

June 4, 2022

## Pediatric training in Belgium: linking training to care

Authors: prof dr Gunnar Buyse and prof dr Stéphane Moniotte, for the Belgian Academy of Paediatrics

In collaboration with:

- Heads of university departments/university coordinating stagemasters: Stephane Moniotte (UC Louvain), Gunnar Buyse and Djalila Mekahli (UZ-KU Leuven), Inge Gies (UZ Brussel), Marie-Christine Seghaye (ULg), Pierre Smeesters and Khalid Ismaili (ULB), Stijn Verhulst and Koen Norga (UZ Antwerpen), Sabine Van Daele and Myriam Van Winckel (UZ Gent).
- Representative of the Belgian society of neonatology: Luc Cornette, Vincent Rigo.
- Board of Belgian Academy of Paediatrics

Source/reference documents: 2007 Master in specialized medicine (Pediatrics) including endterms (learning/attainment targets); European Academy of Pediatrics (EAP) curriculum for common trunk training (2014); KB/AR 1979 (legal recognition criteria)

## A. INTRODUCTION

The seven Belgian university centers each have well developed excellent quality and good-working pediatric training programs, including the annexed academic Master in Specialized Medicine (Pediatrics) programs. Each of them does so within the context/framework of their university's policies and curricular standards and continuum, and with input and contributions of their large group of collaborating regional pediatricians/stagemasters. These programs are well aligned to pediatric care and to the recognition criteria and specialization endterms (learning/attainment targets), and they educate new pediatricians with a good background in most (if not all) pediatric subspecialties. The university centers exchange information and they do work together with joint initiatives where possible and useful. This excellent communication and collaboration also prevails between Flemish and French communities. There is no need/desire to change this model. With this document, the BPA wants to contribute to the alignment of training to care at the national level with harmonization between Flanders and Wallonie-Bruxelles. Training goals and endterms are aligned to the European (EAP) common training syllabus. This document concerns the five year pediatric specialization training leading to the certification as pediatrician in Belgium, and naturally does not deal with any possible additional certified subspecialty training programs afterwards.

The Belgian pediatric specialization program consists of five years full time training in accredited inhospital pediatric centers, in combination with a Master (master after master) in Specialized Medicine, under the directorship and coordination of a university stagemaster. The training program prepares for second/third-line in-hospital pediatrics. The new pediatrician should be competent to look after all common pediatric conditions, and to contribute to the care for children with chronic (rare/complex) diseases in a stepped/shared care model coordinated by 3<sup>d</sup>/4<sup>th</sup> line pediatricians. The provided pediatric care must be patient- and family centered. In a holistic and interprofessional collaborative approach, the pediatrician must be familiar with the work field of first-line general practitioners, of the preventive youth health and wellbeing sector (including VCLB/PMS student



guidance centers, Kind&Gezin/ONE infant consultation/vaccination bureaus), as well as colleagues and caregivers of the mental health sector. Indeed, in addition to being able to diagnose and treat acute and chronic health conditions and diseases in children, a pediatrician must be committed to optimal physical, mental and social health and well-being for all children (from prenatal/newborn to young adulthood).

## B. PEDIATRIC SPECIALISTIC MEDICINE TRAINING IN BELGIUM

The existing pediatric training programs in Belgium are well built and of excellent quality, and meet the legal requirements for the recognition of medical specialists. Official recognition as a pediatrician is possible after succesful completion of the 5-year specialization program (- corresponding plan must be pre-approved by the recognition commission -), and after succesfully fullfilling the requirements of the intrinsically linked master's degree in specialized medicine (Master diploma in specialized medicine).

Training must take place within a complete postgraduate master training program accredited by the national training body. Each trainee's training program is directed by a responsable coordinating university stagemaster. The university coordinating stagemaster works closely together with its network of collaborating regional stagemasters.

The pediatrician specialty training consists of 5 years full time, sufficient to ensure capability of independent practice of the specialty after completion of the training. The training prepares for in hospital pediatrics.

Experience is required in both inpatient and ambulatory settings. Pediatric training must include experience in acute and chronic pediatrics, neonatology, emergency pediatrics, behavioral/ developmental pediatrics and preventive medicine. The university coordinating stagemaster ensures a balanced total package of internships, so that the trainee will have acquired all necessary knowledge and competences at the end of his/her training program.

The program must ensure that the candidate acquires all required knowledge and skills (see endterms and recognition criteria) and becomes competent in the necessary roles (pediatrician as medical expert, as scientist, as communicator, as manager). These 4 roles are key elements of the training.

Clinical experience is gained from direct patient care, supervised by senior clinicians and based on a clinical curriculum and with a focus on excellent clinical skills, sound and where possible evidencebased decision making and the judicious use of additional investigations. On completion of the training, the candidate should be competent to look after all common pediatric conditions.

Professional and ethical practice is learnt through mentorship by senior clinicians with a commitment to continuous quality improvement and to patient/family-centered pediatric care in both the inpatient and ambulatory settings.

Trainees are mentored on a continuous basis and assessed at intervals throughout the training in the workplace. The trainee plays an active role in the steering and follow-up of his/her learning process, developing an active self-learning attitude being a prerequisite for life-long learning. Exposure, gained experience and feedback assessments must be recorded in the training portfolio. Also, see the Master program in specialized medicine at the respective university centers.



The portfolio (preferentially digital: Medbook) serves as a logbook of acquired skills/competences and allows for transparant and good guidance and mentorship.

For the Flemish university centers, the official document 'Masteropleiding arts specialist – afstudeerrichting pediatrie' (Appendix 1) summarizes applicable definitions, general competences, domain-specific competences, profile of specialist, pre-conditions of training program, objectives and learning outcomes (levels 1, 2 and 3), overview of knowledge and skills to be acquired.

Minimal one year must be done in an academic training center and minimal one year in a regional (i.e. non-university) center (regional center/stagemaster accredited by the national training body). Maximal one third (20 months; in practice either 1 year or 2 years) can be done in an accredited training center abroad if approved by the responsible coordinating stagemaster; such a period is separate from the minimal university/regional requirements.

It is the responsibility of the coordinating stagemaster to guarantee that over the 5-year duration of the training the trainee acquires a balanced exposure to general pediatrics and all different pediatric subspecialty domains. In concordance with this and as requested by the recognition commissions the exposure to neonatology must be minimal 6 and maximal 12 months.

Trainees must succesfully pass an exam by the end of their second year of training (i.e. lower education of master in specialized medicine). This exam is also part of the Master in specialized medicine curriculum, and is organised by the respective university center. If a university center would wish to do so, it can consider the EAP European Board of Pediatrics examination as a possible alternative. This is entirely at the discretion of and within the responsability of the coordinating university center.

First authorship on a clinical, research or review paper (- subject must be relevant to pediatrics -) in a peer reviewed medical journal, written/published during the pediatric training, is a requirement for recognition by the commission. This paper can be the same as used for the Master in specialized medicine program.

Scientific research (e.g. leading to a PhD) time can count for 50% of the time as residency training time, with a maximum of 2 years (- 4 years of PhD research counts as 2 years of residency training -), provided that (i) the research relates to pediatrics, and (ii) the specialist-in-training has minimal clinical activity, and preferentially also participates in the on-call system of the pediatric trainees, during the entire period of research.

The university coordinating stagemasters and the recognition commission (Flanders, Wallonia) guard over and certify that a graduating trainee does fulfill all applicable requirements and possesses all the required knowledge/skills/competences for becoming a pediatrician.

## C. GENERAL GOALS AND COMPETENCES OF TRAINING IN PEDIATRICS

## **GENERAL GOALS:**



The general goals of training include the acquisition of skills, knowledge and attitudes in relation to seven key areas:

- 1. Communication and interpersonal skills
- 2. Ethics and professionalism
- 3. Patient safety and quality improvement
- 4. Pediatric expertise (clinical skills / procedures / investigation / interpretation)
- 5. Teamwork and collaborative skills
- 6. Leadership, management skills and a commitment to lifelong learning
- 7. Health advocacy and global health awareness

## Communication and interpersonal skills :

Good communication is a core clinical skill for pediatricians, utilizing effective listening and nonverbal cues.

Trainees should learn to:

1.1. Establish a positive therapeutic relationship with children/adolescents and their families in an age appropriate manner. This relates to involving and empowering the patient/parents in the care, and delivering patient- and family-centered care.

1.2. Respect patient confidentiality, privacy, autonomy and ability to consent.

1.3. Communicate relevant understandable information and provide support in a crisis situation.

1.4. Elicit and draw together relevant information and perspectives of children, families, colleagues and other professionals/caregivers; taking into account factors such as age, gender, disability, ethno cultural background, social support and emotional influences, and appropriately respecting the child

and family's different value systems.

1.5. Develop a common understanding on issues, problems and plans with patients, families, and other professionals to develop a shared plan of care.

1.6. Convey effective oral and written information about a medical encounter, both to families and to other professionals.

## Ethics and professionalism

Trainees must learn to display the following:

2.1. Compassion, integrity, and respect for others

2.2. Sensitivity and responsiveness to a diverse patient population, including diversity in gender, age, culture, race, religion, and disability

2.3. Responsiveness to situations where the wellbeing of the child is endangered/compromised

2.4. Accountability to patients, society and the profession

2.5. Compliance with all legal and moral obligations for reporting disease and potential or real abuse/ neglect

2.6. Recognition of special Issues pertaining to children participating in research

## Patient safety and quality improvement

3.1. Participate in activities that contribute to effectiveness/quality of the healthcare system and patient safety.

3.2. Commit to quality assurance through systemic quality process evaluation and improvement.

3.3. Maintain their own health and that of the team they work with.



## Pediatric expertise

This is covered in details (listing endterms) below.

Trainees must acquire in-depth medical knowledge of the specialism, skills and competences, and must develop and apply problem-solving ability in clinical practice.

## Teamwork and collaborative skills

Trainees should:

- 5.1. Participate appropriately in a professional healthcare team to achieve optimal patient care.
- 5.2. Maintain respect for the views of colleagues in a range of pediatric roles.
- 5.3. Maintain effective time management skills.
- 5.4. Ensure proper handover, referral and discharge planning.
- 5.5. Understand the effects of national and international policies on child health.

## Leadership, management skills and a commitment to lifelong learning

Trainees should learn to:

6.1. Effectively delegate and follow-up on tasks, be able to manage stressful situations and know when to ask for help.

6.2. Deliver the highest quality of care.

6.3. Manage tasks including prioritizing, and assigning

6.4. Maintain comprehensive, timely, and legible medical and hospital records and legal documents.

6.5. Make a lifelong commitment to learning by accepting responsibility for developing implementing and monitoring a personal continuing education strategy.

6.6. Be able to search for evidence and review medical literature with a EBM approach.

6.7. Use a range of sources of research publications and electronic literature databases.

## Health advocacy and global health awareness

Pediatric trainees, as health advocates, must responsibly use their influence and expertise to advance child health as well as the well-being of individual patients, families, communities and populations, seeking additional advice and opinion as appropriate.

## **GENERAL COMPETENCES:**

General competences to be acquired are:

- 1. To understand the roles and responsabilities of pediatricians
- 2. To acquire the generic competencies that relate to clinical practice
- 3. To maintain Good Medical Practice
- **4.** To promote teaching, training, assessing and appraising
- 5. To achieve good relationships with patients and their parents
- 6. To be able to work with colleagues as a multidisciplinary team

To understand the roles and responsabilities (duties) of pediatricians:

- In the safeguarding of babies, children and adolescents
- To support and enable parents and carers to be effective in caring for their children
- To know where and when to ask for help, support and supervision
- To understand their role in the management of chronic illness in children



- To follow the principle that all decisions are to be made in the best interest of the child

To acquire the generic competencies (knowledge, skills, behaviour) that relate to clinical practice:

- Skills in advanced neonatal and pediatric life support
- History taking, clinical examination, effective skills in pediatric assessment and formulating an appropriate differential diagnosis in pediatrics
- Management of ill-health and clinical conditions in pediatrics, seeking additional advice and opinion as appropriate
- Recognition of behavioral, emotional and psychosocial aspects of illness in children and families.
- Safe practical skills in pediatrics. Trainees will be able to perform independently: capillary or peripheral blood samplings; electrocardiogram; lumbar puncture; urethral catheterization; supra-pubic aspiration of urine; collection of blood from central lines; umbilical venous and artery cannulation and sampling; bag valve mask ventilation; external chest compression; tracheal intubation of term newborn babies; tracheal intubation of preterm babies\* and young children; administration of exogenous surfactant\*; needle thoracocentesis for pleural effusion or pneumothorax\*; administer intradermal, subcutaneous, intramuscular & intravenous drugs; insertion of intraosseous needle; percutaneous long line insertion\*; abdominal paracentesis\* (\*: may need supervision)
- Clear record-keeping and report-writing
- Order the appropriate investigations in pediatrics, and know how to interpret them.
- Safe prescribing of common drugs in pediatrics: appropriate indications, dosages in babies, children and adolescents, drug interactions, how to use formulary, guidelines and recognize adverse events.
- Understanding of safeguarding and vulnerability in pediatrics.
- Effective responses to challenge, complexity and stress in pediatrics.

## To maintain Good Medical Practice:

Trainees must ensure they are up-to-date, conform with highest standards of practice, and promote evidence-based medicine where possible. Active participation in the scientific meetings organized by the main Belgian pediatric societies is therefore strongly encouraged.

Trainees should demonstrate:

Knowledge of the science-base for pediatrics.

Knowledge of common and serious pediatric conditions and their management.

An understanding of growth, development, health and well-being in pediatrics.

An understanding of health promotion and public health issues in pediatrics.

An understanding of an evidence-based approach to pediatric practice.

A reflective approach to improvement of equality and diversity in pediatric practice.

Knowledge of the law regarding pediatric practice.

To promote teaching, training, assessing and appraising:

Trainees should achieve:

An understanding of effective teaching in pediatrics.

A positive approach to receiving mentoring and educational supervision, and to coaching and supporting younger colleagues and students.

An understanding of the need for an ethical and rigorous approach to research in pediatrics.

To achieve good relationships with patients and their parents:



Trainees should learn how to effectively communicate with children, young people and their families. Trainees should learn throughout their training program in general pediatrics:

An understanding of effective communication and interpersonal skills with children of all ages. Manifest empathy and sensitivity and skills in engaging the trust, consent and involvement from children and their families.

Understanding of listening skills and basic skills in giving information and advice to young people and their families.

Respect the religious beliefs and behaviors of foreign children and families.

To be able to work with colleagues as a multidisciplinary team:

Trainees should develop:

Effective communication and interpersonal skills with colleagues.

Professional respect for the contribution of colleagues in a range of roles in pediatric practice. Effective time management skills.

Effective handover, referral and discharge procedures in pediatrics.

An understanding of the effects of local, national and international policies on their work and on the health of children.

## Probity:

Trainees should respect the high standards of care and professional behavior within pediatrics and the medical profession as a whole:

Ethical personal and professional practice in providing safe clinical care.

Reliability and responsibility in ensuring their accessibility to colleagues and patients and their families.

An understanding of the importance of self-awareness and a responsible approach to personal health, stress and well-being.

# D. ENDTERMS, LISTING (- NOT EXHAUSTIVE -) OF KNOWLEDGE / SKILLS / COMPETENCES TO BE ACQUIRED DURING THE TRAINING

## **D.1: GENERAL SKILLS AND COMPETENCES**

## NORMAL AND ABNORMAL DEVELOPMENT:

Knowledge:

Normal and abnormal gross and fine motor, cognitive, social and emotional, receptive and expressive language development of infants and young children

Pre-, peri- and postnatal risk factors and causes of delayed or abnormal development Common patterns of developmental abnormality (gross motor, speech and language, global) Range of deficits in common genetic syndromes (eg, fragile X, trisomy 21, fetal alcohol syndrome) Current neonatal and childhood screening tests used in respective national child health visits Screening and basic diagnostic assessment instruments for developmental delay and intellectual disability

7

Indications for imaging (ultrasound, MRI), metabolic and genetic testing Indications for physio-, educational, occupational and/or speech therapy Indications for referral of a child to a pediatric neurologist, speech pathologist



## <u>Skills</u>:

Taking a history of developmental milestones reached Developmental assessment of a child 5 years and under. Basic assessment of hearing and vision Initiation of appropriate investigations to make a diagnosis based upon the history and pattern of abnormal development observed Communication of findings and implications of developmental assessment to parents

## NORMAL AND ABNORMAL GROWTH (SEE ALSO ENDOCRINE DISORDERS):

## Knowledge base:

Normal physical growth from birth to the completion of puberty Genetic, hormonal, nutritional, environmental, psychological, and social factors affecting normal growth Common disorders of height and weight, as well as indications for further evaluation Effects of fetal growth restriction on long-term health Meaning, use and limitations of bone age Causes of poor weight gain in infants and young children Normal and abnormal variations in head shape

## Specific conditions:

Common causes of short or tall stature Common genetic conditions affecting growth

<u>Skills</u>:

Weighing and measuring an infant and child accurately Assessment of normal and abnormal growth at all stages of development using appropriate growth charts, correcting for prematurity when appropriate Assessment of nutritional status by using anthropometric measurements and calculation of body mass index (BMI) Investigations in a child with short or tall stature Advising carers on management with failure to thrive if there are eating difficulties

## NUTRITION:

## Knowledge:

Recommended nutritional requirements at different ages Effect of disease states on nutritional requirements Practical aspects and benefits of breastfeeding Practical aspects of infant formulae Health implications of restricted diets, fat diets, diets determined by custom or socioeconomic situation Indications for, physiological basis of and complications of parenteral and enteral nutrition

## Specific conditions:

Overweight and obesity Failure to thrive Nutritional deficiencies and excesses Feeding disorders Recognition and early management of anorexia nervosa



<u>Skills</u>:

Nutritional assessment Breastfeeding evaluation Interpretation of biochemical and other laboratory indices of nutritional status

## PHARMACOLOGY:

Knowledge base:

Pharmacodynamics: absorption/systemic availability/interpretation of drug concentrations Drug interactions & adverse drug reactions Pathophysiology of drug action mechanisms, correction of pathophysiological states Pharmacokinetics in children in different age groups Placental transfer and breast milk excretion of drugs Drug toxicity and therapeutic drug monitoring Guidelines and protocols for antimicrobial prescribing Drug dosage modification in disease (liver/kidney dysfunction) Drug selection: generic vs. labelled / cost implications / compliance issues / health insurance planning Off label use Complementary and alternative medicines: availability / prevalence / efficacy

## Specific conditions:

Management of pain Principles of sedation and analgesia for procedures (child-centered care) Drug withdrawal

<u>Skills</u>:

Prescribing skills / rational drug therapy Formulary use in practice

## **RESEARCH:**

## Knowledge base:

Biostatistics Types of variables Data distribution patterns Common statistical tests Understand measurement of association Diagnostic tests (sensitivity and specificity, positive and negative predictive value) Principles of systematic reviews and meta- analysis (interpretation and application) Principles of epidemiology and types of epidemiologic studies Bias and confounding variables Causality (causal versus association) Incidence and prevalence Decision analysis Cost- benefit, cost- effectiveness and outcomes Sensitivity analysis Measurement principle (reliability and validity; accuracy and precision)

<u>Skills</u>:



Knowledge about the various settings of clinical studies and the role of Ethics Committees Compliance and regulatory (GCP, GDPR, law, etc) Assessment of study design Assessment of generalization of results Critical reading of literature Application of information to patient care Appropriate evaluation and critique of medical literature Research ethics

## SAFEGUARDING:

## Knowledge base:

WHO definitions of neglect and of physical, emotional, and sexual abuse Other forms of abuse: bullying at school, cyber-bullying, institutional abuse, Munchhausen by proxy, etc.

Family, social and other characteristics associated with increased risk of abuse/neglect Features in the history that raise suspicions that presenting symptoms may be due to abuse or neglect

Clinical signs of non-accidental injuries

Diseases that may mimic physical abuse/neglect

Sequelae of shaking of a child during the first year after birth

Common fracture locations and types in physically abused children

Locations of fractures, bruises, burns/scalds, scars that are rarely accidental

Clinical, psychological and behavioral signs suggesting emotional abuse

Possible physical, psychological, behavioral and maturational problems due to neglect or abuse Clinical, psychological and behavioral signs suggesting child sexual abuse

Cillical, psychological and benavioral signs suggesting cillu sexual abuse

Indications for referral of a child to other specialists experienced in child abuse evaluation

Indications for referral to social and/or psychological services, interprofessional care

## <u>Skills</u>:

Recognition and assessment of suspected acute physical, emotional, sexual abuse Differentiation of intentional neglect from deprivation associated with poverty or low education Utilization of appropriate laboratory tests and skeletal-imaging to differentiate between disease, accidental and intentional injury, including sexual abuse

Complete documentation of clinical signs and procedures that are made to identify the abuse or neglect in accordance with local and/or national law

Appropriate communication with the abused/neglected child and the family

## SUBSTANCE ABUSE/TOXICOLOGY/POISONING:

## Knowledge base:

Epidemiology of substance abuse: current data & trends / developmental patterns / risk factors (genetic & social) Common substances abused / age profiles Common childhood poisonings / exposures Epidemiology of poisoning: local / global / age demographics Prevention measures Poison centers / operating procedures / poison information data / online Toxicology signs and symptoms Types of ingestions / poisonings



Community and home chemical hazards: pesticides / industrial waste / occupational home renovation risks, lead poisoning Poisoning as possible sign of child abuse / neglect Poisoning by unknown agent

Specific conditions:

Paracetamol poisoning Specific therapies elimination measures/antidotes Toxins: button batteries / coins / iron / ethylene glycol Plants / complementary medicines / over the counter medicines

<u>Skills</u>:

Assessment / vital signs, monitoring / history taking Acute management Diagnosis: clinical assessment / laboratory methods, screening methods

## **D.2: SPECIALIST SKILLS AND COMPETENCES**

## ADOLESCENT MEDICINE:

## Knowledge:

Legal and ethical principles dealing with adolescents Normal bio-psycho-social development of puberty in boys and girls Level of cognitive reasoning in early, middle and late adolescents Influence of family and peers in modelling adolescent behavior Epidemiology of the pattern of social and sexual behavior at various ages Gender and sex identity Safer sex practices, sexually transmitted infections, contraception and post-coital contraception Causes of delayed puberty Impact of chronic conditions on adolescent social, psychological and physical development Transition from pediatric to adult care

## <u>Skills</u>:

Effective communication, developing a professional relationship with adolescents, including evaluation of compliance

Discussion with a young person the concept of confidentiality and assent/consent depending on the degree of his/her maturity and in accordance with the local legal guidance

Assessment of growth and development including sexual maturity rating (Tanner stages) Assessment and diagnosis of substance misuse, violence and risk-taking behavior

Assessment of suspected psychiatric symptoms using validated screening questionnaires Assessment and diagnosis of eating disorders

Assessment and delivery of anticipatory guidance of healthy lifestyle including eating habits, physical exercise and media

Planning, providing and integrating care for adolescents

## ALLERGIC DISEASES:

## Knowledge base:

Knowledge of basis of host defense mechanisms



Basic knowledge of immunology relevant to allergic diseases Influence of genetic and environmental factors on allergic disease Variations in normal immune response with age Various phenotypes of allergic diseases Basic diagnostic laboratory techniques involving the immune system Pharmacologic and immunologic therapy of allergic disorders

## Specific conditions:

Allergic diseases, including rhinitis, eczema and anaphylaxis Allergy testing (including skin prick testing, RAST, serum IgE, serum tryptase) Indications for immunoglobulin therapy

Management of cow's milk protein intolerance

<u>Skills</u>:

Taking a history in allergic patients Recognizing clinical symptoms and signs of allergy Prescribing a diet for food allergic children Demonstration of the use of an adrenalin pre-loaded injection Demonstration of the performance and interpretation of the skin prick test Management of acute anaphylaxis

## **CARDIAC DISEASES:**

## Knowledge – general:

Anatomy, physiology and pathophysiology of normal heart; cardiac malformations and diseases Assessment and initial treatment of congenital heart diseases Fetal circulation and changes in circulation at birth Clinical manifestations of congenital and acquired heart diseases Basic understanding of structural and functional echocardiography Principles of pharmacotherapy Referral thresholds for a specialist cardiology opinion

Knowledge - specific:

Common causes of chest pain Common murmurs Common ECG abnormalities Endocarditis (causes, investigations, indications for prophylaxis) Palpitations, tachycardia, arrhythmias Management of syncope Common causes of systemic and pulmonary hypertension

## <u>Skills</u>:

Assessment of the cardiovascular system, including pulses Assessment of heart sounds and murmurs Measurement of blood pressure from birth to adolescence Cardiopulmonary resuscitation (Basic Life Support and Advanced Life Support)

## COMMUNITY MEDICINE:

## Knowledge:



Local, national, and international structures of community based healthcare Key social determinants of child health and well-being Effects of family composition, socioeconomic factors and poverty on child health Community assets and resources toward preventing illness, injury, and related morbidity and mortality Resources that may be available from health agencies, including the voluntary sector and allied health professionals

Support programs for families and children with special health care needs National vaccination program

## Specific conditions:

Complex disability in the pre-school child

<u>Skills</u>:

Ability to work together with schools, childcare, facilities and others Management of children in need of protection and the pathways to ensure follow-up Demonstration of advocacy skills to address relevant individual, community, and population health issues

#### DERMATOLOGY:

#### Knowledge base:

Anatomy and histology of the skin, hair and nails Characteristics of common dermatological problems and serious erythematous, rashes

## Specific conditions:

Common pigmentary or vascular congenital lesions e.g. nevi, haemangiomas Molluscum contagiosum, warts Hair disorders (eg, hypertrichosis and hair loss) Pigmented lesions (hyper- and hypopigmentation) Contact dermatitis Seborrhoeic and atopic dermatitis Urticaria Acne

Skills:

To recognize common exanthemas Recognize and manage dermatological emergencies (e.g. Steven-Johnson, ...) Skin manifestations of common infectious diseases Skin manifestations of systemic disease (i.e. Henoch Schönlein, lupus) Identify mucosal, skin infection, bacterial infected eczema, eczema herpeticum Plan and manage appropriate treatment

## **DISEASES OF THE ORBITA AND EYES:**

#### Knowledge base:

Normal vision development Common causes of visual impairment Ophthalmic presentations of systemic diseases



### Specific conditions:

Management of squint Acute management of trauma Disorders of refraction Conjunctivitis Retinopathy of prematurity Orbital infection, orbital swelling, edema

#### <u>Skills</u>:

Screen for possible visual acuity problems by use of standard visual acuity charts Check strabismus by strabismus charts,

#### ENT DISORDERS:

#### Knowledge base:

Anatomy and pathophysiology of the ear, nose, throat and upper airway Congenital malformations (external and middle ear) Deafness and hearing loss Indications for tonsillectomy, adenoïdectomy and transtympanic drains

#### Specific conditions:

Rhinitis (allergic rhinitis, infectious rhinitis), polyps Epistaxis Trauma or foreign body Tonsillitis and complications, adenoidal hypertrophy Pharyngitis Cleft lip, cleft palate Laryngitis, Croup Otitis media / otitis externa Mastoiditis and sinusitis

#### <u>Skills</u>:

Understand the techniques for hearing evaluation at different ages Performance of simple tests of hearing Interpretation of soft tissue X-rays in acute upper airway obstruction Institute the appropriate treatment for laryngitis

#### **ENDOCRINE DISORDERS AND DIABETES:**

#### Knowledge base:

Normal growth patterns, including constitutional delay and growth disorders Normal and abnormal puberty development, ambiguous genitalia, precocious puberty, disorders of sexual development Recognition and initial investigation of commonly presenting endocrine disorders, including hypothyroidism, AGS, diabetes type 1 and 2 Understanding of the endocrine manifestation of systemic diseases Understanding the pathophysiology and signs of diabetes

Specific conditions:



Common congenital and acquired endocrine disorders, including pituitary, thyroid, and adrenal disease Ambiguous genitalia Maldescended testis Short and tall stature Precocious puberty and pubertal delay Thyroid disease and adrenal disease Obesity, including complications and clinical management strategies

## <u>Skills</u>:

Taking history in endocrine disorders Ability to measure growth accurately and to chart and interpret it appropriately Ability to assess pubertal status (Tanner staging) Ability to institute appropriate insulin regimes to treat diabetes mellitus Ability to manage acute diabetic ketoacidosis, including assessment of major complications Ability to manage acute hypoglycemia, including an understanding of the importance of glucose testing and administration in patients with impaired consciousness

#### **EMERGENCY MEDICINE:**

#### Knowledge base:

Pathophysiology of shock / respiratory failure / cardiopulmonary arrest Principles of monitoring: invasive / non-invasive, biochemistry Fluid & electrolyte management in the acutely ill patient Intra & inter-hospital transport Child protection issues

#### Specific conditions:

Assessment/ triage of the acutely ill child Acute respiratory distress, hypoxia Shock, severe hypotension and hypertension Sepsis Acute allergy/anaphylaxis Acute febrile illness Burns Diarrhea / vomiting / dehydration Hypoglycemia Seizures (see Neurology) Syncope Coma Trauma: abdominal / multisystem / head / limb Wound and laceration evaluation and basic management Special needs children in emergency department

#### <u>Skills</u>:

Resuscitation, including access Acute seizure intervention Patient stabilization and transfer skills Analgesia in children



## GASTROINTESTINAL AND HEPATIC DISEASES:

#### Knowledge base:

Anatomy, physiology and pathophysiology of the gastrointestinal tract, liver, biliary tract and pancreas. Normal nutritional needs and common causes of malnutrition GI symptoms of systemic disease Gastrointestinal infectious diseases and infection control Indications for diagnostic procedures – eg, sonography, radiology, endoscopy and biopsy

#### Specific conditions:

Acute and chronic abdominal pain Common congenital conditions Constipation Common causes of dysphagia Gastroenteritis and diarrhea Principles of oral rehydration and intravenous fluid therapy GI Bleeding Gastro-esophageal reflux Common causes of hepatitis Common causes of jaundice Inflammatory bowel disease Iron deficiency anemia Malabsorption, including coeliac disease and cystic fibrosis

<u>Skills</u>:

Taking history in GI and hepatic diseases Assessment of GI system and liver Assessment of nutritional status, including dietary history Ability to manage paracetamol poisoning

#### **GENETICS AND DYSMORPHOLOGY:**

#### Knowledge base:

Principles and molecular basis of Mendelian- and non-Mendelian inheritance Embryological basis of malformation and environmental factors in fetal development Principles of dysmorphology and syndrome identification Basis of genetic and molecular techniques Ethical and social implications of genetic testing Indications and limitations of prenatal diagnosis Rationale of newborn screening

## <u>Skills</u>:

Construction and interpretation of a family pedigree Recognition of common genetic, chromosomal and dysmorphic syndromes Genetic counselling related to common conditions Ability to access genetic databases Understanding the meaning of genetic results First steps in management/communication of abnormal newborn screening results Ability to address specific health issues is newborns and children with trisomy 21



## HAEMATOLOGICAL AND ONCOLOGY DISORDERS:

### Knowledge base:

Physiology and pathophysiology of bone marrow derived cells Pathophysiology of anaemia and haemolytic diseases Physiology and pathophysiology of the coagulation system Management of common non-malignant haematological conditions Risks and benefits of blood transfusion Principles of management of cancer Short and long term side effects of chemotherapy and radiotherapy Indications for bone marrow transplantation Principles of palliative care

#### Specific conditions:

#### Anaemia

Sickle cell disease and thalassaemias Acute lymphoblastic leukemia Lymph node enlargement, lymphadenopathy Hodgkin and non-Hodgkin lymphoma Medullo-, neuro-, nephro-, hepatoblastoma Coagulation disorders, haemophilia Common causes of neutropenia Common causes of purpura

## <u>Skills</u>:

Taking history in hematologic and oncologic disorders Ability to assess children presenting with hematological or oncological conditions Interpretation of blood smears results Acute management of child with febrile neutropenia Management of long term central lines Care of child requiring isolation

## INFECTIOUS DISEASES AND IMMUNODEFICIENCIES:

#### Knowledge base:

Physiology and pathophysiology of host defense mechanisms Common infectious agents: epidemiology / pathogenicity / characteristics Common infant and childhood infections: viral / bacterial / fungal / parasitic Appropriate and safe prescribing of antibiotic or antiviral therapy Principles of infection control Principles of immunisation and national policy Patterns of antimicrobial resistance / safe prescribing Use of diagnostic tests, culture methods bacterial & viral

## Specific conditions:

Perinatal infections Pyrexia/fever of unknown origin Communicable disease control/prevention/immunisation Diarrhea and vomiting



Pneumonia Septic shock Tuberculosis HIV Acquired and congenital immunodeficiencies Travel medicine / infections / immunisation Covid disease, PIMS

## <u>Skills</u>:

Taking history in infectious diseases Ability to assess child presenting with infectious disease Care of child requiring isolation Hygiene Adequate prescribing Considering development of resistance Being able to address parental vaccine hesitancy

## MENTAL HEALTH AND BEHAVIOURAL DISORDERS:

## Knowledge:

Stages of cognitive and emotional development from infancy to adolescence Biological function of the attachment system, attachment behavior and style Risk factors affecting the role of parent-child attachment and relationship Common predisposing and protective factors related to mental health Long-term effects of trauma and neglect in the first years of life Regulatory disorders of infancy and early childhood Common emotional and behavioral problems in preschool and school-age children Factors influencing learning and school performance Definition and clinical presentation of intellectual disabilities, attention deficit/hyperactivity disorder or autism spectrum disorders Indications for specific genetic and metabolic tests and imaging tools in children with intellectual disabilities Diagnostic criteria of somatoform disorders (SFD) and chronic fatigue syndrome (CFS) Basic investigations in cases of possible SFD and CFS Clinical features and presentation of emotional disturbances (e.g., anxiety, depression) Clinical features of acute psychosis Be familiar and collaborate with colleagues and caregivers from the preventive youth health and wellbeing sector as well as the mental health sector Skills:

Evaluation and diagnostic formulation of common emotional and behavioral problems in preschool and school-age children

Management strategies and counselling for common emotional and behavioral problems including referral as appropriate

Parent/child communication in case of possible SFD

Initial assessment of a child with intellectual difficulties, hyperkinetic disorder or autism spectrum disorder

Using rating scales and questionnaires for assessment of mental health problems

## **METABOLIC MEDICINE:**



## Knowledge:

Principles of metabolic disorders: mitochondrial beta-oxidation, lipids, carbohydrates and amino acids; storage diseases Metabolic crisis Common presentations of metabolic disease (including encephalopathy, neurodevelopmental regression, weakness, visceromegaly and poor growth) Genetic base of common metabolic disorders Screening tests for metabolic disease Basic dietary principles in the care of children with metabolic disease

## Specific Conditions:

Acute metabolic presentation in the newborn and infant

<u>Skills</u>:

Adequate sampling of biomaterials Newborn screening for metabolic diseases Consider underlying metabolic disease in unclear clinical presentation

#### **NEONATOLOGY:**

#### Knowledge base:

Fetal physiology and the physiology of extra-uterine adaptation Antenatal and perinatal effects on neonatal outcomes, including infants of diabetic mothers Epidemiology: Outcomes for survival and factors influencing outcome Prematurity and low birthweight sequelae (short- and long-term; prevention where possible) Growth anomalies: IUGR, SGA/LGA Principles of neonatal stabilisation/ resuscitation Introduction of mechanical ventilation and principles of assisted ventilation, non-invasive ventilation Principles of surfactant and nitric oxide administration Neonatal nutrition and feeding, including maturation of oral skills and support of breastfeeding, NEC Prevention and treatment of neonatal hypoglycemia Newborn screening Neonatal jaundice/ Exchange transfusion Congenital and neonatal infections Congenital malformations, major and minor including surgical/cardiac malformations Respiratory conditions, RDS, BPD, respiratory prevention after discharge including RSV prophylaxis, familial vaccination Neonatal neurology including hypoxic ischemic encephalopathy/hypotonia/seizures, use and value of neonatal neuromonitoring devices (aEEG, EEG) Drug withdrawal Ethical principles involved in the management of the dying baby Prescribing for newborns and breastfeeding mothers Indications for neonatal transfer to level 3-4 unit Skills:

Gestational assessment Examination of the newborn at birth and 6 weeks examination Management of healthy newborn Neonatal resuscitation, including aitway management/intubation emergency thoracocentesis



Stabilization and internal transfer of the sick neonate Blood sampling, interpretation of common laboratory tests, umbilical arterial and venous catheterization Placement PICC line (peripherally inserted central catheter) Arterial blood gas by PAC (peripheral arterial catheter) or capillary Fluid management Use of imaging/point of care abdominal ultrasound/cardiac evaluation/cranial ultrasound interpretation/IVH Communication with parents/family Basics in infant- and family-centered care/NIDCAP (newborn individualized developmental care and assessment program)

## **NEPHRO-UROLOGY DISORDERS:**

#### Knowledge base:

Development of the kidney, urinary tract and external genitalia. Renal physiology and pathophysiology, principles of fluid balance, electrolyte and acid base regulation Renal imaging and function tests Drug prescribing in renal failure

## Specific conditions:

Urinary tract infection Vesicoureteral obstruction and reflux Enuresis: nocturnal and diurnal Management of voiding disorders Haematuria/proteinuria, including nephrotic syndrome Haemolytic uraemic syndrome Common causes of hypertension Indications for renal dialysis and transplantation Acute scrotal pain and torsion

## <u>Skills</u>:

Taking history in nephro-urological disorders Measurement of blood pressure Appropriate urine collection: catheterization / bladder aspiration Interpretation of urinalysis, microscopy, dipstick Interpretation of biochemical investigation results Recognized renal failure

## **NEUROLOGY AND NEUROMUSCULAR DISORDERS:**

## Knowledge base:

Anatomy, physiology and pathophysiology of the central and peripheral nervous system Pathophysiology of common disorders affecting the nervous system (including neuromuscular) Common causes of disability Principles of antiepileptic drugs Sensory deficits e.g. hearing and visual impairment

## Specific conditions:



Meningitis Acute encephalopathy Cerebral palsy Common causes of neuro-degenerative or neuro-metabolic disease Common neuromuscular diseases Febrile and afebrile seizures Headache (acute and chronic) including migraine, secondary to brain tumor Hypotonia Neural tube defects Neuropathies Traumatic brain injury and rehabilitation Developmental problem: autism spectrum, language delay, intellectual disability Learning problems: dyslexia, ADHD, etc...

## <u>Skills</u>:

Taking history in neurodevelopmental and neurological disorders Acute management of seizures, meningitis, (sub)-coma Age appropriate neurological examination, head circumference measurement Detailed developmental assessment Basic concepts of imaging and indications of the different modalities : CT, MRI and ultrasound Lumbar puncture and interpretation of results Ability to communicate with (disabled) children and their families

## PRE- PERI- AND POST- SURGICAL CARE:

## Knowledge:

Basic principles of pre-operative assessment Basic principles of surgical referrals Principles of peri-operative management Principles of post-operative management, including pain/fluid management Know high-risk patient factors

## Specific conditions:

Hernias Maldescended testis Acute abdomen Acute scrotal pain Bowel obstruction; intussusception; pyloric stenosis Appendicitis Abcess

#### <u>Skills</u>:

Be able to diagnose acute abdomen, peritonitis, ileus Able to take care of surgical wounds

#### **RESPIRATORY DISORDERS:**

## Knowledge base:

Physiology and pathophysiology of the respiratory system in children, including age dependent changes.

21



Important epidemiological and genetic factors for respiratory diseases, including tobacco smoke exposure, pollution and allergens.

Specific conditions:

Acute or recurrent stridor Acute respiratory distress Asthma Basics of cystic fibrosis diagnosis and management Lower respiratory tract infection (including pneumonia and bronchiolitis) Hemoptysis Recurrent or chronic cough Sore throat and/or mouth Sleep disordered breathing

<u>Skills</u>:

Take a respiratory history and examination. Recognize and respond to respiratory distress and respiratory failure. Develop a management plan for common respiratory disorders. Prescribe and interpret common laboratory tests, skin prick tests, chest x-rays and lung function. Prescribe appropriate inhalation devices according to age and be able to educate the patient and his/ her parents on how to use them. Define indications for bronchoscopy

#### **RHEUMATIC & SYSTEM-INFLAMMATORY DISEASES:**

Knowledge base:

Aetiology and pathophysiology of rheumatic diseases, systemic inflammatory diseases Inflammatory and non-inflammatory connective tissue diseases Effects of chronic rheumatic diseases on physical growth and social development Rheumatological manifestations of systemic diseases

## Specific conditions:

Acute / chronic arthritis Common causes of joint swelling Common gait disorders (limp, torsional and angular deformities of lower limbs) Common causes of musculoskeletal pain, including limb pain, neck pain, back pain Juvenile idiopathic arthritis (JIA) Normal patterns of leg alignment (bow legs, knock knees, in toeing) Septic arthritis and osteomyelitis

<u>Skills</u>:

Taking a musculoskeletal history Detailed examination of the joints and musculoskeletal system

## SPORTS MEDICINE:

#### Knowledge:

Understand common sports injury and treatment Understand the importance of regular exercise to promote good general health Understand the importance of skeletal maturity in dictating the appropriate type of training



Understand the risks due to incomplete healing of previous injury Understand the risks of contact sports in healthy children

<u>Skills</u>:

Physical examination of the musculoskeletal system.

Recognition of examination findings that are consistent with common sports injuries. Plan the appropriate management/treatment/referral of an athlete with sports injury.