Objectives of Training and Specialty Training Requirements in Pediatrics

Adopted by Council, September 1998

(Please see also Policies and Procedures for Certification and Fellowship.)

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Definition

Pediatrics is that branch of medicine concerned with the study of infants, children and adolescents in health and disease, their growth and development, and their opportunity to achieve full potential as adults.

General Objectives

A pediatrician is a specialist trained in the diagnosis and treatment of a broad range of diseases involving children based on a sound knowledge of normal growth and
development and of the wide range of clinical conditions encountered in infants, children, and adolescents. On completion of the educational program, the graduate physician will be competent to function as a consultant pediatrician in the essential roles and key competencies of pediatricians, that is — medical expert/clinical decision-maker, communicator, collaborator, manager, health advocate, scholar and professional. This requires the physician to have acquired the knowledge, skills and attitudes as indicated in the General Educational Objectives for Pediatrics through coordinated learning experiences organized under the aegis of a university department of Pediatrics. This will have included both the necessary practical clinical experiences and formal educational activities. Through his/her training and as indicated in Section 1 Specialty Training Requirements, the resident will have acquired a degree of independent responsibility for clinical decisions and an understanding of the nature of the relationships between a referring physician and a consultant clinical pediatrician. Following certification in Pediatrics, the resident will be prepared for independent practice.

General Content of Core Training

The resident will have had an adequate experience in both the in-hospital services and the ambulatory facilities of a children's hospital or of the pediatric department of a general hospital. A portion of the training must include experience and study in the comprehensive care of children with physical and psychosocial challenges. The resident will learn the skills to work collaboratively with and to provide consultation to other medical and health disciplines dealing with infants and children, especially with psychiatry, surgery and obstetrics. The resident will acquire the professional attitudes to work with other health disciplines in a variety of health care service models. The resident will develop the skills of a self-directed, life-long learner. The resident will learn the skills to critically appraise both his/her practice as well as the practice of pediatrics.

Specific Content

The resident will have been registered in an accredited pediatric postgraduate residency program. The resident will have had experiences in core general pediatrics and in the various pediatric subspecialties, in both in-patient and ambulatory settings. Core pediatric training must include rotations in critical care pediatrics, emergency pediatrics and neonatology. In order to assure an adequate breadth of training, maximum experience in any one subspecialty or discipline must be limited to six months during the three core years under Section 1. The resident will learn to set his/her own educational goals and will have had opportunities for elective experiences outside of the core training program, the essential feature being that these must be arranged with the understanding and approval of the postgraduate program director.

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Specialty Training Requirements

Four years of approved residency which must include:

Section 1: Three core years of approved residency in pediatrics with appropriate experience in pediatric subspecialties and increasing responsibility, to include a senior supervisory year during which the trainee is regularly entrusted with the
management of ward and/or ambulatory patients, including the most complex problems in pediatrics, with responsibility for supervision of more junior trainees, with the resident reporting directly to a staff pediatrician;

and

**Section 2:** One year of approved residency that may be spent in:

i. one year of residency training approved by the program director and the College that might be: an additional year of general pediatrics; in clinical or basic research in pediatrics; or in a special area of pediatrics in an accredited residency program;

ii. one year in the full-time study of basic science in a university department if this training is taken during or following medical school, relevant to the objectives of pediatrics and acceptable to the director of the training program and to the College.

iii. one year in an approved course of study and training which may include a year of residency training in another Royal College approved program, and relevant to the objectives of pediatrics, and acceptable to the director of the pediatrics residency program and to the College.

**Note:** A maximum of six months credit towards training in Pediatrics, as outlined in Section 2, for other relevant training in Canada or the United States during or following medical school may be given at the request of the pediatric program director to the Credentials Committee, with the advice of the Pediatric Specialty Committee.

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**General Educational Objectives for Pediatrics**

A broad educational experience in Pediatrics is essential if residents are to understand infants, children and adolescents in health and in sickness, and if they are to deal effectively with their physical, mental, emotional and social problems.

Educational objectives of such a basic and fundamental nature, relating to all or many aspects of Pediatrics, are classified under the headings of the **Essential Roles and Key Competencies of Pediatricians** which encompass knowledge, skills, and attitudes.

The resident will demonstrate a variety of personal attributes which are relevant to the broad range of clinical work with pediatric patients and their families. These important attributes which apply in all pediatric settings are described below and are not repeated for each special area. For certain clinical fields, specific additional points regarding attitudes are incorporated within the appropriate section.

Residents must demonstrate the knowledge, skills and attitudes relating to gender, culture and ethnicity pertinent to Pediatrics. In addition, all residents must understand the necessity to incorporate gender, cultural and ethnic perspectives in research methodology, data presentation and analysis.
Essential Roles and Key Competencies

1. Medical Expert / Clinical Decision-Maker

Pediatricians possess a defined body of knowledge and procedural skills which are used to collect and interpret data, make appropriate clinical decisions and carry out diagnostic and therapeutic procedures within the boundaries of their discipline and expertise. Their care is characterized by up-to-date ethical, and cost-effective clinical practice and effective communication in partnership with patients, other health care professionals, and the community. The role of medical expert/clinical decision-maker is central to the function of pediatricians and draws upon the competencies included in the roles of scholar, communicator, health advocate, manager, collaborator, and professional. In this role, the resident will demonstrate diagnostic and therapeutic skills for ethical and effective patient care.

1.1. Knowledge of normal body structure and function as expressed in a biopsychosocial model of human development. The resident will understand the normal human anatomy, physiology and psychology with emphasis on physiological and psychological changes during growth and development.

1.2. Knowledge of disturbed body structure and function
The resident will understand the pathophysiological and psychological processes underlying departures from normal.

The resident should therefore be able to recognize, diagnose and manage;
1. the normal healthy state
2. the natural course of pediatric problems, variations in and deviations from the normal

1.3. Knowledge of promotion and maintenance of optimal functioning in biological and psychological aspects. This will include knowledge of therapy in its broadest sense, to include life-style, dietary, nutritional, physical and drug therapies. The resident will demonstrate the ability to access and apply relevant information to clinical practice.

1.4. Interviewing and communication skills
The resident will be able to establish a professional relationship and to interact with the patient (infant, child or adolescent) and parent, guardian or other care giver in order to obtain a history, to conduct a physical examination and to provide ongoing care. The pediatric resident will establish an atmosphere of open communication appropriate to the situation and will convey interest, sensitivity, empathy and support.

1.5. History taking skills
The resident will be able to obtain and record a complete history including:
  o identifying data and date of contact
  o reasons the patient was brought for or sought medical help (chief complaint)
  o the important symptoms in sufficient detail to provide a clear picture of the clinical problem(s) - history of present illness
  o all other important information from the past history, perinatal history,
developmental history, medications, allergies, review of systems, family history, and social history

1.6. Physical examination skills
The resident will carry out an efficient, orderly physical examination, demonstrating sensitivity to the patient's needs, modified according to the patient's age, gender and problem, and record this information by regions or systems.

1.7. Problem Solving and Decision Making
The resident should demonstrate the ability to correlate, evaluate, prioritize and synthesize information, including the relevant ethical issues, acquired by interview, history taking and physical examination. The resident should recognize and define problems (formulation) and generate a differential diagnosis and problem list.

The resident will be able to demonstrate the ability to manage problems by:
- appropriate application of knowledge derived from critical appraisal of the literature
- formulation of a problem oriented plan of management
- generating a rational plan of diagnostic and therapeutic measures with use of information on cost benefit ratios
- interpretation and modification of a plan of management with explanation and ongoing communication with parents and child
- participating suitably in multi-disciplinary group discussion, initiating or facilitating as required
- maintaining confidential information as appropriate
- evaluating and modifying management plans by periodic reassessment of the patient's progress
- ensuring proper recording of care and its effectiveness
- participating in medical quality assurance activities to review quality of care issues in provision of health care.

1.8. The resident should demonstrate effective consultation skills in presenting well-documented assessments and recommendations in written and/or verbal form in response to a request from another health care provider, with respect to patient care, education and legal opinions.

1.9. The resident should recognize personal limitations and demonstrate a willingness to call upon others with special expertise and make referrals where appropriate.

1.10. Technical Skills
The resident must demonstrate knowledge and skills required for the safe and efficient practice of the following procedures.
- intravenous access and blood-drawing
- umbilical venous and umbilical arterial catheterization
- arterial puncture
- suture of a one layer laceration, simple wound closure
- cardiopulmonary resuscitation (newborn and child)
- tracheal intubation (newborn and child)
- lumbar puncture
- bladder catheterization and/or suprapubic aspiration
- gastric tube placement (oro or nasogastric)
- intraosseous insertion, chest tube placement and thoracentesis as
demonstrated in either a patient or model

The resident should also have knowledge and proficiency of the specific technical skills as outlined in the Systems-Based Educational Objectives.

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2. Communicator

To provide humane high quality care, pediatricians establish effective relationships with patients, other physicians and other health care professionals. Communication skills are essential for the functioning of a pediatrician and are necessary for obtaining information from, conveying information to patients and their families and establishing therapeutic relationships with patients and families. Furthermore these abilities are critical in eliciting patients' and/or families' beliefs, concerns and expectations about their illnesses, and for assessing key factors impacting upon patients' health. (See also Objectives 1.4. & 1.5.)

2.1. Communication Skills
The resident will be able to demonstrate the ability to:
   o listen effectively and obtain and synthesize relevant history from patients, families and communities
   o communicate effectively and discuss appropriate information with patients and families and all members of the interdisciplinary health care team
   o educate patients, families and health care professionals in formal and informal educational settings
   o present the patient's problem(s) clearly, concisely and correctly, in the following ways:
     - verbally, in the clinical setting or formal presentation
     - in a written medical record (in standard or problem oriented form) or consultation report

2.2. The resident will demonstrate caring and empathy for patients and their families, and especially for those individuals who are vulnerable.

2.3. The resident will give close attention to the impact of such factors as age, gender, disability, ethnocultural background, social support, and emotional influences on a patient's illness.

2.4. The resident will demonstrate respect for individual patients, families, colleagues and for their value systems which may be different from the resident's own values.

2.5. The resident will demonstrate an appreciation of the parents' perspective of and concerns for a child's health and the impact of a child's illness on family relationships.

2.6. The resident will demonstrate a willingness to communicate effectively with patients and families and all members of the interdisciplinary team.

2.7. The resident will demonstrate an ability to support and counsel a child (and his/her family) with chronic illness and/or impending death and provide
bereavement counselling.

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3. Collaborator

Pediatricians work in partnership with others who are appropriately involved in the care of children and adolescents. It is therefore essential for pediatricians to be able to collaborate effectively with patients, their families and a multidisciplinary team of expert health professionals for provision of optimal patient care, education, and research.

3.1. The resident will demonstrate a capacity to establish and maintain a productive and responsible relationship with young patients and families, and a capacity to establish and maintain cooperative interpersonal relationships with a multi-disciplinary team and thus contribute effectively to other interdisciplinary team activities.

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4. Manager

Pediatricians function as managers when they make every day practice decisions involving resources, co-workers, tasks, policies, and their personal lives. They do this in the setting of individual patient care, practice organizations and in the broader context of the health care system. Thus pediatricians require the abilities to prioritize and effectively execute tasks through teamwork with colleagues, and make systematic decisions when allocating finite health care resources. As managers, pediatricians take on positions of leadership within the context of professional organizations and the dynamic Canadian health care system.

4.1. Provision of Health Care

The resident will be able to demonstrate the knowledge of various forms of health care provision and to work effectively and efficiently in a health care organization, including the following:
  o an understanding of the importance of the families' (parents' and child's) involvement in the provision of health care to the child
  o the role of a pediatrician in the provision of preventive and therapeutic health care, based on sound scientific evidence
  o the importance of shared responsibility for health care provision in a multidisciplinary setting
  o the advantages, disadvantages and relative costs of preventive and therapeutic health care programs
  o the advantages, disadvantages and relative costs of care in different settings, including an appreciation of the various forms of health care provision, including hospitals, ambulatory clinics, private offices, home care, chronic care and rehabilitation facilities
  o the avoidance of unnecessary investigation and/or hospitalization

The resident should exhibit knowledge of the relative advantages and disadvantages and the impact on the child and the family of such forms of care.
4.2. Quality Assurance
   - Knowledge of the definitions and role of audits, quality improvement, risk management, occurrence / incident reporting, and complaint management in a hospital and ambulatory setting.
   - Knowledge of cost/benefit ratios of diagnostic and therapeutic interventions, cost-containment and efficacy, effectiveness and efficiency as they relate to quality assurance.

4.3. The resident will demonstrate an awareness of the need to continually balance professional, personal, institutional and social commitments.

4.4. The resident will demonstrate open-mindedness to the consideration of alternative health care practices.

4.5. The resident will demonstrate an awareness of cost and cost-effectiveness of various forms of pediatric care, and the ability to utilize resources effectively and to allocate finite health care resources widely.
   - A willingness to participate in cost-containment and quality assurance programs.

4.6. The resident will demonstrate an awareness of the social, societal and governmental aspects of health care provision as applied to the pediatric age group.

4.7. The resident will demonstrate an ability to utilize information technology to optimize patient care, life-long learning and other activities.

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5. Health Advocate

Pediatricians recognize the importance of advocacy activities in responding to the challenges represented by those social, environmental, and biological factors that determine the health of children and adolescents within society. They recognize advocacy as an essential and fundamental component of health promotion that occurs at the level of the individual patient, the pediatric population, and the broader community. Health advocacy is appropriately expressed both by the individual and collective responses of specialist physicians in influencing public health and policy.

5.1. The resident will demonstrate an appreciation that the health care needs of children are distinct from those of adults.

5.2. The resident will encourage promotion of active family involvement in decision-making and continuing management of the child.

5.3. The resident will demonstrate the ability to contribute effectively to improved health of patients and communities.

5.4. The resident will identify the important determinants of health that affect children and adolescents. This includes the ability to recognize, assess, and respond to the psychosocial, economic, societal and biologic factors influencing the health of those served.
6. Scholar

Pediatricians engage in a lifelong pursuit of mastery of Pediatrics. They recognize the need to be continually learning and model this for others. Through their scholarly activities, they contribute to the appraisal, collection, and understanding of health care knowledge, and facilitate the education of their students / housestaff, patients, and other health professionals. (See also Objective 1.7.)

6.1. The resident will recognize the importance of self-assessment of professional competence and acceptance of the responsibility for self-directed learning as a life long goal, to develop, implement and monitor a personal continuing education strategy. Learning should incorporate critical appraisal and evaluation of medical and other relevant literature.

6.2. The resident will maintain a questioning and inquisitive attitude towards medical information and an appreciation of the necessity for ongoing research to develop new knowledge.

6.3. The resident will facilitate the education of patients, housestaff/students and other health care professionals and contribute to development of new knowledge.

7. Professional

Pediatricians have a unique societal role as professionals dedicated to improving the health and well-being of children and adolescents. Pediatricians are committed to the highest standards of excellence in clinical care and ethical conduct, and to continually perfecting mastery of their discipline. Pediatricians are committed to delivering highest quality care with integrity, honesty and compassion.

7.1. The resident will demonstrate knowledge of Medical Ethics
   - basic knowledge of the principles of medical ethics including: "best interest" of the child, autonomy, beneficence and non-maleficence, confidentiality, truth-telling, justice, respect for persons, conflict of interest, advanced directives and end-of-life care, and resource allocation
   - knowledge of and ability to obtain informed consent
   - knowledge of ethical decision-making process
   - knowledge of required communication skills
   - knowledge of child development and family theory that is applicable to pediatric medical ethics
   - knowledge of the legal and ethical codes of professional behaviour and the obligations of a physician that apply to pediatrics including: notification of coroner, reporting of suspected child or sexual abuse, public health issues with respect to infections

7.2. The resident will demonstrate tolerance for ambiguity and uncertainty and the possibility of error in ethical decision-making; flexibility and
willingness to adjust appropriately to changing circumstances.

**7.3.** The resident will demonstrate trustworthiness (honesty, confidentiality) with respect to patients, families and colleagues.

**7.4.** The resident will demonstrate recognition of personal limitations and a willingness to call upon others with special expertise.

**7.5.** The resident will demonstrate a willingness to accept peer and supervisor reviews of professional competence.

**7.6.** The resident will demonstrate an appreciation of the moral and ethical implications of various forms of patient care and research.

### APPENDIX: Systems-Based Educational Objectives in the Core Program in Pediatrics

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These objectives are based on the major systems and classifications of pediatric illness. They are not subspecialty-based objectives. Objectives are listed once in the most appropriate category, rather than repeated under each relevant section.

Knowledge of embryology, anatomy and pathophysiology refers to that which is relevant to common pediatric disorders.

#### 1. ACUTE CARE (Critical Care / Emergency Pediatrics)

1.1 **KNOWLEDGE**

1.1.2 pathophysiology of altered consciousness, shock, respiratory failure and principles of mechanical ventilation  
1.1.3 pathophysiology of cardiorespiratory arrest  
1.1.4 role of nutrition and fluid management in the critically ill patient  
1.1.5 principles, techniques and limitations of invasive and non-invasive cardiorespiratory monitoring  
1.1.6 principles, role, and logistics of interhospital transport of critically ill infants and children  
1.1.7 determination of brain death and principles of organ donation  
1.1.8 management of the child with special needs / technology dependence.

1.2 **SKILLS**

1.2.1 recognition of the critically ill child and stabilization and / or
transfer of the critically ill child

1.2.2 airway management and cardiorespiratory resuscitation
1.2.3 access and care for indwelling catheters
1.2.4 manage a child with a tracheotomy tube including replacement of the tube
1.2.5 management of unexpected death

The following technical procedures, in addition to those listed in Essential Roles 1.10.:

1.2.6 foreign body removal - eye/nose
1.2.7 assess the traumatized eye
1.2.8 immobilization of acute injury including fractures
1.2.9 eye irrigation, and the use of dilating drops, topical fluorescein, topical anesthetics
1.2.10 perform and interpret oximetry
1.2.11 c-spine immobilization
1.2.12 gastric lavage

1.3 PROBLEMS

1.3.1 cardiorespiratory arrest
1.3.2 shock
1.3.3 respiratory failure
1.3.4 status epilepticus
1.3.5 coma
1.3.6 multiple trauma
1.3.7 head injury
1.3.8 apparent life-threatening events (ALTEs)
1.3.9 child abuse
1.3.10 foreign body
1.3.11 acute vomiting
1.3.12 acute dehydration
1.3.13 sepsis
1.3.14 electrolyte imbalance
1.3.15 burn management
1.3.16 near drowning
1.3.17 poisonings and drug overdoses
1.3.18 lacerations

2. ADOLESCENT HEALTH CARE

2.1 KNOWLEDGE
2.1.1 normal development: cognitive, psychological, peer relations, parent-adolescent relations
2.1.2 adolescents and society: influencing factors, heterogeneity, subcultures
2.1.3 health needs and health problems
2.1.4 normal adolescent behaviour
2.1.5 intervention principles
2.1.6 laws and resources in adolescence
2.1.7 normal adolescent gynecology

2.2 SKILLS
2.2.1 gynecological and pelvic examination and specimen procurement
2.2.2 breast examination

2.3 PROBLEMS
2.3.1 eating disorders: anorexia nervosa, bulimia
2.3.2 behavioural problems: risk taking, delinquency
2.3.3 gynecological problems and disorders of menstruation
2.3.4 pregnancy issues, contraception, sexually transmitted diseases
2.3.5 alcohol, drug, tobacco and other substance use and abuse
2.3.6 sexual abuse
2.3.7 chronic diseases and compliance to therapeutic regimen
2.3.8 sexuality: male / female issues

3. ALLERGY AND IMMUNOLOGY

3.1 KNOWLEDGE
3.1.1 the normal host defenses and immune response
3.1.2 variations in normal immune response with age
3.1.3 pathophysiology of immunodeficiency states and autoimmune disease
3.1.4 basic diagnostic laboratory techniques involving the immune system
3.1.5 pathophysiology of allergic disorders
3.1.6 pharmacologic and immunologic therapy of allergic disorders
3.1.7 indications for and limitations of skin testing, RAST testing and challenge testing

3.2 SKILLS (Included in other Sections)

3.3 PROBLEMS

3.3.1 recurrent infections and immunodeficiency syndromes
3.3.2 seasonal and non-seasonal rhinitis
3.3.3 anaphylactic shock
3.3.4 urticaria/angioedema
3.3.5 drug allergy
3.3.6 insect stings
3.3.7 serum sickness
3.3.8 food allergy

4. CARDIOVASCULAR SYSTEM

4.1 KNOWLEDGE

4.1.1 the anatomy, hemodynamics and electrophysiology of the normal heart and the common congenital and acquired pediatric heart diseases
4.1.2 the fetal circulation and changes in circulation at birth
4.1.3 indications for, limitations, benefits, costs and hazards of:
   a. electrocardiogram
   b. chest x-ray
   c. echocardiogram and doppler
   d. diagnostic and interventional cardiac catheterization and angiography
   e. radionuclide studies
   f. exercise ECG
   g. holter monitor
4.1.4 pre- and post-operative needs of the pediatric heart patient, and long-term complications
4.1.5 the incidence and recurrence risk for congenital heart disease
4.1.6 appropriate use of medications commonly used in the treatment of heart disease
4.2 SKILLS

4.2.1 record and interpret reliably an electrocardiogram in all age groups

4.2.2 interpret a chest X-ray with respect to heart size, contour and pulmonary vascularity

4.3 PROBLEMS

4.3.1 common forms of cyanotic and acyanotic congenital heart disease

4.3.2 cardiac murmurs

4.3.3 syncope

4.3.4 chest pain

4.3.5 endocarditis, myocarditis, and pericarditis

4.3.6 Kawasaki disease

4.3.7 congestive heart failure

4.3.8 cardiac arrhythmia

4.3.9 cor pulmonale

4.3.10 rheumatic fever

5. CLINICAL PHARMACOLOGY

5.1 KNOWLEDGE

5.1.1 mechanisms of action of drugs in relation to their ability to correct a pathophysiologic state

5.1.2 pharmacokinetics in infants and children

5.1.3 placental transfer and breast milk excretion of drugs

5.1.4 drug interactions

5.1.5 modifications of drug dosage required in altered pathophysiologic states (renal failure, liver failure)

5.1.6 therapeutic drug monitoring

5.1.7 the cost of commonly used drugs; choice of drugs with respect to availability of drug plans; issues related to compliance

5.2 SKILLS (Included in other sections)

5.3 PROBLEMS

5.3.1 adverse drug reactions -

5.3.2 management of acute and chronic pain

5.3.3 drug toxicity
5.3.4 drug withdrawal
5.3.5 sedation

6. DEVELOPMENT AND BEHAVIOUR

6.1 KNOWLEDGE
6.1.1 normal and abnormal development - gross motor, fine motor language, personal-social and behavioural
6.1.2 biological and psychosocial factors affecting development and behaviour
6.1.3 understanding of and interpreting psychological and education testing

6.2. SKILLS
6.2.1 assessment of psychomotor development
6.2.2 counselling parents on normal growth, development and behaviour with provision of anticipatory guidance
6.2.3 counselling of parents regarding developmental and behavioural concerns with attention to available community support and resources

6.3 PROBLEMS
6.3.1 developmental delay and mental retardation
6.3.2 pervasive developmental disorders/autism spectrum disorders
6.3.3 common behavioural problems
6.3.4 crying infant, infantile colic, sleep disorders, nightmares and night terrors
6.3.5 learning disabilities
6.3.6 attention deficit hyperactivity disorders
6.3.7 school avoidance

7. ENDOCRINOLOGY AND METABOLISM

7.1 KNOWLEDGE
7.1.1 the normal anatomy, and embryology and physiology of the endocrine glands
7.1.2 normal physical growth
7.1.3 physiology of normal and abnormal puberty
7.1.4 disorders affecting the endocrine gland, producing underactivity or overactivity
7.1.5 indications and interpretation of endocrine tests
7.1.6 pharmacology of commonly used drugs and hormones

7.2 SKILLS
7.2.1 bedside measurement of glucose
7.2.2 orchidometry

7.3 PROBLEMS
7.3.1 growth retardation/short stature
7.3.2 ambiguous genitalia
7.3.3 thyroid disease
7.3.4 diabetes mellitus, diabetic ketoacidosis
7.3.5 inappropriate ADH secretion
7.3.6 hypo/hypercalcemia
7.3.7 hypoglycemia
7.3.8 early/late sexual development
7.3.9 pituitary disorders
7.3.10 diabetes insipidus
7.3.11 adrenal disease
7.3.12 hyperlipidemias

8. GASTROINTESTINAL, HEPATIC AND BILIARY SYSTEMS

8.1 KNOWLEDGE
8.1.1 normal and abnormal development of the gastrointestinal tract, liver and pancreas
8.1.2 physiology and function of the gastrointestinal tract including liver, biliary tract and pancreas, in normal and abnormal states
8.1.3 pathophysiology of liver failure
8.1.4 indications for diagnostic procedures including: endoscopy, plain abdominal x-rays, upper gastrointestinal and small bowel x-rays, contrast enema, abdominal ultrasound and CT scan, radionuclide scan
8.1.5 indications for and interpretation of liver function tests

8.2 SKILLS
8.2.1 interpretation of abdominal X-rays

8.3 PROBLEMS
8.3.1 vomiting and regurgitation
8.3.2 diarrhea (acute/chronic)
8.3.3 malabsorption
8.3.4 intestinal bleeding
8.3.5 enlargement of liver
8.3.6 abdominal masses
8.3.7 abdominal pain (acute/chronic)
8.3.8 inflammatory bowel disease
8.3.9 constipation / encopresis
8.3.10 jaundice
8.3.11 liver dysfunction/failure
8.3.12 dysphagia
8.3.13 hepatitis
8.3.14 ulcers

9. GENETICS AND TERATOLOGY

9.1 KNOWLEDGE
9.1.2 modes and molecular basis of inheritance
9.1.3 application of cytogenetics
9.1.4 indications and limitations of prenatal diagnosis
9.1.5 indications and limitations of screening programs for genetic disease
9.1.6 principles of assessment of dysmorphology and syndrome identification
9.1.7 application of molecular diagnosis
9.1.8 common presentations of inborn errors of metabolism
9.1.9 embryological basis of malformation
9.1.10 environmental factors in fetal development

9.2 SKILLS
9.2.1 construction and interpretation of a pedigree
9.2.2 ability to provide genetic counselling to a family / individual with a known genetic or inherited disorder, or referral to appropriate source
9.3 PROBLEMS

9.3.1 the dysmorphic child
9.3.2 exposure to a possible teratogen
9.3.3 approaches to and initial investigations of suspected inherited metabolic diseases
9.3.4 common genetic syndromes (e.g. Down syndrome, Turner syndrome, Fragile-X)

10. RENAL AND GENITOURINARY SYSTEM

10.1 KNOWLEDGE

10.1.1 normal and abnormal development of the genitourinary tract including the external genitalia
10.1.2 clinical presentation of acute and chronic glomerular diseases and tubular disorders
10.1.3 indications for, advantages and risks of investigative techniques: IVP, voiding cystourethrograms, renal scan, renal ultrasound, urodynamics, renal angiography, renin studies and renal biopsy
10.1.4 pathophysiology of renal failure
10.1.5 indications and complications of dialysis and renal transplantation
10.1.6 renal transplantation
10.1.7 fluid and electrolyte requirements in normal and abnormal states
10.1.8 normal mechanisms of acid-base balance
10.1.9 indications for and interpretations of renal function tests

10.2 SKILLS

10.2.1 interpret common abnormalities seen on urine microscopy

10.3 PROBLEMS

10.3.1 enuresis
10.3.2 disorders of the male and female external genitalia
10.3.3 hematuria
10.3.4 urinary tract infection
10.3.5 acute and chronic renal failure
10.3.6 abdominal and pelvic mass
10.3.7 congenital structural anomalies of the urinary tract
10.3.8 vesico-ureteral reflux
10.3.9 incontinence
10.3.10 circumcision
10.3.11 proteinuria
10.3.12 hydronephrosis
10.3.13 hypertension
10.3.14 undescended testes
10.3.15 renal stones
10.3.16 swollen or tender testis

**11. HEMATOLOGY AND ONCOLOGY**

11.1 KNOWLEDGE

11.1.1 development, structure and function of the formed elements of the blood and blood-forming organs including the changes in normal values with age.

11.1.2 physiology of factors responsible for hemostasis and thrombosis

11.1.3 pathophysiology of alterations in morphology or quantity of formed elements in the blood

11.1.4 principles underlying transfusion and hypertransfusion of blood and blood products

11.1.5 pathophysiology of neoplasms including the acute leukemias

11.1.6 characteristics and principles of investigation of the acute leukemias and common tumours of childhood

11.1.7 social, familial and personal effects of childhood cancer

11.1.8 techniques for safe administration of chemotherapy

11.1.9 common side effects of chemotherapy and radiotherapy and their management

11.1.10 management of the immunocompromised oncology patient

11.1.11 late effects of cancer therapy

11.1.12 principles of palliative care

11.1.13 indications for and interpretation of common hematological tests

11.2 SKILLS

11.2.1 counselling families faced with life-threatening illness/chronic childhood illness

11.2.2 informed consent

11.3 PROBLEMS
11.3.1 pallor / anemia
11.3.2 purpura and petechiae
11.3.3 cytopenia
11.3.4 indications and complications of splenectomy
11.3.5 acute complications of hemoglobinopathies and red cell disorders
11.3.6 bleeding
11.3.7 lymphadenopathy
11.3.8 hepatosplenomegaly

12. INFECTIOUS DISEASES

12.1 KNOWLEDGE
12.1.1 characteristics, epidemiology and pathogenicity of common infectious agents and conditions
12.1.2 mechanisms of infection and host defense
12.1.3 pharmacology of anti-microbial agents and interpretation of sensitivity tests for antibiotics
12.1.4 antimicrobial resistance
12.1.5 control of communicable diseases, including: prevention and immunization
12.1.6 prevention of congenital and perinatal infections
12.1.7 nosocomial infections and infection control

12.2 SKILLS
12.2.1 tuberculin skin testing - perform and interpret
12.2.2 procurement of appropriate specimens for diagnosis of infections

12.3 PROBLEMS
12.3.1 common infectious diseases (viral bacterial, fungal, parasitic, protozoan infections)
12.3.2 infection in the immunocompromised host
12.3.3 fever without focus
12.3.4 fever of unknown origin
12.3.5 perinatal / congenital infections
12.3.6 HIV Infection
12.3.7 occult bacteremia
12.3.8 life-threatening infection
12.3.9 infectious issues relating to travel and immigration

13. NEONATAL / PERINATAL MEDICINE

13.1 KNOWLEDGE

13.1.1 fetal growth, development and physiology including the role of the placenta
13.1.2 aspects of pregnancy, labour and delivery which affect the neonate
13.1.3 effect of maternal systemic disease on the fetus and newborn
13.1.4 demographic, medical and psychosocial factors which influence perinatal mortality and morbidity (the high-risk pregnancy)
13.1.5 process of neonatal adaptation to extrauterine life
13.1.6 neonatal growth, nutrition, metabolic problems, feeding problems
13.1.7 aspects of drug therapy unique to the newborn
13.1.8 general principles of care of the newborn: skin, warmth, feeding
13.1.9 problems encountered in the follow-up of the high-risk neonate
13.1.10 newborn screening

13.2 SKILLS

13.2.1 neonatal resuscitation and stabilization of critically ill newborn
13.2.2 initial assessment of the newborn, including APGAR score and gestational age
13.2.3 recognition of the seriously ill newborn
13.2.4 management of conventional mechanical ventilation and its complications

13.3 PROBLEMS

13.3.1 respiratory distress
13.3.2 cyanosis
13.3.3 jaundice
13.3.4 intrauterine growth retardation
13.3.5 asphyxia
13.3.6 sepsis
13.3.7 metabolic abnormalities including: hypoglycemia, hypo / hypercalcemia
13.3.8 intraventricular hemorrhage
13.3.9 anemia, hypovolemia, polycythemia
13.3.10 apnea
13.3.11 congenital anomalies
13.3.12 prematurity
13.3.13 bronchopulmonary dysplasia
13.3.14 retinopathy of prematurity
13.3.15 seizures
13.3.16 floppy infant
13.3.17 feeding difficulties / vomiting
13.3.18 surgical problems of the newborn
13.3.19 bleeding
13.3.20 drug withdrawal
13.3.21 allo-iso-immunization

14. NEUROMUSCULAR SYSTEM

14.1 KNOWLEDGE
14.1.1 basic embryology, neuroanatomy and neurophysiology of the central nervous system, congenital malformations and common pediatric neurologic problems

14.1.2 indications for, appropriate use of, and risks/complications of the following investigations:

- Lumbar puncture
- EEG
- Evoked potentials
- Nerve conduction studies and electromyography
- Skull and spine x-rays
- Ultrasound scan of the head and spine
- CT scan
- MRI
- Radionuclide scan of the head and spine

14.1.3 interpretation of CSF analysis
14.1.4 pharmacology of drugs used in neurologic and neuromuscular problems

14.2 SKILLS (Included in other sections)

14.3 PROBLEMS

14.3.1 congenital malformations of the nervous system including the
14.3.2 neurocutaneous syndromes
14.3.3 developmental regression
14.3.4 seizures and sudden loss of consciousness
14.3.5 headaches
14.3.6 head trauma and sequelae
14.3.7 cerebrovascular diseases including intracranial hemorrhage and strokes
14.3.8 weakness and paralysis
14.3.9 disorders of peripheral nerves
14.3.10 nystagmus, dizziness and vertigo
14.3.11 cerebral palsy
14.3.12 breath-holding spells
14.3.13 raised intracranial pressure
14.3.14 parasthesias
14.3.15 tics
14.3.16 ataxia

15. NUTRITION

15.1 KNOWLEDGE

15.1.1 recommended nutritional requirements during infancy, childhood and adolescence
15.1.2 effect of disease states on nutritional requirements
15.1.3 infant feeding
15.1.4 health implications of restricted diets, fad diets, diets determined by custom or socioeconomic situation
15.1.5 indications for, physiological basis of and complications of parenteral and enteral nutrition

15.2 SKILLS

15.2.1 prescribe and manage parenteral and enteral nutrition

15.3 PROBLEMS

15.3.1 failure to thrive (all renal acidosis)
15.3.2 obesity
15.3.3 nutritional deficiencies
15.3.4 feeding disorders
15.3.5 nutritional excesses

16. OPHTHALMOLOGY

16.1 KNOWLEDGE
16.1.1 basic anatomy, embryology and physiology of the eye, ocular muscles and visual pathways
16.1.2 etiology, classification of visual defects in children
16.1.3 screening procedures for vision
16.1.4 congenital abnormalities of the eye and ocular muscles
16.1.5 acquired abnormalities of the eye
16.1.6 ocular manifestations of systemic diseases

16.2 SKILLS
16.2.1 measure visual acuity by use of standard visual acuity charts

16.3 PROBLEMS
16.3.1 congenital blindness
16.3.2 the red eye
16.3.3 proptosis
16.3.4 strabismus / amblyopia
16.3.5 papilloedema
16.3.6 nasolacrimal duct obstruction
16.3.7 cataracts / leukocoria
16.3.8 anisocoria
16.3.9 ptosis
16.3.10 abnormal acuity
16.3.11 heterochromia of the iris

17. MUSCULOSKELETAL SYSTEM / RHEUMATOLOGY

17.1 KNOWLEDGE
17.1.1 anatomy, structure and function of bone, joint and connective tissues in normal and abnormal
17.1.2 physiology of normal bone growth and function
17.1.3 recognition of non-inflammatory connective tissue diseases, e.g. Marfan's syndrome, Ehlers Danlos syndrome
17.1.4 mechanisms of immune responses in rheumatic disease
17.1.5 indications for, and interpretation of laboratory tests on blood and synovial fluid
17.1.6 principles and applications of physical and occupational therapy for musculoskeletal diseases
17.1.7 pharmacology of common anti-inflammatory drugs, corticosteroids and immunosuppressive drugs
17.1.8 effects of chronic rheumatic diseases on physical growth and social development
17.1.9 common radiographic abnormalities in musculoskeletal diseases

17.2 SKILLS
17.2.1 interpret bone X-rays for fractures

17.3 PROBLEMS
17.3.1 congenital abnormalities
17.3.2 joint and limb pain
17.3.3 common fractures, dislocations or injuries
17.3.4 joint deformities
17.3.5 septic arthritis and osteomyelitis
17.3.6 common gait disorders (limp, torsional and angular deformities of lower limbs)
17.3.7 scoliosis
17.3.8 acute / chronic arthritis
17.3.9 systemic rheumatologic diseases, e.g. systemic lupus erythematosus, juvenile rheumatoid arthritis

18. OTOLARYNGOLOGY

18.1 KNOWLEDGE
18.1.1 embryology, anatomy and pathophysiology of the ear, nose, throat and upper airway
18.1.2 assessment of hearing
18.1.3 indications and limitations of diagnostic imaging of the upper airway
18.1.4 normal and abnormal dentition
18.2 SKILLS

18.2.1 perform curettage under direct vision of the ear
18.2.2 interpretation of the tympanogram
18.2.3 interpretation of upper airway soft tissue X-rays

18.3 COMMON PROBLEMS

18.3.1 hearing loss
18.3.2 otitis media / otitis externa
18.3.3 epistaxis
18.3.4 sinusitis
18.3.5 tonsillitis and complications
18.3.6 cleft lip and palate
18.3.7 voice abnormalities
18.3.8 congenital and acquired neck masses
18.3.9 facial swelling / asymmetry
18.3.10 congenital deformities of ear
18.3.11 mastoiditis
18.3.12 nasal obstruction
18.3.13 nasal polyps
18.3.14 retropharyngeal abscess
18.3.15 hoarseness and stridor
18.3.16 upper airway abnormalities
18.3.17 dental caries

19. RESPIRATORY SYSTEM

19.1 KNOWLEDGE

19.1.1 embryology, anatomy and pathophysiology of lower airways, lung, diaphragm and chest
19.1.2 control of respiration
19.1.3 pharmacology of drugs used in respiratory diseases
19.1.4 role of: chest X-ray, bronchoscopy, lung biopsy, lung scintigraphy, sleep studies, apnea monitors, pulmonary function studies, sweat test, fluoroscopy, and CT scan of the chest

19.2 SKILLS
19.2.1 interpretation of pulmonary function tests
19.2.2 demonstrate use of various devices: e.g. spacers, peak flow meters, metered dose inhalers
19.2.3 interpretation of chest X-rays

19.3 PROBLEMS
19.3.1 cough, acute and chronic
19.3.2 dyspnea
19.3.3 mediastinal and intrathoracic masses
19.3.4 asthma
19.3.5 pneumothorax
19.3.6 adult respiratory distress syndrome
19.3.7 hemoptysis
19.3.8 wheezing
19.3.9 cystic fibrosis
19.3.10 pleural effusions
19.3.11 bronchiolitis

20. SKIN AND ALLIED TISSUES

20.1 KNOWLEDGE
20.1.1 anatomy and pathophysiology of the skin, hair, nails and mucous membranes
20.1.2 pigmentary, inflammatory and immune responses of the skin
20.1.3 pharmacology of commonly used dermatologic medications
20.1.4 indications for skin biopsy

20.2 SKILLS (Included in other sections)

20.3 PROBLEMS
20.3.1 acne
20.3.2 infections of the skin
20.3.3 papulosquamous eruptions
20.3.4 pigmentary and vascular disorders of the skin
20.3.5 eczema and other dermatitides
20.3.6 vesiculobullous eruptions
20.3.7 alopecia
21. MENTAL HEALTH

21.1 KNOWLEDGE

21.1.1 pharmacology of psychotropic and anti-depressant medications

21.1.2 availability of and access to community-based mental health resources

21.1.3 biological, psychosocial and socioeconomic factors affecting mental health

21.1.4 indications for hospitalization

21.2 SKILLS

21.2.1 recognition of the impact of family function on the mental health of the child

21.2.2 ability to distinguish between organic and non-organic causes of psychiatric dysfunction

21.3 PROBLEMS

21.3.1 mood disorders / depression

21.3.2 conduct disorders, oppositional defiant behaviour

21.3.3 family dynamics and psychological adjustment to family stress

21.3.4 personality traits

21.3.5 attempted suicide

21.3.6 adjustment to life stresses

21.3.7 anxiety

21.3.8 violent behaviour

21.3.9 psychoses

21.3.10 emotional abuse

21.3.11 obsessive compulsive disorders

22. SURGERY

22.1 KNOWLEDGE

22.1.1 preoperative assessment

22.1.2 indications for appropriate surgical referrals

22.1.3 perioperative management, including: fluids, steroids, antibiotics

22.1.4 principles of peri- and post-operative management, including pain management
22.2 SKILLS (Included in other sections)

22.3 PROBLEMS

22.3.1 hernias
22.3.2 the acute abdomen
22.3.3 acute scrotal pain
22.3.4 bowel obstruction
22.3.5 appendicitis
22.3.6 abscess