LEKÁRSKA FAKULTA
UNIVERZITY KOMENSKÉHO V BRATISLAVE

Pediatric Information Pack

Information for General Medicine Students, Clinical Evaluation in Children, Clinical Problems in Pediatrics
1998-1999

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Contents

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I. Introduction

This pack contains most of the information you need to know about the organization of your pediatric course. A separate chapter is devoted to explain basic principles of clinical examination in children. Another chapter on clinical problems was also added to translate the objectives and competencies of the pediatric curriculum into real life patient encounters which students can expect.

The complexity of medical care, just as the complexity of our surrounding world, is rapidly increasing. There is so much to learn that students will often emerge confused and ”miss the wood for the trees”. Therefore, we will emphasize principles and encourage the ability to direct personal learning with a problem-solving approach in preference to the ”spoon-feeding” of multitude of facts. We also want students to approach their studies with greater spirit of inquiry and to enjoy the intellectual challenge of science. This is based on the assumption that students are mature adults who given the opportunity will take maximum advantage of the environment to develop their talents.

The principal need for future physicians lies in the primary care or generalist disciplines, which includes pediatrics. Knowledge of the basic principles of child health is essential for all of the medical students, even if only a minority of them will become pediatricians. This does not mean, however, that the contributions of pediatric subspecialities or the importance of their disciplines will be ignored or devalued.

The majority of teaching will take place at the Departments of Pediatrics at the University Children’s Hospital. Your summer practice will provide opportunity for gaining additional clinical experience. We hope and expect that you will enjoy this period working with children and their parents.

The student noticeboards are near to the Secretary Offices on the 4th and 6th floor, respectively. Everything you need to know about the course is displayed here. Please, watch the noticeboard for information, timetables, details of assessment, etc.

Please, feel free to come and talk to any senior member of your Teaching Staff if you have any problems with the course or want advice on reading, electives or careers in pediatrics.

prof. MUDr. László Kovács, DrSc.

MUDr. Adriana Šufliarska, CSc.

II.Pediatric information pack for general medicine students

A) General information

1) The teaching staff

1st Department of Pediatrics	2nd Department of Pediatrics
Doc. MUDr. Marta Benedeková, CSc.	Prof. MUDr. Alica Kapellerová, DrSc.
Prof. MUDr. László Kovács, DrSc.	Doc. MUDr. Veronika Lehotská, CSc.
Prof. MUDr. Dagmar Michalková, DrSc.	Doc. MUDr. Želmíra Mišíková, CSc.
Doc. MUDr.Oľga.Červeňová, CSc	MUDr. Ľudmila Košťálová, CSc.
Doc. MUDr. Jozef Mašura, CSc.	MUDr. Jozef Michalko, CSc.
MUDr. Ľubomír Barák, CSc.	MUDr. Zuzana Pribilincová, CSc.
MUDr. Adriana Šufliarska, CSc.	MUDr. Mikuláš Zvolenský, Csc.
MUDr. Jarmila Hornová	MUDr. Ivana Boďová
MUDr. Ľubica Tichá	MUDr. Regina Krastevová
MUDr. Andrea Čerňanská	MUDr. Sabína Šufliarska
MUDr. Ivana Letenayová	MUDr. Andrea Škublová

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2) Study literature

Required literature

- *Behrman R.E., Kliegman R.: Nelson Essentials of Pediatrics. Philadelphia, W.B.Sauders 1990*

Recommended literature

- *Kapellerová A. a kolektív.: Propedeutika detského lekárstva. Bratislava, UK 1997*
- *Houštek J. a kolektív: Detské lekárstvo. Martin, Osveta/Avicenum 1984*
- *Randušková A. a kolektív: Liečebné postupy v pediatrii. 2. vyd.Bratislava, UK 1992,.*
- *Kapellerová A. a kolektív.: Vybrané kapitoly z pediatrie. Bratislava, UK 1993*
- *Horanský V., Mojžiš R., Slafkovský A.: Pediatria primárnej starostlivosti. Liptovský Mikuláš, TeleM 1994.*
- *Niessen KH: Pediatrie. Praha, Scientia Medica 1996*
- *Lissauer T, Clayden G. Illustrated Textbook of Pediatrics, Mosby London 1997*

3.The pediatric course – rules and principles

A.
You must be dressed tidily at all times and be respectful to everyone on the wards.

B. When you go on to a ward for the first time, you must introduce yourself to the nurses. It is important to get into the habit of discussing children with the nurses. You can learn a lot from your nursing colleagues *if you are prepared to do so.*

C. Be nice to children. Listen to their parents. Don't annoy nurses and medical staff. HELP THEM!

D. You learn most about children by spending time with them: mix with them as much as you can. Have tea with them. Read to them. Play with them. Enjoy them. Talk with their mothers and fathers. Learn how distressing and confusing it is to have an ill child. This cannot be learnt from textbooks.

E. One of the most important parts of the pediatric attachment is the time you spent actually seeing children on the wards. *Most doctors will not mind in the least if you do not immediately know the biochemistry of inborn errors of metabolism, but they will be irritated to find that you do not care about the patients!*

F. Always respect and protect confidential information.

G. Maintain utmost vigilance in preventing spread of cross infection within the wards. The following rules and procedures must be followed:

a. stay away if you are carrying an acute infection
b. always wash hands before and after examining children – especially small infants
c. remove rings, bracelets, etc. and wash hands and forearms when handling neonates
d. obey all "isolation" and "no entry" signs
e. be especially aware of immunosuppressed children

A. Learn and maintain positive working attitudes and behavior

to children: *Minimize their pain, discomfort and embarrassment Accept their uncooperative behavior Take into account special children's needs and vulnerability*

to parents: *Understand their often irrational behavior Show respect to their opinion Demonstrate friendliness, interest and unfailing courtesy*

to yourselves: *Prepare yourselves for continuing education Never be afraid to seek help where appropriate*

to colleagues: *Always treat colleagues ethically, honestly and with courtesy*

B) The pediatric course

1) Overview of the course for general medicine students

The program includes 4 semesters of pediatrics (4^{th} and 5^{th} class) and is delivered by a variety of teaching methods including lectures, clinical practices, seminars and self-directed learning. In addition to this, all students will participate a three-months pediatric clerkship during the final year.

Lectures will be delivered at the first weeks of each semester (table). They cover the most important topics of pediatrics, which are essential for practical teaching. Students participating at the clinical practice are expected to be familiar with the topics delivered.

Year	Semester	Lectures	Pediatric Practice

4th class	Winter (Introduction)	24 hours	20 hours
4th class	Summer	20 hours	20 hours
5th class	Winter	24 hours	20 hours
5th class	Summer	24 hours	20 hours
6th class	Either Winter or Summer	(seminars)	330 hours

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2) Pediatric practice - 4th and 5th year

The objective of the courses is to develop clinical and communication skills in various areas of pediatrics.

Clinical teaching is arranged in one-week blocks during the 4th and 5th years at the Departments of Pediatrics of the University Children's Hospital on the Kramáre.

Summer practice at an "away" hospital provides an opportunity for gaining additional clinical experience.

- Each pediatric block consists of five clinical modules listed on the schedule below and posted on the Department's noticeboard.
- Each module focuses on a group of diagnosis and conditions, which are most frequent in and specific for a given pediatric age group (newborns, toddlers and children).
- Students should show up on the appropriate Department section not later than 8.30 a.m. as specified on the schedule. In the 5th year summer semester, teaching begins with a seminar in the 6th floor Library.
- Students are expected to come to the modules with sound basic theoretical knowledge in order to properly approach and understand clinical cases. Self-learning is, therefore strongly encouraged. Those, without necessary basic knowledge of any of the topics of interest are at risk of disqualifying themselves and being asked for repeating the module.
- During each pediatric block, each student will write a detailed case report. This should include a complete medical history, results of thorough physical examination, appropriate laboratory results and, most importantly, a detailed discussion and differential diagnosis of the given case (simple copying of textbook chapters is strongly discouraged!). At the last module, the essence of the case report will be orally presented to colleagues and discussed with the teacher.
- Students qualify for **credit** by attending all five modules, demonstrating necessary knowledge and skills in examining patients and presenting the detailed case report. Any clinical practical missed has to be compensated before a designated time limit.

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3) Pediatric practice – topics for individual learning

Pediatric Practice – 4th class winter semester

	Topic	
1	Characteristics of various age groups during childhood	Psychomotor development – screening. Growth and weight. Preventive pediatric care. Psychological approach to a child.
2	Pediatric history	Practical guidelines to collect information from parents and children.
3	Clinical examination of infants	Observation, palpation, percussion, auscultation – specific findings in children.
4	Clinical examination of children	Basic diagnostic and therapeutic procedures. Blood drawing, urine collection, investigation of stool. Microbiological investigation. Parenteral treatment – drugs, injections, infusions, transfusion.

5	Nutrition.	Nutritional requirements. Breast feeding. Formula feeding. ”Milk kitchen”. Human milk bank – ”lactarium”.

Pediatric Practice – 4th class summer semester

	Topic	
1	Acute respiratory infections	Acute laryngitis. Acute bronchitis. Wheezing. Pneumonia. Physical examination, laboratory and X-ray findings. Treatment.
2	Recurrent and chronic respiratory diseases	Bronchial asthma. Cystic fibrosis. Bronchiectasias. Hemosiderosis. Physical examination, laboratory and X-ray findings. Treatment.
3	Acute and chronic diarrhea in infants	Clinical evaluation and laboratory findings. Treatment – diet, enteral and parenteral rehydration, total parenteral nutrition
4	Failure to thrive	Clinical evaluation, laboratory findings, functional tests, treatment.
5	Hematology and oncology	Anemia – clinical and laboratory findings, differential diagnosis, treatment. Specific problems of pediatric oncology. Acute leukemia, Hodgkin disease, non-Hodgkin lymphomas.

Pediatric Practice – 5th class winter semester

	Ward	Topic
1	Toddler	Somatic and psychomotor development. Feeding. Fever. Fits. Immunization
2	Internal	Metabolic disorders. Diabetes. Obesity. Hypoglycemia. Growth retardation
3	Newborn	Physiological newborn. Small-for-date baby. Small-for-weight baby. Respiratory distress syndrome. Oxygen and respiratory treatment
4	Cardiology	Evaluation of the cardiovascular system. Congenital heart defects
5	Toddler or internal	Respiratory infections. Pneumonia. Obstructive bronchitis. Asthma. Laryngitis

Pediatric Practice – 5th class summer semester

	Ward	Topic	Seminar
1	Toddler	Feeding disorders. Diarrhea. Vomitus. Dehydration. Acid-base balance. Rickets, tetania.	Congenital heart defects (Doc. Benedeková)
2	Internal	Urinary tract infections. Vesicoureteral reflux. Nephritis, nephrotic syndrome. Evaluation of urine	Urinary tract infections. Obstructive uropathies. (Doc. Červeňová)

3	Newborn	Anemia. Jaundice. Congenital defects. Interpretation of blood tests.	Fluid and acid-base balance. Dehydration - rehydration. (Prof. Kovács)
4	Internal	Intoxication. Headache. Abdominal pain. Enuresis. Hypertension.	Disorders of adolescence (Prof. Michalková)
5	Toddler or internal	Final evaluation – credit	ECG in infants. Arythmias (Doc. Mašura)

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4) Pediatric clerkship – 6th year

The aim of the clerkship is to gain familiarity with the common and important problems that affect children and the psychosocial consequences that arise to themselves and their families.

The tree-months clerkship will be divided between clinical pediatrics (1 month), pediatric infectious diseases, pediatric primary care and basic perinatal care, as it is posted on the pediatric noticeboard.

- Students should show up on the ward not later than 8.00 a.m.
- As much as possible should be spent taking an active part in the activities of the host department, clerking and examining all children who are admitted to the wards and assisting the physicians (who will undoubtedly be grateful for the student's assistance!).
- Students should see the patients whom they have clerked every day. They should write their own follow-up notes in the patient's chart and, whenever possible, accompany patients in any investigation they might be having (e.g. ECG, chest X-ray, USG, etc.). They will be expected to participate at daily rounds with the attending physician and occasionally will be asked to report clinical findings and laboratory results on their patients.
- During the pediatric clerkship, each student should write a detailed case report on a patient she or he clerked. This should include a carefully taken history (medical/developmental/social), results of thorough physical examination, appropriate laboratory results, detailed discussion and differential diagnosis of the case (simple copying of textbook chapters is strongly discouraged!). Essential points of the report will be orally presented by the student and discussed by his/her fellow colleagues at the credit session.
- Students qualify for **credit** by attending the course, demonstrating necessary knowledge and skills in examining patients and presenting case report (a special credit session will be arranged to discuss each case report). Any time missed should be compensated before a designated time limit.

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5) Pediatric skills and competencies

During the pediatric course, students should master certain basic skills and competencies of pediatric care. (*Group 2*). Students are, however, not expected to perform procedures, which are technically more difficult than in adults and to practice them on children will cause distress (Group 2). Far more important is to understand the indications and ponder the justification of the various investigations requested. However, if a student is given the chance to undertake any practical procedure, she/he should size the opportunity.

Pediatric skills that should be performed (Group 1)

- Medical history taking in pediatrics– communication skills
- Clinical and neurological evaluation of newborns
- Clinical evaluation of toddlers, assessment of psychomotor development Measurement of body weight and height and use of the appropriate nomograms for age
- Determination of bone-age and pubertal development (by Tanner)
- Measurement of body temperature (rectal, axillar)
- Measurement of vital functions (pulse rate, respiratory rate)
- Blood pressure measurement of the upper and lower limbs in various age groups
- Microscopic evaluation of urine
- Stool test for pH and reducing substances
- Calculation of food caloric content

- Blood counts and differential blood counts
- Determination of blood groups
- Interpretation of chest X-ray, intravenous urography and cystography
- Examination of throat and methods of taking bacteriological swabs
- Various methods of drug application
- Clinical evaluation of newborn
- Creation of simple genetic pedigree, interpretation of normal karyotype and its abnormalities
- Calculation of fluid and electrolyte requirements in dehydrated infants with 1) acute gastroenteritis and 2) diabetic ketoacidosis

Skills that should be observed (group 2)

- Oral feeding techniques
- Nasogastric tube feeding
- Intravenous fluids into veins of the head and extremities
- Application of oral drugs to newborns and infants
- Sweat test for diagnosing cystic fibrosis
- Methods of blood drawing
- Biopsy of bone marrow
- Immunization, Mantoux test
- Methods of urine collection
- Lumbar punction
- Brain and abdominal ultrasound
- Resuscitation of the newborn, primary neonatal care
- Breast feeding/formula feeding – weight test before and after feeding
- Basic neonatal care – phototherapy, neonatal screening

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6) Pediatric Lectures

4th year, Winter Semester

Introduction. History of Pediatrics. Preventive care in Pediatrics	Prof. Kapellerová
Medical history. Physical examination	Doc. Lehotská
Main characteristics of newborn. Physiological changes in newborn period.	Doc. Lehotská
Breast-feeding. Formula feeding	Prof. Kapellerová
Characteristics of different age groups. Nutrition of toddlers and children. Psychomotor development	Doc. Mišíková
Puberty.	Doc. Mišíková
Low birth weight newborn. Signs of prematurity. Basic neurological examination of newborns and infants.	Doc. Lehotská
Urinary system. Physiological characteristics and examination. Body fluids.	Doc. Lehotská
Cardiovascular system. Anatomical and physiological characteristics. ECG, X-ray.	Doc. Mišíková
Respiratory system. Anatomical and physiological characteristics. Examination.	Prof. Kapellerová
Blood – physiological characteristics during childhood.	Doc. Mišíková

4th year, Summer Semester

Acute Diarrhea, Dyspepsia – simple and toxic, Rehydration.	Doc. Lehotská
Total parenteral nutrition	Doc. Lehotská
Anemia – diagnosis, differential diagnosis and treatment	Doc. Mišíková
Hemorrhagic disease.	Doc. Mišíková
Leukemia. Hodgkin disease. Non-Hodgkin lymphomas	Doc. Mišíková
Failure to thrive – etiology, signs, symptoms and treatment	Doc. Lehotská
Malabsorption. Disorders of liver, gallbladder and pancreas	Prof. Kovács
Peptic ulcer. Disorders of the colon.	Prof. Kovács
Acute respiratory infections. Pneumonia	Prof. Kapellerová
Recurrent respiratory infections. Foreign body aspiration	Prof. Kapellerová
Chronic respiratory disease. Bronchial asthma. Cystic fibrosis. Bronchiectasias.	Prof. Kapellerová

5th year, Winter Semester

Hypertension	Prof. Kovács
Physiology of the Neonate	Doc. Benedeková
Urgent Situations in Neonatology, High-Risk Neonate	Doc. Benedeková
Low-Birthweight Neonate	Doc. Benedeková
Asphyxia & Respiratory Disorders in the Newborn	Doc. Benedeková
Hemolytic Disease of the Newborn	Doc. Benedeková
Mental Anorexia & Puberty	Prof. Birčák
Diabetes mellitus & Obesity	Prof. Michalková
Disorders of the Thyroid & Parathyroid Glands	Doc. Mišíková
Congenital Adrenal Hyperplasia	Doc. Mišíková
Growth Disorders	Doc. Mišíková
Disorders of Connective Tissue	Dr. Mozolová
Disorders of Connective Tissue	Dr. Mozolová

5th year, Summer Semester

Glomerulonephritis. Nephrotic syndrome.	Doc. Lehotská

Congenital Disorders Caused by a Single-Gene Mutation	Prof. Kovács
Chromosomal Abnormalities	Prof. Kovács
Urinary tract infections. Vesicouretral Reflux	Doc. Lehotská
Peptic & Duodenal Ulcer, Disorders of the Large Intestine	Prof. Kovács
Congenital Heart Disease with a Left-to-Right Shunt	Doc. Benedeková
Congenital Heart Disease without Shunting	Doc. Benedeková
Congenital Heart Disease with a Right-to-Left Shunt	Doc. Benedeková
Heart Failure, Therapy of Congenital Heart Diseases	Doc. Mašura
Acute and Chronic Renal Failure	Doc. Lehotská

C) Examination questions for general medicine students

Learning is largely determined by assessment. Practical skills are assessed at the end of each pediatric block and at completing the 6th year pediatric attachment. Summative assessment of pediatric knowledge is accomplished at oral examinations. Each student is expected to pass three pediatric exams:

- at the end of the 4th year winter semester *(Introduction to pediatrics)*
- at the end of the fifth year *(Clinical pediatrics)* and
- following the pediatric clerkship *(Final state examination in pediatrics)*

1) Introduction to pediatrics - Examination questions

Questions A

- Basic nutrients in the food of children (proteins, lipids, carbohydrates, minerals, water) requirements and importance, Importance of vitamins in infants
- Breast feeding – its importance for the normal development of a child, Colostrum, intermediate and mature human milk, Rules of appropriate breast feeding, Obstacles and contraindications of breast feeding
- Comparison of the composition of human and cow milk, Weaning, Formula feeding (when to begin it and how to perform), Formula feeding (various types of formulas), Correct eating habits in toddlers and children
- Various age periods during childhood, Newborn period – definition and characteristics, Toddlers – definition and characteristics, Infants – definition and characteristics, Preschool children – definition and characteristics, School age children – definition and characteristics
- Growth during childhood (growth rate, body proportions), Puberty (staging according to Tanner), Evaluation of psychomotor development
- Medical history – principles in children. What are the parts of the child's medical history?, History – leading complaints, History in infants (specific aspects), Personal history
- Prenatal care, Processes of adaptation during newborn period, Physiological changes during early neonatal period, Low-birthweigth newborns, Hypertrophic and postmature newborn
- Vaccination

Questions B

- Development of brain and sensor functions, Development of language and psychosocial relations, Development of fine motor skills, Development of gross motor skills, Clinical and laboratory signs of locomotion diseases
- Special anatomic and physiological features of the respiratory system in children, Symptoms and signs of respiratory diseases
- Anatomic and physiological features of the uropoetic tract, Symptoms and signs of the diseases of the uropoetic system
- Characteristics of fetal circulation and its change during newborn period
- Symptoms and signs of disorders of the gastrointestinal system

- Acid-base balance and its disturbances, Body fluid and mineral composition and its disorders, Development of immune system in children
- Hypo and hyperfunction of adrenal cortex during childhood (main symptoms and basic examination), Hypo- and hyperthyroidism in children (main symptoms and basic investigation), Anterior pituitary (functions and basic investigation), Sexual differentiation and its disorders – intersex, hermaphroditism, pseudohermaphroditism
- Special anatomic and physiological features of the gastrointestinal system in children
- Values of blood elements during childhood, Iron metabolism. Its importance in child nutrition
- Status presens generalis, Aspexy in children, Auscultation in children, Percussion in children, Palpation in children
- Care of newborn after birth, Evaluation of newborn after birth, Definition of labor, miscarriage, full-term newborn, premature newborn, perinatal mortality rate
- Screening in newborns and older children

Questions C

- Assessment of nutritional state, Physical examination of the gastrointestinal system, Liver function tests, Examination of stool, Investigation of gastrointestinal function, Imaging methods of the gastrointestinal tract, Investigation of pancreatic functions
- Basic principles of physical examination of the respiratory system, Tests of respiratory function, X-ray investigation of the respiratory tract. Assessment of chest X-ray
- Physical examination of the cardiovascular system, Vital signs and blood pressure measurement, Auscultation of the heart, heart murmurs, Special diagnostic methods in cardiology in children, Characteristics of ECG during various periods of childhood
- Urine analysis, Kidney function tests, Imaging methods of kidney and urinary system
- Neurological examination of the newborn, Imaging methods in pediatric neurology
- Enteral tube feeding, gastric lavage and rectal enema, Lumbar puncture, Punctures (generally, except lumbar puncture), Injections (basic rules and types of application, complications), Infusions and transfusions
- Diagnostic tests in immunology
- Care of chronically ill child
- Milk bank, Milk kitchen
- Areas of general pediatrician’s work

2) Clinical pediatrics - Examination questions

- Infections of the upper airways, Acute laryngitis, Sinobronchitis, Pneumonias, Atypical pneumonia (viral, mycoplasma, chlamydia), Allergic respiratory diseases, Chronic respiratory diseases, Dyspnea, Stridor, Cough, Cystic fibrosis, Foreign bodies in the airways
- Anemia, Disorders of white blood cells, Acute lympoblastic leukemia, Hodgkin disease, Idiopathic thrombocytopenic purpura, Anaphylactoid purpura, Lymphadenopathy, Hemorrhagic disorders, Splenomegaly, Disseminated intravascular coagulation, Disorders of the immune system
- Cyanosis, Arythmias, Heart failure, Congenital defects of the heart with a right-to-left shunt, Congenital defects of the heart with a left-to-right shunt, Congenital defects of the heart without a shunt, Endocarditis & myocarditis, Systemic hypertension
- Diseases of the esophagus and the stomach, Diseases of the liver and the pancreas, Obstipation, Hyperbilirubinemia, Hepatomegaly, Intestinal parasites, Vomiting, Biliary atresia, Malabsorption, Hypertrophic pyloric stenosis, Esophageal atresia, Differential diagnosis of anorexia, Abdominal pain, Rickets
- Dehydration, Diarrhea with severe dehydration & electrolyte disturbances in Infants, Acid-base disorders
- Urinary tract infections, Hematuria, Proteinuria, Glomerulonephritis, Nephrotic syndrome, Acute renal failure, Vesicoureteral reflux, Obstructive uropathies, Bacteriuria, Hemolytic-uremic syndrome, Polyuria and polydipsia
- Hyperpyrexia, Principles of antibacterial therapy, Sepsis
- Poisoning, Exanthemas, Atopic eczema, Disorders of puberty
- Low birthweight neonate, Birth injury, Hemolytic disease of the newborn, Neonatal asphyxia, Hemorrhagic disease of the newborn, Infant of a diabetic mother, Respiratory distress syndrome
- Juvenile rheumatoid arthritis, Connective tissue diseases, Rheumatic fever
- Pituitary hypofunction. Diabetes, Hypoglycemia, Congenital adrenal hyperplasia, Hyperthyroidism, Hypothyroidism, Disorders of sexual differentiation, Diseases of the adrenal glands, Growth retardation, Disorders of calcium metabolism
- Genetic diseases – monogenic diseases, Genetic diseases – chromosomal abnormalities
- Headache, Convulsions, Meningitis, Meningoencephalitis - clinical manifestations, Cerebral palsy, Altered consciousness

3) Final state examination - Examination questions

- Work of the primary care pediatrician (primary, secondary and tertiary prevention), Ethical approach to hospitalized child and his parents, Complex care of children at special environmental risk, Abuse and neglect of children

- Peculiarities of medical history in toddlers, Perinatal and infant morbidity and mortality, Breast feeding and its importance, Formula feeding, Feeding in older children, Nutritional requirements of a sick child, Adolescence, Imaging procedures in pediatrics**,** Screening in pediatrics
- Rational antibiotic treatment, Glucocortocoid treatment and its complications, Oxygen therapy (principles and complications), Side effects of drug therapy, Punctures and guidelines for their use
- Postnatal adaptation of fetal circulation, Pediatric and neurological evaluation of newborns, Low birth weight newborns, Infections of fetus and newborn, Emergency care in newborns, Asphyxia syndrome (early and late forms), Jaundice in newborns, Hemolytic disease of newborns, Bleeding disorders in newborns, Birth traumatism
- Chromosomal abnormalities, Evaluation of chromosomes and prenatal genetic diagnosis, Inborn errors of carbohydrate metabolism, Inborn errors of amino acid metabolism, Autosomal-dominant disorders, Autosomal recessive disorders, X-linked disorders
- Peculiarities of immune response during infancy and childhood, Allergic diseases (diagnosis and treatment), Atopic dermatititis
- Outbreak of infections - epidemiological measures in pediatric collectives, Fever – causes and principles of antipyretic treatment, Sepsis, Manifestations of infectious diseases on skin and mucous membranes, Vaccination, Infectious mononucleosis, Syphilis and AIDS in children, Dermatoses and pyodermias in toddlers
- Evaluation of the cardiovascular system in congenital heart disease, Age related normal ECG findings in toddlers and children, Cardiac murmur (functional and organic), Differential diagnosis of cyanosis, Edemas (etiology, differential diagnosis), Congestive cardiac failure, Disturbances of rate and rhythm of the heart, Congenital heart disease with left-to-right shunt, Congenital heart disease with right-to-left shunt, Congenital heart disease without shunt, Inflammatory heart diseases, Hypertension in infants and children
- Epistaxis a adenoid vegetation, Stridor, Foreign bodies in the respiratory tract, Acute diseases of the upper respiratory tract, Sinobronchial syndrome, Anginas, Acute otitis and its complications
- Congenital diseases of the respiratory tract, Cough and its treatment, Acute hypoxia, Bronchial asthma, Acute and chronic respiratory failure, Acute bronchitis, Bronchopneumonia and atypical pneumonia, Tuberculosis in children, Bronchiectasis, Atelectasis and emphysema, Cystic fibrosis, Hemosiderosis of the lung
- Vomiting, Abdominal pain, Melena and hematemesis, Congenital gastrointestinal anomalies, Pylorostenosis, Ulcer disease, Congenital megacolon, Acute appendicitis and intussusception, Inflammatory bowel disease, Malabsorption syndrome, Parasitic infections, Vitamins nutritional requirements, Obesity, Failure to thrive and anorexia, Differential diagnosis of jaundice, Hepatitis and liver failure, Disorders of gall bladder and pancreas
- Congenital anomalies of the urogenital system, Evaluation of renal function, Acute and chronic renal failure, Characteristic laboratory findings in diseases of the kidney and urinary bladder, Nephrotic syndrome, Acute and chronic glomerulonephritis, Hemolytic-uremic syndrome, Urinary tract infections, Vesicoureteral reflux, Tubulopathias, Enuresis
- Fluid and electrolyte disorders (diagnosis and treatment), Poisons and intoxications
- Developmental changes of blood elements, Anemias (classification, diagnosis and treatment), Methemoglobinemias, Transfusion and its complications, Leukemia in children, Malignant lymphoma (Hodgkin disease), Histiocytosis X, Coagulation disorders, Purpuras, Hemophilia
- Growth disorders, Diabetes insipidus, Thyroid diseases, Diseases of the parathyroid gland, Rickets and tetania, Disorders of sexual development, Diabetes mellitus, Hypoglycemic conditions
- Unconsciousness, Headache, Syndrome of intracranial hypertension, Meningitis and meningeal syndrome, Intracranial bleeding, Seizures (fits) in children, Cerebral palsy
- Disorders of the locomotor system, Rheumatic fever, Juvenile chronic arthritis, Connective tissue diseases, Myopathias, Osteomyelitis, Congenital dysplasia of the hip

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III. Clinical evaluation in children

History taking, physical and developmental examination, assessment and management of clinical problems.

1. The uniqueness of childhood

Human beings are constantly changing but the rate is much greater in infancy and childhood than at any other time of life.

- The growth rate of the body, especially the brain, is greatest in infancy and emotional and cognitive functions develop most rapidly at this time.

- Adverse factors, including disease and deprivation, have disproportionately bigger effects during early life, which may be irreparable. On the other hand, the rate of repair and catch-up growth is greatest in the young child.
- Optimum development demands full physical, emotional and psychological support.

It is important that children have caring parents who understand them and give them adequate time. The importance of nature and nurture is greatest in infancy.

1.2. Children are different from adults in their physical and physiological development - hence their reactions to disease or drugs. Their different metabolism and emotional activity requires a clinical, therapeutic and personal approach, which varies according to age.

- Thus the adolescent may be treated as an adult as far as drug dosage or clinical investigation is concerned. However, their emotional development requires slightly different handling with particular awareness of sensitivities and hostilities.
- The preterm infant requires a highly specialized knowledge of their immature physiology on the one hand and a very different clinical approach because of the impossibility of verbal communication.

It follows, therefore, that an understanding of the range of normal developmental stages and of normal physiological values (e.g. hemoglobin, blood pressure, ECG, thyroid function etc.) is essential for interpretation of data obtained on examination/investigation.

It should, therefore, come as no surprise to find that as children are developing organisms, problems and illnesses in them are very different from those of adults.

- Genetic disorders; anomalies of growth and development; problems of perinatal origin; communicable disease; nutritional disorders and social problems dominate, compared with the emphasis in adult medicine which is more on acquired degenerative, malignant, endocrine and inflammatory disease.
- At the same time, there is also the continuum of illness from childhood into adulthood to always consider.

Social relationships. Very young children are totally dependent upon adults and the quality of care partly determines their total development. Full assessment of the child must take in the total family, its lifestyle and level of concern. It is important that the doctor develops the insight required to make these assessments.

- Child health is concerned with families. In addition to the child's illness, the parents' anxieties must always be sought and dealt with. Social and behavioral problems are a large part of contemporary pediatric practice. The child may be used as the family's means of consultation about their own problems.

- Children learn to live with one another and adults, to develop their faculties and skills and to relate to one another through play. The doctor must, therefore, know how to assess play and be able to record it.

- School forms a very important part of the child's life in molding learning, understanding and social and moral values. The doctor must be aware how to obtain information about the school performance of the child and to relate to the school doctors. Teachers can provide a tremendous amount of information for doctors.

2. The clinical method: general comments

This is the method that processes a clinical problem into a diagnosis and a program of management in order to resolve (wherever possible) the initial problem and to identify and deal with social and psychological aspects.

2.1. In common with other branches of clinical medicine the clinical method has 4 principal parts:

- *History taking*
- *Physical examination*
- *Clinical assessment*
- *Management*

Together, these four elements provide the corpus of the problem orientated approach to clinical medicine that has been termed the SOAP approach:

- ***S**ubjective/history*
- ***O**bjective/ examination*
- ***A**ssessment*
- ***P**lan of management*

2.2 The hypothetico-deductive approach. Recent years have witnessed educational theory entering the realms of clinical

problem solving. Becoming dispensed with is the notion that providing all questions are asked and a thorough examination made, a diagnosis will emerge.

Instead, as it was repeatedly shown, physicians from the immediate outset of the doctor/patient encounter generate a set of *diagnostic hypotheses* which, through questioning and specific examination, are tested, revised and challenged. It is the central role of the initial testable hypotheses that constitutes the key to effective problem solving.

This approach differs from the conventional approach of routine data collection: *"a blank mind ritualistically collecting information might miss important clues that would otherwise be generated by an "inquiring mind"* (Elstein).

2.3 A clinico-pathological model for paediatric problems: the hypothetico-deductive process should explain diagnostic theories for main problems and any associated problems in terms of mechanisms (immediate underlying patho-physiological process(es) or developmental variation), etiology and, often, socio-environmental determinats.

3. Guidelines for history taking in children

Children are frightened of new situations, especially hospitals, and the doctor's first encounter is crucial**.** The type of relationship which is established on this occasion may well be the pattern for many years to come. It is important, therefore, to have as good contact as possible.

Don't forget, first impressions are usually those that last.

Arrange to see the child initially in the presence of one or both parents.

- The interactions between parent(s) and child can then be observed and assessed.
- Depending on the child's age, it might also be desirable to see him/her on their own.
- Always introduce yourself, shake hands with the parents and, if the child seems to appreciate it, with him too.
- It is important to have toys within easy reach so that the young child can keep himself amused while the history is being taken. At the same time, it will be possible to observe how he manipulates the toys and assess some of his motor skills.

The interview should be as unhurried as possible and time given to allow the mother/father to say all that they have to say, within reason. The child will also be observing the doctor and medical students during this period and forming his own assessment.

- When talking to or examining the child it is best to be on the same level, either by sitting on a lower chair or kneeling at his side; children always appreciate being talked to.
- Direct statements are preferable to questions, which often threaten the child.
- Be natural and spontaneous in your approach to the child. Be accepting of children as they are - e.g. if a child is negativistic or shy begin by talking with the parent (s). Avoid too direct comment or "correction statements" about his behavior. Make plenty of statements but few questions. Often a child will "answer" an "open-ended" statement more easily.

4. History taking

The history is extremely important in evaluating childrens' illnesses and problems. The process that sets out to obtain and integrate relevant and accurate information is the beginning of the hypothetico-deductive process that sets out to make a diagnosis from a presenting problem:

Without a diagnosis there can be no sound basis for management!

4.1. History taking has another important function, often overlooked: to understand the social, emotional and health predicament of the child and family. Considering these aspects is essential for later management, whatever the problem. On occasions, the problem itself might even be caused by anomalies in the social background, e.g. child abuse.

4.2. Other than in the older child, who can usually give an excellent history, much of the information collected during history taking in pediatrics has to be obtained through parents, guardian, relatives or friends. Hearing a story second (or even third) hand will often contain bias and inaccuracies, which should always be borne in mind whenever inconsistencies are seen to exist.

4.3. For newborn babies with a problem, the history of the clinical problem is even more atypical - it usually being the history of the mother's pregnancy and labor (a social and environmental history of the young infant). Try to evaluate the reliability of the mother or other person as a witness it is usually better than your first impression. It is a wise rule to assume that the mother is always right until proven otherwise. Occasionally, her history is deliberately misleading but with practice it is possible to be suspicious of this and to pursue the reasons why she is behaving in this way; for example, when the child

is the victim of non-accidental injury.

4.4. When indicated let children tell their story in their own words. Wherever possible, children should always be included in history taking: they should not feel left out. It is also important never to underestimate a child's own story. It is, after all, their problem which is being discussed (!) and older children are, in their naivety, often very reliable historians and better than their parents.

4.5. Obsessional inquiry about all bodily functions is less important than in adults since it detracts from the flow of the story and, in many instances, is irrelevant to the problem.

Irrelevant questions often generate boredom in both child and parents.

4.6. Systematic inquiry is more a recording of certain personal and family details, notably details of birth, feeding practices, early development and school, social aspects, past health and immunization history. **A** carefully taken **family history** is always needed. Not only will all these elements assist in reaching a diagnosis but they will also help the pediatrician understand the impact and significance to the child and family of the problem.

Always listen to the mother, she should know best!

The following two examples illustrate this important concept:

> *Example 1:* **A** 28-week prematurely born baby boy was ventilated for 6 weeks for hyaline membrane disease. Three months after hospital discharge he developed a mild cough associated with an upper respiratory tract infection. Had the baby not had such an eventful neonatal course the parents would not have been as worried as they appeared to be. Because the lungs had earlier been affected, any chest problem was, inevitably, a source of major concern - hence the parental anxiety over what would otherwise be considered a rather trivial symptom. Without a detailed birth history this should not have been evident!
>
> *Example 2:* **A** 9-year-old girl was brought to see a doctor because of abdominal pain. The parents seemed more concerned than the child. Family history revealed-that the child's uncle had died of cancer of the stomach and whose initial symptom was abdominal pain. The parents' anxiety was, therefore, eminently justified. Without a carefully taken family history, the seemingly excessive parental concern would not be understood!

4.**7.** The pediatric clinical history: conceptual framework. Every history must include, as well as details of the presenting problem, social milieu and prenatal history, early development (including feeding), immunization record, past health and general health.

4.8 There are several approaches to the history taking sequences. The following is a recommended sequence of pediatric history taking:

A. Initially record details of the presenting problem.

B. Then collect the child's personal details in the following order:

- social history
- family health
- birth history
- previous illnesses
- immunization record
- development (including progress in school)
- current health

With all the above information now available return to the presenting problem to fill in any relevant gaps.

5. The clinical method

5.1 You must be able to examine the *"four ages of childhood"*: newborn, infant, toddler, older child/adolescent.

5.2 The examination needs to be conducted with the utmost gentleness and avoiding pain. Traumatic procedures such as looking at a throat should be left to the end. Cold hands do not endear the doctor to the child neither does a cold stethoscope. It is important, therefore, to maintain warm hands and stethoscope.

5.3. The examination of children is dependent upon establishing mutual trust. Always explain to the child (if old enough) while carrying out the physical examination. It can also help sometimes to actually show the child what you are asking him to do, for example, finger-nose testing. The key to success is patience, understanding, sympathy, gentleness and humor.

With babies under nine months old this is easily acquired as they are trusting individuals. It is best to get fairly close to them - about two or three feet away - and engage their attention with your face. A smile and appropriate noises are very effective in evoking responses. Much of the examination can be proceeded with whilst keeping the child's attention fixed in this way. At about the age of nine months, infants become apprehensive of strange adults and often react against a direct approach. It is always worthwhile trying to earn their smile and co-operation but difficult to achieve it, especially if the child has been examined by a not sufficiently sympathetic doctor before. Sometimes it is best not to look directly at the child but to concentrate on the parents and to talk to them meanwhile. Children of three and four years may be more responsive to the direct approach.

5.4. One of the best ways of obtaining a child's trust is to demonstrate your relationship with the parent(s). If the child sees that the doctor relates well and respects the mother and father, he will respond in a similar way. If the child cries, try to find out why - it may be because he is afraid, because he is in pain, because you hurt or frighten him, because he has been conditioned by previous experience or because he cannot tolerate separation from mother.

5.5. Rather than the more formal testing in adults, doctors have to be opportunists when looking at children. If the child is asleep, seize the opportunity to examine his abdomen and auscultate his chest. These two procedures can easily be done without moving the blankets and sheets much, if at all. Much of the physical examination will be deduced by observation:

- *Is the child sick or well?*
- *Does the child look well nourished, normally grown?*
- *Does the child behave normally?*

5.6. In approaching the child for the examination, you must be prepared to be flexible and not adhere to a rigid order of examination but do what he will permit. Two or more separate examinations may be needed at times before the examination is complete. Time spent in winning confidence is not wasted.

Watching the child is paramount at all ages, especially the youngest (listening becomes more important later).

Observation of the mother/child interaction is an important part of the examination. A tremendous amount can be learnt by noting the frequency of respiration the amount of intercostal indrawing, the shape of the chest and the symmetry of movements etc. Much can be learnt from watching the infant's spontaneous movements inside the incubator. The infant with preservation of the exquisitely fine individual finger, face and eye movements in the newborn period is likely to have an intact central nervous system.

5.7. The formal method of examining adults in the supine position is fine for the older child and very young infant but older infants and toddlers object to lying down. They feel threatened and often cry if placed in this position. It is sometimes wisest to examine them in the upright position and this may be the only way in which an abdomen can be examined. The very apprehensive infant and toddler may well be most easily examined sitting on his mother's lap with his back to the doctor. With a little practice it is possible to examine the abdomen very satisfactorily in this position.

Infants and toddlers do not like to be undressed and it is sometimes best, therefore, to undertake auscultation underneath the vest or, occasionally, through it. With practice one learns how to discriminate the rare adventitious sounds which arise from an infant's vest or T-shirt.

6. Sequence of clinical examination

To be meaningful the clinical examination has to proceed in a logical order:

A) First note the state of "clinical wellbeing" before you touch the child. Stand back and use your eyes and your ears:

- *Is the child desperately ill/sick/fairly well?*
- *Any breathing difficulties?*

Nutritional State: underweight/overweight: short/normal/tall. Include in a chart, height (length) and weight, and allocate to each a centile point. If not included at this stage these will be forgotten.

Level of consciousness: alert, tired, asleep

Behavior: appropriate for age: miserable/co-operative/overactive/happy etc. Watch play. Smell of breath such as in ketoacidosis.

Level of hygiene (e.g., dirt under nails, presence of napkin dermatitis). Color. Pallor. Breathlessness. Jaundice. Cyanosis, peripheral or central. Temperature (this is an invasive procedure and can be left until later if not already recorded by the nurse). Finger clubbing. Lymph gland enlargement. Skin color, rashes, bruises and other injuries.

In practice the physical examination is a continuous process starting from the minute the child is seen for the first time. Observation throughout history taking is an essential part of the examination. Observation always precedes palpation or auscultation!

B) Evaluation of the systems

Continue with the system(s) suspected at being at fault from the clinical history.

Head and Neck: Note the size and shape of the head. Measure the maximum occipito-frontal circumference. It is essential to plot this circumference on the centile chart for the first two years at intervals, along with estimation of height and weight centiles.

For older children, single measurements and occasionally plotting on head circumference centiles might be relevant in some cases, such as those children with neurological problems.

Fontanelles: Feel for size and tension. Sutures can be easily palpable at birth. Wide sutures indicate increased intracranial pressure and prominent. ridges indicate premature fusion of the suture(s).

Ears: Note abnormalities of shape or position. Auroscopic examination, if any, should be left until the end of the physical examination.

Face: Dysmorphisms such as in Down's syndrome. Some facial appearances are diagnostic of certain conditions such as hypothyroidism and Cushing's syndrome. Look for bruising and other signs of injuries.

Eye: Subconjunctival haemorrhages, inflammation of the conjunctiva and dysmorphic features such as epicanthic folds; jaundice.

Mouth: Number and state of teeth; presence of oral thrush; mucosal pallor and state of mucosal hydration; presence of rash; color of the tongue as a means of assessment of central cyanosis.

Skin: look for rashes: erythematous or purpuric, raised or flat: cafe au lait spots: scratch marks: bruises or other injury: birthmarks: naevi etc. Exanthema of common infectious diseases (especially measles, chickenpox and meningococcaemia).

Cardiovascular system

Approach is the same as for adult patients, although there are certain **special points**:

- Inspection for jugular venous pressure should always be attempted though, practically, this is extremely difficult to elicit in small children. In young children the brachial pulse may be easier to examine than the radial. Always feel the femoral pulses.
- Don't forget to always measure the blood pressure. This should usually be done at the end of the examination unless the child is in suspected circulation failure when it must be taken immediately. The cuff size must be appropriate, more than two thirds the length of the humerus. You may find it easier to locate the systolic pressure with your fingers than by auscultation. If auscultation is difficult, simply state the systolic pressure. (Mention if the child was crying).

Respiratory system

Special points:

- With younger children you may find it easier if the child is on mother's lap or, to listen to the back, with his arms around her neck.
- Signs of respiratory distress in young infants and children include grunting; tachypnoea; intercostal recession or indrawing. Chest expansion is best determined using a measuring tape.
- Has the child got a cough and stridor? Look at the shape of the chest.
- Is there a pectus carinatum (pigeon chest); pectus excavatum (depressed chest); Harrison's Sulcus. Percussion can be omitted in neonates and young infants, especially if it is thought to upset the child. Vocal fremitus is not a sign of great value in children.
- When auscultating use the diaphragm of the stethoscope. Start at the apices and work down to the bases.
- The quality of the breath sounds in young infants is often more harsh (bronchial rather than vesicular).

The abdomen

The ideal position to examine the abdomen is with the child lying down on a couch. Unfortunately, a number of small children have different ideas! If necessary, examine on the mother's lap. Make sure you have warm hands. Frozen digits are definitely out!

> **Look for:** obesity; hernias (child standing); inspection of the genitalia is not required unless clinically indicated (except in baby boys where it is important always to palpate the testes); abdominal distension; buttock shape (any gluteal wasting); napkin rash (in small babies). Be careful if you suspect tenderness. Always ask first if it hurts anywhere. If it does, start the palpation at the opposite end of the abdomen.
>
> Rectal examination is NOT part of the normal physical examination in children.

Always respect the child's modesty: the abdomen should always be covered with a blanket and never left exposed!

Ear, nose and throat

This part of the examination has been left towards the end because young children do not like having their ears and throats examined.

- Enlargement of some lymph nodes in the neck (and groin) is common.
- To examine the ears, sit the child on mother's knee and tell her to put one hand around his chest, the other round his forehead and to hold him against her. Pulling the pinna slightly out and back helps to visualize the tympanic membranes. Do not force the speculum into the meatus but rest it at the entrance.

- When inspecting the throat, try to get the child's co-operation to open his mouth voluntarily **but do not examine the throat of a child with possible epiglottitis!** A tongue depressor is not usually required and should not be used unless absolutely necessary. Look at the tonsils, their color, size and for any exudate. A useful play is to get the child to pant "like his/her dog".

Central nervous system

It is not always practical or possible to carry out a thorough CNS examination. In children as young as two or three an "adult" CNS examination can almost be done depending on the child's cooperation and the examination approach. In younger children ingenuity and great patience is called for to perform a modified QVS examination. A mass of observations is obtained simply observing the child at play.

- Initial inspection should include play, behavior, level of consciousness, abnormal movements.

- The head is important, especially in infants. Head circumference, shape, fontanelle size, setting of eyes and ears.

Cranial Nerves

  - Is there squint?
  - Does the child focus correctly?
  - Are there any 'wandering' movements? Is there any nystagmus?

Ocular Movements: It will not be possible to get a younger child to directly move his eyes to left or right therefore compromise by holding a doll or toy on one side (have someone hold his head) and he may demonstrate eye movements by following. Alternatively, rotate his head when his eyes are focussed upon you and they will remain fixed upon you. Lateral and medial movements can be tested easily by this means.

Facial Weakness: I.ook for facial asymmetry especially during crying or smiling.

Hearing and Speech: Ask mother if she is concerned about the child's hearing and observe how he responds to sounds in his environment.

  - note whether his response to speech of others are appropriate for his age.
  - does he talk normally for his age? Is speech easily intelligible? Can he put words together in combination of 2, 3 or more?
  - one should be able to test the hearing of a child of six months and older. Divert attention with a familiar object and get an assistant (out of sight) to gently shake a rattle or a bunch of keys when the child will turn towards the sound.

The formal "distraction" test of hearing is performed at 8 months.

Tongue: Getting the child to show his tongue is part of pediatric folklore. If he does this you will get a better view of the pharynx and tonsils.

The limbs: It is difficult to get a ahild to co-operate in an ordered limb examination. Therefore, observe the child at play.

Tendon reflexes: these are often difficult to detect in young children. Time will be needed to find the correct position of the limbs for this purpose. Gentle but adequate persuasion of the tendon is needed.

Remember always to test the primitive reflexes in infants and older children if neurological problems are suspected.

Upper limbs: does he use both hands; can he coordinate his movements; are they the same size; is there any evidence of stiffness/laxity of the joints?

Lower limbs: does he walk; is the gait normal; has he a limp; is co-ordination appropriate for his age?

More objectively, if co-operation is possible (and the age is right) assess the power and tone. Ask him to draw pictures or write. Get him to kick or throw a ball.

Remember to assess the possibility of scoliosis and kyphosis especially in infants and adolescents.

Developmental examination:

This must always be done! For the older child an inquiry about school performance and overall assessment of intelligence is adequate. For detailed developmental assessment a specialist examination is needed

7. Summary of clinical problem(s)

The findings (relevant positive and negative) of the history and examination are now brought together as an assessment (*summary to date*). This is an essential, though all too frequently overlooked, part of the clinical method. The assessment of the clinical problem must be written down clearly in brief sentences. Included in this assessment should be a clearly stated diagnosis or, if not reached differential diagnosis.

> *For example:* A five months old little boy, previously well and fully immunized, admitted with a two day history of fever unresponsive to erythromycin and paracetamol and progressive drowsiness. Examination reveals irritability, neck stiffness and a full fontanelle. Meningitis, probably haemophilus, is the likely diagnosis.

It is important. not to jump to conclusions and to make hasty spot diagnoses. Sometimes the clinical features alone are sufficient to give a pathophysiological diagnosis, e.g. chest infection. Microbiological investigations might be needed to verify the etiology. More often than not, however, the clinical assessment is crucial in reaching a diagnosis. It should provide foundations for the plan of management.

8. Plan of management

Three components make up this concluding part of the clinical method:

1. **To establish the diagnosis**:

   Is there already a diagnosis from the history and examination? Is there a need for further investigations to confirm or make a diagnosis. If so, what further investigations are required. Do not forget that the history and examination are also investigations!

2. **Treatment** of the various problems that emerge out of the diagnosis.

   A diagnosis is not treated – its component problems are! An important clinical skills to learn is how to dissect a diagnosis into its component parts.

   3. Communication: Telling children and parents about the problems and how they will be dealt with.

These principles underlie a responsible and intelligent approach to clinical management! They need constant reinforcement.

1. **Establishing the diagnosis – the need for further investigations**

Additional investigations might be needed to confirm a clinical impression. These further investigations will usually be directed to the main problem (its pathophysiology and etiology and, on occasions, its social and psychological associations)

and to its possible complications.

Conceptually, the only difference between the preceding "history and examination" and "further investigations" is the nature of the investigations - "further investigations" simply being more laboratory, electrophysiological or image orientated. "Routine" investigations are to be discouraged! They can create problems, cause pain or discomfort and be a drain on budgetary resources.

The following catechisms should be borne in mind whenever contemplating further investigation (Asher 1971):

> *It is a salutary exercise in mental discipline to catechize oneself when ordering any medical investigation, saying:*
>
> - *Why do I order the test?*
> - *What am I going to look for in the result? If I find it, will it affect my diagnosis?*
> - *How will this affect the management of the case? Will this ultimately benefit the patient?"*

High medical standards should not be equaled with high technology, which is itself appropriate for only a small minority of patients.

8.2. Treatment

Whenever possible - diagnosis should always precede treatment! But sometimes in clinical emergencies, e.g. shock, suspected meningococcal disease, treatment will have to be anticipatory. Without a diagnosis it is difficult to organize an orderly problem list. Treatment can be considered in two categories

- *"general" problems and*
- *"specific to particular problems"*

General problems: this includes aspects such as diet, need for bed rest and monitoring measures such as temperature, blood pressure, pulse rate, respiratory rate etc., aspects of care largely undertaken by nurses which, though often taken for granted, are as essential to achieve the best possible medical outcome as are more specific radical aspects of treatment. These are all essential and may even be viewed as continuing clinical investigations, though, for convenience, they are best considered as part of the treatment schedule. They will always be taken into account in the day evaluation of clinical problems.

Specific to particular problems: The key to this is the identification of problems that require treatment. These can best be defined by referring to the clinical/pathological model for clinical illnesses. It is good practice in listing problems to always consider two possible limbs:

a. *pathophysiological" (medical) and*
b. *psychosocial*

In this way social and psychological implications of an illness will always be considered:

8.2.1. Medical problems (examples)

l. Is there a problem that might relate to the **immediate mechanism** (pathophysiology) responsible for an illness which can be reversed or modified, as in

- *treating hypothyroidism with thyroid hormone.*
- *treating idiopathic epilepsy with anticonvulsants.*

2. Is there any problem involving **etiology** (the root cause) that can be specifically dealt with, as in:

- *repair of a large ventricular septal defect in an infant with intractable heart failure .*
- *using penicillin to treat pneumococcal pneuminia.*

3. Is there a problem that reflects a **complication** of a disease process, as in:

- *dehydration caused by gastroenteritis and treated with oral rehydration*

  solutions.

It is to be realized, that in real day-to-day clinical practice the precise diagnosis will often not be made for several days after the problem has initially presented, awaiting the results of further investigations. The initial specific

problem list will, therefore, not be complete. Some may have to be speculative, tentative or anticipatory, for example, a child with typical clinical features of acute post-streptococcal infection suspected and treated with penicillin several days before the results of the ASLO is returned.

8.2.2. Psychosocial problems

For example:

- *Genetic counseling in a baby born with a cleft palate.*
- *School performance in a child with epilepsy.*

8.3. Communication

This much neglected aspect of the clinical method often provides the greatest challenge and is frequently the most difficult to learn. It is currently the focus of a lot of interest in medical education.

With experience, and provided rules are followed, diagnosis and treatment of illnesses and problems in children are often straightforward - although often demanding in mastery of certain technical skills.

Less easy is how to explain illness and its social and psychological consequences to children and their parents (often of very diverse social and educational backgrounds).

- *How to tell parents that their newborn baby has Down's syndrome.*
- *How to tell a child of 9 and its parents of a diagnosis of leukemia.*

Students must be aware of the importance of this aspect but they will not be expected to be competent in all aspects of communication skills. This is left more to the postgraduate phase of learning. But an awareness of its importance as part of management is essential.

9. Examination of neonates

Every newborn baby must be given a thorough examination within 24 hours of birth. Before this time a preliminary examination and assessment will already have been given on the labor ward (by a midwife/obstetrician/pediatrician) to detect major problems which might need immediate attention.

9.1. This more leisurely newborn examination which is typically undertaken in an otherwise healthy newborn baby, providing the initial assessment soon after birth has been satisfactorily completed, has essentially to satisfy **5 main objectives** (some of which will inevitably overlap with the earlier assessment at birth):

a. to ascertain 'general clinical wellbeing
b. to (further) document the effects of any birth trauma which might have taken place
c. to detect any covert or overt errors of morphogenesis (congenital abnormalities) not yet noted, or even overlooked. Covert errors will include, for example, heart murmurs and congenital hip dislocation
d. to further detail any abnormality(s) noted at birth which was not considered to require special admission to the neonatal unit (e.g. small cleft palate)
e. to record weight, length and head circumference and skinfold thickness, the principal measurements of physical size and to determine growth and nutritional status in relation to gestational age (e.g. large or small-for-dates)

9.2. Examine the baby in the following order:

a. First observe the general condition of the baby, noting in particular the color, breathing, state of consciousness, posture, dysmorphic features and state of nutrition.
b. Listen to the heart sounds with the bell of the stethoscope and then feel for the femoral pulses. (It is helpful if (a) and (b) are performed before any other systematic examination as the latter may induce discomfort or crying and make the former examinations difficult to interpret.
c. Preferably head to toe approach with a special emphasis on the following:

    1. Size of the head; degree of tension of the fontanelle and separation of sutures.
    2. Dysmorphic features of the head and neck.
    3. Inspection of the back and the limbs. Count number of digits.
    4. Abdominal examination, including inspection of the umbilicus, looking specifically for signs of inflammation or sepsis. Genitalia inspection.
    5. CNS assessment, including primitive reflexes, general tone and level of alertness.
    6. Feel for the palate with the little finger, make sure the finger nails are cut short; hands have already been washed in any case.

7. Lastly, test for dislocation of the hips. This examination should be left right until the end because it induces discomfort and crying.
8. Complete the physical examination by reviewing the remaining systems.

Note: The Guthrie heel prick test performed on 4-5th days for PKU and congenital hypothyroidism should, conceptually, be considered a part of the newborn examination, searching in this instance for ' hidden' metabolic and endocrine problems.

10. The clinical presentation

To be able to *present a clinical problem coherently* is an important skill to be learned during the clinical years. It *is the basis of good clinical practice*. Mastery will reap its rewards in the student years, but this facility is acquired only with constant practice.

10.1. The following scheme should be followed (with appropriate flexibility) when presenting a child on a ward teaching round or seminar:

First: Introduce the child – name, age and the presenting problem(s)

Then: Summarize the child's relevant personal history:

- family and social
- birth and neonatal (including feeding) - development
- past health - immunization - current health

Now, return to summarize the presenting problem(s):

Report relevant points of the examination

- general considerations
- system(s) considered relevant to clinical problem
- remainder of examination

Give an assessment of clinical problem(s)

- **s**ummarize relevant history and examination at the time of admission
- give a diagnosis/differential diagnosis as considered at presentation.

Discuss management

- describe any further investigations needed to have established a diagnosis.
- outline the initial problems needing treatment.
- describe briefly the general aspects of treatment and then refer to treatment of each problem in turn and their outcome up to the day of presentation.
- what were the social and psychological consequences of the problem and its treatment?
- what explanations were given to the child and parents?
- if the child has been sent home, what arrangements have been made for continuing care?
- what problems were met within this follow-up program?

These guidelines must be read

alongside the detailed account of the clinical method described above!

IV. Clinical problems in pediatrics

Introduction

These clinical problems translate the objectives and competencies of the pediatric curriculum into real life patient encounters which students can expect. The brief clinical vignettes represent typical presenting complaints encountered in pediatric practice. These have been kept brief to serve as "triggers", giving only enough detail for further investigation or discussion. Most of the problems are designed to stimulate discussion of appropriate differential diagnoses and initial

evaluation or management.

Clinical problems were arranged into the following sections:

- Introduction
- Health supervision
- Growth and development
- Behavioral problems
- Nutrition
- Issues unique to adolescence
- Issues unique to the newborn
- Medical genetics/Congenital malformations
- Common illnesses
- Therapeutics
- Fluid and electrolyte management
- Poisoning- prevention and treatment
- Pediatric emergencies

Health supervision

1. You are evaluating a five day old infant prior to discharge from the nursery. What advice would you give the parents regarding feeding, sleeping, and general care of their new baby? When should they expect to see you for "routine care"?
2. A healthy ten month old is starting to cruise and pull himself up on furniture. What advice would you give the parents to make the house safe?
3. A four month old infant develops a fever of 40 C and fussiness six hours following her second DiTePer immunization. Parents are concerned about whether this child should receive any further immunizations.
4. A six month old child is known to be immunosuppressed. How should her immunization schedule be modified?
5. A six month old infant develops fever and then a generalized seizure eight hours following DiTePer immunization. What are the considerations for modifying future immunizations?
6. In the nursery, parents are informed that blood needs to be drawn from their newborn for "screening tests." Describe to the parents what these are.
7. Parents ask you the most appropriate time to screen children for anemia. Please discuss your answer.
8. The parents of a one year old are considering whether to have their child attend a nursery. They would like to discuss the risks and benefits with you.
9. A three year old boy is seen in your clinic for a pre-kindergarten exam. What is involved in this evaluation?

Growth and development

1. A three month old full term infant has gained 420 grams since birth. Her height velocity is normal. Her parents want to know if this is adequate. What would you tell them?
2. A fifteen month old has no recognizable words. Parents are concerned and wonder if he needs speech therapy. How would you respond?
3. An infant rolled over at four months and sat with assistance at six months, but at one year he is unable to stand or sit alone. His parents are quite concerned and ask if this is normal. Explain your answer.
4. The parents of a nine month old infant are concerned because she is not sitting. She has mildly increased tone and scissoring of her lower extremities. She can grasp a rattle, but does not reach for objects. She coos and has a social smile. What would you tell her parents?
5. A six month old has a head circumference in the 50th percentile, height in the fifth percentile, and weight in the fifth percentile (baby was at 50th percentile for all measurements at three months). Is further evaluation warranted at this time?
6. The mother of a ten year old girl wants to know when she might start her periods. What would you tell her?
7. A twelve year old boy complains that he is the shortest person in his class. He is 130 cm. He wants to know if he should take a "growing medicine". How would you respond to his question?
8. The parents of an eight year old girl want to know how tall she will be. What will you tell them?
9. A nine month old boy is seen in your office who is able to pull to a standing position, crawl, grasp objects with thumb and forefinger, and says "Mama" and "Dada". His parents are concerned that he's not as big as the nine month old next door. How will you respond to their concerns?

Behavioral problems

1. A three year old is to start nursery school but is not yet toilet trained. How would you counsel his parents?
2. A sixteen month old has had several episodes of breath-holding and cyanosis that leave him limp for a few seconds. They occur when he is angry or upset. What is your approach to this problem?

3. A one month old baby is not yet sleeping through the night. Parents are surprised at this. What would you tell them?
4. A five year old boy is still wetting the bed at night. Discuss your approach to this.
5. A two year old "refuses to eat". What is important in your evaluation?
6. A fifteen year old boy who had been an honor student is reported for truancy. He seems withdrawn form his parent sand friends. He quits the soccer team after a fight with his coach. Describe your approach.
7. The parents of a seven year old boy receive a call from the child's teacher because he is having difficulty following directions and behaving in class. She feels he has a short attention span. How should you proceed?
8. A fourteen year old girl runs away from home for two days after a fight with her parents. Discuss a reasonable initial approach. Who would you call for help?
9. A seven year old girl complains of a stomach ache several times a week, often keeping her home from school. It is not associated with vomiting, diarrhea, or fever. How would you approach this?
10. A ten month old who used to go contentedly to the baby-sitter now cries when her mother leaves. What would you tell her mother?
11. After being hospitalized for pneumonia a three year old girl begins to wet her pants, talk "baby talk", and ask for the bottle. Her parents are quite distressed and seek your advice. How would you counsel them?
12. The parents of a two year old ask how to control their son's temper tantrums. Describe how you would address this situation.

Nutrition

1. The mother of a newborn asks you if it's important for her to breast feed her baby. At twenty-four hours post delivery, she doesn't feel she's making enough milk. Discuss your advice to this mom including differences between formula and breast feeding.
2. The mother of a six month old needs to return to full-time work. She has enjoyed breast feeding, but is ready to switch to formula. She asks if this is okay for her baby. How would you counsel her?
3. A two month old infant is seen in your office for routine follow-up. Mom asks about the need for vitamin supplements. Discuss when and what supplements should be considered.
4. A four month old infant has been exclusively breast fed. The parents would like advice regarding when to proceed with solid foods. Explain your answer. What if the infant had been formula fed?
5. A two year old girl eats a limited variety of food. What is your advice to her parents?
6. A five year old boy has been seen in your office for a pre-kindergarten physical. Although previously at the 50th percentile for height and weight, he is now at the 95th percentile for weight and has remained at the 50th percentile for height. How would you counsel him and his family?
7. A thirteen year old female wants to "go on a diet" and asks your advice. How would you evaluate and counsel her?
8. A sixteen year old female is brought to your office by her mom because of a 10 kg weight loss over the last six months. Describe the important aspects of the history and physical exam and how these relate to your differential diagnosis.
9. The health conscious parents of a one year old child ask if they can switch her to nonfat milk as they are concerned about obesity and heart disease. How would you counsel them?
10. A six month old is not growing or gaining weight. The baby is taking 200 ml of formula every three or four hours. How would you evaluate whether this intake is adequate?
11. A one year old child is still drinking formula. Parents ask if they can transfer from formula to cow's milk. How would you counsel them?
12. Discuss your approach to fluoride supplementation in your community.

Issues unique to adolescence

1. A fourteen year old female is seen in the clinic with her mother for acute onset of dysuria and urinary frequency. Describe your approach to this patient including appropriate interviewing techniques, physical exam, diagnostic studies, initial management, and advice to her parents.
2. A fifteen year old boy is brought to your clinic by his parents after he threatened to "take a bunch of pills". He seems depressed in affect, and on initial evaluation is clinically stable. Explain your approach to this young man, including important history, physical exam findings, diagnostic studies, management principles and advice to his parents.
3. A seventeen year old female sees you for a pre-university physical. Describe your approach to history, physical exam, and guidance/counseling.
4. A sixteen year old boy presents to your clinic with polyuria and weight loss over the past three weeks. Describe the important aspects of the history and physical exam, diagnostic considerations, differential diagnosis, and basic management principles.
5. The mother of a thirteen year old female expresses concern that her daughter has not yet had the onset of menses. How would you counsel her?
6. A sixteen year old male presents with fever, fatigue, and sore throat for four days. Discuss what aspects of physical exam and lab data will help establish a diagnosis.
7. A fourteen year old female well-known to your practice makes an appointment to see you alone regarding a desire for

contraception. What advice would you give her? What are her rights to confidentiality? What are your responsibilities to inform her parents?
8. A fourteen year old male presents for a football sports physical. What are the important points to cover in the history and physical exam?
9. Late one Sunday night, a previously healthy fifteen year old male is brought to you by his parents after he returned home from a party confused and combative. Describe your approach to this clinical problem.

Issues unique to the newborn

1. A ten day old infant presents to your clinic because of "yellow skin color". Pregnancy and neonatal course were uncomplicated. The baby was discharged to home on the first day of life. Describe your approach to this baby.
2. The mother of a four week old infant phones at 10:00 p.m. and says her baby has had a temperature all day and that the fever is now 40 C. Describe important points of history, physical exam, diagnostic considerations and basic management principles.
3. You are called to the nursery to see a two day old infant who has developed duskiness and tachypnea over the past four hours. Describe your initial approach and differential diagnostic considerations.
4. You are called to the nursery to evaluate a two hour old infant who has developed respiratory distress. Describe your approach and differential diagnostic considerations.
5. A full-term infant is noted to be jaundiced at 48 hours of age in the nursery. Total bilirubin is 200 umol/l. What tests would be helpful to further evaluate this baby? What is your differential diagnosis?
6. A newborn infant is noted to be irritable and jittery, vomits, has diarrhea, and develops seizure activity. What would be of most concern to you regarding mother's history?
7. The parents of a healthy newborn are distressed that he will be receiving a vitamin K shot. They also request that nothing be put in his eyes. Describe your approach to this family's concerns.
8. A baby is found to have a clavicular fracture after birth. The exam reveals crepitus and irregularity over the fracture, movement of the arm is painful, and the Moro reflex is absent on that side. Describe your explanation of the problem to the parents and your initial approach.
9. A baby has an Apgar score of 5 at one minute and 9 at five minutes. Describe what this means.
10. A full term 48 hour old baby is noted to have a generalized rash consisting of small yellow papules on an erythematous base, most prominent on the trunk. What is this and how should it be treated?
11. A 24 hour old infant has not passed a meconium stool. Discuss possible explanations.
12. A term newborn weighs 4800 grams. What complications might this infant experience?
13. A mother with no prenatal care and a history of known substance abuse has just delivered a baby. What special concerns do you have about caring for this infant?
14. A full term newborn weighs 2200 grams. What factors might have contributed to this infant's small size?
15. Describe how you would determine SGA or prematurity using a Dubowitz exam.
16. A baby presents a two months of age because the parents are concerned that he is "floppy". Describe your approach to this infant and discuss the differential diagnosis.

Medical genetics/Congenital malformations

1. A three year old girl presents for evaluation of recurrent pneumonia (five times in two years). As you proceed with the history, you learn she has also had chronic diarrhea. She is at the fifth percentile for height and weight. Develop a differential diagnoses based upon history and physical exam findings. What particular genetic disease must be considered? Construct a family pedigree if her aunt (mother's sister) and cousin (mother's brother's child) have the same condition.
2. A newborn infant of a family you have known for years is noted to have prominent epicanthal folds, small ears, hypotonia, short, broad hands and feet, brachycephaly, and a heart murmur. Mom notes that the baby "looks different" from the other three siblings at birth. Explain your approach investigating this baby's medical condition. How would you discuss this problem with the parents?
3. The parents of a two year old boy with developmental delay report a history of mental retardation in several male members of their family. What diagnosis needs to be considered and what diagnostic screening would you use?
4. A newborn female is noted to have redundant neck skin and puffy hands. What diagnostic test would you perform and what additional abnormalities would you screen for?
5. The mother of a newborn tells you she has taken phenytoin throughout her pregnancy and wants to know what effect this may have on her baby. Discuss your answer.
6. You are asked to evaluate a baby in the nursery who is small for gestational age and microcephalic. What questions would be important to ask the mother?
7. You are meeting with parents expecting their first child. They reveal that the mother's first cousin has cystic fibrosis and wonder if their child might be affected. What advice would you give them?
8. A mother of a two year old child with sickle cell disease is pregnant and wants to know about the risk of future children having the disease. How would you counsel her?

9. The mother of one of your patients calls to say she is pregnant. Prenatal ultrasound reveals a child who appears to be affected with spina bifida. She wants to know the implications of the disease. How would you counsel her? What precautions need to be taken at the time of delivery and neonatal period?

Common illnesses

Problems are listed in several categories according to the presenting sign or symptom

Cough

1. A twelve year old child presents with a three day history of cough, chest pain and fever of 39,8o C. Exam reveals bilateral crackles. Chest radiograph shows diffuse interstitial markings. Cold agglutinins are pending. Discuss your differential diagnosis. Explain the most likely etiology, and basic management.
2. A six week old afebrile infant presents with conjunctivitis, staccato cough, and tachypnea. Exam reveals bilateral crackles and wheezes, and mild reactions. Chest radiograph shows patchy densities and hyperinflation. What is the likely diagnosis? Explain the most etiology and basic management.
3. A six month old former 28 week preemie presents with URI symptoms, increasing cough, wheezing, and tachypnea. Exam reveals increased work of breathing with retractions, poor air exchange, wheezing on auscultation, and baby has perioral cyanosis. Chest radiograph reveals bilateral perihilar streakiness and hyperinflation. Discuss most likely cause and basic management.
4. A four year old presents with cough for 3-4 days following a URI and fever to 41 C for twenty four hours. Exam reveals crackles on the right. What would you expect the chest radiograph to show?
5. A two year old child presents with abrupt onset of cough, wheeze and tachypnea. He is afebrile. Exam reveals diminished air exchange and wheezing on the right. What is the most likely cause?
6. A one month old infant with a one week history of cough and congestion now presents with paroxysms of cough associated with blue spells. The baby is afebrile. Exam of the chest is normal between paroxysms. Her WBC is 28,000 with 14 S and 86 L. Chest radiograph is normal. What is the likely etiology of her problem and what would be your initial approach?
7. A seven year old presents with two weeks of cough and nasal congestion following an upper respiratory infection. The cough is worse at night and frequently awakens him. His mother says he has also developed "bad breath". What is your assessment of this child, and what would be your basic management of the problem?
8. An eleven year old presents with frequent episodes of cough, worse with colds, and then associated with some shortness of breath. She had previously taken medication for this which gave her a headache and made her feel "hyper". She requests better therapy. What is the most likely diagnosis and how would you proceed?
9. A sixteen year old presents with cough and shortness of breath following exertion. This is affecting his ability to play soccer. How would you proceed?

Fever

1. A two week old presents with fever of 40 C . Her exam is unremarkable. What are your concerns? Discuss appropriate basic management.
2. A seven month old girl presents with a fever to 38,5 C, mild irritability, and poor feeding. How would you proceed?
3. A seven month old presents with fever to 41 C , mild irritability, and poor feeding. Your differential diagnosis includes urinary tract infection; how would you proceed if this is the case?
4. An eight year old presents with fever of 40,5 C and headache. Exam is remarkable for nuchal rigidity. Describe your concerns, appropriate work-up and basic management.
5. A six month old has had a high fever for three days and an otherwise normal exam. On day four he breaks out in an erythematous maculo-papular rash and his fever rapidly declines. What illness does this child have? How would you treat him?
6. A seven year old girl presents with cough, coryza, conjunctivitis and fever of 41 C for twenty four hours. She then begins to break out in a macular rash which starts on her head and spreads to the rest of her body. Her exam is also remarkable for gray-white, tiny dots seen on her buccal mucosa. What disease is this? How should it be treated? Is there preventive therapy available?
7. A 4 year old boy presents with a five day history of fever and rash. He has received acetaminophen and amoxicillin without improvement. On exam he is irritable with a temperature of 41 C, bilateral conjunctivitis, enlarged cervical nodes, puffy hands, and a maculo-papular rash. Discuss the differential diagnosis and outline a plan for evaluating the patient.

Sore throat

1. A six year old presents with high fever, headache, sore throat, and a sandpaper rough, red rash which began in the axillae and neck and has become generalized. Exam is remarkable for pharyngitis, anterior cervical adenopathy, circumoral pallor and the rash. What is this child's diagnosis and what is the etiological agent? How should this be treated?

2. A nine year old presents with a sore throat and fever of 39,5 C. Exam reveals slight anterior cervical adenopathy and very red throat (no exudate). What is your differential diagnosis and how would you proceed?
3. A fourteen year old female presents with malaise, fever, headache and sore throat. Exam reveals enlarged tonsils with exudate, pharyngeal petechiae, posterior cervical adenopathy, and splenomegaly. A colleague found her to have strep throat and gave her ampicillin three days ago; she now has a diffuse, erythematous rash. Discuss differential diagnosis and initial management.

Otitis/Ear pain

1. An eighteen month old male presents with fever and irritability (pulling at his ear) after four days of URI symptoms without fever. What is the most likely cause of the fever? What might you expect on physical exam? How should he be initially managed?
2. A two year old has had six episodes of otitis media (which you have diagnosed and treated) over the past five months. Parents ask about the treatment options at this point. What factors need to be considered?
3. A fifteen month old was diagnosed with otitis media three weeks ago. Today on exam his tympanic membrane looks dull, gray, and has poor movement. What are your recommendations?

Upper respiratory infections

1. A three year old presents with runny nose, nasal congestion, mild irritability, and fever of 39 C over the past forty-eight hours. What is the most likely diagnosis and how would you treat this?
2. An eleven year old has spring time nasal congestion and itchy eyes which have become more of a problem over the last three years. Suggest diagnosis and considerations for initial management.
3. A sixteen month old presents with swollen eyes and a fever of 40,5 C. Exam is remarkable for an ill appearing toddler with periorbital edema and erythema. Discuss you diagnosis and describe initial management.

Abdominal pain

1. A ten month old presents with bouts of irritability during which he draws up his legs and appears to be in pain. He has become lethargic and mildly febrile. What would you include in the differential diagnosis? Describe how would you proceed.
2. A three year old has had forty-eight hours of fever, vomiting, and diarrhea. Describe your approach to the differential diagnosis. Discuss management principles based on diagnosis and physical exam findings.
3. A fourteen year old male presents with onset of severe abdominal pain six hours ago. He then developed fever and has vomited three times. He has had no diarrhea. Pain is now right-sided. Discuss your approach to this patient. What additional considerations do you have if the patient were female?
4. An eight year old female presents with several abdominal pain, pruritic lesions on the buttocks and lower extremities, and joint swelling. Discuss your differential diagnosis.
5. The mother of a fourteen month old baby's feels an abdominal mass when washing the baby's stomach during a bath. What concerns do you have? What would you tell the mother?
6. A six year old presents with fever and abdominal pain, bloody diarrhea and a few scattered petechiae. Discuss the differential diagnosis and initial approach to this patient.

Diarrhea

1. A one year old presents with vomiting and diarrhea for three to four days. Discuss appropriate evaluation and treatment.
2. A three year old presents with a three day history of watery, foul-smelling stools, flatulence and anorexia. At least two other children who attend the same daycare have had similar symptoms in the past month. What etiologic agents need to be considered in the differential diagnosis?

Constipation

1. A six year old presents with chronic abdominal pain of six weeks duration. Discuss your initial approach to this patient.

Skin problems

1. A four year old female presents to your clinic with an itchy rash over her trunk and extremities. Exam reveals raised, erythematous lesions with serpiginous borders and blanched centers. The lesions are evanescent and vary in size. What is appropriate diagnosis and treatment?
2. A four year old presents with a dry, erythematous, itchy rash involving the antecubital and popliteal fossae, wrists and ankles. Discuss the diagnosis and appropriate therapy.
3. An eighteen month old presents with many golden-yellow, crusted-weeping lesions which seem to be spreading according to the child's parents. Discuss the likely diagnosis and management considerations.

4. A five year old boy presents with a dog-bite to the cheek. How would you care for this?
5. An eight year old presents with a painful, swollen, erythematous, indurated forearm. Exam also reveals axillary adenopathy on the same side. What is the likely diagnosis? How should this be managed?

Limb/joint pain

1. A 15 year old girl injured her ankle while playing basketball. What advice would you give for acute care?
2. An athletic 12 year old boy complains of knee pain when running and playing soccer. Discuss the possible causes and an approach to problem.
3. A 14 month old girl presents with acute onset of fever and refusal to walk. Discuss your initial evaluation of this child.
4. A five year old presents with a swollen, red knee. Discuss diagnostic considerations and describe your approach to this child.
5. A four year old presents with a one week history of multiple joint pain and swelling. Discuss your differential diagnosis.

CNS problems

1. A fourteen year old girl presents to the ER with a right-sided headache which she describes as "the worst headache I've ever had." She reports seeing "flashing lights" prior to the onset of the headache. Discuss your initial assessment and treatment of this patient.
2. A nine year old boy is sent to the school nurse several times a week for headaches. His mother brings him to the pediatrician for evaluation. Discuss your assessment of this child.
3. A sixteen year old with a history of seizures wants to know if he can get a driver's license. What advice would you give him?

Heart murmur

1. On routine physical exam, a five year old girl is found to have a heart murmur. The murmur is systolic and best heard along the left sternal border. It does not radiate. Discuss your approach to the patient. How would you distinguish between an innocent and a pathologic murmur?

Lymphadenopathy

1. A ten month old girl is evaluated because of recurrent pneumonia and failure to thrive. She has completed a course of amoxicillin without improvement. On physical exam, she has oral thrush, diaper dermatitis, cough, and axillary and inguinal nodes. Describe your approach to the evaluation of this patient. What types of disease are you most concerned about?
2. A six year old, previously healthy, female presents with a 3 by 5 cm, tender anterior cervical lymph node. Discuss the differential diagnosis and basic management principles.

Splenomegaly

1. A ten month old boy is seen for his first pediatric visit. On exam he is fussy with a low grade fever and has a spleen palpable 6 cm below the costal margin. Discuss your approach to the evaluation of this patient.
2. A ten year old boy with known sickle cell disease is noted to have significant splenomegaly. Discuss your concerns and approach to this patient.

Hepatomegaly

1. A four year old child presents with nausea, vomiting, fever and fatigue. On physical exam he has scleral icterus and a tender liver edge palpable 3 cm below the costal margin. Discuss your plan for evaluating this patient.

Impaired vision

1. The parents of a four month old are concerned because she has "crossed eyes". How will you evaluate this patient?
2. You are unable to see a red reflex when examining the eyes of a newborn. Discuss the causes and your approach to the patient.

Impaired hearing

1. A two year old boy has had 4 episodes of otitis in the past year. His parents complain that he doesn't talk. Discuss your concerns. What would you tell his parents?

Hematologic

1. A two year old presents with a nosebleed and petechiae on her concerns extremities. She is afebrile and the exam is

otherwise normal. She recently recovered from a URI. Discuss the differential diagnosis and basic management of this child.
2. A four year old boy presents with fever, irritability, and pallor of several days duration. On examination he has petechiae and a palpable liver and spleen. Discuss your differential diagnosis and initial assessment of this patient.
3. On a routine health supervision visit, a 1 year old boy is found to have Hgb 8.8, Hct 27 with MCV 68. Discuss your approach to the diagnosis and treatment of this child.

Hematuria

1. A ten year old boy complains of "dark urine" and a headache. Urinanalysis demonstrates proteinuria. Discuss your diagnostic approach to this patient.
2. A four year old boy is brought to the pediatrician because of "puffy eyes". He is afebrile. He recently recovered from a "cold". Discuss your evaluation and differential diagnosis
3. A two year old girl being evaluated for a febrile illness is found to have 1+ ketones and 1+ protein in her urine. Assuming the remainder of the urinalysis is normal, discuss your assessment.

Therapeutics

1. A three year old has right otitis media and a fever of 39,4 C. Discuss your initial approach to this child.
2. An eighteen month old has conjunctivitis. She is afebrile and has no eyelid erythema. Discuss your treatment.
3. A four year old girl has her first urinary tract infection. Urinalysis shows "many" WBCs and numerous motile, rod shaped bacteria on an unspun specimen. Describe your initial management of this child.
4. A six year old boy has been coughing for 3 days. His cough is especially prominent at night. His activity level has decreased and he seems more tired. He is afebrile and has diffuse wheezes on examination of the lungs. Discuss your initial assessment and treatment.
5. A thirteen year old has had a cough and chest discomfort for one week. He had a low grade fever at the onset of the illness. He has no past history of respiratory problems. Describe the basic management of this problem.
6. A ten year old complains of nasal congestion, sore throat and headache. She notes that this has been a problem every fall for the past 3 years, but this year her symptoms are worse than before. Describe your initial management and treatment plan.
7. A two year old has been scratching his arms and legs for several weeks. He has patches of erythema with obvious excoriations on the extensor surfaces of his arms and legs and also in the antecubital fossae. How would you treat this?
8. A four year old has had a runny nose for one week. He now has a golden yellow, crusting, slightly oozing rash in his nostrils and on his face. What is your diagnosis and basic management?
9. An eleven year old has a sore throat and a positive rapid streptococcal test. Discuss your assessment and initial management.
10. A fifteen year old has had a sore throat, swollen anterior and posterior lymph nodes and splenomegaly. She also has had a positive rapid streptococcal test. Explain your treatment plan.
11. A known asthmatic complains of worsening cough and wheezing, unresponsive to inhaled albuterol. How would you proceed?
12. A six year old started swimming lessons at the city pool one week ago. He now complains of earache. He is afebrile. He complains of pain when his right ear is touched. His right external ear canal is filled with a purulent discharge. Discuss your diagnosis and initial treatment plan.
13. A mother brings her child in for her eighteen month maintenance visit. The family plans to go camping in the Rocky Mountains in July and the mother asks questions about insect repellent and sunblock. What advice would you give her?

Fluid and electrolyte management

1. A six year old girl is admitted for elective surgery. She weighs 28 kg. Write an order for her IV fluids prior to surgery.
2. A two year old has sustained a severe closed head injury and is comatose. He weighs 14 kg. What factors need to be considered in writing his daily fluid orders?
3. A seven month old infant has had fever, vomiting, and diarrhea for the past 24 hours. How would you determine whether to admit the patient to the hospital for IV fluids or treat as an outpatient?
4. An infant weighing 8 kg is estimated to be 12% dehydrated. What is the calculated deficit and how should it be replaced? What IV solution(s) should be used? What laboratory tests should be ordered?
5. A two month old infant is brought to the Emergency room because of seizures. History reveals that he has had diarrhea for five days and has been fed only water and apple juice. What might be the cause of the seizures and how should they be treated?
6. A nine month old infant has diarrhea and signs of moderate dehydration. His electrolytes reveal Na+ 162, K+ 5.6, Cl- 122, Bicarb 12. During IV rehydration the patient has a generalized seizure. What is the probable cause of the seizure?

How should it be treated?

7. A nine month old infant has vomiting and diarrhea. He has dry mucous membranes and decreased tearing and urination. He is taking fluids well. You decide to treat him as an outpatient. What type of fluid would you use and what instructions would you give to the parents?
8. A nine year old child with diabetic ketoacidosis has the following electrolytes: Na+ 132, K+ 5.4, Cl- 103, Bicarb 4. As the fluid deficit is corrected, what is likely to happen to the serum K ? How should this be treated?

Poisoning - prevention and treatment

1. An eighteen month old boy is found in the garage coughing and choking. A jar of paint thinner is spilled on the floor and on his clothing. What advice would you give to the parents over the phone? Should they give Ipecac? What is the most serious toxicity of this ingestion/exposure?
2. A two year old boy is brought to the Emergency room in a coma after his mother returned from next door and found him unsupervised and unresponsive in his room. What questions would you want to ask the mother? How would you evaluate the patient?
3. You receive a phone call from the mother of a 2 1/2 year old child who was found eating Mom's prenatal vitamins. She thinks he may have swallowed 16 tablets. What is the toxic component of prenatal vitamins? What advice would you give the mother?
4. After a fight with her boyfriend, a sixteen year old girl takes 30 acetaminophen tablets. She reports this to her mother six hours later when she is feeling nauseated. What is the appropriate management of this adolescent?
5. A three year old is brought to the Emergency room because of weakness, diarrhea, and drooling. He had been playing unsupervised in the garage. He is found to have pinpoint pupils and bradycardia. What is the most likely cause of these symptoms and how should the patient be treated?
6. A four year old girl with juvenile rheumatoid arthritis develops fever, deep, labored breathing, vomiting, and diarrhea. She complains of ringing in her ears. Discuss the probable cause of these symptoms.
7. A three year old child is evaluated in clinic because of irritability, decreased appetite and intermittent abdominal pain. In your assessment, you detect delayed development, particularly of language, and a mild anemia. How would you further evaluate this child?
8. Discuss the anticipatory guidance given to the parents of a one year old during a health supervision visit.
9. A child comes to the Emergency room after ingesting an unknown quantity and type of her grandmother's pills. What findings in the physical exam will help to identify the type of pills?

Pediatric emergencies

1. A three year old child presents to the Emergency room with acute onset of stridor and tachypnea. Discuss your approach to this patient, including important aspects of the history and physical exam, the differential diagnosis, and management principles.
2. A four month old baby presents to the Emergency room with a fever of 30 C and petechiae. Discuss important areas of the history and physical exam. Discuss your differential diagnosis.
3. A three year old boy presents to the Emergency room with a 48 hour history of cough, increasing wheezing and shortness of breath for the past two hours. Discuss differential diagnosis and describe general management principles.
4. A fourteen month old presents to the Emergency room with a history of symmetric convulsive activity that lasted 2-3 minutes.
5. The child was sleepy initially but is now awake and alert. She has a temperature of 30 C and has no nuchal rigidity. She has been a previously well child. Immunizations are up to date. List other important points to check in the history and physical exam, detail appropriate diagnostic tests and outline treatment. Provide an explanation for the parents.
6. What if this child was still somewhat somnolent and the exam did reveal nuchal rigidity? Describe how this presentation alters differential diagnosis and basic management.
7. A four year old boy presents with brief loss of consciousness and vomiting after falling off a six foot slide. How would you evaluate him and what are your concerns?
8. The mother of an 18 month old calls to say her child has pulled a just-poured hot cup of coffee down from the table which spattered across his face and chest. What are your recommendations?
9. A four year old girl is brought to the Emergency room for acute onset of tachypnea, dyspnea and cough which began while she was attending a friend's birthday party. The children were eating cake and ice cream when her symptoms began. There were peanuts and small candies on the table. Explain your initial concerns and describe a reasonable approach to her evaluation and management.
10. A six year old presents with dog bites to the face and upper arm. Discuss your concerns and basic management principles.
11. A four year old male is being seen because of a sore throat. On exam you find bruises on his face and back in various stages of healing. Explain your concerns and approach.

12. A two year old presents to the emergency room after breaking her arm during a fall. The child was seen six months ago with a broken leg. What are your concerns? What evaluation should occur next?