.4.6. The competent/incompetent patient
PEPs must be able to assess whether a child has the competence to make an informed decision. They must also understand the legal rights of the parents or a guardian. They must be familiar with those aspects of mental health legislation which relate to competence.

3.1.4.7. Abuse and violence
PEPs must be able to recognise patterns of illness or injury which might suggest physical or sexual abuse or domestic violence to children. They must be able to initiate appropriate child protection

procedures. They must also learn to prevent and limit the risks of violence and abuse to staff working in an emergency setting. PEPs need to know where help with the management of child in need of child protection can be obtained and understand the pathways ensuring follow up. The PEPS must maintain skills in the recognition, assessment and reporting of child protection matters and have an up to date knowledge of the legal processes relating to child protection within their country. They should be able to produce medical reports about child protection cases as given within their medical remit to do so. PEPs may be called upon to provide information or evidence in court so should understand their country's legal process in relation to child protection.
The PEPs should also be familiar with local facilities for children who require assistance with drug or alcohol problems.

3.1.4.8. Do not attempt to resuscitate (DNAR) and limitations of therapeutic interventions
PEPs must learn to discuss with colleagues and in a professional and empathic manner with relatives the initiation or possible discontinuation of active interventions when this is considered to be medically appropriate.[6] They must understand when and how they should use advance directives such as living wills and durable powers of attorney.

3.1.4.9. Medico-legal issues
PEPs must operate within the legal framework of the country in which they are working.

3.1.4.10. Legislation and ethical issues in Paediatric Emergency Medicine
PEPs should have an understanding of ethics and law, as well as the legal aspects of bioethical issues in Paediatric Emergency Medicine. They must be able to make a reasoned analysis of ethical conflicts and develop the skills to resolve ethical dilemmas in an appropriate manner. They must also look to the law for guidance, although the law does not always provide the answer to many ethical problems.

Ethics in both Paediatrics and Emergency Medicine help to prepare PEPs to face new ethical dilemmas in their practice.[7] The use of ethical analysis provides the framework for determining moral duty, obligation and conduct. PEPs must learn to identify, refine, and apply general moral principals to their practice related to:

- *Patient autonomy* (informed consent and refusal, patient decision making capacity, treatment of minors, advance directives, the obligations of the Good Samaritan statutes).
- *End of life decisions* (limiting resuscitation, futility).
- *The physician-patient and family relationship* (confidentiality, truth telling and communication, compassion and empathy).
- *Issues related to justice* (duty, ethical issues of resuscitation, health care rationing, moral issues in disaster medicine, research, resuscitation issues).

3.1.5. Organisational Planning and Service Management Skills
This competence is needed to enhance the safety and quality of patient care and work environment. PEPs must continuously adapt and prioritise existing and available resources to meet the needs of all patients and maintain the quality of care.

3.1.5.1. Case management
PEPs must be able to provide and balance the different care processes between the individual patient and the total case-mix. After primary and secondary assessment, they may refer a child to another point of contact within the health care or social network. They must provide clear guidance to those children discharged without formal follow up.

3.1.5.2. Quality standards, audit and clinical outcomes

It is important that PEPs use evidence-based medicine and recognise the value of quality standards to improve patient care which is effective and safe. They must be able to undertake audit and use clinical outcomes, including critical incident reporting, as ways of continuously improving clinical practice.

3.1.5.3. Time management

PEPs must be able to manage the individual child as well as the overall patient flow in a timely manner which is dependent upon available resources, accepted medical standards and public expectation. PEPs must also learn to manage their own time in an effective way.

3.1.5.4. Information management

PEPs often manage patients for whom limited information is available. They may need to communicate with other agencies to obtain relevant information whilst respecting the confidentiality of the patient. Patient data collected during the process of care must be accessible to all involved health care professionals through adequate documentation.

PEPs need a broad knowledge of the latest advances in medicine and must be able to access and manage information relevant to the specific care of an individual patient.

3.1.5.5. Documentation

PEPs are responsible for clear, legible, accurate, contemporaneous and complete records of patient care where the author, date and time are clearly identified. Documentation is a continuous process and all entries must be made in real time as far as possible.

3.1.6. Education and Research

3.1.6.1. Self education and improvement

PEPs must develop their knowledge and practice in both Paediatrics and Emergency Medicine by continuous education. They have to identify areas for personal improvement and learn to implement patient care based on scientific evidence. They should have knowledge of the clinical features, diagnostic criteria, epidemiology, natural history, patho-physiology and complications and consequences of acute illness and injury in children.

They must be able to recognise when physical and psychological (or psychiatric) problems are present and when more than one o f those conditions are present. The PEPs must be able to assess the child's mental state, taking into account their age and state of development, and when to seek help with more expert advice.

3.1.6.2. Teaching skills

PEPs must be involved in teaching undergraduate, graduate and post graduate health care students, and the general population. They must also continuously develop the skills to be effective teachers.

3.1.6.3. Critical appraisal of scientific literature

PEPs must be able to investigate and evaluate their own practice. They must learn to use evidence-based medicine and guidelines, where applicable, and become familiar with the principles of clinical epidemiology, biostatistics, quality assessment and risk management.

3.1.6.4. Clinical and basic research

PEPs must understand the scientific basis of Paediatrics and Emergency Medicine, the use of scientific methods in clinical research and the fundamental aspects of basic research conditions, know the scientific basis of the management of injuries and their consequences in clinical practice and treatment. They must know the aetiology and pathophysiology of common and serious childhood They must be able to critically review research studies and be able to understand, present and implement them into clinical practice. They should understand the process of developing a hypothesis from a clinical problem and of testing that hypothesis. They should also understand the specific aspects of obtaining consent as well as the ethical considerations of research in emergency situations. They must be able to apply effectively to their practice, the knowledge and understanding that they have acquired during training, and maintain the ethos of linking clinical and basic research to their practice throughout their working lives.

3.2. System-based Core Knowledge

3.2.1. Care of Adults in the Paediatric Emergency Department

It is acknowledged that full competency in the care of adults may be outside the training of some PEM physicians, particularly those from a paediatric background. Despite this, a minimum of basic emergency care should be offered to all adults within the PED.

This should include initial stabilisation of the adult patient and management of life-threatening and time-critical emergencies. Further appropriate interventions and investigations should be undertaken according to the competence of the managing PEP.

The PEP should arrange transfer and ongoing care of the adult patient at the most appropriate adult care centre and facilitate this transfer to a high standard.

3.2.2. Cardiovascular Emergencies in Children and Adolescents

- *Arrhythmias*
  - *SVT, Ventricular Tachycardia, Re entry Tacycardias, Torsade de Pointes*
- *Congenital heart disorders*
  - ⇒ Hypoplastic left ventricule, aortic stenosis, coarctation of the aorta
  - ⇒ Atrial septal defect, ventricular septal defect, atrioventricular canal, patent ductus arteriosus
  - ⇒ Tetralogy of Fallot, double-outlet right ventricle, pulmonary stenosis, transposition of the great arteries
  - ⇒ Tricuspid atresia, Ebstein anomaly
  - ⇒ Pulmonary abnormal venous return
- *Contractility disorders, pump failure*
  - ⇒ Cardiomyopathies, congestive heart failure, acute pulmonary oedema, tamponade
- *Inflammatory and infectious cardiac disorders*
  - ⇒ Endocarditis, myocarditis, pericarditis, Kawasaki disease
- *Ischaemic heart disease*
  - ⇒ Abnormal left coronary artery, acute coronary syndromes
- *Traumatic injuries*
- *Vascular and thrombotic disorders*
  - ⇒ Thrombophlebitis, pulmonary embolism
  - ⇒ Hypertensive emergencies
  - ⇒ Pulmonary hypertension

3.2.3. Dermatological Emergencies in Children and Adolescents

- *Inflammatory and Infectious disorders*
- *Skin manifestations of*
  - ⇒ Congenital disorders (Lyell syndrome)
  - ⇒ Toxic disorders (Stephen Johnson)
  - ⇒ Systemic disorders

3.2.4. Endocrine and Metabolic Emergencies in Children and Adolescents

- *Acute presentation of inborn errors of metabolism*
- *Adrenal insufficiency and crisis*
- *Disorders of glucose metabolism*
  - ⇒ Hyperosmolar hyperglycaemic state, ketoacidosis, hypoglycaemia
- *Thyroid disease emergencies*
  - ⇒ Hyperthyroidism, hypothyroidism, myxoedema coma

3.2.5. Fluid and Electrolyte Disturbances in Children and Adolescents

- *Acid-Base Disorders*
- *Electrolyte Disorders*
  - ⇒ Hypernatraemia, hyponatraemia, hyperkalaemia, hypokalaemia, hypercalcaemia, hypocalcaemia
- *Volume status and fluid balance*
  - ⇒ Dehydration, oedema

3.2.6. Ear, Nose, Throat, Oral and Neck Emergencies in Children and Adolescents

- *Bleeding*
- *Airway obstruction*
- *Foreign bodies*
- *Inflammatory and Infectious disorders*
  - ⇒ Angio-oedema, epiglottitis, laryngitis, paratonsillar abscess
- *Traumatic problems*

3.2.7. Gastrointestinal Emergencies in Children and Adolescents

- *Congenital disorders*
  - ⇒ Oesophageal atresia, intestinal atresia, intestinal duplication, anal atresia
  - ⇒ Pyloric stenosis, Meckel's diverticulum, Hirschsprung's disease
- *Inflammatory and Infectious diseases*
  - ⇒ Appendicitis, cholecystitis, cholangitis, diverticulitis, exacerbations and complications of inflammatory bowel diseases, gastritis, gastroenteritis, gastro-oesophageal reflux disease , hepatitis, pancreatitis, peptic ulcer, peritonitis
- *Metabolic disorders*
  - ⇒ Galactosaemia, Fructosaemia, Tyrosinaemia
  - ⇒ Hepatic failure
- *Traumatic and mechanical problems*
  - ⇒ Foreign bodies, hernia strangulation, intestinal occlusion (volvulus, etc.)
- *Tumours*
- *Vascular diseases: Ischaemia and bleeding*
  - ⇒ Necrotising enterocolitis, mesenteric ischaemia, upper and lower gastrointestinal bleeding, ischaemic colitis
- *Other problems*
  - ⇒ Complications of gastrointestinal devices and surgical procedures

3.2.8. Gynaecological and Obstetric Emergencies in Children and Adolescents

- *Inflammatory and Infectious disorders*
  - ⇒ Vulvovaginitis, pelvic inflammatory disease, mastitis
- *Obstetric emergencies*
  - ⇒ Abruptio placentae, eclampsia, ectopic pregnancy, emergency delivery, HELLP syndrome during pregnancy, hyperemesis gravidarum, placenta praevia, post-partum haemorrhage
- *Traumatic and related problems*
  - ⇒ Ovarian torsion
- *Tumours*
- *Vascular disorders: Ischaemia and Bleeding*
  - ⇒ Vaginal bleeding

3.2.9. Haematology and Oncology Emergencies in Children and Adolescents

- *Anaemias*
- *Complications of leukaemias and lymphomas*
  - ⇒ Lysis syndrome
  - ⇒ Neutropenia, Thrombocytopenia
- *Congenital disorders*
  - ⇒ Sickle cell disease, hereditary haemolytic anaemias, haemophilias, and Von Willebrand's disease
- *Inflammatory and Infectious disorders*
  - ⇒ Neutropenic fever, infections in immuno-compromised patients
- *Vascular disorders: Ischaemia and bleeding*
  - ⇒ Acquired bleeding disorders (coagulation factors deficiency, disseminated intravascular coagulation), drug-induced bleeding (anticoagulants, antiplatelet agents, fibrinolytics), idiopathic thrombocytopenic purpura, thrombotic thrombocytopenic purpura, Henoch Schönlein's purpura
- *Transfusion reactions*

3.2.10. Immunological Emergencies in Children and Adolescents

- *Allergies and anaphylactic reactions*
- *Inflammatory and Infectious disorders*
  - ⇒ Acute complications of vasculitis

3.2.11. Infectious Diseases and Sepsis in Children and Adolescents

- *Common viral and bacterial infections*
- *Food and water-born infectious diseases*
- *HIV infection and AIDS*
- *Common tropical diseases*
- *Parasitosis*
- *Rabies*
- *Sepsis and septic shock*
- *Sexually transmitted infections*
- *Staphylococcal and Streptococcal toxic shock syndrome*
- *Tetanus*

3.2.12. Musculo-Skeletal Emergencies in Children and Adolescents

- *Congenital disorders*
  - ⇒ Developmental dysplasia of the hip, osteogenesis imperfecta
- *Inflammatory and Infectious disorders*
  - ⇒ Juvenile idiopathic arthritis and its complications, bursitis, cellulitis, necrotising fasciitis, osteomyelitis, septic arthritis, polymyalgia rheumatica, soft tissue infections
- *Metabolic disorders*
  - ⇒ Complications of other systemic diseases
- *Traumatic and degenerative disorders*
  - ⇒ Back disorders, common fractures and dislocations, compartment syndromes, crush syndrome, osteoarthrosis, rhabdomyolysis, soft tissue trauma
- *Tumours:*
  - ⇒ Pathological fractures
  - ⇒ Bone tumours

3.2.13. Neurological Emergencies in Children and Adolescents

- *Inflammatory and Infectious disorders*
  - ⇒ Brain abscess, encephalitis, febrile seizures in children, Guillain-Barré syndrome, meningitis, facial palsy (Bell's palsy), temporal arteritis
- *Traumatic and related problems*
  - ⇒ Complications of CNS devices, spinal cord syndromes, peripheral nerve trauma and entrapment, traumatic brain injury
- *Tumours*
  - ⇒ Common presentations and acute complications of neurological and metastatic tumours
- *Vascular disorders: Ischaemia and Bleeding*
  - ⇒ Stroke, subarachnoid haemorrhage, subdural and extradural haematomata, transient ischaemic attack, venous sinus thrombosis
- *Other problems*
  - ⇒ Acute complications of chronic neurological conditions (e.g. mental retardation), acute peripheral neuropathies, seizures and status epilepticus

3.2.14. Ophthalmic Emergencies in Children and Adolescents

- *Inflammatory and Infectious disorders*
  - ⇒ Conjunctivitis, dacrocystitis, endophthalmitis, iritis, keratitis, orbital and periorbital cellulitis, uveitis
- *Traumatic and related problems*
  - ⇒ Foreign body in the eye, ocular injuries,
- *Vascular disorders: Ischaemia and Bleeding*
  - ⇒ Retinal artery and vein occlusion, vitreous haemorrhage
- *Others*
  - ⇒ Acute glaucoma, retinal detachment

3.2.15. Pulmonary Emergencies in Children and Adolescents

- *Congenital*
  - ⇒ Adenomatoid lung, pulmonary sequestration
  - ⇒ Congenital diaphragmatic hernia
  - ⇒ Laryngeal, tracheal stenosis
  - ⇒ Cystic fibrosis
- *Inflammatory and Infectious disorders*
  - ⇒ Asthma, bronchitis, bronchiolitis, BPD exacerbation, empyema, lung abscess, pleurisy and pleural effusion, pneumonia, pulmonary fibrosis, tuberculosis
- *Traumatic and related problems*
  - ⇒ Foreign body inhalation, haemothorax, tension pneumothorax, pneumomediastinum
- *Tumours*
  - ⇒ Common complications and acute complications of pulmonary and metastatic tumours,
- *Vascular disorders*
  - ⇒ Pulmonary embolism
- *Other disorders*
  - ⇒ Acute lung injury, ARDS, atelectasis, spontaneous pneumothorax

3.2.16. Psychiatric and Behaviour Disorders in Children and Adolescents

- *Behaviour disorders*
  - ⇒ Autism and communication disorders, affective disorders, confusion and consciousness disturbances, intelligence disturbances, memory disorders, perception disorders, psychomotor disturbances.

- *Common psychiatric emergencies*
    - ⇒ Acute psychosis, anorexia and bulimia complications, anxiety and panic attacks, conversion disorders, deliberate self-harm and suicide attempt, depressive illness, personality disorders, substance, drug and alcohol abuse

The PEPs should understand the impact of illness on mental functioning, for both children and their carers, and the effect of each on the behaviours and functioning of the other. The presentation of how children present with mental health problems at different ages must be understood, as well as the need for specialist input in the case of serious emotional distress or mental illness. The system used in the PEPs country regarding the management of mental health illness and psychological problems should be known by the PEPs so as to explain to relevant parties, the framework of care that can be delivered. The PEPs should also be able to sensitively assess the patterns of relationships and functioning within a family and how these might impact on a child's illness, the PEPs seeking professional advice when appropriate.

3.2.17. Renal and Urological Emergencies in Children and Adolescents

- *Congenital*
    - ⇒ Urinary tract malformations
- *Inflammatory and Infectious disorders*
    - ⇒ Glomerulonephritis, haemolytic uraemic syndrome, urinary tract infections, pyelonephritis, epididymo-orchitis, sexually transmitted infections
- *Metabolic disorders*
    - ⇒ Acute renal failure, nephrotic syndrome, nephrolithiasis
- *Traumatic and related problems*
    - ⇒ Urinary retention, testicular torsion
- *Tumours*
- *Vascular disorders: Ischaemia and Bleeding*
- *Other disorders*
    - ⇒ Comorbidities in dialysis and renal transplanted patients, complications of urological procedures and devices

3.2.18. Trauma in Children and Adolescents

- *Origin of trauma:*
    - ⇒ Burns, blunt trauma, penetrating trauma
- *Anatomical location of trauma:*
    - ⇒ Head and neck, maxillo-facial, thorax, abdomen, pelvis, spine, extremities
- *Polytrauma patient*
- *Frequent trauma in children:*
    - ⇒ Wounds and bruises
    - ⇒ Nail finger crushes

3.3. Common Presenting Symptoms

This section of the Curriculum lists the more common presenting symptoms of children and adolescents, in the emergency setting. The differential diagnoses are listed according to the systems involved and then in alphabetical order. The diagnoses requiring immediate attention, in terms of potential severity and need of priority, are highlighted in **bold**. These lists of possible diagnoses cannot be exhaustive.

3.3.1. Acute Abdominal Pain

- *Gastrointestinal causes*
  - ⇒ **Acute gastro-enteritis, appendicitis,** cholecystitis, **cholangitis,** constipation, hepatitis, Hirschsprung's disease, inflammatory bowel disease, **intestinal volvulus**, **acute pancreatitis, peritonitis,** peptic ulcer, **viscus perforation**
- *Cardiac/vascular causes*
  - ⇒ **acute pericarditis, acute myocarditis**
- *Dermatological causes*
  - ⇒ herpes zoster
- *Endocrine and metabolic causes*
  - ⇒ **Diabetic ketoacidosis,** other metabolic diseases, porphyria
- *Gynaecological and Obstetric causes*
  - ⇒ **Ovarian torsion**, pelvic inflammatory disease, **ectopic pregnancy**
- *Haematological causes*
  - ⇒ Familial mediterranean fever, **sickle cell crisis**
- *Musculo-skeletal causes*
  - ⇒ Back pain, and referred pain from thoraco-lumbar spine
- *Renal and Genitourinary causes*
  - ⇒ **Pyelonephritis**, renal stones
- *Respiratory causes*
  - ⇒ **Pneumonia**, **pleurisy**
- *Toxicology*
  - ⇒ Poisoning
- *Trauma*
  - ⇒ **Abdominal**

3.3.2. Altered Behaviour and Agitation

- *Psychiatric causes*
  - ⇒ Acute psychosis, depression
- *Cardiac/Vascular causes*
  - ⇒ **Hypertension,** vasculitis
- *Endocrine and metabolic causes*
  - ⇒ **Hypoglycaemia,** hyperglycaemia, electrolyte imbalance, hyperthermia, **hypoxaemia**
- *Neurological causes*
  - ⇒ **Cerebral space-occupying lesions**, dementia, hydrocephalus, **intracranial hypertension, CNS infections**
- *Toxicology*
  - ⇒ Alcohol and drug abuse, poisoning

3.3.3. Level of Consciousness

- *Neurological causes*

⇒ **Cerebral tumour**, epilepsy and **status epilepticus,** encephalitis, **meningitis, stroke,** subarachnoid haemorrhage, **subdural and extradural haematomas, traumatic brain injury**

- *Cardiovascular causes*
  - ⇒ **Hypoperfusion states**, **cardiogenic shock**
- *Endocrine and metabolic causes*
  - ⇒ **Electrolyte imbalances**, **hepatic coma,** hypercapnia, hypothermia, **hypoxia, hypoglycaemia**/ hyperglycaemia, uraemia
- *Gynecological and Obstetric causes*
  - ⇒ Eclampsia
- *Infectious causes*
  - ⇒ **Septic shock**
- *Psychiatric causes*
  - ⇒ Conversion syndrome
- *Respiratory causes*
  - ⇒ **Respiratory failure**
- *Toxicology*
  - ⇒ alcohol intoxication, **carbon-monoxide poisoning, narcotic and sedative poisoning,** other substances

3.3.4. Back Pain

- *Musculo-Skeletal causes*
  - ⇒ **Fractures,** intervertebral disc strain, strain of muscles, ligaments and tendons, arthritis
- *Cardiovascular causes*
  - ⇒ Aortic stenosis
- *Infectious causes*
  - ⇒ **Osteomyelitis, discitis**
- *Endocrine and metabolic causes*
  - ⇒ **Diabetic ketoacidosis, congenital suprarenal insufficiency**
- *Gastrointestinal causes*
  - ⇒ Cholecystitis, **pancreatitis**
- *Dermatological causes*
  - ⇒ Herpes zoster
- *Gynecological causes*
  - ⇒ Endometriosis, pelvic inflammatory disease
- *Haematological and Oncological causes*
  - ⇒ Abdominal or vertebral tumours
- *Neurological cause:*
  - ⇒ Subarachnoid haemorrhage
- *Renal and Genitourinary causes*
  - ⇒ Renal abscess, renal calculi
- *Trauma*

3.3.5. Bleeding (Non Traumatic)

- *Ear, Nose, Throat causes*
  - ⇒ Ear bleeding (otitis, trauma, tumours), epistaxis
- *Gastro-intestinal causes*
  - ⇒ **Haematemesis and melaena** (Mallory Weiss syndrome, oesophagitis, oesophageal varices, acute gastritis, gastro-duodenal ulcer) rectal bleeding (acute diverticulitis, haemorrhoids, inflammatory bowel disease, tumours)

- *Gynecological and Obstetric causes*
  - ⇒ **Menorrhagia/metrorrhagia** (abortion, abruptio placentae, tumours)
- *Renal and Genitourinary causes*
  - ⇒ Haematuria (urinary tract infection, pyelitis, tumours, urolithiasis)
- *Respiratory causes*
  - ⇒ **Haemoptysis** (bronchiectasia, hemosiderosis, pneumonia, tumours, tuberculosis)

3.3.6. Cardiac Arrest

- *Cardiac arrest treatable with defibrillation*
  - ⇒ **Ventricular fibrillation, pulseless ventricular tachycardia**
- *Pulseless electric activity*
  - ⇒ Acidosis, **hypoxia,** hypothermia, **hypo/hyperkalaemia**, hypocalcaemia, hypo/hyperglycaemia, **hypovolaemia, tension pneumothorax, cardiac tamponade, acute myocarditis**, **pulmonary embolism,** poisoning
- *Asystole*
  - ⇒ **Hypoxia** (eg., apnoea, drowning, foreign body), **hypovolaemia,** sudden infant death syndrome

3.3.7. Chest pain

- *Cardiac/vascular causes*
  - ⇒ **Acute coronary syndrome,** aortic stenosis, **arrhythmias, Kawasaki disease, acute pericarditis, pulmonary embolism**
- *Respiratory causes*
  - ⇒ **Acute chest syndrome, pneumonia,** pneumomediastinum, pneumothorax (especially **tension pneumothorax**), **pleurisy**
- *Gastrointestinal causes*
  - ⇒ Gastro-oesophageal reflux, oesophagitis
- *Musculo-Skeletal causes*
  - ⇒ Costosternal injury, costochondritis, intercostal muscle pain, pain referred from thoracic spine
- *Psychiatric causes*
  - ⇒ Anxiety, panic attack
- *Dermatological causes*
  - ⇒ Herpes zoster

3.3.8. Crying Baby

- *I - Infections*
  - ⇒ Herpes stomatitis, **meningitis, osteomyelitis,** urinary tract infection
- *T –*
  - ⇒ **Testicular torsion**, trauma, teeth problems,
- *C - Cardiac*
  - ⇒ **Arrhythmias, congestive heart failure**
- *R -*
  - ⇒ Reaction to milk, reaction to medications, reflux
- *I -*
  - ⇒ Immunisation and allergic reactions, insect bites
- *E - Eye*
  - ⇒ Corneal abrasions, glaucoma, ocular foreign bodies
- *S – Some gastrointestinal causes*
  - ⇒ **Hernia, intussusception, volvulus**

3.3.9. Diarrhoea

- *Infectious causes*
  - ⇒ AIDS, bacterial enteritis, **viral gastro-enteritis,** parasites (e.g., **malaria**), food-borne, toxins
- *Toxicological causes*
  - ⇒ Drugs related, poisoning (including heavy metals, mushrooms, organophosphates, rat poison, seafood)
- *Endocrine and metabolic causes*
  - ⇒ Carcinoids, diabetic neuropathy
- *Gastrointestinal causes*
  - ⇒ Diverticulitis, dumping syndrome, **inflammatory bowel disease,** enteritis due to radiation or chemotherapy
- *Haematological and Oncological causes*
  - ⇒ Toxicity due to cytostatic therapies
- *Immunology*
  - ⇒ Food allergy (e.g., gluten intolerance, milk cow's disease)
- *Psychiatric disorders*
  - ⇒ Diarrhoea "factitia"

3.3.10. Dyspnoea

- *Respiratory Causes*
  - ⇒ **Airway obstruction** (e.g., stridor, viral laryngitis, foreign body), atelectasis, **asthma, bronchiolitis,** parenchymal diseases **pleural effusion, pneumothorax**
- *Cardiac/vascular causes*
  - ⇒ **Cardiac failure, cardiac tamponade, pulmonary embolism**
- *Ear, Nose, Throat causes*
  - ⇒ **Obstructive rhinopharyngitis**, obstructivetonsils, peri-tonsillar abcess
- *Fluid & Electrolyte disorders*
  - ⇒ **Hypovolaemic shock, acute anaemia**
- *Gastrontestinal causes*
  - ⇒ Gastro-oesophageal reflux
- *Immunological causes*
  - ⇒ Vasculitis
- *Metabolic causes*
  - ⇒ Metabolic acidosis, metabolic diseases, poisoning (e.g., acetylsalicylic acid)
- *Neurological causes*
  - ⇒ Guillain Barré syndrome, spinal amyotrophy, myopathy (e.g., Duchesne and other forms)
- *Psychiatric disorders*
  - ⇒ Conversion syndrome
- *Toxicology*
  - ⇒ CO intoxication, cyanide intoxication (fire smoke exposure)
- *Trauma*
  - ⇒ Flail chest, lung contusion, traumatic pneumothorax**,** haemothorax

3.3.11. Fever and Endogenous Increase in Body Temperature

- *Systemic infectious causes*
  - ⇒ **Sepsis and septic shock,** parasitosis (e.g., malaria), viral diseases (e.g. flu)
- *Organ-specific infectious causes*

⇒ Abscesses, cholecystitis, cholangitis, **encephalitis, meningitis**, endocarditis, **myocarditis,** otitis, pharyngitis, tonsillitis,

- *Non-infectious causes*
  - ⇒ Hyperthyroidism**,** inflammatory bowel disease, pancreatitis, pelvic inflammatory disease, toxic shock, Lyell syndrome, Stevens-Johnson syndrome,
- *Haematological and Oncological causes*
  - ⇒ **Leukaemia and lymphomas, solid tumours**
- *Immunological causes*
  - ⇒ Arthritis, lupus, sarcoidosis, periodic fever, vasculitis
- *Musculo-Skeletal causes*
  - ⇒ **Osteomyelitis,** fasciitis and cellulitis
- *Neurological causes*
  - ⇒ **Cerebral haemorrhage**
- *Psychiatric causes*
  - ⇒ Factitious fever
- *Renal and Genitourinary causes*
  - ⇒ Urinary tract infection, **pyelonephritis**
- *Toxicology*

3.3.12. Headache

- *Vascular causes*
  - ⇒ migraine, cluster headache, tension headache, cerebral haemorrhage, hypertensive encephalopathy, **ischaemic stroke**
- *Haematological and Oncological causes*
  - ⇒ **Brain tumours**
- *Immunological causes*
  - ⇒ Temporal arteritis, vasculitis
- *Infectious causes*
  - ⇒ Abscesses, dental infections, **encephalitis,** mastoiditis, **meningitis,** sinusitis
- *Musculo-Skeletal causes*
  - ⇒ Cervical spine diseases, temporomandibular joint syndrome
- *Neurological causes*
  - ⇒ Trigeminal neuralgia
- *Ophthalmological causes*
  - ⇒ Accommodation disorders, acute glaucoma,
- *Toxicology*
  - ⇒ Alcohol, analgesic abuse, calcium channel blockers, opioids and caffeine withdrawal
- *Trauma:*
  - ⇒ Head trauma

3.3.13. Jaundice

- *Gastrointestinal causes*
  - ⇒ Hepatitis, **hepatic failure,** obstructive, pancreatic tumour, acute pancreatitis
- *Cardiac/Vascular causes*
  - ⇒ **Cardiac failure**
- *Haematological and Oncological causes*
  - ⇒ **Haemolytic anaemias, sickle cell disease,** thrombotic thrombocytopenic purpura, haemolytic uraemic syndrome, disseminated intravascular coagulation
- *Infectious causes*
  - ⇒ **Malaria,** leptospirosis

- *Gynecological causes*
- *Toxicology*
    - ⇒ Drug-induced haemolytic anaemias, poisoning, snake venom,

3.3.14. Pain in Arms

- *Cardiac/Vascular causes*
    - ⇒ Coarctation of the aorta, venous thromboembolism, ischaemic heart disease
- *Musculo-skeletal causes*
    - ⇒ Periarthritis, cervical spine anomalies
- *Trauma*

3.3.15. Pain in Legs

- *Cardiac/Vascular causes*
    - ⇒ Acute ischaemia, arteritis, deep venous thrombosis**, s**uperficial thrombophlebitis
- *Immunological causes*
    - ⇒ Polymyositis
- *Infectious causes*
    - ⇒ **Arthritis,** cellulitis, necrotising fasciitis, **osteomyelitis**
- *Musculo-Skeletal causes*
    - ⇒ Sciatalgia
- *Neurological causes*
    - ⇒ Sciatica
- *Nervous system causes*
    - ⇒ Peripheral nerve compression
- *Trauma*

3.3.16. Palpitations

- *Cardiac/Vascular causes*
    - ⇒ **brady-arrythmias** (including sinus and AV blocks**),** extrasystoles, tachy-arrythmias (including atrial fibrillation, **supraventricular tachycardia, ventricular tachycardia**)
- *Endocrine and metabolic causes*
    - ⇒ Thyrotoxicosis
- *Toxicology*
    - ⇒ Drugs

3.3.17. Seizures

- *Neurological causes*
    - ⇒ Febrile seizures, generalised epilepsy, complex or focal epilepsy, **status epilepticus**
- *Cardiac/Vascular causes*
    - ⇒ Dysrhythmias, **hypertensive encephalopathy,** migraines, **syncope**
- *Endocrine and metabolic causes*
    - ⇒ **Metabolic seizures**
- *Gynaecological causes*
    - ⇒ Eclampsia
- *Infectious causes*
    - ⇒ **Encephalitis, meningitis**
- *Psychiatric causes*
    - ⇒ Narcolepsy, pseudo-seizures
- *Respiratory causes*

⇒ **Respiratory arrest**
- *Toxicology*
  ⇒ **Drugs/toxins**

3.3.18. Shock
- *Cardiac/Vascular causes*
  ⇒ **Acute myocardiatis**, **arrhythmias, coarctation of the aorta**, **hypertensive crisis**
- *Endocrine and metabolic causes*
  ⇒ Addison's crisis
- *Fluid and Electrolyte disorders*
  ⇒ **Hypovolaemic shock**
- *Gastrontestinal causes*
  ⇒ Diarrhoea, vomiting
- *Gynaecological/Skin causes*
  ⇒ **Toxic shock**
- *Immunological causes*
  ⇒ **Anaphylactic shock**
- *Infectious causes*
  ⇒ **Septic shock**
- *Neurological causes*
  ⇒ Neurogenic shock
- *Trauma*
  ⇒ **Haemorrhagic shock**

3.3.19. Skin Manifestations
- *Dermatological causes*
  ⇒ Eczema, psoriasis, skin tumours
- *Haematological and Oncological causes*
  ⇒ Henoch-Schönlein's purpura, idiopathic thrombocytopenic purpura
- *Immunological causes*
  ⇒ Vasculitides, urticaria, **Stevens-Johnson syndrome, Lyell syndrome**
- *Infectious causes*
  ⇒ Viral exanthematas, **meningococcaemia**, herpes zoster/simplex, cutaneous abscess, scabies
- *Psychiatric causes*
  ⇒ Self-inflicted skin lesions or from abuse
- *Toxicology*

3.3.20. Syncope
- *Cardiac/vascular causes*
  ⇒ **Arrhythmias** (including brady-tachy syndrome, Brugada syndrome, drug overdose, long QT syndrome, sick sinus syndrome, torsades de pointes, ventricular tachycardia),
  ⇒ **Hypoperfusion** (including ischaemia, valvular, haemorrhage, obstruction: e.g. aortic stenosis, pulmonary embolism, tamponade)
  ⇒ Orthostatic hypotension
  ⇒ *Endocrine and metabolic causes*
  ⇒ Addison's disease
  ⇒ *Fluid and Electrolyte disorders*
  ⇒ **Hypovolaemia**
- *Gastrointestinal causes*
  ⇒ Diarrhoea, gastro-oesophagal reflux, vomiting,

- *Neurological causes*
  - ⇒ Autonomic nervous system disorder, epilepsy, vasovagal reflex,
- *Toxicology*
  - ⇒ Alcoholic or drug consumption

3.3.21. Urinary Symptoms (Dysuria, Oligo-Anuria, Polyuria)

- *Renal and Genitourinary causes*
  - ⇒ **Acute renal failure, acute urinary retention,** cystitis and **pyelonephritis**
- *Cardiac/Vascular causes*
  - ⇒ **Cardiac failure**
- *Endocrine and metabolic causes*
  - ⇒ Diabetes mellitus, diabetes insipidus
- *Fluid and Electrolyte disorders*
  - ⇒ **Hypovolaemia**

3.3.22. Vertigo and Dizziness

- *Ear and Labyrinth causes*
  - ⇒ Benign postural vertigo, Meniere's disease, otitis, vestibular neuritis, viral labyrinthitis
- *Cardiac/Vascular causes*
  - ⇒ Arrhythmias, hypotension
- *Endocrine and metabolic causes*
  - ⇒ **Hypoglycaemia**
- *Haematological and Oncological causes*
  - ⇒ **Anaemias**
- *Nervous system causes*
  - ⇒ Acoustic neuroma, bulbar or cerebellar lesions, multiple sclerosis, temporal epilepsy
- *Psychiatric causes*
  - ⇒ Anxiety
- *Respiratory causes*
  - ⇒ **Hypoxia**
- *Toxicology*
  - ⇒ Alcohol abuse, drugs and substances

3.3.23. Vomiting

- *Gastrointestinal causes*
  - ⇒ **Acute gastro-enteritis, appendicitis,** cholecystitis, gastric obstruction and retention, gastroparesis, hepatitis, pancreatitis, pyloric stenosis, **small bowel obstruction**
- *Cardiac/Vascular causes*
  - ⇒ **Myocardial ischaemia**

Ear, Nose, Throat causes

- ⇒ Vestibular disorders

Endocrine and metabolic causes

- ⇒ **Diabetic ketoacidosis**, hypercalcaemia

Fluid and Electrolyte disorders

- ⇒ **Hypovolaemia**

- *Gynaecological and Obstetric causes*
  - ⇒ Pregnancy

Infectious causes

- ⇒ **Sepsis, meningitis**

Neurological causes

- ⇒ **Cerebral oedema or haemorrhage, hydrocephalus, intracranial space-occupying lesions**
- *Ophthalmological causes*
  - ⇒ Acute glaucoma
- *Psychiatric causes*
  - ⇒ Eating disorders
- *Renal and Genitourinary causes*
  - ⇒ Renal calculi, uraemia
- *Toxicology*

3.4. Specific Aspects of Emergency Medicine

3.4.1. Abuse and Assault in Children and Adults

- Child abuse and neglect
- Intimate partner violence and abuse
- Sexual assault
- Patient safety in emergency medicine
- Violence management and prevention in the emergency department

3.4.2. Analgesia,Sedation and Drug Prescribing in Children

- Understanding the pharmacological characteristics of commonly prescribed drugs
- Pain transmission (anatomy, physiology, pharmacology)
- Pain assessment
- Pharmacology of sedative and pain relieving drugs
- Psychological and social aspects of pain in paediatric and adolescent patients

For all medications, the PEPs should be able to prescribe safely and effectively, knowing the pharmacokinetics and pharmacodynamics of commonly prescribed drugs. The late effects of therapies and their consequences and toxic effects should be known. The PEPs must be able to respond appropriately to errors of prescription, and be able to investigate any adverse effect or drug error. The PEPs should be aware of local and national guidelines for pain relief in children and be able to safely calculate and prescribe resuscitation drugs and fluids to complex surgical and medical patients in the ED setting.

3.4.3. Disaster Medicine

- Disaster preparedness, disaster response
- Major incident planning/procedures/practice
- Mass gatherings
- Specific topics (triage, bioterrorism, blast and crush injuries, chemical agents, radiation injuries)
- Debriefing and mitigation

3.4.4. Environmental Accidents in Children

- Electricity (electrical and lightening injuries)
- Flora and Fauna (injuries from exposure, bites and stings)
- High-altitude (medical problems)
- NBCR (nuclear, biological, chemical and radiological, decontamination, specific aspects)
- Temperature (heat and cold related emergencies)
- Travel medicine
- Water (near-drowning, complications of diving)

3.4.5. Forensic Issues

- Basics of relevant legislation in the country of practice
- Recognise and preserve evidence
- Provide appropriate medical documentation (including forensic and clinical photography, collection of biological samples, ballistics)
- Appropriate reporting and referrals (e.g. child abuse or neglect, gunshot and other forms of

- penetrating wounds, elder abuse, sexual assault allegations)
- Medico legal documentation
- Understanding the importance of post-mortem examination and knowing the relevant guidelines relating to obtaining consent for post-mortem examination.

3.4.6. Injury Prevention and Health Promotion

- Collection and interpretation of data related to prevention and health promotion
- Epidemiology of Accidents and Emergencies
- Formulation of recommendations

3.4.7. Patient Management Issues in Emergency Medicine

- Emergency department organisation (administration, structure, staffing, resources)
- Management of specific populations:
    - ⇒ Children in special circumstances including child protection
    - ⇒ Homeless families
    - ⇒ Mentally incompetent adolescents
    - ⇒ Psychiatric patients

3.4.8. Problems in the Neonate

- Neonatal failure to thrive
- Neonatal jaundice
- Neonatal seizures
- Neonatal sepsis

3.4.9. Toxicology in Children

- General principles of toxicology and management of poisoned patients
- Principles of drug interactions
- Specific aspects of poisoning
    - ⇒ Drugs (eg, acetaminophen, amphetamine, anticholinergic, anticonvulsants, antidepressants, antihypertensives, benzodiazepines, digitalis, monoamine oxidase inhibitors, neuroleptics)
    - ⇒ Industrial chemicals
    - ⇒ Plants & mushrooms
    - ⇒ Alcohol abuse and alcohol poisoning
    - ⇒ Drugs of abuse
- Organisation and information (e.g. poison centres, data bases)

3.4.10. Pre-Hospital Care

- Emergency Medical Services organisation (administration, structure, staffing, resources)
- Medical transport (including neonates and children, air transport)
- Paramedic training and function
- Safety at the scene
- Collaboration with other emergency services (e.g. police, fire department)

3.4.11. Psycho-Social Problems

- Social wellbeing of specific populations (see 3.4.7)
- Patients with social issues
- Frequent visitors
- Social care following discharge

3.5. Core Clinical Procedures and Skills

Key in the undertaking of clinical procedures is the ability of the PEPs to safely and effectively manage the ensuing results, which may require expert advice on occasion. The PEPs will need to participate in discussions with other services, e.g. radiology, biochemist or other laboratory services and have an effective approach to the management of follow-up of patients.

The PEPs should know the indications, local and national guidelines for undertaking common investigations and procedures. They should recognise the complications of the common procedures and know the guidelines for obtaining consent for procedures. An understanding of the common age-related normal ranges and appearances is required. The PEPs should be familiar with the equipment that the PEPs is to use to undertake the investigation.

The PEPs should be able to explain the investigation results to carers and/or the child, and be receptive to feedback from the carers or child. They should be able to speak to carers when complications have occurred and explain about the effects of any treatments or therapies that are required as a consequence of the results of the investigations.

The PEPs should be able to teach and supervise others in their performance of practical procedures.

3.5.1. CPR Skills

- Cardio-pulmonary resuscitation procedures in a timely and effective manner according to the current ILCOR guidelines for children and adults
- Advanced CPR skills (e.g. therapeutic hypothermia)

3.5.2. Airway Management Skills

- Open and maintain the airway in the emergency setting (e.g., insertion of oropharyngeal or nasopharyngeal airway)
- Endotracheal intubation
- Alternative airway techniques in the emergency setting (e.g., laryngeal mask insertion, surgical airway)
- Difficult airway management algorithm
- Use of rapid sequence intubation in the emergency setting

3.5.3. Analgesia and Sedation Skills

- Assessment of the level of pain and sedation
- Monitor vital signs and potential side effects during pain management
- Provide procedural sedation and analgesia including conscious sedation (including testing of life support equipment)
- Use of appropriate local, topical and regional anaesthesia techniques

The use of play and distraction methods should be used as much as possible, to alleviate distress and discomfort to the child.

3.5.5. Breathing and Ventilation Management Skills

- Assessment of breathing and ventilation
- Oxygen therapy
- Interpretation of blood gas analysis, pulse oximetry and capnography
- Bag-mask-valve ventilation
- Thoracocentesis

- Chest tube insertion, connection to under-water drainage and assessment of functioning
- Non-invasive ventilation techniques
- Invasive ventilation techniques

3.5.6. Circulatory Support and Cardiac Skills and Procedures
- Administration of fluids including blood and substitutes
- Monitoring of ECG and the circulation
- Defibrillation and pacing (e.g., cardioversion, transcutaneous pacing)
- Emergency pericardiocentesis
- Vascular access (peripheral venous, arterial, and central venous catheterisation, intraosseous access)

3.5.7. Diagnostic Procedures and Skills
- Interpretation of ECG
- Appropriate request and interpretation of laboratory investigations (blood chemistry, blood gases, respiratory function testing and biological markers)
- Appropriate request and interpretation of imaging (e.g., X-rays, ultrasound, CT/MRI)
- Performance of focused assessment of sonography

3.5.8. ENT Skills and Procedures
- Anterior rhinoscopy
- Insertion of nasal pack
- Inspection of oropharynx and larynx
- Otoscopy
- Removal of foreign body if airway is compromised
- Insertion and replacement of tracheostomy tube

3.5.9. Gastrointestinal Procedures
- Insertion of nasogastric tube
- Gastric lavage
- Abdominal hernia reduction
- Abdominal paracentesis
- Measurement of abdominal pressure
- Balloon tamponade for oesophageal varices

3.5.10. Genitourinary Procedures
- Insertion of indwelling urethral catheter
- Suprapubic tap
- Testicular torsion reduction
- Evaluation of patency of urethral catheter

3.5.11. Hygiene Skills and Procedures
- Decontamination of patient and the environment
- Patient isolation and staff protection

3.5.12. Musculoskeletal Techniques
- Aseptic joint aspiration
- Fracture immobilisation

- Joint-dislocation reduction
- Log roll and spine immobilisation
- Splinting (plasters, braces, slings, tapes and other bandages)
- Management of compartment syndrome
- Fasciotomy, escharotomy

3.5.13. Neurological Skills and Procedures
- Evaluation of consciousness including the Glasgow Coma Scale
- Fundoscopy
- Lumbar puncture
- Interpretation of neuro-imaging

3.5.14. Obstetric and Gynaecological Skills and Procedures
- Emergency delivery
- Vaginal examination using speculum
- Assessment of the sexual assault victim

3.5.15. Ophthalmic Skills and Procedures
- Removal of foreign body from the eye
- Fundoscopy

3.5.16. Temperature Control Procedures
- Measuring and monitoring of body temperature
- Cooling techniques (evaporative cooling, ice water)
- Warming techniques
- Monitoring heat stroke patients
- Treatment and prevention of hyper- and hypothermia

3.5.17. Transportation of the Critically Ill Patient
- Telecommunication and telemedicine procedures
- Preparation of the EMS vehicle
- Specific aspects of monitoring and treatment during transportation

3.5.18. Wound Management
- Abscess incision and drainage
- Aseptic techniques
- Treatment of lacerations and soft tissue injuries
- Wound irrigation and wound closure

4. TRAINING OF PAEDIATRIC EMERGENCY MEDICINE SPECIALISTS

4.1 Purpose of training

A Paediatric Emergency Physician is a trained paediatrician or emergency physician who has specialised in the investigation and treatment of acutely ill and injured children within the framework of an approved and accredited training syllabus and unit.[8]

Obligatory prerequisites for entering the training programme in paediatric emergency medicine (PEM) are:

- Successful completion of training in Basic Paediatric training, according to national standards
- Successful completion of training in Emergency Medicine, according to national standards

Trainees will be expected to have acquired extensive skills in the following domains:

Clinical competence:
Become clinically proficient in the care of an acutely ill and/or injured child through formally scheduled rotations and an ongoing exposure in the PED with specific emphasis on general medical and surgical diseases, trauma, resuscitation, airway management, disaster management, toxicology, environmental issues, psychiatric illness, child protection, and transport issues

Personal Competence:
Develop leadership and administrative skills required for the management of a busy emergency department setting.

Practical skills:
Be able to competently perform commonly used practical procedures along with less common life-saving procedures.

Teaching:
Develop and demonstrate teaching competence in Paediatric Emergency Medicine on a one-on-one basis, in small groups and in large groups.

Research:
Acquire knowledge and skills needed to become a productive investigator by undertaking high quality research and formal instruction in statistics, epidemiology and research design.

4.2 Professional development

4.2.1 During initial period of training

Clinical component:

a) Master the fundamentals of the care of the ill and injured paediatric patient
b) Develop proficiency in critical procedures
c) Develop effective communication skills that exhibit empathy and compassion for the patient and his/her family
d) Develop proficiency in clearly and concisely communicating clinical questions to other specialty physicians
e) Develop a good working rapport with staff
f) Maintain necessary certifications (i.e., PALS, ATLS, sedation, etc.)

Teaching component:
a) Develop bedside teaching skills
b) Begin to teach at junior doctor lectures
c) Acquire the basic skills on how to develop a teaching session (PowerPoint presentations, etc.)
d) Work on bedside clinical teaching of families, students and junior doctors

Research component:
a) Develop a relationship with a mentor
b) With mentor start and complete a small research project
b) Attend Research conferences
c) Begin to develop research interest

4.2.2 During advanced period of training

Clinical component:
a) Master the care of the complicated ill and injured paediatric patient
b) Maintain procedure and communications skills
c) Develop skills in managing the flow of patients in the ED, including information technology (IT) solutions to managing patient flow
d) Develop good organisational and multi-tasking skills in managing a busy emergency department

Teaching component:
a) Master bedside teaching
b) Become involved in institutional teaching opportunities

Research component:
a) Develop a research question
b) Attend relevant Evidenced Based Medicine Course

It may be that some of the skills in the advanced section are obtained within the basic section and vice versa. The imperative is that these skills must all be achieved by the time of completion of the training.

A European PEP should acquire detailed and in depth knowledge of:

- Epidemiology of Paediatric emergencies and accidents, mortality and morbidity rates, methods of data collection at national and local level
- Principles of the Emergency Care of children
- Organisation of Emergency Medical Services in their region of practice
- Aetiology, pathogenesis, clinical recognition and differential diagnosis of diseases that acutely and/or critically affect children, from neonatal period to adolescence
- Cardiopulmonary resuscitation, major trauma management and team leader function
- Social and behavioural disorders
- Toxicology
- Pharmacology, pharmacokinetics, drug toxicity and interactions
- Pain management and anaesthesia
- Accident prevention and health promotion
- Child protection
- Legal aspects of paediatric emergencies, ethical issues and other legal problems

- Technical skills relevant to acute care
- Relationships with other services
- Communication skills including bereavement care
- Teaching skills
- Research skills
- Managerial skills

4.2.3. Duration of training

European medical specialty training is governed by the EU Directive 2001/19/EC and is set at *a minimum of 5 years of full-time training* as a primary medical specialty.According to the UEMS Charter on Training, the duration of training of medical specialists **must** be sufficient to ensure training for independent practice of the specialty after the completion of training.[9]

From a Paediatric background, the recommended duration of training in PEM is a minimum of **two years**, after having completed the 3-year training of the *'common trunk in paediatrics'*.

From an Emergency Medicine background, the recommended duration of training in PEM is a minimum of **two years**, including the previous experience in PEM or paediatrics acquired during the 5-year training in EM.

It is, however, recognised that this syllabus has only the character of a European guideline, and that the relevant national regulations might deviate substantially from it. It is suggested that national regulations which deviate substantially from this concept are revised stepwise in order to achieve a trans-European homogeneisation of standards.

Appendix 1 - Organisation of training

Training structure & management

The training programme in each country should be structured in accordance with national speciality guidelines and EU legislation as well as UEMS recommendations. The responsibility and authority for organising, coordinating, managing and assessing the individual training centre and the training process must be clearly identified in each centre by the National Training Authority (NTA) responsible for the training programme in the country.

The organisation for PEM training in each of the participating countries in Europe will be detailed in the document called 'Models of training in PEM in Europe' and will cover the modes of training, delivery of training requirements and the assessments systems to determine competencies achieved by the PEM trainee. What follows is a generic guide to training in PEM.

Training centres/units:

The training centres must be approved and recognised by the National Training Authority of each country and must have appropriate clinical/practical facilities to support the delivery of training. Training centres must have a sufficient number of patients and an appropriate case-mix to meet training objectives. The training must expose the trainee to a broad range of experience.

Several institutions located in close proximity might combine into one training centre. In such case, one qualified individual must be designated as training centre director who represents this centre and carries responsibility for the offered programme.

Tutor/teachers:

PEM training director is a tutor (see below) and head of a full training centre. The PEM training director must have overall responsibility for the general administration of the training programme, including:

1. Supervision of the quality of didactic and clinical education in the programme;
2. Participation in the selection of trainees to the programme in accordance with national and departmental policies and procedures;
3. Monitoring trainee supervision; the delegation of PEM tutors to undertake training and assessment
4. Assurance that the degree of professional responsibility accorded to a trainee is proportionate to his/her skills and experience;
5. Overall evaluation of trainees' knowledge, skills, and performance;
6. Assessment of the teaching personnel;
7. Secondment of trainees on rotation out of the department;
8. Involvement in disciplinary hearing where necessary.

The PEM training director is the supervisor of each trainee or she/he designates a PEM tutor as supervisor to the trainee at the beginning of her/his training. The PEM training director or the PEM tutor advises the trainee on important training issues and reviews the trainee's progress at yearly intervals. Each trainee's progress is monitored regularly by the PEM tutor and with the trainee her/himself. The trainee maintains a personal log book (portfolio), where she/he documents relevant training experiences. This log book and the trainee's progress through various training modules are discussed with the PEM teacher at regular intervals. The tutor will promote opportunity for the trainee to gain competencies in the necessary skills and be involved in the assessment of the trainee's progress.

Trainees

All trainees are adult learners and therefore must share responsibility with their trainers for their education. The trainees should be pro-active in identifying their own knowledge gaps and should take advantage of all the formal and informal learning opportunities offered.

Selection Procedure of Trainees

Programme faculty and training centres or other responsible bodies must select and appoint trainees who are suitable for the subspecialty in accordance with an established selection procedure and with agreed selection criteria. The selection process should include an interview with the applicant to assess personality, motivation and other issues of relevance to PEM.

Training Posts per Training Programme

Postgraduate training must be carried out in appropriately remunerated positions. To ensure training and teaching of high quality the National Training Authority must approve the maximum number of trainees per year and/or per training programme for accreditation purposes. The number of training posts must be based upon established criteria and be in proportion to:

- Clinical/practical training opportunities;
- Supervisory capacity and teaching personnel-trainee ratio;
- Available resources for trainee education such as quality and volume of patients and related clinical material available for education.

Supervision

Trainees must be supervised in such a way that they assume increasing responsibility according to their level of education, ability and experience. Schedules for teaching personnel must be structured to ensure that supervision is readily available to trainees on duty.
The trainee must learn through exposure to a broad range of clinical experience in the specialty and be able to appreciate the issues associated with the delivery of safe, high quality and cost effective health care.

Evaluation of training process

Accreditation is given by the European Board of Paediatrics and European Board of Emergency Medicine. In any specific case, this recommendation is based upon information received from the national PEM representative (a member of the committee on PEM training in Europe)

The working group on PEM training in Europe must establish a mechanism for evaluation of the training process that monitors each of the following areas:

- Training programme, facilities, general outcomes and programme structure and overall quality
- Faculty development
- Trainee performance and progress

A system of centre visits should be instituted in the future. Ideally, accreditation given by the European Board of Paediatrics and the European Board of Emergency Medicine should then be based on the report from such a centre visit.

Accreditation of Training Centres

Paediatric Emergency Departments offering training programmes must be officially certified (accredited). The National Training Authority must be responsible for selecting and approving training institutions and faculty at national level in accordance with national rules and EU legislation as well as UEMS and EAP recommendations.[10]

For each country of the EU, a list of centres, training directors, tutors and teachers is held by the national body responsible for training. This list should be updated at regular intervals. Each centre is defined by the available modules and the tutor(s) and teacher(s) available

The National Training Authority must be able to grant or, if appropriate, withdraw recognition of training centres based on well-defined criteria. Feedback about the quality of training from both trainers and trainees must be systematically sought, analysed and acted upon by means of a visiting programme or other relevant means by representatives of the NTA.

Evaluation of Training Programme

Regular evaluation of the educational effectiveness of the training programme must be assured in a systematic manner. In particular, the quality of the curriculum and the extent to which the educational goals have been met by trainees must be assessed. The programme must use the results of trainees' assessments of the programme together with other programme evaluation results to improve the programme.

Evaluation of Trainers

The Programme Director must evaluate teaching personnel performance as it relates to the educational programme. These evaluations should include a review of the faculty's clinical teaching abilities, commitment to the educational programme, clinical knowledge, professionalism, and scholarly activities.

Evaluation of Trainees

Specialist education and training must include a process of assessment that tests whether the trainee has acquired the requisite knowledge, skills, attitudes and professional qualities to practise in the specialty at an appropriate standard. Assessment must emphasise formative in-training methods and constructive feedback. Appraisal of specialists should happen at all stages, but an essential stage must be to ensure that the trainee has the appropriate competency before he or she can practise independently as a specialist. The National Training Authority must define a process of formative and summative assessment of trainees, including criteria for passing examinations. Detailed about the current models used in European participating countries will be detailed in the document the Models for the Delivery of Training in PEM.

European Diploma in Paediatric Emergency Medicine

During the next few years, the European Board of Pediatrics and the European Board of Emergency Medicine should develop an examination at European level for paediatric emergency physicians. This format will provide a useful tool for the harmonisation of standards of practice in Paediatric Emergency Medicine across Europe.

Appendix 2 Compatibility of European countries with and without recognised PEM training programmes for training

EU countries with existing programmes in PEM or with programmes in an advanced stage of development, at the time this European programme is implemented, should be considered as compatible if they:

- Have a content comparable (though not necessarily strictly identical) with the European programme
- Have a duration of a minimum of two years for those with prior training in Paediatric Medicine; a minimum one year for those with prior training in Emergency Medicine, dependent on their previous PEM or paediatric experience.
- Each national syllabus should be scrutinised by the European Board of Pediatrics, the Board of Emergency Medicine and the UEMS for compatibility.

EU countries without existing programmes in PEM. National professional medical bodies should be encouraged to adopt a national training programme in PEM and to structure it in close compatibility with the European programme.

- Until implementation of such a national training programme, motivated individuals should have the opportunity to train according to the European programme and to document their obtained qualification in a relevant board examination on a voluntary basis.
- The instruments to monitor such training and to entertain a final examination are again the European Board of Paediatrics and the European Board of Emergency Medicine in cooperation with the UEMS.

Non-EU countries. On a voluntary basis, the same arrangements as listed for EU countries should be applicable.

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