2012 International Standards of Care for Children in Emergency Departments

This document is a consensus document aimed at assisting hospitals around the world in defining minimum standards of care for children aged 0-18 years in the Emergency Department.

Each chapter contains:

- Essential and desirable recommendations
- Explanatory text
- References
- Resources

The full document is available from http://www.ifem.cc/Resources/PoliciesandGuidelines.aspx

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Chapter 1: Purpose and Scope of this document

Why do we need standards of care for children in Emergency Departments? The International Federation of Emergency Medicine aims to publish these standards in order to improve the emergency care of children around the world. There is evidence that publishing standards assists both managers and clinical staff deliver improvements (for example following similar documents in the UK\textsuperscript{1} and the USA\textsuperscript{2}). Despite this, children even in developed countries often lack good emergency care\textsuperscript{3}.

What do we mean by “Emergency Department”? This document is intended for use in countries with established hospital emergency departments (EDs). This means an area of the hospital where patients can arrive without an appointment with illness or injury, and be seen by a team in an area dedicated to emergency care. The standards here do not cover the whole of emergency care: they highlight the special needs of children, assuming that a basic emergency department is functioning. Hospitals where patients are seen in the out-patient clinic area or on admissions wards may also find this document useful.

Is this document aimed only at medical and nursing staff? No these standards are not only clinical standards for medical personnel, they are also about the design and organization of the department and its staff. Chapter 3 covers particular challenges relating to Pediatric Emergency Care (PEC). Good care cannot happen without a functioning network of pre-hospital (ambulance and primary care) healthcare, through emergency care, to in-hospital care. Chapter 4 describes issues for PEC networks.

What do we mean by “children”? This document aims to cover the needs of the newborn up to 18 years. Children aged 12-18 have many similarities to adults, but there are still important differences. These teenagers in fact are often “in a gap” – health services are more commonly designed to treat either smaller children or adults. Those children aged 16-18 are regarded mostly as adults, but can be quite vulnerable, and many children’s hospitals treat this age group.

What do we mean by “Pediatric Emergency Medicine”? For optimum care, there is a unique skill-set needed to treat acutely ill infants, children and teenagers. This specialized training doesn’t necessarily reside solely with pediatric doctors and nurses, or with emergency medicine personnel. Pediatric emergency care is a mixed skill-set. There is a strong argument that EM staff can benefit from the non-surgical skills, communication skills and holistic practice of pediatric staff. However it is equally true that pediatric staff can benefit from the organizational, critical care and trauma skills of EM staff. Therefore mixing the two staff groups and/or training staff in Pediatric Emergency Medicine (PEM), is of benefit to all involved.
**Does this mean very specialized training?** No, not necessarily. Training can be added on after core training in either EM or pediatrics (see Chapter 19). Much depends on whether a country has EM training as specific training and if so, as core training or add-on to other specialities. In countries with very established EDs and where Emergency Medicine (EM) is a full core speciality (eg USA, Canada, Australia, New Zealand, UK) PEM is a sub-speciality of EM, with its own training. In these countries PEM can also be a sub-speciality of Pediatrics. In others such as South America, South Africa, Spain, Sweden, Ireland, PEM specialists exist although PEM is not formally recognized as a sub-specialty in its own right, or indeed EM may not regarded as a core speciality - but as a super-speciality after core training in another area (eg Israel, Denmark).

However, a formal sub-speciality of PEM is not necessary. If the ED accepts a full range of acute care needs across the age spectrum, the doctors and nurses should have the skills to achieve excellent care across the range of age and disease, for example a child with a fracture who also has child protection issues, or a pale, floppy 5-day-old baby, or a teenager intoxicated with drugs or alcohol. Chapter 9 covers staff training and competences.

**Does this mean separate facilities?** Not necessarily. There is no “right” model. Facilities may be purely pediatric or mixed with adults. A Pediatric Emergency Department (PED) is often part of or co-located with an Adult Emergency Department, but with often some separation to protect children from distress. Approximately 6% of mixed EDs in the United States have a physically separate pediatric ED but there are over 180 Children’s Hospitals with an ED treating children up to 21 years of age. In the UK nearly all EDs have a separate waiting area for children, the vast majority have treatment areas reserved for children, while about 20% have a purpose built area (usually next to the main ED) but only 4% of EDs are in a separate children’s hospital.

Chapter 20 contains the full set of recommendations from this document. The Appendices contain checklists and resources that we hope are useful to EDs worldwide.

**References**

1. Standards for Children and Young People in Emergency Care Settings (third edition) 2012. Royal College of Paediatrics and Child Health. [www.rcpch.ac.uk/emergencycare](http://www.rcpch.ac.uk/emergencycare)
Chapter 2: Definitions

**Advanced life support (ALS)**
Ability to stabilise airway, breathing and circulation using basic life support (see below) and drugs, fluids, endotracheal intubation, in the context of cardiac arrest or near-arrest.

**Basic life support (BLS)**
Ventilation (mouth to mouth or basic equipment) and cardiac compressions, in the context of cardiac arrest or near-arrest.

**Clinicians**
Qualified healthcare staff – usually meaning doctors and nurses.

**Competencies**
The skills which staff have when knowledge is translated into practice.

**Critical care**
Care of a seriously ill patient requiring intensive monitoring and a high nurse: patient ratio, incorporating high dependency care and intensive care.

**Emergency Department (ED)**
Also known as accident & emergency (A&E), emergency room (ER), emergency center (EC), emergency ward (EW), or casualty department, is a medical treatment facility or department within a hospital, specializing in acute care of patients who present without prior appointment, either by their own means or by ambulance. Due to the unplanned nature of patient attendance, the department must provide initial treatment for a broad spectrum of illnesses and injuries, some of which may be life-threatening and require immediate attention.

**Emergency Medicine (EM)**
The scope of practice of doctors, nurses and allied professionals trained to work in an Emergency Department. It includes hospital care and out of hospital responses (including major disasters / mass casualty incidents).

**Emergency Medical Services (EMS)**
This phrase is commonly used throughout the world to imply ambulance (air or land) on-scene response. This responsibility is often shared by fire and rescue services if they are trained in basic medical response. See also Pre-Hospital Care (below).

**General Practitioner (GP)**
A doctor who is a generalist and cares for patients with minor or chronic conditions within the community setting, as opposed to hospital. Also known as Family Doctor.

**Mass casualty incidents (MCI)**
Mass casualty incidents are incidents resulting from man-made or natural causes resulting in illness or injuries that exceed or overwhelm the ambulance/fire and hospital capabilities of a locality, jurisdiction, or region.

**Observation ward**
An area where a patient is moved to after the urgent care delivered in the ED. This may range from soon after arrival to many hours later, and the patient may stay for hours to 1-2 days. Staffing will usually include senior ED staff. Also known as Clinical Decisions Unit.

**Paediatric**
Medical and nursing care relating to infants, children and adolescents. In this document, this refers to patients aged from birth to 18 years Pre-hospital care. Care which occurs before the ED / hospital phase – usually delivered by ambulance services, sometimes fire or first aid trained personnel.
**Pre-hospital care**
Care which occurs before the ED / hospital phase – usually delivered by ambulance services, sometimes fire or first aid trained personnel. See also EMS. It is the phase of care before the hospital before arriving at or occurring outside of the hospital.

**Primary care**
Health services by providers who act as the first and principal point of consultation for patients within a health care system. This is usually close to the patient's own home. Includes General Practitioners / Family Doctors.

**Primary-level hospital**
A hospital which has few specialities, mainly internal medicine, obstetrics-gynaecology, pediatrics, general surgery or only general practitioners; limited laboratory services are available; bed size ranging from 30-200 beds; often referred to as district hospitals or first level referral.

**Regional network**
The pre-hospital, primary care and hospital care provided in more than one hospital, where the hospitals understand each other’s roles and cooperate to provide services across a geographical region.

**Resuscitation room**
Specific area of the ED used for critical care or high risk patients. It usually contains equipment for rapid imaging, diagnostics and intensive care level treatments.

**Secondary – level hospital**
Highly differentiated by function with five to ten clinical specialities; bed size ranging from 200-800 beds; often referred to as provincial hospital.

**Tertiary-level hospital**
Contains highly specialized staff and technical equipment, e.g., cardiology, Intensive Care Unit and specialized imaging units; clinical services are highly differentiated by function; might have teaching activities; bed size ranging from 300- 1,500 beds; often referred to as central, regional or specialist level hospital.
Chapter 3: Challenges Facing Pediatric Emergency Medicine

On a worldwide level the challenges facing pediatric emergency medicine are similar to those facing emergency medicine in general, but are more acute, meaning that the state of emergency care for children globally is poor. Often organized systems are not in place to provide emergency care for any patient, especially children.

Unless the specific needs of children are considered, children will have a lower standard of care than adults. This does not imply the need for highly specialized equipment, staff or facilities, just giving attention to the differences, and often making simple changes to practice, for example asking for some basic equipment, sharing of ideas between pediatric and emergency staff, some joint training and having a lead doctor and nurse for children's issues. The other sections of this document go into more detail about some of these ideas.

Common challenges include:
- Overcrowding of emergency care areas in hospitals
- Poor facilities for children and mothers
- Long waiting times for a hospital bed
- Limited access to the right hospital beds for children
- Poor staff training for pediatric emergency conditions
- Insufficient equipment and supplies of the right size
- Policies more suited for adult than pediatric patients
- Few processes in place to allow for rapid transport for specialty services including trauma, critical care, and burns
- Difficulties in getting senior or specialist advice for the pediatric age group
- Limited access to the right hospital beds for children
- In resource poor countries, emergency presentations being due to chronic disease, poor health or neglect
- In resource rich countries, EDs may be used for relatively minor illnesses and injuries

There is often a culture of ignorance or acceptance of poorer standards of care for children in the ED. Although in the developed world there are systems in place for deciding which EDs are available, staffed, and have equipment to care for patients with urgent and emergent conditions, the needs of the pediatric patients are often not met. In the U.S.A. the care of children in emergency settings has been described as "uneven." There are centres of excellence throughout the United States, but there are also areas where appropriate staff and emergency care are a challenge. Surveys in Canada and the U.S.A. show that often infant-sized equipment is missing including masks, endotracheal tube sizes for neonates, and laryngeal mask airways. Only 6% of EDs in the United States have all of the equipment and medication outlined in a national policy statement. In the U.K. in 2009 only 42% of ambulance services had pediatric pulse oximetry probes, and 50% had concerns about up to date pediatric training for frontline staff. These concerns have led countries to publish standards of care for children in emergency departments.

In areas that are resource poor, these differences between provision for adults and provision for children are usually even greater. Many hospitals in Africa do not employ even one pediatrician.

Workforce issues are paramount and yet there are too few pediatric emergency medicine specialists, even where EM is well developed. Emergency physicians with training in care of patients of all ages and especially in medical and trauma resuscitation of children are also relatively scarce globally. As described in Chapter 1, the skills for emergency care of children do not usually lie fully in either pediatric facilities / staff, or in emergency departments / staff. General (non-pediatric) medical and nursing training usually contains varied or minimal
amounts of pediatric teaching. Often pediatric staff skills centre around medical illnesses in babies and young children, and adult staff skills centre around trauma.

Big differences in case-mix can be seen between different countries, and even between hospitals within each country. The proportion of injury to illness varies greatly, as does the proportion of serious cases to very minor cases. Poor, inner city areas of developed countries often see a high proportion of non-serious cases. If ED and pediatric staff have not been trained to be confident in differentiating these children from those with serious conditions, they will fail to stem the tide of increasing hospital admission rates for children which is being seen in developed countries. By contrast, EDs in poor, rural areas will see a high proportion of seriously ill or injured children.

Finally, resources are lacking to be able to manage sudden surges of pediatric patients, particularly in a wide scale disaster, in all parts of the world.

A well functioning system of pediatric emergency care (PEC) does not have to be expensive. Information can be shared, for example if pediatric and emergency medicine staff learn from each other. Hospital managers can appoint ED staff with specific responsibility for PEC to aid liaison and make simple changes; there is a wealth of resources available to help, which are found in the resources appendix at the back of this document.

A lead nurse and doctor can ensure that the ED is alert to child welfare problems (see Chapter 16), can make sure that communication and family-orientated care is highlighted as important (see Chapter 5), and advise on issues such as information equipment (see Chapter 10) and technology (see Chapter 13). Providing a child-friendly environment and some basic equipment is not expensive.

Improvements in workforce and staff training are clearly more resource-dependent (see Chapters 8, 9) and strategic improvements in the whole network of healthcare can be expensive and require support from managers and politicians. Sometimes though, change can be facilitated just by increased awareness of the problems. This document aims to help clinicians and managers review and improve their services.

**Recommendations**

**Essential**

1. As emergency healthcare systems mature, countries must consider the special requirements of the pediatric patient with respect to environment, equipment and staff skills, ensuring they meet the needs of both the pediatric and adult population of emergency patients
2. Where EDs see patients of all ages, there must be a lead doctor and lead nurse for pediatric issues

**References**

Chapter 4: An Integrated Service Design

Introduction

No Emergency Department (ED) will reach the full potential for its patients unless it integrates with, and coordinates with, other services in the region. This includes pre-hospital care, primary and hospital care.

The ED may be part of a children-only or adult-only service, or may be mixed. Mixed EDs are more common where Emergency Medicine is more established as a speciality service, 24 hours a day, with its own staff.

Patients may convey themselves to the ED, or by arrive via ambulance services. Alternatively patients may go to the ED because of a referral by another health professional (this may be following a face to face or a telephone consultation). The proportions of these routes of entry vary widely in different countries and within countries.

If the patient brings themselves to the ED then it is ideal that they are attending with ED-appropriate conditions; this requires good public education and accessible primary healthcare. If patients arrive with inappropriately minor conditions then local arrangements should be in place to deflect the patient to another facility, back to primary care, or to self-care. Without flexible and efficient alternatives to the ED, the ED becomes overwhelmed, and unable to give adequate resource to serious cases. Accessing local primary care is much easier with agreed pathways between the hospital and the primary care organisation. For patients arriving by ambulance, smooth transition from pre-hospital care is needed (see Chapter 14).

Once the patient arrives in the ED and is assessed and stabilised, what happens next will depend on the level of care available in the hospital. There will be differences in the scope and role of the ED depending on whether the facility is a primary-, secondary- or tertiary-level hospital.

In this document the arrangements of provision of care between primary care, other forms of health and social care, and the different hospitals neighbouring each other, are referred to as the “regional network”.

Differences between adult and pediatric regional networks

Fewer pediatric patients arrive to EDs by ambulance than adults. Those who do arrive by ambulance tend to be sicker. Ambulance services must understand which facility to bring children to, within the regional network, both for injury and for illness.

Not all hospitals will have the inpatient resources to definitively care for critically ill or injured children. The role of the ED should be agreed and understood in the network (see section 3 below). EDs designated as adult-only receiving facilities may sometimes receive very sick children, arriving in their parents’ arms.

Many managers designing regional networks do not have pediatric emergency care as a priority, because it is generally lower cost, lower volume than adult emergency care, and many children can be treated quickly and easily. It is often forgotten that most staff are trained to deal with adults, but have had little training in the care of children (see Chapter 9), and that children presenting to EDs will often have a poorer standard of care than adults (see Chapter 3).

Because children fall seriously ill less frequently than adults, pediatric facilities tend to be smaller and fewer, and the network which links healthcare for children will tend to be bigger.
geographically. The need to transfer a child from the ED to another facility for ongoing care is more common. This means that in many areas specialist transport / retrieval services exist, particularly for critical care. In this situation, primary- or secondary-level hospitals must have clear and agreed guidelines about which children should be transferred, and the referral mechanism must be simple and understood by both hospitals.

**Co-ordinated care of the pediatric patient in the ED**

The capability of each hospital for pediatric care must be clear and understood by all of the health services in the area. Any guidelines or documents in the network relating to “patients” should make it clear if they include children as well as adults. The age cut-off defining a “child” varies in practice in different areas but in each locality it must be agreed. There are some good examples of clear documents describing their own state or country’s arrangements for a regionalised network. Clear, written guidelines for transfer criteria to specialist pediatric centres must exist, and mechanisms for swift and expert transfer agreed. In some countries the EMS services transport only to those facilities that meet agreed guidelines to receive pediatric patients but even where these guidelines are in place, parents often bypass EMS and arrive at the nearest ED in an emergency. Therefore every ED must be fully equipped and staff trained to deliver life-saving care for neonates through to geriatric aged patients.

Defining a level of care of a hospital depends on the resources and specialist services it can provide. This then influences the level of care its ED can provide. Maintaining this level of care requires ongoing careful attention to ensuring the ED is staffed (see Chapter 8) and equipped (see Chapter 10) to deal with the full range of ages and conditions that it normally receives. The ED must also ensure its staff have competence in relevant skills to provide these services (see Chapter 9).

A close working relationship is needed with family practitioners, pre-hospital care, intensive care, surgery, orthopaedics and radiology – not just pediatric medicine. In many hospitals, adult and pediatric facilities co-exist, and the pediatric ED patients can be treated as part of a mixed ED; in mixed EDs some thought should be given to safe, good care of pediatric patients. The remaining chapters of this document cover these issues in more detail.

In some cities, the ED which receives children is in a hospital which is an entirely pediatric facility, so the ED only sees pediatric patients. While this generally generates fewer problems in ensuring safe, high quality care of children, it is important that the right skills are present for all presentations across the range of age groups, including trauma situations, and older children.

In some hospitals, the ED exists and accepts children, but without pediatric specialist support on the same site. In this situation the ED staff must be trained to the right level to deal with children for stabilisation before transfer. Indeed a high level of training and competency in pediatric resuscitation may be needed, compared with a fully pediatric-supported unit. In all hospitals there must be access to pediatric specialist advice (at least by telephone). On a large hospital site, there may be a distance between the pediatric and adult facilities. In this situation there are options for the locating pediatric emergency service: whether to situate it co-located with the adult ED, or in the children’s section of the hospital. There is no right solution – but the area which receives pediatric emergency patients must be able to deliver the standards referred to in the rest of this document. From the point of view of availability of high level equipment, accessibility of staff such as radiographers and surgical doctors, and the versatility of response of a larger department to surges of either pediatric or patients, it may be more cost effective to see children alongside the main ED with staff able to rotate easily depending on patient flow.

In the management structure of hospitals with both adult and pediatric services, it must be agreed whether the ED services are governed by the Acute / Emergency section of hospital management, or the Pediatric section, if these are different. Where there is controversy then
the optimum way to evaluate the options is by analysing demographic data such as actual patient numbers, their age, the time of day of presentation and the disease profile presenting to the ED; also to assess the likely numbers and skill-mix of staff (see Chapter 8) and perform some quality of care analysis (see Chapter 11).

Reviewing these factors and comparing it to the ideal is useful – a so-called "gap analysis". A gap analysis performed by all stakeholder clinicians and managers carries more weight than by any one party and is usually a useful exercise. Chapter 5-13 and 16-18 provide more specific areas of focus and the summary of recommendations (Chapter 20) can be used as a checklist. Written agreements about provision of care for children’s emergencies must match the reality of the workload of the ED.

For the smoothest treatment of a child with any condition, an evidence-based, agreed care pathway can help (see Chapter 11). This means that the journey from arrival to diagnosis and definitive treatment is agreed by all concerned (eg radiology, orthopaedics and other departments) and runs smoothly, rather than being negotiated each time on an individual basis. Written clinical pathways are especially useful for predictably difficult areas such as mental health and social problems, child protection, dealing with sudden death in children (Chapters 16, 18).

Lastly, there may be some financial differences between management of children and adults in the ED. For healthcare systems where payment is required for emergency care and the family can or will not pay for care, the ethics of denying treatments to children merit special consideration, compared with similar situations for adults; payment systems should be agreed and understood between relevant organisations. The ideal situation would be that true emergency care should never be denied on the basis of ability to pay.

**Recommendations**

**Essential**

1. Pre-hospital, primary care and hospital services for emergency pediatric care must be integrated, and the role and capabilities of each ED within the regional network should be clear and understood
2. Clear, written guidelines for transfer criteria to specialist pediatric centres must exist, and mechanisms for swift and expert transfer agreed
3. All EDs must be prepared at all times to deal with initial resuscitation of a child brought in unexpectedly
4. The ED must be staffed and equipped to deal with the full range of ages and clinical presentations of children that it normally receives.
5. Access to specialist pediatric advice to the ED must exist 24 hours a day (by telephone, telemedicine, internet or in person)

**Desirable**

1. Managerial documents governing regional networks of emergency care should specify which arrangements apply to pediatric patients
2. Core specialities should be available to assist the ED; these include anaesthesia for all ages of child, critical care, general pediatric medicine, emergency surgery, orthopaedics, and radiology and pathology services

**References**

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Unidad de urgencias hospitalaria Estándares y recomendaciones.
Chapter 5: Child and Family-Centered Care

Introduction

Child- and family-centered care (CFCC) is an approach to healthcare which recognizes the developmental and behavioral characteristics of children, the integral role of the child’s family, and encourages a mutually beneficial collaboration among patient, family, and healthcare providers. CFCC embraces the concepts that to deliver good care for children and adolescents in the stressful setting of the ED, it is important to understand the patient’s developmental stage, the greater needs of their family, and their psychological needs. All EDs caring for children should consider these needs. CFCC is key to promoting best patient outcomes, care satisfaction and patient safety. CFCC also benefits healthcare providers, reducing stress in caring for child patients and increasing workplace satisfaction.

Differences between children and adults

Ill or injured children rarely present alone to the ED, and are typically dependent upon parents, siblings and other family members. In addition, parents clearly have legal authority for treatment decisions on behalf of their children. Dialogue, decisions and responsibility for treatment must be shared with parents or legal guardians in most circumstances. However, situations such as life-threatening emergencies, or where an older child is deemed competent to take their own decisions, the parent / legal guardian does not have to be part of the decision. This is particularly true when the decision is deemed to be in the child’s best interest. Local guidelines should be available and be followed.

There is an enormous range of developmental, cognitive, and behavioral capabilities within any pediatric age group. While there may be obvious variation between for example infant, pre-school, school-aged, adolescents, there can also be substantial variation among otherwise healthy children within each of these groups. The presence of chronic illness and special health care needs likely adds further to variation. The approach to an ill or injured child in the ED should be informed and guided by the knowledge and experience of the patient’s family members. As so many children are not capable of communicating their current symptoms, or a past medical history, and may not cooperate with aspects of the clinical examination or diagnostic testing, family members are invaluable in providing vital information and in assisting the delivery of care. While all patients generally benefit from the presence of family members, this is particularly true for children.

Delivering CFCC

Family needs and family presence

Parents of ill or injured children will generally be anxious and feeling protective, and must have ample opportunity to share their concerns and have questions answered. While the majority of parents willingly consent to tests and treatments, fearful parents may not immediately offer their trust and assent. Taking the time to listen and understand concerns, combined with efforts to fully inform, and when needed, engaging the assistance of a trusted source of medical advice (e.g. the child’s primary or specialty care provider), may help develop a partnership between ED staff and the family.

Whenever possible, the delivery of emergency care to children should occur in the presence of parents and other key family members. The option of family presence should be offered for all aspects of emergency care, including invasive procedures and resuscitation (see Chapters 6, 18). The vast majority of families believe they should be present during medical treatment, and family presence does not appear to reduce efficiency or success rates for invasive or resuscitation procedures. EDs should develop policies, practices and ED culture changes supporting family presence. Families will often be juggling multiple priorities such as the care of other children, and may have practical needs such as nutrition for other children, breast-feeding, and nappy-changing.
**Effective communication**

Effective communication with children and families is key for best patient outcomes.\(^2,3,7\) It is clear that parents are often needed to help determine the presence and severity of symptoms, therefore communication must be directed to the child and their accompanying family member(s). ED staff should be aware of child development and be capable of communicating with children of all ages at a developmentally appropriate level. Children can be remarkably perceptive and can be involved in treatment discussions. Engaging the child in the right way will promote trust and cooperation with ED care, and reduce both patient and family member anxiety – not only on this occasion, but on future attendances, should they occur. Awareness of cultural factors also play a pivotal role in the delivery of CFCC.

Timely access to qualified interpreter services is essential for effective communication when a language barrier exists.\(^2,3,5,12\) The common use of accompanying family members or friends as translators runs the risk of inaccurate information and may compromise patient privacy and safety,\(^5,12-14\) with patients and families bringing unique family structures, religious views, and health care beliefs and practices to the ED. ED care providers should also be vigilant for families with limited health literacy so ED discharge instructions and patient education materials should match requirements. At discharge you are usually relying on the family to provide care for the child so it is important to avoid advice which is too medicalized, or impractical for childcare or insensitive to cultural context. Lastly, communication with the patient’s primary care provider is another necessary component of CFCC, as most General Practitioners will often have responsibility for the whole family (see Chapter 3).\(^2,15,16\)

**The right environment**

Treatment rooms for children require more space per patient than needed in adult care areas, in order to accommodate family members and a greater range of equipment (see Chapter 10). Other considerations for the environment of care include:

- Enough rooms suitable for children, to match the proportion of children in the ED attenders
- Waiting and treatment areas that are separated both in sight and sound from adult care areas and ideally securely zoned off from the adult areas (e.g. security doors), to protect children from harm; although this is not possible in all EDs and at all times, every effort should be made to find a reasonable compromise
- Pediatric care areas should be safe with respect to accident risks (e.g. sharps boxes not stored on the floor)
- The environment of the pediatric area should be child- and family-friendly. Murals, posters, colorful decoration, and familiar distractions (e.g. cartoon videos, computerized games, toys, books) help allay anxiety and pain, and can make ED care much easier for all concerned. Fundraising for these resources from the local area may be quite easy: for example, local newspapers and businesses will often help provide toys or money
- There should also be resources for older age groups. Adolescents prefer some privacy away from small children, and need books, magazines or different distractions, and will often read health promotion material. This is a good opportunity to provide information on sexual health, smoking, drugs, etc (see Chapter 17)
- A suitable area should be available adjacent or within the ED for breast-feeding and nappy-changing

Local fundraising via special events or local media will often be very successful in attracting charitable donations for facilities or equipment for children’s emergency areas.

Finally, child life or play specialists are an invaluable resource in the delivery of CFCC and in the creation of an environment of care supportive of the needs for children and family. The role of a play specialist in the ED includes\(^17\):

- Providing distraction therapy for potentially distressing procedures
- Providing support for siblings and family members during the delivery of care
- Enhancing nursing and medical skills to involve play in the management of procedures in children
• Creation and maintenance of a child-centered environment, including advising on safe and appropriate toys and facilities
• Supervision of play in the ED

Recommendations

Essential
1. Child and family centered care (CFCC) must be a priority for staff and managers through clinical practice, staffing, and environmental design
2. Children must be separated from distressing sights and sounds of other patients, with some separation from the main waiting area for adults
3. The option of family-member presence must be encouraged for all aspects of ED care.
4. The ED must contain enough child-orientated treatment rooms (depending on the proportion of child ED attenders) with sufficient space to accommodate family members
5. The ED environment must be safe for children
6. Younger children must have access to nutrition (this includes provision for breast-feeding)
7. ED staff must give health advice and explanations in clear language and ensure they have been understood, being considerate that the family will usually have responsibility for delivering ongoing healthcare

Desirable
1. Guidelines for medical treatment should be available for balancing the wishes of the child, legal responsibility of the guardian and the child’s best interests
2. The pediatric areas should look attractive to children, and provision of toys, books etc and employment of play specialists should be considered, to facilitate high quality care
3. Timely access to qualified interpretive services should be available 24 hours a day
4. Services provided should reflect the cultural context of the family, and encourage families to be involved in patient care decisions.
5. Communication barriers such as literacy and the educational level of the family should be taken into account when giving health information.
6. Written information should be available for common conditions, and written in simple language, using diagrams where appropriate, to aid understanding

References


Chapter 6: Initial Assessment of an Ill or Injured Child

Introduction

In most Emergency Departments patients do not present one by one, at a rate suited to the amount of time or treatment they need. It is therefore necessary to balance the individual patient’s needs against that of the whole patient load, ensuring that the sickest patients are identified quickly and prioritised rather than in chronological order of arrival.

Every child arriving at an ED should have a rapid visual inspection by a qualified/trained practitioner very soon after arrival; this is to quickly identify children with life-threatening features who need immediate resuscitation. Reception, security and other non-qualified staff may also be trained to identify a lifeless, extremely ill or fitting patient, and when identified can alert senior staff. When a seriously ill patient arrives at ED there must be no barriers to accessing treatment: administrative or payment transactions must only take place after a child commences medical care.

A trained member of staff must assess all patients presenting for emergency care within 15 minutes of arrival. The ideal timing, manner and extent of this initial assessment will vary from one setting to another depending on many factors.

The word “triage” has a variable meaning, in the original context of mass casualty settings triage referred to a simple system for rapidly sorting casualties into priority groups. In modern ED practice, the initial assessment process is more detailed than this – it is usually performed by trained staff, takes less than 5 minutes, identifies potentially life-threatening problems and allocates a priority assignment for the patient (usually on a 3-5 point scale). This initial assessment may also include initiation of investigations and treatment, if time and the skills of the staff member allow.

In a busy ED, triage is an essential organisational step that can save many lives by early identification of life-threatening problems. Triage also allows an ED to measure the casemix of the current patients (by seeing how many are waiting in each triage category) and it can help identify when the ED personnel resources are overloaded. The most suitable model of initial assessment will vary for different situations - this chapter describes a range of models available for children.

Differences between children and adults

Children are less likely to arrive by ambulance, even if seriously ill. This is for two reasons: they are easier to transport than adults, and parents are often unaware how sick their child is. Therefore it is essential that the arrivals area is frequently observed by qualified staff who can recognize a critically ill infant or child (as above).

Children can be difficult to assess clinically, compared with adults. In the often noisy and chaotic setting of an ED children easily become frightened and cry or are uncooperative, thereby altering their vital signs and making clinical parameters more difficult to interpret, and sometimes making it impossible to get even basic vital signs measured.

This means that ED staff need to have the communication and assessment skills to deal with a sick child (see Chapter 9), and have a triage / assessment tool suitable for children, using age-appropriate normal ranges for heart rate, respiratory rate and blood pressure.
Initial assessment

Choosing the right type of initial assessment model

Several different initial assessment models exist – examples are summarised in Table 1. Any ED may use different models flexibly, depending on staffing, current workload and acuity of new arrivals. In developing countries patients are likely to be sicker, so a more rigid approach of an immediate visual inspection of new arrivals followed by a thorough initial assessment very soon after arrival by a qualified nurse is recommended.

Table 1: Models of initial assessment / triage

<table>
<thead>
<tr>
<th>Model</th>
<th>Example</th>
<th>Timing &amp; Time Taken</th>
<th>Involves</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rapid visual inspection</td>
<td>Quick “eyeball” of new arrivals to ED</td>
<td>Immediately upon arrival – takes a few seconds</td>
<td>Quick look at face and body to check color, breathing and if floppy / lifeless</td>
<td>Identifies obviously ill child immediately</td>
</tr>
<tr>
<td>Brief initial assessment</td>
<td>Patient Assessment Triangle (PAT)²</td>
<td>Within 5 minutes of arrival – takes less than a minute</td>
<td>Quick assessment of: appearance, work of breathing and skin circulation.</td>
<td>Identifies high priority child immediately. Overlaps with streaming (below)</td>
</tr>
<tr>
<td>Streaming</td>
<td>Categorization by area of ED e.g. resuscitation room, illness area, minor injury area, deflection to other services e.g. primary care / dentist</td>
<td>Within 15 minutes of arrival. Takes 2-3 minutes per patient.</td>
<td>Quick history, possibly measuring vital signs too.</td>
<td>For allocation to the right area in EDs where there is a choice of receiving areas. Patient would receive full initial assessment in that area as opposed to the arrivals area</td>
</tr>
<tr>
<td>See and Treat</td>
<td>Rapid assessment and full management by senior emergency doctor or nurse</td>
<td>Performed within 15 minutes or may follow brief initial assessment / streaming, takes 5-15 minutes per patient</td>
<td>For uncomplicated cases. Replaces full assessment and incorporates treatments and discharge. rapidly.</td>
<td>Overall quicker throughput to limit ED congestion. If cases are more complicated than initially thought, they are referred into main ED.</td>
</tr>
<tr>
<td>Full initial assessment</td>
<td>Comprehensive assessment, usually using a standardized and validated tool (See Figure 1)</td>
<td>Within 15 minutes of arrival. Takes approximately 3-5 minutes per patient.</td>
<td>Most involve assessment of: presenting complaint, key emergency signs and vital signs</td>
<td>Allocation to a triage category to allow prioritization of whole ED workload</td>
</tr>
</tbody>
</table>

Rapid Visual Inspection
All new arrivals in the ED must be quickly inspected to look for obvious signs of life-threat or serious illness. Ideally a qualified ED staff member will perform this rapid visual inspection
and it should take just a few seconds to do. In every ED the reception, security and other non-qualified staff should also be trained to identify a lifeless, extremely ill or fitting patient, and have a way of alerting trained staff.

**Brief initial assessment**
In certain circumstances an abbreviated initial assessment (rather than a full initial assessment) may be appropriate. For example in some resource poor situations several families may be waiting, even for initial assessment. In these situations a staff member trained in the use of a tool such as the PAT² should quickly assess waiting children and eliminate the queue. In this situation a full assessment must still take place within 15 minutes.

**Streaming**
In EDs with several areas of the department with separate functions (e.g., resuscitation, injuries area, illness area, and sometimes a primary care facility nearby) a brief initial assessment is combined with rapid re-direction of patients to the appropriate receiving area, where a full initial assessment will take place. Local policy and considerations may allow omission of measurement of certain vital signs (e.g., pulse oximetry, blood pressure) on well-appearing patients. In some EDs, this allows the patient to be diverted to another (non-ED) service, to ensure the ED only sees suitable patients.

**See and treat**
In resource rich EDs or in any ED at times when there is a good staff : patient ratio, initial assessment can incorporate treatment or advice, followed by immediate discharge. This can be called a “see and treat” system, which is more efficient than passing the case on to another nurse / doctor. This is more suited for low acuity patients.

**Full initial assessment**
Whether or not a brief assessment (see above) has taken place a more comprehensive initial assessment should be performed within 15 minutes of arrival, by a member of ED staff (usually an experienced nurse). This full initial assessment, which is often called “triage”, requires specific training.

Many systems have been evolved around the world to standardise full initial assessment – Figure 1 show examples of several established triage systems for children.

**Figure 1: Examples of paediatric triage systems**³⁻¹⁰

- Canadian Paediatric Triage and Acuity Scale
- Manchester Triage System for Paediatric Emergency Care
- Soterion Rapid Triage System
- Emergency Severity Index
- National Triage Scale

**Paediatric Triage Systems specifically for developing countries:**
- South African Triage Scale (SATS)
- World Health Organisation Emergency Triage Assessment & Treatment (ETAT)

Initial assessment should be governed by policies to reduce variation and risk of individual practice (see Chapters 11, 12). Staff should understand modifications needed for children presenting with mental health problems, complex disabilities or chronic disease, or suspected child abuse.
Finally, if waiting times are long, triage-type assessment should be repeated to ensure that any child who deteriorates whilst waiting is detected.

**Instigation of treatments and next steps**

During initial assessment it is also commonplace for basic treatments to be initiated before comprehensive patient review. During times of ED overload these extra tasks may have to be minimised to save time, but on the whole the ED is much more efficient if these tasks are initiated early.

Some common examples for children are given below:

- Pain assessment and provision of analgesia appropriate to the age of the child
- Fracture immobilisation such as splint or slings
- First aid for small or minor burns
- Simple soft tissue injury & wound management measures such as clean dressings
- X-Ray requests
- Prescribing of an antipyretic drug
- Prescribing of bronchodilators
- Trial of oral rehydration solution
- Provision of a sterile container to collect a urine sample in unexplained fever

Pain must be assessed and treated within 30 minutes of arrival. Pain assessment in children is a core competence for ED staff (see Chapter 9).

**Vital Signs**

Most triage / assessment systems depend on recording of vital signs. All children must have vital signs measured and recorded on the triage sheet. Standard vital signs include respiratory rate, heart rate, temperature, pulse oximetry and blood pressure, but pulse oximetry and blood pressure are sometimes omitted depending on the triage tool used. This is acceptable in a well looking child but not in the situation of a sick child.

**Weight**

Children must be weighed for accurate fluid and drug calculations. In the situation where the child requires immediate resuscitation weight is estimated (see Chapter 7).

**Blood glucose**

Young children and babies are particularly vulnerable to hypoglycaemia when unwell. Most children who are ill do not feed well and they may also be vomiting – this combined with the fact that they have smaller glycogen reserves puts them at high risk for hypoglycaemia. Any child who appears seriously unwell or has a reduced level of consciousness must have a blood glucose measured at triage.

**Special Circumstances**

A system should be in place for children with special needs, chronic diseases. Information should be available (see Chapters 12, 13) to access clinical records, standard care pathways, patient-specific management plans and facilities for children with special needs such as:

- Chronic, complex diseases (eg congenital problems, learning disabilities, metabolic problems)
- Malnutrition – in countries where this is prevalent children should also be visually inspected for signs of severe malnutrition at triage; the WHO recommends looking for signs of severe visible wasting or pitting oedema of both feet. Children with evidence of severe malnutrition should be triaged with a higher triage category as they are at higher risk of serious illness and rapid deterioration.
- Mental health problems, drugs, alcohol dependency (see Chapter 17)

Translators should be available for families who speak different languages.
All staff should be aware of the local guidelines for precautions and measures required for the initial assessment of patients presenting with Chemical-Biological-Radiological (CBR) related signs or symptoms.

**Recommendations**

**Essential**

1. Every child arriving at an ED must have a rapid visual inspection very soon after arrival
2. All staff members (including non-healthcare qualified) must be trained and empowered to alert others to the arrival of a seriously ill child
3. All ED clinical staff must be highly competent in recognizing the seriously ill or injured child, and recognizing a deterioration in a child's condition
4. A critically ill or injured child must be moved immediately to a suitable resuscitation area
5. There must be no barriers to accessing immediate initial assessment by a qualified staff member trained in the recognition of serious illness in children
6. All patients presenting for emergency care must receive a full initial assessment by suitably staff within 15 minutes of arrival
7. The choice of an efficient model of initial assessment for children must take into consideration time available, staff skills, casemix and current workload
8. All children must have vital signs (temperature, respiratory rate and heart rate) measured at initial assessment; blood pressure and oxygen saturations should be included if the child is seriously ill
9. Drug dosages must be based on an accurate weight
10. All patients in moderate or severe pain must be have pain relief provided within 30 minutes of arrival

**Desirable**

1. In countries where malnutrition is prevalent – children should also be visually inspected for signs of severe malnutrition at triage.
2. For children with special needs, chronic diseases or complex conditions, initial assessment should include a request for priority access to hospital notes and clinical management plans and these children should be prioritised as they are vulnerable.
3. Initial assessment should include modifications for children presenting with mental health problems, complex disabilities or chronic disease, or suspected child abuse

**References**

Chapter 7: Stabilising and Treating an Ill or Injured Child

Introduction

Once a patient has had an initial assessment (see Chapter 6) the next job of the ED is to resuscitate, stabilise and treat ill and injured patients. All patients require a focused assessment to formulate a differential diagnosis and management plan. This management plan is commenced in ED and continues either with an inpatient team or with a General Practitioner.

The length of time spent on the assessment, diagnosis and treatment phase in ED varies widely from minutes through to a period of hours in many cases. Sometimes long stays are because of lack of hospital beds: overcrowding of the ED is common in some countries, and virtually non-existent in others (see Chapter 3).

In some hospitals patients may stay under the care of ED staff for up to 24 hours in an observation ward and this may reduce admissions to the in-patient wards of the hospital. However, this requires a suitable area where patients can be safely observed and there must be adequate medical and nurse staffing to ensure patients are properly monitored and regularly reviewed. Although broadly true for both adult and pediatric emergency patients, stays of 24+ hours are more likely for adult patients.

This chapter covers the first few hours after arrival in the ED.

Differences between children and adults

Emergency services for children lag well behind those available for adults worldwide (see Chapter 3). In Sub-Saharan Africa, where 43% of the population is younger than 15 years of age, it is likely that equipment, resources and services for children are even less available. Whilst the total numbers of critically ill children are less than adult patients, every ED must be able to treat a seriously ill child. This is particularly important in ‘adult only’ ED’s. A basic level of competence for resuscitating children is needed in all EDs as parents or carers will often bring a very sick child to the nearest hospital, which may be an adult only ED.

Children often become ill more rapidly than adults, but usually recover quickly and are less likely to have underlying chronic illnesses. EDs often see high numbers of children aged less than 2 years because they have frequent viral illnesses and present with non-specific symptoms such as fever, poor feeding and vomiting. It can be more difficult to accurately assess small children at this stage, for the likelihood of serious illness.

Investigations and treatments are more difficult to perform in children and may require a different approach. More time, effort and staff are often needed during investigations and treatments performed on children. It may be necessary to sedate or anaesthetise a small, uncooperative or frightened child in order to complete procedures such as laceration repair or fracture reduction.

Parents of sick children and may not have had time to bring essential items with them. A range of appropriate infant foods should be stocked, a private space for breastfeeding mothers, diapers and changing facilities should be available. A play area can help to make waiting a less difficult time for parents and children (see Chapter 5).
Stabilising and treating sick children

Initial Resuscitation & Stabilisation Of Seriously Ill Children

There should be clearly defined criteria for when and how a call for help to wider ED or hospital staff should be made. Traditionally this type of call has been called a ‘cardiac arrest’, ‘code’ or ‘medical emergency response team’ call.

A child should not have to be in cardio-respiratory arrest for a call to be made. Any child who is showing signs of impending or imminent collapse (even if still breathing and with some effective circulation) requires urgent resuscitative measures, and will benefit from a trained team of staff. The requirement for a formal team callout will vary depending on the resources, staffing and skills levels available within the ED. Family should be given the opportunity to be present during resuscitation of a child (see Chapters 5, 18).

All staff must be trained in pediatric basic life support and at least one member of staff on each shift must be trained in advanced pediatric life support (see Chapters 8, 9). Staff able to undertake advanced airway management must be available within 5 minutes of the need being identified. Trained staff should be able to stay with a child to deliver high-dependency/critical care until moved to a dedicated critical care environment or recovery happens.

Resuscitation algorithms should be clearly visible in resuscitation areas and all staff should be familiar with these. A paediatric resuscitation cart/bag must be available with airway, vascular access supplies and equipment for children of all ages. Also a difficult airway cart should be available in the resuscitation area and a process for consulting with other experts in airway management should be clearly in place (see Chapter 10).

A method for estimating weight for children who are too unstable to be weighed must be available. One commonly used method is the use of standard formulae for estimating weight from age. Alternatively rapid estimates of weight can be obtained from tapes measuring length of the child e.g. the Broselow Tape. These estimates may be inaccurate if children are either malnourished or overweight. The Paediatric Advanced Weight Prediction in the Emergency Room (PAWPER) tape uses both length and an evaluation of body habitus to estimate weight.

Further Assessment, Investigation and Treatment

Any ED’s where children are seen should have guidelines on the assessment, investigation and management of common emergency conditions. These guidelines should be easily accessible and regularly updated (See Chapter 11). The presence of senior doctors in paediatric ED’s, in addition to the use of guidelines, has been associated with better quality of care and fewer complaints, with decreased hospital admissions fewer invasive tests being performed. If a junior doctor or nurse is in doubt as to whether further investigations are needed they must consult a senior, especially for radiation exposure (see below). Every effort must be made to minimise painful or unnecessary investigations and procedures in children, and to balance the need for these against the realistic difference they will make in management decisions.

It may be possible to avoid admission and/or unnecessary investigations in a child by undertaking a period of observation. Such facilities in an ED are usually known as ‘Short Stay Unit’ or ‘Observation Ward’. There is wide variation in the number of hours a child may be permitted to stay in these areas, but usually it is between 6-24 hours. There needs to be clear criteria for the type of children to be admitted, the team or doctor responsible for the child’s care, the objective of the observation period and a defined review time.

Specialist Input and Allied Support Services

There must be a system for 24-hour consulting with paediatricians and other key specialists such as paediatric surgeons, neurosurgeons, ENT, orthopaedics etc. whether by telephone,
telemedicine or on-site. Staff in the ED should clearly understand how to access help, and the regional network should co-operate in providing assistance (see Chapter 4).

In particular, EDs require a high volume of radiology services (plain radiography, CT, MRI). If these are not available on-site there must be a system for transferring to the nearest facility with the required imaging. Ideally all images should be reviewed and reported in a timely fashion by a trained radiologist with paediatric experience; this can be done remotely (digital link transfer). Medical imaging policies should be in place, consistent with ALARA (as low as reasonably possible) principles to minimise the potential cumulative dose of lifelong radiation.

Commonly used laboratory services (such as haematology, biochemistry, microbiology, transfusion) must be available. There should be a reliable out-of-hours laboratory service for essential tests.

A trained play specialist is a valuable asset to any ED where children are seen – in particular for helping to reduce fear by preparing children for procedures such as insertion of intravenous lines, suturing etc. (see Chapter 5).

**Discharging a child**

The nature of work practices in the ED is that patient assessment is rapid, efficient and timely, however it is clearly possible that mistakes in diagnosis will occur. For this reason parents must be encouraged to return if they think the child’s condition has changed or deteriorated. Clear communication is essential (see Chapter 5). Information which the family / carers need to understand includes:

- the usual natural progression of the condition
- what the parent can do to help their child
- administration of medications (doses, timing)
- advice on signs and symptoms of potential worsening for the condition
- what to do if child’s condition worsens or if they are worried

It is good practice to provide parents with telephone numbers to call if they need further advice or help. Follow-up clinics in the ED may be helpful for minor injury review, medical complaints (where the child needs a single further assessment) or for follow-up of results (e.g. urine culture). ED clinics are not suitable for children who will need multiple on-going follow-up appointments.

**Recommendations**

**Essential**

1. There must be a defined ‘Resuscitation Team’ of clearly identified staff from within the ED or hospital
2. All ED clinical staff must be highly competent in basic pediatric life support
3. At least one member of staff on each shift must be competent in advanced pediatric life support skills
4. Staff able to provide advanced airway management must be available within 5 minutes of the need being identified
5. Trained staff must stay with a critically ill child until moved to a dedicated critical care environment or recovery happens
6. Resuscitation algorithms and equipment should be available in resuscitation areas
7. A method for estimating weight for children too unstable to be weighed must be used
8. There must be a system for 24-hour consulting with key specialists either on site or remotely, including toxicology information
9. The ED must be supported by 24-hour basic radiology and laboratory services
10. At discharge, carers must have advice which they understand, for managing their child’s condition and recognising deterioration

11. All children seen in the ED must be discharged with a discharge letter to keep, and/or a letter sent to their General Practitioner

Desirable

1. Following any major paediatric resuscitation a system should be in place for staff and family to be offered debriefing and if required counselling

2. A “difficult airway” cart should be available

3. Parents and family should be given the opportunity to remain present during resuscitation of a child

References


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Chapter 8: Staffing

Introduction

Emergency departments vary considerably in size, patient volume, patient casemix, design, and level of service provision. The ED should be staffed with enough qualified people, so that it can respond effectively to the needs of its patients and their families. This includes access to ancillary staff, such as clerical personnel, staff for transferring patients within the hospital, staff to perform investigations etc.

Staffing in the ED varies greatly between and within different countries. In more advanced ED systems, it is common that:

- specifically trained emergency medicine physicians exist who work only in the ED
- senior physicians are present to supervise junior ED doctors at all times
- ED staff are trained to perform specific roles (e.g. triage, resuscitation roles), but work together with flexibility and teamwork for one patient
- all ED staff (doctors, nursing and allied health professionals) work in a team, with fewer boundaries between their roles compared to their in-patient colleagues
- ED staff can safely manage all types of pediatric emergency (illness, injury, drug overdose, mental health)

In less advanced systems, it is common that:

- staff work both in the ED and other areas of the hospital
- the majority of ED doctors have no specific EM training
- supervision of junior ED staff is variable
- ED doctors and nurses have to change roles frequently because the ED has fluctuating staffing
- ED staffing is heavily senior nurse dependent, and
- roles are often poorly defined for ED staff members, thus teamwork becomes more difficult

Experience shows that more full-time ED staff members make departments run more smoothly, and thus maintenance of good clinical care standards becomes easier. If it is not possible, and other methods are used to increase ED staff numbers (e.g. other hospital staff come to the ED only when other priorities are not competing) then safe care is less likely and staffing becomes inefficient and unpredictable.

Whilst the main responsibilities of ED staff are focused on direct clinical care, it is necessary that all members of staff also have sufficient protected non-clinical time for other aspects of their job, such as research, education and training, and safety/quality improvement activities. Time dedicated to these activities improves staff satisfaction and retention, and enables the ED to develop and improve patient care.

Most ED work is busy and tiring. Working long continuous shifts increases the risk of making errors in-patient care and decision making. To minimize this risk, management should aim to roster separate medical and nursing teams for day and night shifts, with adequate recovery time between shifts e.g. maximum 12 continuous hours. If staff members also work elsewhere in the hospital, the shift duration should take account of that time. If shifts are long, an option to reduce fatigue is for staff to rotate to another area of the ED during their shift.

Differences between adult and pediatric ED staffing

On the whole ED staffing issues are generic. However it is important to have the right staff levels and skills for pediatric patients, and staff employment may be limited by availability of suitably trained clinicians in pediatric emergency medicine (see Chapter 3). Therefore in evaluating the staffing on a shift-by-shift basis, providing safe coverage for children can
present its own challenges. To maintain safe 24 hour cover, a critical mass of trained staff is needed, which may require investment into hiring and training staff with pediatric skills (see Chapter 9).

The peaks and troughs of patient arrivals by hour of day tend to be more exaggerated than for adult patients. In most countries pediatric attendances have two peaks: late morning / early afternoon, and early evening, with low attendances from midnight to 8 a.m. Depending on length of stay in ED (variable worldwide) this may affect staffing levels.

A well-functioning staffing model

Leadership for Service Provision

All ED’s must have a senior doctor and a senior nurse with explicit responsibilities to lead and manage the major aspects of ED work. For mixed ED’s, there must also be a senior doctor and nurse with authority and responsibility for ensuring best practice in pediatric emergency medicine.

In larger ED’s it is desirable that these leaders should lead a core team of ED nurses and doctors skilled in delivering high standards of pediatric care in their ED. They will require protected time free from clinical work in order to:

- Lead education in pediatric emergency care to junior medical and nursing staff
- Lead quality projects to continually improve department wide pediatric emergency care; an example is the creation of pediatric clinical guidelines
- Advocate for resources required to treat children e.g. equipment, drugs, and patient discharge education leaflets
- Foster ongoing relationships with non-ED pediatric specialties. Examples include:
  - Inpatient specialties
  - Outpatient clinics
  - Community services, including child protection agencies and local health care centers

Specific roles and areas in ED

ED staff are usually allocated specific roles with different functions in different areas of the department. There are specific pediatric considerations within these roles. All areas must be covered safely, by staff with the correct skills.

Triage / initial assessment Staff

All developed EDs have a system to assess patients on arrival. Chapter 6 describe the process and skills needed. In some countries, it is done by medical staff; in others by nursing staff. When children arrive in the triage area, there should be a member of staff competent to perform a pediatric assessment within 15 minutes of arrival. This means matching staffing to the typical patient arrival times (described above).

Resuscitation Staff

All EDs must be staffed with personnel specifically trained and competent to deal with severe and critical injuries and illnesses in children, 24 hours a day. This means, at a minimum, basic pediatric life support skills. In mixed ED’s, this may be a team of combined adult and pediatric trained clinicians (or clinicians trained in both). Specific considerations regarding the resuscitation team member allocation include:

- The core team members must be familiar with the layout in the ED, practice resuscitation frequently, and have pediatric skills; this often means that a combination of the core ED team with additional personnel is the best solution
- An additional experienced member of staff will be needed, with specific training and responsibility, for supervising the family (if present), to explain and reassure the resuscitation process (see chapters 5, 18)
During resuscitation, additional non-ED clinicians with specific paediatric expertise may arrive to assist. Others may also arrive for other reasons, such as medical students. This is welcomed, however resuscitation must not hampered by too many people in the resuscitation area.

**Main Department Staff**
The number of main department staff will depend on the following factors:

- The floor plan of the department
- The severity of illness or injuries of the patients
- The number of patients
- The need for supervision of junior doctors

Different ED’s will have different floor plans, with the main department either one unit, or divided into areas with monitored beds, unmonitored beds, ambulatory assessment rooms, procedural rooms. Staff with appropriate skills should be allocated to those areas. Success in achieving adequate staffing is more likely when you employ staff with multiple skills (emergency medicine and pediatric internal medicine), and careful rostering. Patient: staff ratios will depend on casemix. Therefore an analysis of the volume of minor versus major injuries/illness and the number of critical care cases (and their length of stay in ED) should determine numbers of nursing and medical staff (see Chap 13). Standards in different countries recommend one pediatric emergency physician every 11,000 to 16000 visits per year.\(^1\)

The number of patients arriving is dependent on the time of day (described above). The number of ED staff to assess these children should attempt to match this pattern. There are two reasons for the need of rostering senior clinicians during peak attendance hours:

- To provide best direct care for children, rapidly
- To provide ongoing supervision of junior staff seeing children

Medical staffing needs to provide enough supervision for junior doctors who may have little pediatric experience. Face to face supervision is important. This may be achieved either by an increase in the number of staff rostered to work during those periods, or perhaps in departments which see both children and adults, there should be flexibility to move staff between different clinical areas to cope with surges of patient presentations. These options also need to be considered when ED overcrowding becomes a factor in bigger ED’s, so as to ensure patient safety for admitted patients in the ED with no ward bed available. Fewer children attend during night shift hours, so covering the night time period with fewer paediatric trained staff may be appropriate. Nevertheless, ED’s must maintain enough staff to care for sick children all times.

In pediatric practice, nurse staffing is more time consuming for tasks such as assisting procedures, and drug administration. However, much ongoing basic care will be provided by family members, unlike many adult patients. This should be encouraged to assist nurses provide care, as increased parent satisfaction is achieved when they can assist in caring for their children whilst in the ED. Nursing assistants are also particularly valuable in pediatric practice to help with this.

In some countries Emergency Nurse Practitioners and other advanced non-medical clinicians are employed to complement medical staffing. These clinicians have a specific scope of practice that defines their role in the ED. When employing them, a balance must be achieved between a proven increase in ED efficiency, and allowing junior doctors the opportunity to develop competence in (seeing and) managing the same type of patients.

**Observation Ward Staff**
Use of short stay units are particularly important in emergency pediatrics as children often recover more quickly than adults, allowing for quicker discharge when compared to full inpatient stays. Staffing this area should include physicians and nurses trained in pediatric observational medicine, which is becoming a specialized skill in pediatric internal medicine. The number and training of the providers in the unit should be in accordance with the volume...
and acuity of patients. This generally means more frequent senior doctor reviews than for inpatients to enable early discharge.

**Allied Health Professionals**

Play specialists (child life specialists) are very valuable in pediatric emergency care. Their roles are described in Chapter 5. If resources do not allow them to be employed full time, then they should be targeted at peak times, especially evenings and weekends. If there is no play specialist available, access to another staff member who is trained to perform these skills should be available.

Large ED’s will need other allied health professionals dedicated to ED work (such as respiratory therapists, phlebotomists, nursing assistants, plaster technicians, etc.). All such staff should know the differences of how to perform their roles for pediatric patients as compared to adult patients.

Volunteers can be helpful in taking care of children when family members are not able to, or to assist in providing food, drink, and other assistance to families.

**Recommendations**

**Essential**

1. ED staff must not work long continuous shifts e.g. more than 12 hours, as fatigue leads to patient care errors and decision making errors; there must also be adequate recovery time between shifts.

2. Staff numbers must be adequate to allow safe coverage of all areas of the ED where pediatric patients are being cared for, at all times

**Desirable**

1. A core body of medical and nursing should be contracted specifically to the ED full time, for smooth running and high quality of care

2. In larger EDs for mixed-age patients, there should be a core team of staff skilled in pediatric patients

3. Staff rosters should take into account peaks and troughs of pediatric arrivals, the need for supervision of junior doctors, and the pediatric skill sets of the staff on any given shift

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Chapter 9: Staff Training and Competences

Introduction

The staff of the ED should be staff that are used to working in that environment (see Chap 8) and trained to deal with all the patients who present to the ED. Training and competency should include:

- Resuscitation of patients at an expert level
- Performing within an efficient and effective resuscitation team using appropriate teamwork skills
- Assessment and management of patients who present to an ED with an undifferentiated illness or injury, including mental health, poisonings, and social problems (see Chaps 6, 7, 16, 17)
- The use of clinical reasoning, up to date research and risk stratification skills to produce a safe differential diagnosis and management plan for patients presenting to an ED (often in the context of incomplete information and the need for fast decisions)
- Use of safe practices and minimising error, using resources such as local clinical guidelines, drug dose books, etc.
- A working knowledge of, or access to, advice on allied areas of practice e.g. disaster medicine, child abuse and forensic medicine, public health and preventative medicine, quality improvement, research and medical education

In more developed countries, there are usually:

- Well defined training programs in both general emergency, and pediatric emergency medicine
- A multitude of learning courses designed to teach the knowledge and skills listed above

In less developed countries, it is more likely that:

- The specialty of emergency medicine is still being established, and the specialty of pediatric emergency medicine is even less developed
- There is limited support for clinicians to have time and ways to acquire these skills
- The availability of local courses to learn such knowledge and skills is patchy
- A rapid referral of patients to specialists occurs using risk stratification, at a basic level, of the patient’s presentation the patient. This compares with a more refined practice of PEM which is referral after assessment, diagnostics and a period of treatment time

Differences between children and adults

In an ED staffed by nurses and doctors who are fully trained in pediatrics, there may be a gap in knowledge, skills and confidence for some core ED functions such as major trauma, resuscitation, organisation of the ED to cope with large numbers of patients, and some adolescent issues (see Chap 17).

Likewise in an ED staffed by adult-trained doctors and nurses, there may be a gap in knowledge, skills and confidence for treating pediatric minor and major illness, dealing with child protection issues, performing practical procedures for smaller children, and communication with children and families. On the whole, most junior doctors and the majority of nursing staff have had much more exposure to adult patients than to children. In some areas of the world such as the United States, United Kingdom, Australia, New Zealand, and Canada, emergency medicine training incorporates the care of children of all ages. This later model is preferred as it most closely reflects the practice of emergency medicine globally.
Such staff must learn why pediatric emergency medicine is different from adult emergency medicine and general pediatric medicine, and how to achieve these skill-sets. This chapter therefore addresses the issues of learning these skill-sets, to ensure safe management of the whole variety of children and adolescents attending the ED (see Chaps 3 and 4).

**Paediatric Emergency Medicine training and competence**

Training to become paediatric emergency physicians is well developed in some countries, with a set education curriculum required to be completed (see Chapter 19), whereas in other countries the speciality is still evolving. Training in PEM, within both general EM and general paediatric medicine training programs, is also varied. The following describes recommendations related to ongoing training for general ED staff to attain competence in the practice of quality pediatric emergency medicine practice.

**Access to training activities**

Training activities should be supplied so that all appropriate staff members have the opportunity to attain PEM specific skills e.g. triage, airway skills, resuscitation and teamwork, observation, medication delivery, procedures, etc. Access to a structured program, however, is difficult due to the unique characteristics of the workplace e.g. shift work, varying surges of patient presentations throughout the day. Thought must be given to supplying education in a way which maximises attendance whilst maintaining quality care in the emergency department.

**Resuscitation skills**

Fortunately, children present for resuscitation less commonly than adults. It is known that performance of skills deteriorates over time if they are not used, and thus more so for pediatric resuscitation skills. The maintenance of resuscitation skills is vital; this can be achieved with educational courses and frequent practice. A recent study suggests good retention rates if CPR is practiced every 3 months or more often.

Also, resuscitation of children is highly emotive (see Chapter 18), and combined with the relative infrequency of occurrences, creates a highly stressful environment for all involved in the resuscitation of children. Well-rehearsed resuscitation skills improve confidence. The provision of education to teach skills to manage staff emotions and behaviour will aid staff, leading to increased staff retention and job satisfaction.

**Teamwork skills**

The importance of working as a team cannot be overstated. This is a skill which requires specific attention. Studies have shown it is effective in improving performance in the fields of aviation and the military, and is starting to be seen as important in EM. This means providing ongoing practice and training with colleagues from different backgrounds together and will help to ensure that efforts are coordinated and roles can be traded efficiently.

One method of teaching this is practising as a team with a mannequin as the patient. This is done by giving a clinical situation (i.e. a scenario) and observing how ED staff responds to that scenario as a team. This method also aids in teaching leadership skills, essential in the ED.

**Core PEM clinical knowledge**

Children may present with both illness and injury to an ED. It is ideal that staff can treat both (this includes both doctors and nurses). If the two streams are separated and different clinicians see different types of patients, there is a risk that a holistic view of the patient will be lost, for example child protection issues in injured children (see Chapters 1, 5).

Core clinical teaching should include the following knowledge (as highlighted in other chapters of this document):
• The differences between normal children and adults with regard to their physical, physiological, and psychosocial characteristics
• The changes in these characteristics with the child’s age
• Child-specific diagnoses, eg. Bronchiolitis, intussusception, congenital abnormalities presenting as emergencies (cardiac, metabolic), and diagnoses which present in different ways, eg urinary tract infection
• The method of initial assessment and management of all children which present to their local workplace (see Chapters 7, 8)
• Common illnesses and injuries (serious and minor)
• Identification of potentially seriously ill children
• The management of children involves using different sizes of equipment and smaller dosages of medications and fluids, often involving calculations (see Chapter 10)
• Child and family centred care (see Chapter 5)
• Medico legal factors when assessing and managing children, such as consent and refusal to treatment, confidentiality, parental responsibility
• Knowledge of child protection issues and the recognition of risk factors for child abuse (see Chapter 16) and actions to take if such are identified
• Primary prevention of pediatric illness and injury which can be highly effective and important at a young age, eg. promotion of healthy diet in children, having an active lifestyle, utilizing safety devices such as child car seats and bike helmets, prevention of drug abuse, shielding children from harmful images in the media, etc.

Creating the underpinning Education Program

In order to deliver a quality education program for the ED, there needs to be a dedicated person responsible for creating the education program. In mixed-age ED’s, it may be more feasible for this person to co-ordinate both adult and paediatric aspects of the education program, as long as the senior responsible for paediatric aspects of the department has input into the program. In a large department the lead doctor and lead nurse may delegate to a staff training team, but their role is still to overview:

• Reviewing the knowledge of individual staff, and the department as a whole; from these, a relevant education program can be created; once this is completed, learning outcomes can be created to structure the local program (see below)
• Identifying experienced clinicians available to teach in the education program. Ideally, these teachers should also have expert knowledge in effective methods of teaching delivery (see below).
• Organising a combination of different learning activities to make the education program effective and enjoyable
• Ensuring mandatory training takes place e.g. child protection awareness, pediatric resuscitation updates and refresher sessions
• Knowledge of available external courses and ensuring protected time for staff to attend e.g. advanced pediatric life support courses, to supplement in house educational program
• Continuous quality improvement of the education program

Applying Education Theory to your program

Adult learners are self- directed and goal oriented, and they seek information that they can readily apply. When designing your program, utilise the adult learner’s desire for what they want to learn to maximise the program’s success. After reviewing the individual and department’s educational needs, one can create learning outcomes which are clear.

Once this is done, there are a number of different effective learning activities, and may include:
• small group presentations
• semi-directed small group discussions, which are better at keeping the learner focused
• skills stations, particularly useful for learning procedural skills
• mock scenario and simulation teaching, particularly useful for learning teamwork and leadership
• case based discussions, to put teaching into context e.g. pediatric resuscitation case reviews, pediatric mortality and morbidity audits
• using e-learning modalities to supplement face to face learning
• learning whilst simultaneously working, e.g. bedside teaching and the use of manikins for practicing skills in the resuscitation room; this is very effective, but can only be done if sufficient senior staff are also working to provide ongoing supervision of juniors.

It is desirable that supervising senior staff should not have a full clinical load so they can best provide adequate educational supervision.

Though the ED environment is seldom comfortable for learning, educators must be capable of identifying opportunities for learning, and realize that interpersonal or relationship setting is very important in the process of learning, and that they are always role models.

The use of inter-professional education, where both nursing and medical staff attend the same educational session, has been shown to be beneficial in certain situations, especially in mock scenario and simulation teaching.

**Applying education theory to teachers**

Staff who teach PEM should have training in how to teach. The following points should be considered:

- Time provided for senior staff to learn how to supervise and teach
- Instruction on how to prepare lectures/presentations and deliver small or large group discussions (seminars/grand rounds)
- Instruction on how to prepare and co-ordinate whole PEM education courses and programs.
- Learning how to evaluate and provide effective feedback to educational activities and the teachers themselves

**Recommendations**

**Essential**

1. All ED staff must be competent to deal with the full range of illnesses, injuries and age-groups that they are expected to see and understand the differences from adult patients
2. Refresher training must be available for staff to maintain their knowledge and skills in paediatric resuscitation
3. ED staff must learn to work as a team
4. Senior staff must be physically present and available to teach junior ED staff (medical and nursing) while they work.
5. Senior staff who teach juniors whilst they work must not have a full clinical load, so they can ensure that supervision and education occurs in the busy ED environment
6. A senior ED doctor and ED nurse must be designated to have the role of creating and managing the ED’s education and training programs

**Desirable**

1. Staff should also complete educational courses that deal specifically with all aspects of ED work, including advanced resuscitation, teamwork skills, risk management and evidence-based practice
2. Individual ED’s should program their learning activities to maximise attendance of ED staff whilst maintaining quality care in the ED at all times
3. The education program should incorporate best practice in education, and be delivered by a team of ED staff

4. Teaching of all team members should occur as a team, teaching both doctors and nurses together (inter-professional education)

References


7. Spotting the Sick Child (UK Department of Health e-learning package) [http://spottingthesickchild.com](http://spottingthesickchild.com)


Resources
Readers are asked to look at Appendix 2 (Useful Resources) for further information to aid in creating their education programs.
Chapter 10: Equipment, Supplies and Medications

Introduction

Every ED should be well equipped with the necessary equipment, supplies and medications needed for the care of the acutely ill or injured patient, on a 24-hour basis, for adults and children. These should be easily accessible, clearly labelled, and safely organised, maintained and stocked, even in peaks of activity. In larger EDs there may be a group of support staff assigned specifically to this task.

Differences between children and adults

The main challenge for treating patients of all ages is to have readily available medical equipment suitable for all patients, of various sizes, and medications in formulations suitable for patients of different ages and body weight and abilities (for example liquid formulations). While adults vary a lot in body size, the variation is less than that of children from birth to puberty, and the biggest difference in adults is usually body fat rather than height and non-fat tissues, so standard dosages tend to be used most of the time.

The range of equipment and supplies for children can make identification, accurate sizing and storage difficult or confusing, especially in an emergency. For drug dosages, medication errors are common and can be very serious.

Choosing the right equipment, supplies and medications

Equipment and supplies

Equipment, supplies must be of high quality and appropriate for all patient ages, from the premature baby through to the fully grown teenager. This is a challenge, and is the reason why most EDs who cater for adults and children will tend to store the pediatric supplies in a specific area, so that all pediatric sizes does not have to occupy a lot of space in every area of the department. For everyday use, mobile carts can be useful. The number of areas where pediatric equipment is present should be based on the scenario of "the worst" busy day. For mass casualty incidents it is likely that different processes will operate.

The ED should form part of a larger, well developed and organised regional network of pediatric emergency care resources. This means staying abreast of new resources, and ensuring that if patients are transferred, the differences in equipment between services, for example infusion equipment, are minimised. This is further highlighted if medical or nursing teams work in more than one ED, or work across the ED and the in-patient areas.

Standardising the layout and range of what is stocked will reduce confusion, delays in treatment, and medical errors. All staff should be familiarised with the department’s equipment and medications (eg during staff orientation programs) and refresh this knowledge frequently.

ED’s serving different localities must cater to their own casemix and review usage of their supplies for the expected amount and degree of complexity of patients seen. Mobile resuscitation trolleys or “crash” carts organised to cater to the needs of pediatric patients of all ages should be immediately accessible in various strategic areas within the ED.

Other than the resuscitation area, resuscitation trolleys must be accessible in other areas where procedural sedations, and observation and monitoring are done.
ED staff should be educated on the location of all items and the organisation of pediatric specific mobile trolleys. This often requires frequent review or re-orientation because of the degree of complexity and infrequent use. A list of recommended equipment can be found in Appendix 1. Each ED needs to make an informed and agreed decision about how extensive the list should be. Checklists should be used, in order to reduce risk.

The layout of equipment should be logical. Where different sizes exist labels should be clear. If there are many compartments or drawers to separate the different sizes and types of equipment, it may help to have transparent compartments with photographs on each for easy recognition.

**Medications**

An appropriate selection of medications must be stocked or readily available. The lists should be reviewed at least annually based on safety and efficacy information (see Chapter 11). In many countries there are local, regional or national formularies specific for paediatric use. If these exist, they must be available in the ED. A list of recommended medications can be found in Appendix 1. Each ED needs to make an informed and agreed decision about how extensive the list should be. Checklists should be used, in order to reduce risk.

Pre-calculated dose guidelines and size of medical equipment for children of all ages must be made accessible in the form of charts, length based drug dosage tapes, pre-marked length based resuscitation trolleys, or medical software. Where IT packages exist, safety checks should be built in (see Chapter 13).

Similarly, dilution guidelines and charts for the preparation and administration of medications and IV fluids suitable for the pediatric patient should be readily available. Where there are more than one dilution or formulation options, there must be great clarity to avoid errors. The use of charts for each drug helps prevent error. Where the number of options can be reduced, this should be encouraged. The expertise of a pharmacist familiar with pediatric medications is invaluable to the ED and should be encouraged.

Tertiary centres should provide the expertise and support to their affiliated EDs. Close liaison with the pediatric department within the hospital, and the other hospitals in the network can help simplify common issues such as off-label or off-licence use of certain drugs.

Resuscitation medications, supplies and equipment must be reviewed with each revision of the Pediatric and Neonatal Basic and Advanced Life Support guidelines released by the International Liaison Committee on Resuscitation (ILCOR) Pediatric Task Force.

**Recommendations**

**Essential**

1. Every ED must be well equipped and organized with easy access the necessary equipment, supplies and medications needed for the care of acutely ill or injured children of all ages on a 24 hour basis
2. Equipment and medications must have a standardized and logical layout, to ensure familiarity for staff, and should ideally match those used in associated departments (eg operating theatres, intensive care unit)
3. Pre-calculated resources for common or emergency drug doses and equipment sizes for children of all ages must be accessible, as well as dilution guidelines and charts for the preparation and administration of medications and IV fluids
4. Resuscitation medications, supplies and equipment must be reviewed with each revision of international guidelines
Desirable

1. Mobile pediatric resuscitation trolleys should be immediately accessible wherever a child could deteriorate
2. Staff should be familiarised with the departments equipment and medications
3. Checklists for equipment, supplies and medications should be used, to reduce the risk of missing items
4. Resources to aid preparation of medications should be readily available.
5. Other centres in the regional network should provide expertise and support to their affiliated EDs, in harmonising equipment and medications
6. Medications and equipment should ideally match those used in associated departments (e.g., operating theatres, intensive care unit)

References

3. http://aappolicy.aappublications.org/cgi/content/full/pediatrics;107/4/777

Resources

Readers are asked to view Appendix 1 (checklists of equipment, supplies and medications) and Appendix 2 (Useful Resources) for further information
Chapter 11: Quality and Safety

Introduction

Improving the quality of care and reducing risk can be especially challenging in the ED setting. Achieving optimal patient outcomes requires a sustained commitment to improving care quality and patient safety by healthcare professionals.

While patient safety is related to care quality, the two concepts are not identical. A consensus conference on quality in emergency medicine defined quality as the care health professionals would expect to receive if they were themselves ill. The US Institute of Medicine (IOM) has defined quality as “the degree to which healthcare services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge.” The six domains of quality, as defined by the IOM include:

- Effective – evidence-based care that leads to better outcomes than alternatives
- Efficient – optimal utilization of available resources, avoiding waste
- Timely – accessible and operationally efficient
- Safe – no harm to patients, reduction of medical error
- Equitable – equal access to care and care quality, regardless of demographics
- Patient centered – involve patients (and families) in medical decision-making

Patient safety is defined as “the avoidance, prevention and amelioration of adverse outcomes or injuries stemming from the processes of healthcare.” Patient safety is a concern in all EDs, due to the nature of the environment, such as competing demands for staff, high patient acuity, rapidly changing situations, overcrowding, multiple interruptions, lack of patient familiarity, literacy and language barriers, clinician fatigue and numerous human factors.

The ED therefore needs underpinning processes and “safety net systems” to ensure the individual patient receives high quality, safe care at all times. It is not acceptable to accept a high level of risk or variation in care quality, just because it occurs in an ED. Occasions for medical error and harm to ill or injured patients can often be predicted, or will follow a pattern that can be seen by learning from experience. Policies, procedures and protocols for ED care can improve quality and decrease risk (see Chapter 12).

Differences between children and adults

There is little difference in the approach to care quality and patient safety between adults and children. Caring for children in the ED brings some additional challenges that can increase error.

- Children possess distinct anatomic, physiologic, and developmental characteristics, and may present with conditions that are unique to specific pediatric age groups
- Variation in weight-based medication dosing, age-related vital signs
- Deficiencies in day-to-day readiness in many EDs, such as the absence of key equipment for children of all ages
- Staff in many EDs may have less training and/or on-going experience in pediatric care (see Chapter 4). This gap may require special consideration, over and above the operating framework for adult patients

It is important that pediatric emergency medicine skills and competencies are a component of continuing professional education, that ED staff have timely access to pediatric specialists for advice, and that guidelines for high-frequency and high-risk conditions exist (see Chapter 12). Staff education should incorporate gaps in knowledge which result in risks to pediatric patients.
Continuous Quality Improvement

Quality Assurance

In the 2006 publication “Emergency Care for Children: Growing Pains,” the IOM recommended that the delivery of care should be based on a foundation of scientific evidence. This was based on a review which demonstrated unacceptable variability between EDs, even in a developed country (the U.S.A.). In the ideal model, PEM data are collected so that care providers may then learn from prior experience and improve their performance (See Chapter 13). This data collection allows the on-going monitoring of emergency care to ensure quality. In pediatric emergency care, there is no widely accepted, organized and comprehensive method of measuring quality.

Though the evidence base in pediatric emergency care has steadily grown over the past decade, there remain numerous gaps. As an example, in North America, the UK and Europe, the majority of medications utilized for children in tertiary care settings lack sufficient data for formal pediatric labeling (approved prescribing recommendations). Much like current practices in the delivery of pediatric emergency care, the use of these medications is frequently based upon limited data and/or extrapolation from their use in adults.

Many studies have demonstrated wide variation in clinical practice, even in pediatric academic centers. The growing evidence base in pediatric care has resulted in the publication of evidence-based guidelines. These guidelines can serve to reduce unnecessary variation in care, foster operational efficiency and cost reduction, and improve patient outcomes. Poor awareness and real-life adoption of such guidelines by practitioners remains as a meaningful barrier to their adoption.

All ED facilities should have a plan for the ongoing monitoring of care quality, and goals for quality improvement through regular cyclical change-and-review programs. The review of ED patient care (e.g. unexpected patient care outcomes), care quality monitoring and plans for quality improvement should include services provided for children. Pediatric diagnosis and/or patient specific performance measures are tools that can be used to drive quality improvement.

Patient safety

A common root cause of error and poor emergency care outcomes is failed communication between healthcare providers and gaps in provider-patient/family communication (see Chapter 5). Structured formats for information handoffs and other key communication events (eg. subspecialty consultation), along with efforts to reduce interruptions during these important processes, can reduce error.

Awareness of the presence of limited health literacy and language translation barriers will improve communication with patients and families. Finally, a commitment to family-centered care will also assist efforts to improve care quality and reduce medical error. This is especially true when caring for medically complex children.

Studies suggest that medication dosing in children is an especially error prone activity, whether as a cognitive/manual dose calculation or electronically, unless safeguards are built in (see Chapter 10).

Recommendations

Essential

1. EDs must have a described and implemented program of continuous quality improvement, with regular review of patient safety and quality of care on a cyclical basis, which covers the high risk and high volume areas of pediatric emergency care practice.
Children must be weighed in kilograms, with the exception of children who require emergency stabilization, and the weight should be recorded with the vital signs.

Patient chart reviews must be conducted to identify gaps in knowledge which result in risks to patients; education of staff must take place to close those gaps.

For children who require resuscitation or emergency stabilization, a standard method for estimating weight in kilograms must be used (eg, length-based system).

The quality improvement plan of the ED must include pediatric patient and disease-specific indicators.

Desirable

Processes for safe medication storage, prescribing, and delivery should be established and should include the use of pre-calculated dosing guidelines for children of all ages.

Infection-control practices, including hand hygiene and use of personal protective equipment, should be implemented and monitored.

Policies for reporting and evaluating of patient safety events, including medical error or unanticipated outcomes should be implemented and monitored; training should be given to those who are assigned this responsibility.

Components of the ED pediatric quality improvement plan should interface with pre-hospital, inpatient pediatric, and hospital-wide quality improvement activities.

References

Chapter 12: Policies, Procedures and Protocols

Introduction

The more evolved the Emergency Department, the more policies and procedures it will tend to have. The diversity of practice and the high-risk environment of urgent decision-making means that underlying principles for quality, safety and risk assessment are very important. These areas are covered in Chapter 11.

Policies are useful for staff who do not usually work in the ED or in the field of practice a policy covers, and are most useful if they are locally relevant, with names and contact details. They should ideally be integrated into the patient’s medical record and management (see Chapter 13). Compliance with policies should be monitored and periodically updated to reflect recent medical advances.

Differences between children and adults

In many areas of practice policies and procedures for children may be integrated with those for adults. Specific policies are needed to reflect some of the unique needs of infants and children which staff will find useful, or to cover high risk or difficult areas of practice.

The pediatric emergency care issues that warrant separate policies or procedures include, for example, pediatric vital sign assessment thresholds, triage guidelines, and pain assessment scales, all of which vary with age.

A useful list of specific practice areas where policies are useful can be found in Appendix 2 (Useful Resources). Policies should be up to date with local and international (evidence-based) practice.

Developing guidelines

Initial Priorities for Policy Development

Initial priorities for developing countries with poorly developed emergency care systems should be to create and implement policies around:

- illness and injury triage / initial assessment (see Chapter 6)
- pain assessment and management
- infectious disease (oral rehydration, prevention of cross-infection)
- procedural sedation
- transfer policies and procedures for critically ill and injured children (see Chapters 4, 7)

Stabilization and rapid transport can be life saving and will depend on local resources both from a transport capability (e.g. ground, air) and availability and distance to centers with specialist services. An international Task Force for Pediatric Mass Critical Care recently published recommendations related to care of children in large scale man-made or other disasters that supports the World Health Organization’s recommendations collaboration of staff in military, transport and educational sectors, and established international organizations such as NGOs (Non-governmental Organizations) with areas of the world with few health care resources and personnel. These recommendations could be applied to transfer of critically ill and injured children on a more day-to-day basis (which would also provide an infrastructure and preparation for larger scale events).
Priorities for developed emergency care systems are for more comprehensive policies, as recommended by their own or neighbouring national organisations. Within a regional network, policies should be as compatible as possible (see Chapter 4).

**Clinical Care Guidelines**

There are numerous evidenced-based clinical care or practice guidelines that have been developed for children with various medical and surgical conditions that can promote equitable and effective patient care for children. A full discussion of clinical care or practice guidelines available are beyond the scope of this document but as emergency care systems mature, staff should be educated on these guidelines and monitored for compliance. A list of resources is available in Appendix 2.

In EDs with less paediatric expertise, guidelines should focus on presenting symptoms rather than diagnoses, for example a guideline on “fever”, or on “petechiae and purpura”, and should be careful to be age-specific, for example “difficulty in breathing in children under 2 years” or “fractures in the non-walking infant”.

In EDs with more pediatric expertise, specific guidelines related to diagnosis are more common. In mixed EDs there is less of a need for guidelines where adult patient treatment is similar, for example asthma, but a need for pediatric-specific conditions such as bronchiolitis, intussusception.

**Recommendations**

**Essential**

1. Policies, procedures and protocols must include the issues specific to the clinical care of pediatric patients in the ED
2. ED staff must have access to relevant policies, procedures and protocols, for example those of the depart, hospital, regional network or international guidelines

**Desirable**

1. As the emergency care system matures, emergency care managers should incorporate evidenced-based clinical care/practice guidelines for children, and educate and monitor their staff on their use
2. Policies should be compatible across the regional network
3. Clinical policies should be symptom based unless there is a high degree of pediatric emergency medicine expertise available

**References**


Appendix 2 (Useful resources) contains further information. For clinical practice guidelines, most of the major national colleges have fully accessible guidelines on their websites, eg American College of Emergency Physicians, College of Emergency Medicine (UK), Canadian Association of Emergency Physicians, Australasian College for Emergency Medicine.
Introduction

Around the world, hospitals have a wide variation in the degree of computerization available to help clinical practice. At its basic level, for an ED to function efficiently, it needs to know how many patients are in the ED, how many are high priority, and to be able to create a medical record quickly - potentially from no prior record or information. These functions may be performed on paper or computer based systems.

In developed systems, comprehensive computerized ED information systems serve to streamline operational workflows, service delivery (e.g. patient process tracking, clinical guidelines, electronic prescribing, investigation orders), and to record and analyse basic demographic and episode-related information, to facilitate audit, research and good clinical practice.

Many ED's currently only achieve partial computerization. It should be cautioned that partial adoption of information technology “may actually be counterproductive, leading to decreased efficiency and threaten patient safety”^1. Ideally web based, free-standing devices should be used in the ED. Small devices may be carried by staff, or larger devices can be mobile, on wheels, in a way to prevent theft. Connectivity with biomedical monitoring devices like vital signs monitoring equipment will enhance the care of the critically ill or injured patient.

Differences between pediatric and adult information systems

A lead doctor and lead nurse with experience in pediatric emergency care must be integrally involved in the development and implementation of ED information systems in ED’s which manage children. While much of the successes from the implementation of adult ED information systems can be adapted for children, there is a need for special attention to meet the unique needs of pediatric services.

Examples of where pediatric specific information is important include:
- Registration of official responsible adult, which is important when children may be cared for by non-parents
- Alerts as to previous child protection concerns
- Alerts to children with specific needs e.g. chronic disease, autism
- Immunization status
- Names of patient’s primary care team such as General Practitioner/Family Doctor, and community support worker (if exists) eg school nurse, pre-school support nurse
- Clinical diagnoses unique or common to pediatric patients
- Previous attendances (multiple attendances may be linked to child welfare issues)
- Clinical fields to alert staff to important areas of practice such as pediatric pain scores, family diagram, weight and height

There should be a minimum dataset, which incorporates the specific needs of children. It is usually possible to build pediatric capabilities to existing ED information systems incrementally.
Adapting ED Information Systems for Pediatric Patients

There are pediatric specific recommendations for ED information systems based on the core functions as stated by the Institute of Medicine (IOM), namely that of obtaining demographic data, health information, disease or injury surveillance, electronic communication with health care partners, connectivity for the clinical functions of the ED, research database, and clinical quality improvement.

Over and above this standard data, other information is of particular importance to children.

**Patient identification and demographic information**

- The name of the child and the person(s) with legal parental responsibility and guardianship, or official responsible adult
- the name of person accompanying child to the ED on this episode
- names of primary care staff responsible for the child (important for family-centered care, and may also indicate engagement with health services)

**Risk management information**

Automatic alert systems must be built in for high risk patients, for example:

- repeat ED attendances (either re-attendance following recent episode which is associated with deterioration / missed diagnosis, or an above average rate of ED presentations which is associated with welfare concerns)
- high risk complex medical problems
- those requiring specific treatments
- children in the care of welfare or child protection agencies or with previous highlighted welfare concerns

**Facilitation of ED functions and processes**

**Triage**

Pediatric triage scores (eg vital signs) and pain scales should be incorporated into the triage data. Chapter 6 describes the information which should be incorporated.

**Order management, decision support and patient support**

Children require different clinical decision support guidelines from adults, as they have different diseases, and the same diseases (eg diabetes) are sometimes managed differently. Information specific for pediatric patients should be incorporated for commonly encountered conditions like fever, febrile seizures, gastroenteritis, croup and bronchiolitis. Decision support can be integrated into ED computer systems, but if unavailable, linkage or signposting to online information is useful. Chapters 11, 12 describe how IT can be integrated into policies and guidelines, and contain references and resources for evidence-based guidelines.

If history and physical examination templates are used in the ED, pediatric fields are useful to include important points in the history or clinical examination to look out for. These can be useful prompts for those who are inexperienced in pediatric patient care.

Help with age/size specific drugs and equipment (see Chapter 10) reduces risk, and due to the complexity of this task, electronic support can save time and improve accuracy. Electronic auto-calculation of drug and intravenous fluids dosages based on age and weight in kg is especially useful, particularly in a resuscitation situation. Physician alerts should be built in to warn the prescriber if drug dosage is not within the therapeutic range, or if a drug that is contraindicated in children is prescribed. More complex systems which can contribute to safe electronic prescribing will allow the child’s medical history and allergies to be taken into account.
Results management

Ordering of investigations and results management should be integrated. Pediatric normal values for laboratory test results should be included.

Research and quality improvement

Some pediatric emergency conditions are unique to children, so ED disease codes must include these. In some ED software systems it is possible to customize diagnostic codes. The International Classification of Disease (ICD) codes are available but cumbersome for practical use in an ED, but other resources exist in English⁴ and Spanish⁵.

The emergency department’s pediatric case-mix characteristics, attendance patterns, prescription patterns, and ED resource utilization, can be analyzed through the collection and analysis of pediatric specific data in the ED IT system. This will aid continuous quality improvement (see Chapter 11).

Public Health Case Reporting/ Disease or Injury Surveillance

The ED IT system can be a useful surveillance tool for infectious diseases prevalent in children e.g. measles, influenza or hotspots for accidents in the locality. Many injuries in children are preventable. Data on injury causation (how, when, what, why, where) according to the WHO Injury Surveillance Guidelines⁶ should be incorporated where possible, as surveillance data on injury epidemiology is crucial to guide the promotion and advocacy for childhood injury prevention, which is a major cause of death in children. These ED data can be used to feed trauma registries and motor vehicle crash databases⁷.

Environmental diseases may also be tracked through the system e.g. pollution and asthma. Automated electronic reporting to the relevant public health agency may also be built in. Access to other demographic data e.g. child’s school, may also aid public health agencies to identify outbreaks of disease.

Electronic communication with other health care partners

The ED systems should be able to connect with other systems within the hospital and local healthcare facilities, such as the pre-hospital care system, in-patient information and the child’s primary care team. Information sharing with organizations outside the ED can be difficult, and those relevant for children may need separate links from those routinely connected for adult patients. This is important for integrated health care. In countries with advanced infrastructure for information technology, this is achievable with individual local health networks or clusters, as a starting point.

Arriving patients require urgent treatment, and unless computer systems are linked, there is insufficient time to get information by paper records or telephone / fax. This is especially so for children with chronic medical conditions where the number of practitioners involved in the child’s care can be very high. In the absence of data linkage and accessibility, families themselves should be encouraged to keep information about the child’s health. The American Academy of Pediatrics and American College of Emergency Physicians have jointly developed such forms downloadable from the web⁸. This type of information can exist in the simplest form as a medical alert pocket sized card listing the patient’s chronic medical problems and relevant medications.

Recommendations

Essential

1. The lead doctor and lead nurse with the lead role for pediatric emergency care must be integrally involved in the development and implementation of ED information systems in ED’s which manage children.
2. ED information systems must include special adaptations to meet the needs of pediatric patients
3. ED information systems must have the ability to connect to health information outside the ED
4. Prescribing alerts must be built in to guard against pediatric dosing errors

Desirable
1. ED’s should exploit information technology to achieve full computerization for cost effective patient care, reduce medical errors, and promote patient safety
2. Full electronic connectivity for all ED work should ideally be integrated, from patient arrival to discharge
3. In fully electronic clinical systems pediatric specific templates for history and physical findings should be considered
4. Computerized clinical guidelines and pathways should include information about common pediatric specific conditions
5. The ED computer system should collect sufficient data for disease and injury surveillance
6. Pediatric specific data should be generated to aid clinical quality improvement and research.

References
Chapter 14: Pre-hospital Care

Introduction

Pre-hospital care relates to the Ambulance Based or Emergency Medicine Service (EMS) phase of patient care. Emergency physicians are inevitably involved in pre-hospital care, either by
- being a member of the pre-hospital team, or
- providing advice and training from the ED to pre-hospital staff, or
- being part of the receiving ED team when a patient is brought by ambulance

For the next stage of care in the ED to happen effectively, it is clear that close communication and integration of care pathways between pre-hospital and ED teams is desirable. Chapter 4 describes how the different parts of the network in each region should integrate with each other.

This chapter will discuss only those aspects of pre-hospital care directly related to ED patient care. Chapter 15 discusses the special circumstances of mass casualty incidents.

Differences between adults and children

Children with serious illness or injury are less likely to arrive by ambulance than adults of similar case severity, simply because they are easier to transport, so parents often feel they will arrive at the hospital quicker if they bring the child themselves. Combined with a lower representation in the general population and a lower incidence of serious illness and injury in children compared with adults, pre-hospital staff are exposed to relatively fewer pediatric cases than adult ones. Pediatric calls constitute only 5-30% of ambulance activations (depending on the country).

In addition, most pre-hospital staff receive much less training in the care of children than they receive for adults. As a result, confidence, and sometimes competence, is much less, particularly in common diseases which affect only children e.g. bronchiolitis, croup. Equipment and medication issues often arise because of the different sizes, doses and formulations needed, while carrying space and weight are usually limited in the pre-hospital setting.

Ensuring safe pediatric pre-hospital care

Call initiation rates vary greatly between different countries. Where possible, staff at schools or day care centres should be trained in providing first aid and in activation of pre-hospital services.

On arrival at the scene, pre-hospital staff are often the first clinicians who can recognise evidence and clues of child abuse or neglect (scene awareness). This skill should be encouraged and reporting systems taught to pre-hospital staff, as well as encouragement to promote primary prevention of pediatric illness and injuries.

There are different types of pre-hospital clinicians found in international pre-hospital services. Examples include Medics, Emergency Medical Technicians, Paramedics, Intensive Care Paramedics, Physicians (pre-hospital care doctors), etc. EMS services must define levels of knowledge and performance of skills in assessing and managing sick children across all their staff, and facilitate specific training. In providing training, they should be mindful that confidence and competence is likely to be lower than for adult clinical practice (see above). When describing a pre-hospital service, the specific needs for children include the following components:
Clinical assessment skills

The principles of initial assessment are similar to those described in Chapter 6. For basic level care, the Pediatric Assessment Triangle provides a useful framework to spot a sick child. For more advanced pre-hospital staff a more complete assessment can take place such as the “3 minute toolkit”. Assessment often leads to allocation of a triage category on arrival at the ED. Various models for this, which are relevant for children, are described in Chapter 6.

The core skills needed for pediatric assessment are:

- Eliciting a history from the family or carers and from the child, using age appropriate language
- Dealing calmly with carers or members of the public, who are often under stress or may be emotional, and calming the child, to optimise assessment
- Performing a physical examination appropriate to the age of the child (e.g. a neurological assessment or measuring vital signs)
- Good scene awareness skills to detect situations where a child has been inappropriately put at risk (see Chapter 16)
- Competence in providing first aid and BLS to infants, children and adolescents
- Recognition and basic treatment of common pediatric emergencies and pain
- Skills to transport children safely and comfortably to an appropriate destination (see Chapter 4)

Ongoing refresher training must be available, because pediatric emergencies are less common than in adults.

Medical treatment

All providers of pre-hospital services must define the level of medical treatment their organization expects staff to provide, depending on provider training (e.g. technician, paramedic, physician), travel time and logistics such as space in the vehicle/aircraft. Good clinical decision support algorithms take these variables into consideration.

Children usually have drug doses and fluid regimes calculated on patient’s weight, making rapid calculations difficult. Therefore, for safety, memory aids should be available to assist pre-hospital staff in these calculations, e.g. Broselow® pediatric emergency tape and pocket charts (electronic or printed folders). These should contain common resuscitation and anaesthetic drug dosages and pediatric treatment protocols. Chapters 6, 7 and 10 refer to resources for triage and treatment. Apps also exist for smartphones and tablets.

Equipment also needs to be varied according to size, and carrying capacity must not compromise patient safety. Most important are correct sizes of devices for airway/breathing management, circulation access (including intraosseous devices), equipment for monitoring the patient’s vital signs, and trauma stabilization devices such as neck collars and spinal boards.

Communication between services

Clear communication channels between pre-hospital and hospital sites is the key to good outcomes when transporting sick children to a health facility. This communication includes the following aspects:

- Transport contracts or agreements between the pre-hospital service and the receiving hospitals, based on the local pediatric capabilities available at each destination within the regional network in, i.e. which receiving facilities have the right staff and facilities for the child with that condition e.g. trauma, psychiatry, critical care needs (see Chapter 4)
- Easy to follow protocols for staff on scene to understand which is the best receiving facility for the child
- Pre-agreed variations from the ideal patient pathway, if resources are over-capacity; this usually requires real time information of pediatric capacity across the network
- Standardised formats of relaying clinical information (e.g. advance warning calls to receiving ED’s, in what order the information is relayed such as history, vital signs, and treatment given)
- Sharing of information, research evidence, educational activities quality assurance with ED colleagues, who in turn should proactively support local EMS services

**Recommendations**

**Essential**

1. Pre-hospital (EMS) services must define the level of pediatric skills expected by responding staff

2. All pre-hospital staff should be trained to safely assess, manage, and transport common pediatric emergencies to a pre-defined level within the pre-hospital (EMS) network; this includes scene awareness and calming

3. All pre-hospital responders must be competent in first aid and BLS for infants, children and adolescents.

4. Pre-hospital responders with advanced training must be competent in advanced life support for infants, children and adolescents.

5. All EMS vehicles must carry basic equipment suitable for children of all ages

**Desirable**

1. All pre-hospital staff should have access to memory aids for drugs and treatment algorithms

2. EMS services should standardise and agree with the hospitals in the network, how they will share patient information and which facilities should receive the spectrum of patients they transport

3. ED staff should support EMS services in quality improvement and education for pediatric emergencies

**References**


2. Spotting the Sick Child (UK Department of Health e-learning package) [http://spottingthesickchild.com](http://spottingthesickchild.com)

Chapter 15: Disaster Incidents and Patient Surges involving Children

Introduction

Patient surges occur when the numbers of patients that present for care overwhelm the usual resources allocated for the ED to function. This may involve a random range of age groups, or a particular age group, depending on the circumstances, such as an accident at a leisure event. Some pediatric examples of patient surges could include, winter days when large numbers of pediatric patients present due to respiratory infection, or occasions where several very sick children arrive at once, after a school bus accident or a fire in a building. These events would be best described as local incidents.

In more extreme cases, a regional incident may occur, as might occur during floods. This may escalate to a “mass casualty incident” (MCI). MCIs may result from natural disasters (eg. hurricanes, floods, earthquakes), disease (pandemics), or could be man-made (eg. airplane crash, radionuclear event, acts of terrorism) events. Disaster planning entails the organizational planning for all hazards either manmade or caused by nature.

Disaster / surge incidents are defined as events in which the number and type of casualties surpass the capability of optimal treatment based on existing resources. The magnitude of an incident can be defined by the level of emergency response required to cope with it, rather than the absolute number of casualties. While some incidents may require only extra local resources, others will require regional, national or international resources. Major challenges of medical preparedness for disaster planning include:

- Pre-hospital and hospital preparedness for all the various scenarios
- Assimilation and retention of knowledge amongst healthcare personnel
- Assuring staff protection while caring for contaminated casualties
- Stockpiles of vital equipment and medications
- Planning for children as well as adults

The goal for medical services managing patient surges is to ensure optimal care for all potential causes. The underlying principle is therefore “to do the greatest good for the greatest number”. To achieve this goal, routine priorities may need to be modified depending on available resources, eg extent of resuscitation, deferred treatment, timeliness of surgery, threshold for hospitalization, fewer investigations, increased scope of patient care responsibilities of nurses and paramedics, and onward transfer arrangements.

Differences between children and adults

The delivery of optimal care to the paediatric population during patient surges, and especially during a disaster, requires advance planning, specialized care processes, specific resources, and training beyond what might be required solely for adults.

Unique physiological, physical, and psychological differences in children make them one of the most vulnerable populations during disasters. Children exhibit significantly higher mortality rates in disasters when compared to adults; this risk increases further for children under five years. Important differences making children more vulnerable in disasters / MCIs include:

- Children lack the mental, physical or cognitive ability to react to the situation in the best way
- Their small size increases their chances of sustaining serious head and multisystem organ injuries from blunt trauma
- Children have more rapid respiratory and heart rates that increase their susceptibility to airborne chemical and biological agents
• Children have greater skin permeability and a relatively larger body surface area to mass ratio that increase their susceptibility to chemical and biological agents contacting their skin; this also makes children more susceptible to heat and fluid loss.
• Children can exhibit an incredible potential for resiliency in the immediate aftermath of a disaster, however the effect of witnessing injury or loss of a close relative can have a profound, life-long effect10.
• If separated from parents, children become distressed, difficult to triage and treat, difficult to identify and challenging to reunite with their families. Caring for unaccompanied or orphaned children requires planning considerations for identification, tracking and reunification with family members or other trusted parties.

Unfortunately, evidence shows that disaster plans often fail to address pediatric issues11, and that emergency services both at the pre-hospital and hospital levels often lack the knowledge, skills and equipment to provide optimal care for children. Yet on the other hand, there exists an expectation that during emergencies children should receive at least the same level of care (or greater) as that provided for adults. Many disasters involve children, so they must be incorporated into every stage of disaster planning.

Managing pediatric patient surges / disasters

Successful planning

The key for successful management of paediatric victims is appropriate preparedness. This should include the following components:
• Pre-hospital and hospital preparedness at all levels (local, regional, national, international), for all potential hazards
• Clear identification of facilities that either will or will not receive infants, children and/or adolescents
• Adequate resources (especially equipment and medications) for children of all ages
• Medical and paramedical skills
• Conduction of practice disaster drills with sufficient pediatric victims to test readiness

Clinical management

Triage assessment

The normal challenges of communication and assessment of injuries and physiological parameters (see Chapter 6) are magnified during a disaster. In particular, accurate triage is difficult because conventional scoring systems use adult-based physiologic parameters and may rely upon cognitive and developmental abilities beyond those of young children. An ED may need to use a MCI triage tool that has been modified to reflect unique vital sign ranges, developmental capabilities, and resuscitation recommendations in children, eg JumpSTART11.

When overwhelmed, experience from some centers shows that a rapid visual inspection (see Chapter 6) by a senior member of staff, promotes appropriate casualty triage to the resuscitation area versus a secondary area, and this may have to substitute for measurements such as vital signs in the first instance. The Pediatric Assessment Triangle has been proposed as one such tool which uses visual inspection and can help rapidly triage children.2

Clinical assessment and emergency treatments

On scene clinical personnel should have the knowledge and skills for the initial assessment and stabilization of children (see Chapter 14), although in most MCI situations speed of transfer is paramount.
The normal pre-hospital equipment for children (see Chapter 14) may become depleted if a cohort of similar aged children is affected (eg a school class). Regional networks must have systems to escalate the situation and access stockpiles of pediatric equipment and drugs. The demand for trauma stabilization devices such as neck collars and spinal boards may require adaptive solutions using adult equipment.

**Recommendations**

**Essential**

1. All pre-hospital responders who might attend a disaster scene must be trained to effectively triage and manage children as well as adults
2. Disaster planning must consider children when making hazard vulnerability assessments and case scenarios
3. Designated sites within the hospital for decontamination and management of patients in disasters must consider child casualties
4. There must be pre-planned process to identify and treat unaccompanied children
5. Equipment for disaster victims must include appropriate types and size ranges and quantities for children
6. Emergency medications for disaster victims must include appropriate formulations, administration devices and dosing calculation aids for children, including antidotes and vaccines

**Desirable**

1. Disaster care processes should try to keep children and families together if feasible, and support identification, tracking and timely reunification of unaccompanied children with family
2. Staff training programs for pre-hospital and hospital personnel should include coping with surges in pediatric patients
3. The principles of management of adults in patient surges / disasters should form the basis of pediatric casualty management, recognising the additional psychological difficulties
4. The regional network should collaborate to promote preparedness, and disaster drills involving sufficient numbers of children should test readiness

**References**

Chapter 16: Child Protection and Safeguarding

Introduction

Child abuse is a serious problem worldwide and can affect any child regardless of age, gender, culture, or socio-economic status. Despite the difficulty in detecting cases of potential child maltreatment, emergency clinicians must be able to recognize and manage children presenting as a result of abuse or neglect.

Compared to other health care settings, ED’s more often see patients in crisis circumstances, which are times when child abuse can be more prevalent. ED staff must identify and help such patients. Within the limits of local resources, senior staff should ensure that there is a culture of helping, and an awareness of services in their own area to help such patients.

There are wide societal and cultural variations in the degree of acceptable behaviors towards children, however in most countries abusive relationships and/or circumstances towards children, are not accepted as tolerable. In some countries extremes of abused basic human rights may also be seen, and this should never be tolerated. Article 19 of the UN Convention on the Rights of the Child enshrines the child’s right to be protected from all forms of physical or mental violence, injury, abuse or neglect. The UN Committee on the Right of the Child has recently released a general comment in response to the alarming increase in extent and intensity of violence towards children globally. They preface their document with the statement: “No violence against children is justifiable; all violence against children is preventable.”

Prompt action to safeguard vulnerable children is an essential part of ED practice. Each ED should have a lead doctor and lead nurse with the specific responsibility for advocating the safeguard of children and young people within the ED. This role may be separate or in conjunction with adult safeguarding.

Differences between children and adults

EDs in developed countries often have sophisticated systems in place to detect welfare concerns, and refer to appropriate agencies. In developing countries such systems maybe less clear or in some cases may not exist at all. ED physicians should play a role in advocating for robust, reliable mechanisms to be in place to assist in reporting and investigating cases of suspected child abuse.

In comparison with detecting welfare concerns in adults, children in need of protection are more likely to be “concealed” – in other words an adult may present the child and give a false account of events. Also, legally the child is still in the custody of an adult, so all decisions affecting their welfare need to involve the adults, and very likely, a court of law. Many countries have legal obligations regarding the recognition and reporting of suspected children at risk. Both detection and management of vulnerable children requires a special set of skills and liaison work.

Identifying and dealing with child welfare issues

Defining and detecting safeguarding concerns

Child protection refers to the safeguarding of children from maltreatment such as physical abuse, child neglect, factitious or induced illness (previously called Munchausen syndrome by proxy), sexual abuse, and the emotional effects of poor parenting, domestic violence or
negative effects of parental drug misuse or mental health issues. Many children may be subjected to more than one type of maltreatment.

There is a need to carefully evaluate circumstances such as over-discipline or socio-cultural norms around child care, and to evaluate the effects of poverty and overcrowding in terms of significant, preventable harm.

The ED may be the first opportunity for professionals to detect children needing protection. Although child abuse can be encountered in any child, staff should also be particularly vigilant for families in circumstances with a higher risk, including:

- Poverty
- Overcrowding
- Drug or alcohol misuse
- Chronic illness amongst family members or in the child
- Mental health problems, including post-natal depression
- Domestic violence
- Poor parenting skills
- Family dysfunction
- Social isolation
- Children with physical, developmental or emotional/behavioral disabilities or special needs

The emotional, behavioral and social manifestations of child maltreatment and neglect may not be immediately apparent in the context of the busy ED. The ED staff should also be vigilant for harmful carer-child interactions such as hostility, excessive anxiety, argumentative interactions with family or staff, threatening to remove the child from the ED before medical evaluation is complete, and excessive disciplining of the child in front of staff. Sexual abuse should be suspected if there are injuries around the genitalia, inappropriate sexual behavior, unexplained pregnancy, or sexually transmitted diseases, although sexual abuse frequently presents with no visible evidence.

Fabricated or induced illness should be considered if there is a discrepancy with a recognized clinical picture or response to treatment.

ED information systems must highlight recurrent ED attendances or “at risk” children (see Chapter 13) as many children who go on to experience more serious forms of abuse will often have had previous contact with health services.

If an up-to-date child protection register (list of names) is held by the authorities, that information should be accessible to ED staff. If there is a register this information should be used as an additional piece of information to aid in understanding the circumstances surrounding the child’s presentation to the emergency department. Absence of a child’s name on such a list should not in itself reassure staff.

**Management of suspected cases**

A full discussion of case management is beyond the scope of this text but ED staff should be trained and vigilant to suspect cases based on evidence-based reviews. For any child attending the ED, the first responsibility of medical and nursing staff is to attend to the child’s needs including treatment of injuries and analgesia administration. These aspects should not be delayed because of concerns of possible child abuse. Staff must be trained to identify cases where child abuse should enter their differential diagnosis (see Chapter 9). This includes history (especially mechanism of injury), examination and radiological signs. Senior or expert advice should be sought in the context of:

- repeated injuries/ingestions, and repeated apparent life-threatening events without a medical explanation
- delay in seeking medical help
- unexplained or vague account of injury or injury not matching the child’s developmental capability; for this good communication between health care
professionals and the child and their families is essential; the child’s physical, sensory
and learning disabilities should also be taken into account. False histories tend to
lack detail, or vary each time they are told.

- poor general hygiene or nutrition
- injuries that are multiple or of apparently different ages
- injuries on areas less commonly injured in true accidents, signs of which include
  linear bruising patterns and scalds which are not in a typical splash pattern
- children in cardiac arrest or peri-arrest with no pre-existing illness

It is important to gain the history in a non-accusatory, clear and open manner. If language
barriers exist, a translator must be used. Family members should not be relied upon, in case
of concealment of the truth. Staff should also invite the opportunity for the child to speak to
them alone, and similarly the carers. This may yield useful information.

In many countries, after the initial emergency care has been provided by the ED physician,
detailed workup and follow-up is provided by a specialized child protection team or trained
police professionals. Internal vaginal and rectal examinations are not performed by ED staff
in most countries. Detailed history and clinical examination needs to be coordinated with care
and discretion, so that the patient is not subjected to repeated questioning and examination,
or that the legal case is not jeopardized by possible distortion of the history or examination
which could destroy forensic evidence

**Policies and Procedures**

If ED staff suspect abuse or neglect, local procedures must be followed, and police or social
services informed. It is not the responsibility of ED clinicians to prove a case of child abuse
but there is a duty of care to report suspicions. Such procedures should comply with both
national and local guidelines allowing for consistency in standards but also ensuring they are
locally relevant. Parents or the child’s guardian should have the reasons for further referral
explained in a non-threatening manner.

Clear protocols, supported by simple flowcharts and staff training will improve awareness,
identification and documentation of cases (see Chapter 12). Checklists can be used to prompt
questions and aid detection amongst staff. Photographs may only be taken according to local
policies.

Keeping forensic samples of vaginal/ rectal fluids, hairs, underclothes etc important as part
of the forensic examination but only by an authorized physician or gynecologist. Forensic
examination of the genitalia can be a frightening and uncomfortable experience for the child
and again local policy must be followed.

**Staff training**

In difficult situations involving consent, confidentiality and sharing of medical information, the
ED clinician should be able to access senior advice to cover ethical and legal matters
appropriate to the ED environment and the state / country’s laws.

Senior ED staff should strive to overcome anxieties and discomfort amongst more junior staff,
as part of training and case reflection. The possible challenges may include:
- Lack of confidence in their own knowledge & skills to be able to correctly
  identify child abuse
- Concern about missing a medical disorder which explains the presentation
- Discomfort of disbelieving or suspecting a parent or carer
- Fear of complaints and their own personal safety

**Patient discharge from the ED**

In cases where there are no medical indications for admission to in-patient care, the child or
adolescent must not be discharged to an environment where he or she would have continued
contact with the suspected person, unless a full risk assessment (ideally involving police and
social services) has been undertaken. Where such resources are not available, the ED needs to work closely with the child’s family or extended family to arrange for the most optimal care arrangement.

For patients in need of medical care, there should be clear procedures for admission to a ward, which should include a full handover and transfer of responsibility. A referral and notification system should be established for efficient information exchange to multidisciplinary teams and the relevant agencies e.g. the police, medical social workers, school health visitor / nurse, primary health care team, and child protection officers 24 hours a day.

**Recommendations**

**Essential**

1. Where there is the possibility of child abuse or neglect the first responsibility of ED staff must be to attend to the child’s needs including treatment of injuries and analgesia
2. ED information systems must be configured to identify children attending frequently, and those with known safeguarding concerns
3. A referral and notification system must exist, which is compliant with legal / regional guidelines, and ED staff must be mandated to refer suspected child protection cases via this system
4. All doctors and nurses must be trained in child protection – this includes recognition, initial management, and notification of the right authorities, according to established protocols in the ED the local area
5. Patients must be managed in a culturally appropriate and sensitive manner; if language barriers exist, a translator must be used in safeguarding cases
6. Potentially vulnerable children and young adults should not be discharged from the ED until a place of safety is identified
7. The lead doctor for pediatric issues in the ED must have overall responsibility for ensuring that safeguarding issues are identified by staff and notified correctly; this should be included in the ED’s continuous quality improvement program

**Desirable**

1. Clear protocols, supported by simple flowcharts and checklists, should be available in the ED. This will improve awareness, identification and documentation of cases
2. Forensic photographs should not be delayed (within the confines of local policy) as injuries may change in appearance
3. The ED should have access to sources of information about the child’s welfare

**References**

Introduction

Adolescents are a low user group of Emergency Departments, but are an often neglected group of patients. ED’s often cater for small children and for adults, but adolescents lie in-between, both physically and psychologically. They need care specific to their development and understanding, respecting their autonomy while remembering that they are not fully mature.

In many developing countries the upper age limit for being considered a child is 12-14 years and so the adolescent age group falls into the adult domain. Regardless of whether they are classified as children or adults - adolescents should be acknowledged as having specific issues and needs and these should be addressed and catered for by the ED.

It is also in this age group that issues such as mental health, substance misuse, sexual activity, injuries sustained in anti-social or criminal acts, and abusive situations (bullying, family violence, neglect, etc) often culminate in ED attendance (for example minor injuries), at a stage when skillful input from ED and other staff can prevent future problems. In fact, these presentations can be disruptive to the flow throughout the ED and often require more resources than many illness or injury presentations.

Differences between adolescents and other age groups

Adolescents are vulnerable because they can be perceived as self reliant, reluctant to accept help, and independent. Sadly some adolescents are lonely, depressed, living in unsatisfactory families or peer groups, but reluctant to admit they are not coping. Their need for help and protection often goes unnoticed (see Chapter 16). They often present to ED’s if their behaviour or actions become unmanageable by the people who are deemed responsible to care for them.

Services for this age group can be scarce, as sometimes neither paediatric nor adult services take responsibility for them, and in many countries specific services are usually under-funded and hard to source. As a result, many adolescents wait for many hours for specialist input, or are discharged home with inadequate follow up, or transferred to adult facilities inappropriately, particularly in the areas of mental health or drug / alcohol misuse. The busy and immediate environment of ED impairs the ability of staff to meet these patients’ needs: assessment and management is time-consuming and they often lack patience.

Adolescents with chronic disease often become unstable during these years and present frequently to the ED. This may be due to rapid growth and hormonal changes, or because of non- or poor compliance with treatment. It is also common for them to resent and rebel against their disease (eg diabetes, asthma) because of the impact it has on their lifestyle, and in comparing themselves with their healthy peers.

Improving the care of adolescents in emergency departments.

Assessment of adolescents

If there is space, the ED environment should ideally provide a waiting area specifically for 10-17 year olds, providing some refuge from small, noisy children but protection from the sights and sounds of adult patients. Age appropriate books, magazines, health promotion leaflets should be provided (see Chapter 5).
Clinicians need to combine adult and pediatric skills and competencies for this age group (see Chapter 9). During this time of great change, there is an opportunity to influence adolescents in taking care of their health, if ED clinicians recognise the challenges but respond in a positive, age-appropriate way.

Often specific training for medical and nursing staff is useful, for example to deal with issues of consent / refusal of treatment, and managing difficult issues in the right way (see Chapter 9). An approach to history taking in more complex situations is show in Table 1.

<table>
<thead>
<tr>
<th>Table 1. Approach to history taking in more complex situations: the 6 P’s⁷</th>
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<tbody>
<tr>
<td>1. Pre-existing psychological disorders</td>
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<tr>
<td>2. Precipitants: triggers for presentation</td>
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<tr>
<td>3. Presentation: Why now?</td>
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<td>4. Perpetuation: factors preventing recovery</td>
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<tr>
<td>5. Positives: strengths and resources</td>
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<tr>
<td>6. Preconceptions: belief systems, expectations from ED</td>
</tr>
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The young person will usually wish for autonomy, and staff will require good communication skills and judgement to deal with their immaturity. A prompt, skilful and multidisciplinary approach maximises the best outcome and ensures the adolescent’s and his/her family’s safety, and in some situations that of the general public.

It is important to talk to the child as well as the parent or accompanying adult. During assessment, staff should be respectful of the adolescent’s wish to be regarded and conversed with as an adult, while recognising the immaturity they may have in understanding medical information, seeing consequences of decisions or behaviour, and unexpressed fears about medical treatments.

It is usually in the best interests of the child to involve family members in their care, but the circumstances of each case should be considered in a balanced way, and the legal framework for this should be understood (see below). In many countries, adolescents are permitted to seek and receive healthcare without parental involvement and EDs must maintain confidentiality, except if this is clearly not in the child’s best interests.

If an ED presentation is not straightforward (eg fracture, allergic reaction), it may be useful to remember the child’s likely immaturity in understanding the situation, and to know some tips for engaging them in their own health management.

For those patients who frequently present to EDs, care plans have been shown to improve care by ensuring a consistent and appropriate approach. It is important to use the expertise of the multidisciplinary team (hospital specialist, mental health worker, ED staff, primary care and social services). An electronic alert can be added to the ED computer system to alert staff to the crisis plan (see Chapter 13).

ED staff must be trained to understand their country’s laws, local policies and practical tips for dealing with situations in the ED with respect to:

- the legal, social and professional responsibilities in dealing with this age group
- legal guardianship / responsible adult, and the rights of the child to consent to or refuse treatment
- confidentiality of medical information and sharing information with other agencies
- how to manage safeguarding, welfare or child protection issues (see Chapter 16)
Mental health, behavioural issues, and substance abuse

These issues are grouped together because in real practice it is sometimes impossible, and often unhelpful, to try to separate out the issues. The type and standard of the assessment will depend on the organisation of the department, local protocols and access to specialist opinion.

Underneath the primary problem presented to the ED there may lie underlying problems which staff should be alert to. Typical examples in emergency medicine include:

- Injuries such as a fractured 5th metacarpal or hand wound may represent a punch resulting from anger management issues, frustration, isolation, bullying, family problems.
- Recurrent headache, abdominal pain, collapses, panic attacks, false pregnancy scares etc may signify stress, or abuse.

The HEADSS assessment\(^8\) is a useful screening tool for conducting a comprehensive psychosocial history and health risk assessment with a young person. It provides valuable information about the young person’s functioning in key areas of their life. It is shown in table 2.

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<tr>
<td>E</td>
<td>Education / Employment / Eating Exercise</td>
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<td>A</td>
<td>Activities and Peer relationships</td>
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<td>Drug use/cigarettes/alcohol</td>
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<td>S</td>
<td>Sexuality</td>
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<td>S</td>
<td>Suicide/depression/mood</td>
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In a busy ED, it is also often easy to dismiss a young persons experience with alcohol as “normal adolescent behaviour” but recurrent episodes of intoxication should prompt evaluation for underlying issues such as social / welfare issues (see Chapter 16) or depression. Alcohol and drug intoxication may be “experimental” but if there is a pattern of substance misuse, there are usually underlying causes, which require intervention by virtue of the age of the child.

Acute drug ingestion presents specific challenges and requires emergency clinicians to blend the usual resuscitation measures with psychosocial management by medical staff, social workers, mental health specialists and security personnel. Full assessment should balance identification of both medical and psychosocial issues. Staff dealing with this age group must be trained for awareness of the symptoms and signs of recreational drugs and alcohol. Measurement of vital signs is important, as acute presentations such as diabetic ketoacidosis, hypoglycaemia or encephalitis in this age group may present as behavioural problems and be mis-diagnosed by inexperienced pre-hospital and hospital staff.

Issues such as drug toxidromes, or pregnancy may have to be dealt with before mental health or child protection issues can be fully addressed, although a brief mental health assessment to determine the patient’s capacity to make their own decisions, and a risk assessment of the level of supervision needed (eg nursing or security staff or police) should be part of the initial medical assessment.
The benefits of tranquility and privacy must be balanced against the need for close observation, and possibly restraint. The physical or chemical (eg benzodiazepine) restraint of any patient is often avoidable, but may be deemed necessary in the uncooperative or violent patient to prevent injury and/or distress to the patient, staff and everyone in the ED. Most situations can be managed by staff being calm, friendly, listening and acknowledging the adolescent’s feelings. Restraint should be regarded as a last resort and clear guidelines must be available, as it carries physical risk to the patient. The patient must be continuously monitored with time limited and specific orders.

All episodes of restraint must be clearly documented and include the indications, benefits and that consent could not be obtained because of incapacitation. If medication is used, psychiatric assessment is often delayed to enable the effects on cognition to wear off.

**Onward referral to other services**

Each hospital will have its own age limit for admission to pediatric ward areas. In large hospitals, areas specifically designed for adolescents may be available. If the child is discharged from the ED full communication with professionals already involved with the child must occur. This includes the primary care, mental health and social care teams.

In many countries, admission to appropriate facilities for mental health or drug / alcohol misuse is more difficult to organise. Some countries have a policy for all children under 16 years who present with self-harm to be admitted to a facility where a full thorough psychosocial assessment can be completed. Other countries have a method of urgent outpatient follow-up of these patients. If hospital admission occurs this may be to a general pediatric ward where a specialist child or adolescent mental health team will see the child, and obtain information about their social situation. It is preferable for this age group not to be admitted to an adult mental health or general ward and the regional network should strive to ensure rapid access to a suitable facility, 24 hours a day. If transfer to another facility is needed, guidelines for safe transfer must exist.

The ED should be aware of and provide advice to adolescents about local support in the form of government and non-government / charitable agencies as well as information (eg sexual health, drugs / alcohol, common health problems) available to them (eg leaflets, websites).

**Recommendations**

**Essential**

1. EDs must consider the needs of adolescent patients as distinct from those of young children and of adults
2. Patients who arrive with a mental health/substance misuse problem must receive a timely response by experienced staff to determine the severity of illness, degree of stress and provide medical stabilisation
3. All ED staff must be familiar with legislation surrounding consent, confidentiality and mental capacity of patients under the legal age of adulthood
4. Staff involved in using restraint must be trained to do so, specifically for pediatric patients

**Desirable**

1. Education programmes should include causes, signs and symptoms and optimal management of children with mental ill-health/substance misuse
2. Adequate space should be available for children/families in crisis; and should include a private room with suitable supervision by emergency staff
3. If a child/young person needs to remain in the ED due to an absence of inpatient facilities there should be clear parameters for maintaining comfort and safety of the patient, staff and public.

4. Protocols, clinical pathways and assessment tools to improve care for young people in mental health crisis should be established.

References


Chapter 18: Death of a child in the ED

Introduction

The death of a child is one of the hardest situations for ED and other staff to deal with and requires skill, sympathy, and composure. There are many issues to take into account when considering the termination of resuscitation efforts and the management of death in the ED.

The ED staff have to support the family, and physicians have to give clear information about the death. Adequate record taking is important for medical and/or legal investigations. ED physicians must notify authorities of deaths that may be due to abuse, neglect or any criminal act.

In countries and hospitals that have organ donation programs, emergency physicians have an important role in the first phases of the procedure.

Differences between the death of a child and an adult in ED

Although staff manage death quite frequently in the ED, the circumstances that surround the death of a child constitute one of the most stressful situations in the practice of EM, and one in which not all staff members in EDs have had adequate training. ED staff members must be able to recognize the adverse effects which the death of a child may have on them and take measures to reduce their impact on both themselves and the ED team as a whole.

Presence of family members is more likely to be encouraged for a pediatric cardiac arrest than in an adult. This situation requires planning and managing (see below).

Resuscitation attempts are often more prolonged in pediatric than in adult cardiac arrest but with no evidence to support this practice. Recent guidelines recommend that after 20 minutes of resuscitation, the resuscitation team leader should consider whether or not to stop, based on patient’s history, clinical data, ETCO2 value, and type of rhythm (shockable / non shockable).

In many countries there are more complex procedures post-death in children than for adults. One reason for this, in countries with low child mortality rates, is that sadly child abuse is responsible for a significant proportion of deaths.

Dealing with pediatric death in the ED

Immediate management of death

When a child arrives at the ED in cardiac arrest, then unless the patient has signs of irreversible death, such as rigor mortis and lividity, CPR should always be administered, while accurate facts are obtained. This is because the event is usually unexpected and often sudden.

The way in which ED staff handle a child with a chronic illness and in whom death is expected soon, is different to a child with a sudden unexpected cardiac arrest. In these children, the reason for expecting treatment needs to be determined and handled sensitively. If deterioration occurs during an ED care episode some terminal patients or their families may express the wish to have CPR withheld and though it may be difficult for ED physicians, this wish should be respected in the resuscitation plan. However, advanced directives to withhold
CPR are subject to the laws of each country or state and hospitals should develop policies accordingly. ED staff members are well advised to know these policies and appreciate their implications in practice.

Except in cases of sudden profound hypothermia (usually snow / icy water), resuscitation should not be sustained for longer than 20-30 minutes in the absence of cardiac output at any stage. The prognosis is worse for children than for adults. Even if cardiac output is restored for a few hours, a good neurological outcome is very unlikely. Family presence during CPR is increasingly accepted at many EDs. Although some staff may be reluctant to allow parents to stay by their child during CPR at first, most EDs that overcome this resistance find family presence easy to manage. It is unusual for parents to disrupt the resuscitation team’s efforts.

Decision about presence during CPR is a personal and private decision, deeply influenced by cultural and social opinions about life and death. There is research evidence which indicates that parents (in retrospect) would have preferred to be with their child during resuscitation, even when the outcome was death. Parents who were present during CPR have been reported to feel less anxiety and to better accept the child’s death. During CPR, families should be periodically informed of the status of their child. This is a responsibility which must be explicitly incorporated into the team’s roles. Parents should not be asked to make the decision to cease resuscitation efforts. This is something the ED staff must do. Afterwards, the family should be informed in a sympathetic and firm manner.

In some cases, where death is not sudden but imminent, “end of life care” provision should be offered to these children. There have been advances in the knowledge and skills to perform “end of life care” for adults with terminal illness. The same should be offered to children so that the child’s final hours, if this occurs in the ED, are painless, anxiety free, and the child’s dignity is maintained in the presence of the family. A website listing resources to help this is included in the resources appendix.

Management after death is declared

After death, staff must give clear information to the family about its potential causes, and be willing to answer, patiently and compassionately, any questions the family might have. This should be done in a quiet closed area with comfortable seating, avoiding overloading the family with too much information. It is advisable that a member of the staff (ideally a nurse or social worker) accompany the family all the time they stay in the ED. Families should be given the opportunity of seeing and holding the deceased child, and the staff should respect social, religious, and cultural diversity.

Adequate record taking of the history, physical examination and management of resuscitation is important for understanding the cause of death and to facilitate medical and/or legal investigations in cases of unexpected death or when abuse is suspected. This is particularly true for children in the 0-5 age group, in which the incidence of abuse is high. When there is no obvious cause of death (by preceding events or patient medical history), doctors must take a detailed history of events, which includes the position of the body, the person who found the child, the circumstances surrounding the death, when the victim was last seen alive, etc. Although physicians do not usually ask such questions, they are important in these cases. It can be difficult to remember all the relevant history, examination and investigations, so guidelines and checklists are useful.

ED physicians are responsible for informing the family of the need for an autopsy as well as for notifying authorities (as per the country’s legal requirements), and following child protection policies (when relevant).

The ED staff should also help the family with information on funeral arrangements. Finally, it is important to notify the child’s primary care physician of the death, and work with him/her in follow-up of autopsy results. Hospital administration should be notified, in case there are future appointments pending which should be cancelled.
In countries and hospitals that have organ donation programs, emergency physicians should know their country’s legislation and services, be able to discuss the possibility of organ donation with the family of the deceased patient and to notify organ procurement organizations. This can be achieved through workshops and training sessions.

ED staff must be aware of the potential emotional impact of a patient’s death on themselves, and be able to take some time off from the ED when this impact becomes too stressful. Child death review teams exist in many countries. These are multidisciplinary meetings including relevant police, social services, hospital and primary care representatives, to review cases and autopsy results, and make recommendations of causality as well as any learning from the event for any agencies involved with the child pre-death.

Recommendations

Essential

1. EM physicians must be familiar with the laws of their country and state, in addition to the policies of their institutions, regarding the death of a child

2. CPR must be administered initially (until information is verified) unless there are unmistakable signs of death or there is a legally valid written directive stating no to initiate CPR or other forms or life saving treatment

3. ED senior staff and managers must ensure that their staff members are prepared for and helped with the emotional consequence of dealing with child

4. EM staff must report on any case where death is suspected to be the result of neglect or abuse, to the relevant authorities (Police or other) within the country’s law and institutional policy

Desirable

1. EM staff should respect parents’ desire to remain at the child’s bedside during resuscitation

2. Staff physicians should give families every consideration at the moment of informing them of their child’s death; the place where this is done should be quiet and free of other people.

3. Families should be given the opportunity of seeing and holding the deceased child.

4. A member of the staff should accompany the family while they stay in the ED and help them with funeral arrangements, respecting social, religious, and cultural diversity

5. An ED or pediatric doctor should notify the child’s primary care physician of the death, and liaise with him/her in follow-up of postmortem examination results

6. Policies and checklists for the ED should be available to ensure the taking of adequate records, which are important for medical and legal reasons.

7. Staff training sessions and clinical case discussions should include resuscitation scenarios resulting in death, and ensure staff are confident with death notification, organ donation laws and procedures

References


5. Freyer D. Care of the Dying Adolescent: Special Considerations. Pediatrics 2004;113:381. DOI: 10.1542/peds.113.2.381. In: http://pediatrics.aappublications.org/content/113/2/381.full.html
Chapter 19: Advanced training and academic research

Introduction

Where Emergency Medicine is developed as a speciality in its own right, it is underpinned by academic activity. By this, we mean research to improve patient care, and teaching and training to improve staff competencies. In many countries (eg North America, UK, Australasia, South Africa, Israel) there are full academic departments of Emergency Medicine, coordinating global research. EM is a relatively new speciality, so that the development of academic EM has lagged behind other specialities, but now attracts high level funding and international level research.

There are many international peer-review medical and nursing journals devoted to emergency care, and each year there are many national and international EM conferences held around the world. Over the last 15 years, pediatric emergency medicine has evolved as a sub-specialty, with a growing academic base.

Differences between Paediatric and Adult Academia and Research

The goal of academic PEM is to achieve the advancement of emergency care through education and research, advocacy, and professional development. In general, academic PEM is less developed than academic work and research in the field of general (adult) EM (see Chapter 3). This is for several reasons:

- There are fewer clinicians and academics practising PEM than adult EM
- Ethics applications and consent / confidentiality issues are more complex in PEM
- Difficulties in obtaining informed consent from families to ask for permission for their children to participate in research
- Practical difficulties in obtaining objective measures or outcomes (e.g. pain scoring, symptom rating, physiological parameters, invasive monitoring or blood tests)
- Finding a niche in existing journals and conferences: PEM falls between the 2 areas of paediatrics and EM, and academic and research output can therefore be more challenging to access

In some countries, however, the development of PEM as a sub-specialty has enabled advanced specialised training, academic work and quality research. Future investment in, and commitment to, education, teaching and research in paediatric emergency medicine (PEM) has the potential to improve care and save lives worldwide.

Creating high quality education and research in pediatric emergency medicine

Basic education in Paediatric Emergency Medicine

Chapter 9 refers to aspects of education and training for EDs to train all staff to attain a basic competence in pediatric emergency knowledge and skills. At a higher training level many countries offer extensive curricula and courses (see Chapter 9).

International conferences for EM routinely have pediatric tracks and workshops.
Specialised PEM training programs

These are programs that offer specific curricula in PEM. The goal of these programs is to train pediatric EM specialists who can provide expert paediatric emergency care, supervise others who provide such care, and teach and conduct research focused on improving the care of acutely ill and injured children. In the United States there are over 50 PEM subspecialty or fellowship training programs. There has been a recent increase in paediatric emergency medicine training programs outside of the United States including programs in Canada, Australia and the United Kingdom, and non-speaking English countries, such as Israel or Turkey.

Clinical Education in the workplace

Within the ED, education often occurs during the period of employment, in order to ensure the full range of skills needed (see Chapter 9). This is usually presented by PEM faculty in larger departments in developed countries, offering residents / junior doctors and medical students the opportunity to learn and discuss issues related to various topics in PEM. Where hospitals have PEM trained senior staff, PEM faculty need to provide teaching outside the ED.

Examples include:

- **PEM Seminars/"Grand Rounds".** An educational activity that provides the general hospital staff a forum to present topics in their subspecialty. It also provides the ED an opportunity to communicate what PEM is, as well as discuss controversial issues in PEM, present practice guidelines being developed, and present research projects of the department.

- **Computer-based educational programs.** Self-education created by PEM specialists using specific software developments or internet access to web-based courses or lectures as well as web forums.

- **Formal PED rotations for Fellows, Residents, Medical Students and Junior Nurses.** These rotations provide for training staff additional exposure to paediatric emergencies and to improve management and technical skills. Formal rotations have prescribed learning outcomes in PEM that are expected to be achieved by the end of the rotation, as agreed by PEM specialists.

Teaching Opportunities in PEM

As described in Chapter 9, senior staff with a mandate for education require sufficient protected (non-clinical) time to carry out this duty. They must also have a high standard of teaching skills, and be able to use these skills in a variety of ways such as didactic, informal or opportunistic teaching. There must also be a mechanism to evaluate and provide effective feedback to educational activities provided, and monitor the skills gained by the learners.

Advanced pediatric life support courses, are designed to enable expert care in paediatric resuscitation; these courses should be available to medical and nursing personnel who treat children in any ED.

Research in Pediatric Emergency Medicine

The volume and quality of PEM Research is poor worldwide compared with adult EM research. In order to improve this, PEM subspecialists should be encouraged to seek training in research methodology. Certification in GCP (International Committee on Harmonisation of Good Clinical Practice in Medical Research) is one way to ensure minimum competency in research concepts. Completion of GCP enables practitioners to enter patients into a clinical study (consent process according to local regulations).

Development of a research centre requires the creation of departmental infrastructure and the education of faculty and fellows with the body of knowledge and skills for the conduction of
quality research projects in PEM. This needs collaboration with a university. A key part of the future maturation of the specialty is the training and appointment of PEM academics who can compete with the best in medical academia.

In addition to the development of local/institutional research projects a potential strength of PEM research is the generation of more generalized and clinically important results through participation in multi-center / multi-national studies. For example, national research consortiums include Pediatric Emergency Research Canada (PERC)-Canada, Pediatric Emergency Care Applied Research Network (PECARN) or Pediatric Emergency Medicine Collaborative Research Committee (PEM CRC) – USA, and Pediatric Research in Emergency Departments International Collaborative (PREDICT) – Australia/New Zealand. Research in European Pediatric Emergency Medicine (REPEM) represents an international - European paediatric research forum with PERN acting as global network of all paediatric research networks. As academic hospitals have university affiliation, it is also possible to collaborate with other departments such as epidemiology, statistics and paediatrics. For further information see Appendix 2 (Useful Resources).

There is clear ethical guidance that recognises the need for emergency care studies and enables research in emergency situations\(^7\)\(^9\). The World Medical Association Declaration of Helsinki says “if the research cannot be delayed, the study may proceed without informed consent”\(^10\). There are still some difficulties in translating this underlying ethical principle into national or local regulations, however recent international trials have shown that most countries have a regulatory framework that allows PEM research.

For establishing and conducting a successful academic pediatric ED the following components/ capabilities should be developed and operated:

- **Training.** Provision of formal training in research design and statistics, and on the use of personal computers for managing and writing research.
- **Mentoring.** Faculty member assisting fellows/residents in developing and conducting a research project. The faculty mentor provides advice on study design, data collection, abstract preparation and manuscript writing.
- **Protected Time.** The program director should strive on providing fellows with protected time to conduct research projects.
- **PEM research networks.** In addition to the development of local/institutional research capabilities, there is an option to join national (PERC-Canada, PECARN or PEM CRC – USA, PREDICT – Australia/New Zealand, REPEM – Europe) or international (PERN) research networks for conducting multi-center, multi-national research studies. (networks' websites listed below in references section) (see Appendix 2)

**Recommendations**

**Essential**

1. In order for an ED to be seen as academic, the ED must foster education of PEM to the general health community, and participate in creating publishable research, usually under the umbrella of a university

2. All PEM staff in established PEM training programs must have basic knowledge of best practice in education and research concepts, to further the reputation of PEM as a distinct specialty of medicine

**Desirable**

1. Development of international PEM research networks should be supported to increase the research performed worldwide

2. PEM staff should be given support to learn skills to lead both educational and research activities

3. Senior staff participating in research should be provided with formal training in research design and statistics

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4. Countries with established PEM training programs should assist in training physicians in the specialty worldwide and share best practice.

5. Countries with established EM training programs should incorporate PEM training programs modeled after existing programs (eg the United States, Canada, the UK and Australia).

References


Resources

*Appendix 2 (Useful Resources) contains further information.*
### Chapter 20: Full list of recommendations

<table>
<thead>
<tr>
<th>CHAPTER 3</th>
<th>Challenges facing paediatric emergency medicine</th>
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<tr>
<td><strong>ESSENTIAL</strong></td>
<td>As emergency healthcare systems mature, countries must consider the special requirements of the pediatric patient with respect to environment, equipment and staff skills, ensuring they meet the needs of both the pediatric and adult population of emergency patients. Where EDs see patients of all ages, there must be a lead doctor and lead nurse for pediatric issues.</td>
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<td><strong>DESIRABLE</strong></td>
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<th>CHAPTER 4</th>
<th>An integrated service design</th>
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<td><strong>ESSENTIAL</strong></td>
<td>Pre-hospital, primary care and hospital services for emergency pediatric care must be integrated, and the role and capabilities of each ED within the regional network should be clear and understood. Clear, written guidelines for transfer criteria to specialist pediatric centres must exist, and mechanisms for swift and expert transfer agreed. All EDs must be prepared at all times to deal with initial resuscitation of a child brought in unexpectedly. The ED must be staffed and equipped to deal with the full range of ages and clinical presentations of children that it normally receives. Access to specialist pediatric advice to the ED must exist 24 hours a day (by telephone, telemedicine, internet or in person).</td>
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<td><strong>DESIRABLE</strong></td>
<td>Managerial documents governing regional networks of emergency care should specify which arrangements apply to pediatric patients. Core specialities should be available to assist the ED; these include anaesthesia for all ages of child, critical care, general pediatric medicine, emergency surgery, orthopaedics, and radiology and pathology services.</td>
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<th>CHAPTER 5</th>
<th>Child- and family-friendly care</th>
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<tr>
<td><strong>ESSENTIAL</strong></td>
<td>Child and family centered care (CFCC) must be a priority for staff and managers through clinical practice, staffing, and environmental design. Children must be separated from distressing sights and sounds of other patients, with some separation from the main waiting area for adults. The option of family-member presence must be encouraged for all aspects of ED care. The ED must contain enough child-orientated treatment rooms (depending on the proportion of child ED attenders) with sufficient space to accommodate family members. The ED environment must be safe for children.</td>
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Younger children must have access to nutrition (this includes provision for breast-feeding)

ED staff must give health advice and explanations in clear language and ensure they have been understood, being considerate that the family will usually have responsibility for delivering ongoing healthcare

**DESIRABLE**

Guidelines for medical treatment should be available for balancing the wishes of the child, legal responsibility of the guardian and the child's best interests

The pediatric areas should look attractive to children, and provision of toys, books etc and employment of play specialists should be considered, to facilitate high quality care

Timely access to qualified interpretive services should be available 24 hours a day

Services provided should reflect the cultural context of the family, and encourage families to be involved in patient care decisions.

Communication barriers such as literacy and the educational level of the family should be taken into account when giving health information.

Written information should be available for common conditions, and written in simple language, using diagrams where appropriate, to aid understanding

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**CHAPTER 6**

**Initial assessment of an ill or injured child**

**ESSENTIAL**

Every child arriving at an ED must have a rapid visual inspection very soon after arrival

All staff members (including non-healthcare qualified) must be trained and empowered to alert others to the arrival of a seriously ill child

All ED clinical staff must be highly competent in recognizing the seriously ill or injured child, and recognizing a deterioration in a child's condition

A critically ill or injured child must be moved immediately to a suitable resuscitation area

There must be no barriers to accessing immediate initial assessment by a qualified staff member trained in the recognition of serious illness in children

All patients presenting for emergency care must receive a full initial assessment by suitably staff within 15 minutes of arrival

The choice of an efficient model of initial assessment for children must take into consideration time available, staff skills, casemix and current workload

All children must have vital signs (temperature, respiratory rate and heart rate) measured at initial assessment; blood pressure and oxygen saturations should be included if the child is seriously ill

Drug dosages must be based on an accurate weight

All patients in moderate or severe pain must be have pain relief provided within 30 minutes of arrival

**DESIRABLE**

In countries where malnutrition is prevalent – children should also be visually inspected for signs of severe malnutrition at triage.
For children with special needs, chronic diseases or complex conditions, initial assessment should include a request for priority access to hospital notes and clinical management plans and these children should be prioritised as they are vulnerable.

Initial assessment should include modifications for children presenting with mental health problems, complex disabilities or chronic disease, or suspected child abuse.

**CHAPTER 7  Stabilising and treating an ill or injured child**

**ESSENTIAL**

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<tr>
<td>There must be a defined ‘Resuscitation Team’ of clearly identified staff from within the ED or hospital</td>
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<tr>
<td>All ED clinical staff must be highly competent in basic pediatric life support</td>
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<td>At least one member of staff on each shift must be competent in advanced pediatric life support skills</td>
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<tr>
<td>Staff able to provide advanced airway management must be available within 5 minutes of the need being identified</td>
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<td>Trained staff must stay with a critically ill child until moved to a dedicated critical care environment or recovery happens</td>
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<td>Resuscitation algorithms and equipment should be available in resuscitation areas</td>
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<td>A method for estimating weight for children too unstable to be weighed must be used</td>
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<td>There must be a system for 24-hour consulting with key specialists either on site or remotely, including toxicology information</td>
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<td>The ED must be supported by 24-hour basic radiology and laboratory services</td>
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<td>At discharge, carers must have advice which they understand, for managing their child’s condition and recognising deterioration</td>
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<tr>
<td>All children seen in the ED must be discharged with a discharge letter to keep, and/or a letter sent to their General Practitioner</td>
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**DESIRABLE**

- Following any major paediatric resuscitation a system should be in place for staff and family to be offered debriefing and if required counselling.
- A “difficult airway” cart should be available.
- Parents and family should be given the opportunity to remain present during resuscitation of a child.

**CHAPTER 8  Staffing**

**ESSENTIAL**

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<tr>
<td>ED staff must not work long continuous shifts e.g. more than 12 hours, as fatigue leads to patient care errors and decision making errors; there must also be adequate recovery time between shifts.</td>
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<tr>
<td>Staff numbers must be adequate to allow safe coverage of all areas of the ED where pediatric patients are being cared for, at all times</td>
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**DESIRABLE**

- A core body of medical and nursing should be contracted specifically to the ED full time, for smooth running and high quality of care.
- In larger EDs for mixed-age patients, there should be a core team of
### CHAPTER 9  
**Staff training and competence**

**ESSENTIAL**
- All ED staff must be competent to deal with the full range of illnesses, injuries and age-groups that they are expected to see and understand the differences from adult patients
- Refresher training must be available for staff to maintain their knowledge and skills in paediatric resuscitation
- ED staff must learn to work as a team
- Senior staff must be physically present and available to teach junior ED staff (medical and nursing) while they work.

**DESIRABLE**
- Senior staff who teach juniors whilst they work must not have a full clinical load, so they can ensure that supervision and education occurs in the busy ED environment
- A senior ED doctor and ED nurse must be designated to have the role of creating and managing the ED’s education and training programs
- Staff should also complete educational courses that deal specifically with all aspects of ED work, including advanced resuscitation, teamwork skills, risk management and evidence-based practice
- Individual ED’s should program their learning activities to maximise attendance of ED staff whilst maintaining quality care in the ED at all times
- The education program should incorporate best practice in education, and be delivered by a team of ED staff
- Teaching of all team members should occur as a team, teaching both doctors and nurses together (inter-professional education)

### CHAPTER 10  
**Equipment, supplies and medications**

**ESSENTIAL**
- Every ED must be well equipped and organized with easy access the necessary equipment, supplies and medications needed for the care of acutely ill or injured children of all ages on a 24 hour basis
- Equipment and medications must have a standardized and logical layout, to ensure familiarity for staff, and should ideally match those used in associated departments (eg operating theatres, intensive care unit)
- Pre-calculated resources for common or emergency drug doses and equipment sizes for children of all ages must be accessible, as well as dilution guidelines and charts for the preparation and administration of medications and IV fluids
- Resuscitation medications, supplies and equipment must be reviewed with each revision of international guidelines

**DESIRABLE**
- Mobile pediatric resuscitation trolleys should be immediately accessible wherever a child could deteriorate
- Staff should be familiarised with the departments equipment and medications
- Checklists for equipment, supplies and medications should be used, to reduce the risk of missing items
- Resources to aid preparation of medications should be readily available.
Other centres in the regional network should provide expertise and support to their affiliated EDs, in harmonising equipment and medications.

Medications and equipment should ideally match those used in associated departments (e.g., operating theatres, intensive care unit).

### CHAPTER 11  Quality and safety

**ESSENTIAL**
- EDs must have a described and implemented program of continuous quality improvement, with regular review of patient safety and quality of care on a cyclical basis, which covers the high risk and high volume areas of pediatric emergency care practice.
- Children must be weighed in kilograms, with the exception of children who require emergency stabilization, and the weight should be recorded with the vital signs.
- Patient chart reviews must be conducted to identify gaps in knowledge which result in risks to patients; education of staff must take place to close those gaps.
- For children who require resuscitation or emergency stabilization, a standard method for estimating weight in kilograms must be used (e.g., length-based system).
- The quality improvement plan of the ED must include pediatric patient and disease-specific indicators.

**DESIRABLE**
- Processes for safe medication storage, prescribing, and delivery should be established and should include the use of pre-calculated dosing guidelines for children of all ages.
- Infection-control practices, including hand hygiene and use of personal protective equipment, should be implemented and monitored.
- Policies for reporting and evaluating of patient safety events, including medical error or unanticipated outcomes should be implemented and monitored; training should be given to those who are assigned this responsibility.
- Components of the ED pediatric quality improvement plan should interface with pre-hospital, inpatient pediatric, and hospital-wide quality improvement activities.

### CHAPTER 12  Policies, procedures and protocols

**ESSENTIAL**
- Policies, procedures and protocols must include the issues specific to the clinical care of pediatric patients in the ED.
- ED staff must have access to relevant policies, procedures and protocols, for example those of the depart, hospital, regional network or international guidelines.

**DESIRABLE**
- As the emergency care system matures, emergency care managers should incorporate evidenced-based clinical care/practice guidelines for children, and educate and monitor their staff on their use.
- Policies should be compatible across the regional network.
- Clinical policies should be symptom based unless there is a high degree of pediatric emergency medicine expertise available.

### CHAPTER 13  Information systems and data analysis

**ESSENTIAL**
- The lead doctor and lead nurse with the lead role for pediatric emergency care must be integrally involved in the development and
| Implementation of ED information systems in ED’s which manage children |
| ED information systems must include special adaptations to meet the needs of pediatric patients |
| ED information systems must have the ability to connect to health information outside the ED |
| Prescribing alerts must be built in to guard against pediatric dosing errors |

**DESIRABLE**
- ED’s should exploit information technology to achieve full computerization for cost effective patient care, reduce medical errors, and promote patient safety
- Full electronic connectivity for all ED work should ideally be integrated, from patient arrival to discharge
- In fully electronic clinical systems pediatric specific templates for history and physical findings should be considered
- Computerized clinical guidelines and pathways should include information about common pediatric specific conditions
- The ED computer system should collect sufficient data for disease and injury surveillance
- Pediatric specific data should be generated to aid clinical quality improvement and research.

**CHAPTER 14  Pre-hospital care**

**ESSENTIAL**
- Pre-hospital (EMS) services must define the level of pediatric skills expected by responding staff
- All pre-hospital staff should be trained to safely assess, manage, and transport common pediatric emergencies to a pre-defined level within the pre-hospital (EMS) network; this includes scene awareness and calming
- All pre-hospital responders must be competent in first aid and BLS for infants, children and adolescents.
- Pre-hospital responders with advanced training must be competent in advanced life support for infants, children and adolescents
- All EMS vehicles must carry basic equipment suitable for children of all ages

**DESIRABLE**
- All pre-hospital staff should have access to memory aids for drugs and treatment algorithms
- EMS services should standardise and agree with the hospitals in the network, how they will share patient information and which facilities should receive the spectrum of patients they transport
- ED staff should support EMS services in quality improvement and education for pediatric emergencies

**CHAPTER 15  Disaster incidents and patient surges involving children**

**ESSENTIAL**
- All pre-hospital responders who might attend a disaster scene must be trained to effectively triage and manage children as well as adults
- Disaster planning must consider children when making hazard vulnerability assessments and case scenarios
<table>
<thead>
<tr>
<th>Designated sites within the hospital for decontamination and management of patients in disasters must consider child casualties</th>
</tr>
</thead>
<tbody>
<tr>
<td>There must be pre-planned process to identify and treat unaccompanied children</td>
</tr>
<tr>
<td>Equipment for disaster victims must include appropriate types and size ranges and quantities for children</td>
</tr>
<tr>
<td>Emergency medications for disaster victims must include appropriate formulations, administration devices and dosing calculation aids for children, including antidotes and vaccines</td>
</tr>
<tr>
<td><strong>DESIRABLE</strong> Disaster care processes should try to keep children and families together if feasible, and support identification, tracking and timely reunification of unaccompanied children with family</td>
</tr>
<tr>
<td>Staff training programs for pre-hospital and hospital personnel should include coping with surges in pediatric patients</td>
</tr>
<tr>
<td>The principles of management of adults in patient surges / disasters should form the basis of pediatric casualty management, recognising the additional psychological difficulties</td>
</tr>
<tr>
<td>The regional network should collaborate to promote preparedness, and disaster drills involving sufficient numbers of children should test readiness</td>
</tr>
</tbody>
</table>

**CHAPTER 16 Child protection and safeguarding**

| **ESSENTIAL** Where there is the possibility of child abuse or neglect the first responsibility of ED staff must be to attend to the child’s needs including treatment of injuries and analgesia |
| ED information systems must be configured to identify children attending frequently, and those with known safeguarding concerns |
| A referral and notification system must exist, which is compliant with legal / regional guidelines, and ED staff must be mandated to refer suspected child protection cases via this system |
| All doctors and nurses must be trained in child protection – this includes recognition, initial management, and notification of the right authorities, according to established protocols in the ED the local area |
| Patients must be managed in a culturally appropriate and sensitive manner; if language barriers exist, a translator must be used in safeguarding cases |
| Potentially vulnerable children and young adults should not be discharged from the ED until a place of safety is identified |
| The lead doctor for pediatric issues in the ED must have overall responsibility for ensuring that safeguarding issues are identified by staff and notified correctly; this should be included in the ED’s continuous quality improvement program |
| **DESIRABLE** Clear protocols, supported by simple flowcharts and checklists, should be available in the ED. This will improve awareness, identification and documentation of cases |
| Forensic photographs should not be delayed (within the confines of local policy) as injuries may change in appearance |
| The ED should have access to sources of information about the child’s welfare |
### CHAPTER 17  Adolescents, mental health and substance abuse

**ESSENTIAL**

- EDs must consider the needs of adolescent patients as distinct from those of young children and of adults.

- Patients who arrive with a mental health/substance misuse problem must receive a timely response by experienced staff to determine the severity of illness, degree of stress and provide medical stabilisation.

- Staff involved in using restraint must be trained to do so, specifically for pediatric patients.

- All ED staff must be familiar with legislation surrounding consent, confidentiality and mental capacity of patients under the legal age of adulthood.

**DESIRABLE**

- Education programmes should include causes, signs and symptoms and optimal management of children with mental ill-health/substance misuse.

- Adequate space should be available for children/families in crisis; and should include a private room with suitable supervision by emergency staff.

- If a child/young person needs to remain in the ED due to an absence of inpatient facilities there should be clear parameters for maintaining comfort and safety of the patient, staff and public.

- Protocols, pathways and assessment tools to improve care for young people in mental health crisis should be established clinical.

### CHAPTER 18  Death of a child in the emergency department

**ESSENTIAL**

- EM physicians must be familiar with the laws of their country and state, in addition to the policies of their institutions, regarding the death of a child.

- CPR must be administered initially (until information is verified) unless there are unmistakable signs of death or there is a legally valid written directive stating not to initiate CPR or other forms of life-saving treatment.

- ED senior staff and managers must ensure that their staff members are prepared for and helped with the emotional consequence of dealing with child.

- EM staff must report on any case where death is suspected to be the result of neglect or abuse, to the relevant authorities (Police or other) within the country’s law and institutional policy.

**DESIRABLE**

- EM staff should respect parents’ desire to remain at the child’s bedside during resuscitation.

- Staff physicians should give families every consideration at the moment of informing them of their child’s death; the place where this is done should be quiet and free of other people.

- Families should be given the opportunity of seeing and holding the deceased child.

- A member of the staff should accompany the family while they stay.
in the ED and help them with funeral arrangements, respecting social, religious, and cultural diversity

An ED or pediatric doctor should notify the child’s primary care physician of the death, and liaise with him/her in follow-up of postmortem examination results

Policies and checklists for the ED should be available to ensure the taking of adequate records, which are important for medical and legal reasons.

Staff training sessions and clinical case discussions should include resuscitation scenarios resulting in death, and ensure staff are confident with death notification, organ donation laws and procedures

CHAPTER 19 Advanced training and academic research

ESSENTIAL In order for an ED to be seen as academic, the ED must foster education of PEM to the general health community, and participate in creating publishable research, usually under the umbrella of a university

All PEM staff in established PEM training programs must have basic knowledge of best practice in education and research concepts, to further the reputation of PEM as a distinct specialty of medicine

DESIRABLE Development of international PEM research networks should be supported to increase the research performed worldwide

PEM staff should be given support to learn skills to lead both educational and research activities

Senior staff participating in research should be provided with formal training in research design and statistics

Countries with established PEM training programs should assist in training physicians in the specialty worldwide and share best practice

Countries with established EM training programs should incorporate PEM training programs modeled after existing programs (eg the United States, Canada, the UK and Australia)
Appendix 1: Checklists for pediatric equipment, supplies and medications

The following lists are suggestions compiled from several sources. Other lists do exist (see Appendix 2 Useful Resources).

### Pediatric specific medications and equipment will be in underlined italic.

**Drugs and equipment for resuscitation and stabilization areas.**

**Immediate Availability in Standardized Resuscitation Carts**

Epinephrine (Adrenaline) 1:10,000
Epinephrine (Adrenaline) 1:1,000
Adenosine
Atropine sulphate
Lidocaine 1% (lignocaine)
Amiodarone
Calcium chloride 10%
Sodium bicarbonate 4.2% and 8.4%
Nebulisable beta agonist (salbutamol, albuterol, or terbutaline)
Nebulised Budesonide
Hydrocortisone
Furosemide (frusemide)
Antibiotics customised to local microbiology
Rectal diazepam 5mg and 10mg
diazepam, lorazepam and/or midazolam
phenytoin sodium
phosphenytoin
IM paraldehyde
Dextrose 10%, 50%
Naloxone

**Drugs for procedural sedation and analgesia, and rapid sequence intubation**

Etomidate
Midazolam
Thiopental (thiopentone)
Suxamethonium
Propofol
Rocuronium, Vecuronium, Atracurium
Ketamine
Morphine
Nitrous oxide

**Drugs for post–resuscitation stabilization**

Adenosine
*Alprostadil (prostaglandin E1)*
Aminophylline
Amiodarone
Dobutamine
Dopamine
Digoxin
Diuretic- Frusemide
Flumazenil
Soluble Insulin
Beta Agonist eg. salbutamol
**Mannitol 10% and 20%**
Midazolam
Norepinephrine (noradrenaline)
Propranolol
Magnesium sulphate
Procainamide
Parenteral antibiotics
phenytoin
phenobarbitone
**Antidotes**
**Antihypertensives**

**High Alert Medications Kept Separately**
KCL 7.45%
NACL 20%
MGSO4 49.3%
NACL 3%
HEPARIN 1000U/ML
Hemostatics – systemic, topical, Factor 8, 9, Fresh Frozen Plasma/ Platelets

**Drugs for treatment in the ED**

Note: These medicines may need not be stocked within the ED, but should be readily available when needed on a 24-7 basis.

**Antidotes ( e.g. N Acetylcysteine, Glucagon, Calcium Gluconate)**
**Antivenins (with charts and administration and preparation dilution guides to guide infrequent usage)**
**Antihistamines**
**Anti-infective agents – systemic/ topical - may also include;**
- pediatric formulations of post –exposure prophylaxis (PEP) for presumptive treatment of sexually transmitted infections, including Neisseria gonorrhoeae (cefixime) and Chlamydia trachomatis (Azithromycin), and prevention of transmission of HIV (zidovudine and lamivudine)
**Antimalarials in endemic areas. Fixed-dose antimalarial combination artemether + lumefantrine (20 mg + 120 mg tablets for infants and children weighing 5–14 kg), artemether injection (20 mg/ml), for the treatment of malaria due to Plasmodium falciparum**
**Anti-inflammatories – steroidal and non-steroidal**
**Anaesthetics – topical, infiltrative,**
**Antiemetics: Ondansetron/ Domperidone**
Activated charcoal
**Antacids**
**Analgesics - topical, oral and parenteral – narcotic and non narcotic**
**Antipyretics**
Benztropine/ Diphenhydramine IV for oculogyric crisis
Bowel evacuants/ laxatives
Bronchodilators
Emergency contraception ( PEP for victims of sexual assault)
Haloperidol
**Oral Replacement Solutions**
Proton pump inhibitors
Zinc sulfate (20 mg dispersible, tablets), and oral rehydration salts (ORS) sachets ( developing countries)
Vaccines and Toxoids e.g. tetanus toxid, Rabies vaccine and immunoglobulin*

**IV infusion fluids – various types, including electrolyte replacements, including compound solution of sodium lactate**

**EYE / ENT / External Preparations:**
Amethocaine 1% (minsims)
Oxymetazoline
Sodium Chloride 0.9% eye drops
Co-phenylcaine Forte spray (50ml)
Fluorescein
Chlortetracycline 1% eye ointment / Chloramphenicol eye drops
Chlorhexidine 0.05% (100ml)
Chlorhexidine 4% scrub (500ml)
Chlorhexidine handrub (500ml)
Blood Glucose test strips
Lignocaine 2% jelly
Povidone iodine solution
Surgical lubricant 42g
Silver nitrate sticks
Silver Sulphadiazine
Topical anaesthetic cream (EMLA 5% / Amethocaine)

**Equipment**

**General Equipment :**

*APLS/good practice algorithms*

Organized emergency trolley / cart

*Printed drug doses/ equipment size tape or tables.*

Clock with second hand

*Weighing scale for infants and children (preferably electronic, in kilograms only, without concurrent readings in pounds to minimize risks of errors)*

*Pediatric Specific Resuscitation and monitoring charts: vital signs, GCS scores, Equipment, Drugs stat doses and infusion.*

*Pain scale assessment tools appropriate for age.*

*Patient warming device*

Intravenous blood/ fluid warmer

XRay view box or PACS computer system

Eye chart

Pliers and Wire cutters – for removal of rings and stuck zippers

**Equipment for secondary and tertiary level ED.**

Slit lamp with tonometer – handheld portable, and standing non-portable

Portable ultrasound with vascular Doppler

Fluoroscopy for fracture reduction

*Continuous nitrous oxide equipment with scavenger capabilities*

**Monitoring equipment:**
ECG monitor/defibrillator with paediatric paddles and pads, 0–400 joules, external cardiac pacing capabilities and hard copy capabilities

Pulse oximeter (with adult/paediatric probes)

Noninvasive blood pressure monitoring with appropriate sized cuffs (infant, child, adult, thigh)

Digital axillary, rectal and tympanic membrane thermometer. (+ Hypothermia thermometer for ED’s in temperate countries)

Otoscope, ophthalmoscope

Stethoscope

Cardiopulmonary monitor

Access to 12 lead ECG

Portable continuous end tidal CO₂ monitoring device*

Doppler Ultrasound devices*

Arterial/capillary blood glucose monitor*

Access to blood gas machine*

Bedside blood gas / electrolyte test machine

Rapid diagnostic tests (RDTs) for suspected malaria in endemic areas

**Airway Control/Ventilation Supplies and Equipment**

Self inflating Bag-valve-mask device: paediatric (500 mL), and adult (1000/2000 mL) with oxygen reservoir, infant, child, and adult masks

Oxygen delivery device with flow meter

Clear oxygen masks, standard and non-rebreathing (infant, child, adult)

Nebuliser masks child and adult

Space chamber for delivery of metred dose inhaler medications with appropriate size masks

Nasal cannula (infant, child, adult)

Oropharyngeal airways (sizes 0–5)

Suction devices-catheters 6–14 fr yankauer-tip

Nasopharyngeal airways (infant, child, adult)

Nasogastric tubes (sizes 6- 18 fr)

Laryngoscope handle and blades: curved 2,3; straight or Miller 0,1,2,3

Endotracheal tubes: uncuffed (2.5 and 3.0), cuffed or uncuffed (3.5 – 5.5), cuffed (6.0 – 8.0)

Stylets for endotracheal tubes (paediatric, adult)

Lubricant, water soluble
Magill forceps (various sizes)

Laryngeal masks airway (size 1, 1.5, 2, 2.5, 3, 4, and 5)

Tracheostomy tubes (shiley sizes 0–6)

Oxygen hoods

Oxygen blender

Paediatric ventilators*

Closed Chest drainage set

Emergency thoracotomy instruments and supplies, chest tube sizes infant: 10-12 F, children 16/24F, adult 28-40F

Cricoidotomy set

Vascular Access Supplies and Equipment

Note: All vascular access supplies should be disposable, single use.

Butterflies (19–25 gauge)

Needles (18–27 gauge)

Intraosseous needles (pediatric and adult sizes)

NOTE: 1st choice needle for intrasosseous infusion is a purpose-made IOL needle but if these are not available - alternatives must be present - 2nd choice is the 18G bone-marrow aspiration needle; 3rd choice is the 18G short spinal needle and last choice is 18-21G plain needle.

Catheters–over-the-needle devices for intravenous lines (14–24 gauge)

Cardiac compression board

Arm boards for immobilization of IV site (infant, child and adult sizes)

IV administration sets and extension tubing with calibrated chambers, with ability to regulate rate and volume of infusate.

Umbilical vein catheters (3.5F and 5.0F)

Central Venous Catheters (4.0 – 7.0 Fr) and kits

Paediatric infusion pumps

Syringe drivers

I.V. fluids

Lumbar puncture set

Urinary catheters: Foley 6–18 Fr

Fracture immobilization

Cervical Collars – hard and soft, pediatric sizes
Spinal board (child/adult)
Femur splint (child/adult)

Extremity splints

*Cast and splint application supplies and equipment (various sizes)*

Cast cutter, cast spreader

*Crutches (various sizes)*

**Sterile procedure sets and instruments**

*Lumbar Puncture sets with infant and pediatric (22 gauge), and adult (18-21 gauge) lumbar puncture needles *(LP’s not done in the ED setting in some places)*

*Difficult airway : laryngeal mask airways, needle cricothyrotomy supplies, surgical thyrotomy kits (various sizes)*

Tube thoracostomy tray.

*Urinary catheterization kits and urinary catheters (in dwelling) : 6-22 French*

*Newborn delivery kits, including equipment for initial resuscitation of the new born, umbilical clamp, scissors, bulb syringe, towel, transparent cling wrap (for maintenance of body temperature in premature infants during transportation)*

Incision and Drainage sets

Dressing sets

Toilet and Suture Sets (standard, and fine instruments for repair of facial and finger wounds)

Sexual assault evidence-collection kits

Dental sets – complexity of equipment depending on the level of paediatric dental capabilities and support

*Eye Speculums (various sizes)*

*Demarre eye Retractors*

Tarsal Cyst forceps

Jobsen’s ear probes

*Nasal speculums (various sizes)*

Squire’s Hook

Magill’s suction tubes

Frazer Suction Tubes (size 3-10 Fr)

*Tilleys' forceps – various sizes for removal of foreign bodies*

Laryngoscopic mirror (also known as Dental mirror)

## Pediatric specific medications and equipment will be in underlined italic.
Appendix 2: Useful Resources

CHAPTER 3 Challenges facing paediatric emergency medicine


CHAPTER 4 An integrated service design


CHAPTER 5 Child- and family-friendly care


Emergency Nurses Association. Family-centered care tool for the emergency department. [http://www.ena.org/IQSIP/Practice/Pages/PedCare.aspx]


CHAPTER 6 Initial assessment


South African Triage Scale: [http://emssa.org.za/sats/]


Canadian Paediatric Triage and Assessment Scale. [http://caep.ca/resources/ctas]


Spotting the Sick Child (UK Department of Health e-learning package) [http://spottingthesickchild.com]

CHAPTER 7 Stabilization and treatment


Spotting the Sick Child (UK Department of Health e-learning package) [http://spottingthesickchild.com]

CHAPTER 8 Staffing

Standards for Children and Young People in Emergency Care Settings (third edition) 2012. Royal College of Paediatrics and Child Health. [www.rcpch.ac.uk/emergencycare]

American Association of Pediatrics policy statement on Care of Children in Emergency Departments, 2009, Krug S, Gausche-Hill M. Guidelines for care of
CHAPTER 9    Staff training and competence


Spotting the Sick Child (UK Department of Health e-learning package) http://spottingthesickchild.com

Resuscitation courses and online resources about resuscitation

- http://www.alsg.org/en/?q=apls
- http://www.heart.org/HEARTORG/CPRAndECC/HealthcareTraining/Pediatrics/Pediatric-Advanced-Life-Support-PALS_UCM_303705_Article.jsp
- http://www.heartandstroke.com/site/c.ikIQLeMWjTE/b.3484049/k.9A5F/CPR_courses.htm#PALS
- http://www.advancedlifesupport.co.za/course04_PALS.cfm
- http://www.aplsonline.com

“How to Teach” resources


CHAPTER 10    Equipment, supplies and medications (see also Appendix 1)


CHAPTER 11 Quality and safety


CHAPTER 12 Policies, procedures and protocols

http://www.acep.org
http://www.acem.org.au
http://www.collemergencymed.ac.uk
http://www.caep.ca

CHAPTER 13 Information systems and data analysis


CHAPTER 14 Pre-hospital care


Spotting the Sick Child (UK Department of Health e-learning package) http://spottingthesickchild.com

CHAPTER 15 Disaster incidents and patient surges involving children
AAP Disaster Website. Children & Disasters. Disaster preparedness to meet children’s needs. Available at: http://www.aap.org/disasters/index/cfm

National Commission on Children and Disasters. 2010 Report to the President and Congress. Available at: http://archive.ahrq.gov/prep/nccdreport/


Planning, Response, and Recovery Efforts. Available at: http://www.aap.org/advocacy/releases/opinionpoll102210.htm


CHAPTER 16  Child protection and safeguarding


Systematic reviews of bruising, fractures, head and spinal injuries, oral injuries and bites. Cardiff Child Protection Systematic Reviews (Core Info). http://www.core-info.cf.ac.uk

CHAPTER 17  Adolescents, mental health and substance abuse


CHAPTER 18  Death of a child in the emergency department


CHAPTER 19  Advanced training and academic research

Examples of curricula in paediatric emergency medicine:
ACEM/RACP joint training program in paediatric emergency medicine for Aust/NZ

ACGME Program Requirements for Graduate Medical Education in Pediatric
Emergency Medicine in USA
(accessed 11 Dec 2011).

Royal College of Physicians and Surgeons of Canada: Subspecialty Training
Requirements in Pediatric Emergency Medicine:

UK College of Emergency Medicine: Paediatric subspecialty training curriculum

Curriculum for Paediatric Training Paediatric Emergency Medicine Level 1, 2 and 3
Training, CEM and RCPCH, 2010.

A Framework of competences for Level 3 training in paediatric emergency medicine, RCPCH, 2008.
http://www.rcpch.ac.uk/sites/default/files/Framework%20of%20Competences%20Level%203.pdf

International Federation for emergency medicine model curriculum for emergency

Research networks for PEM

PERC – www.perc.srv.ualberta.ca
PERCARN – www.pecarn.org,
PREDICT – www.pem-aunz.org/PREDICT
REPEM – www.eusem.org/paediatric section
PEM - CRC – www.pemcrc.org