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Digital textbook's appendix "Student's Guide. Online Library for Medical Universities" (www.studmedlib.ru/extra) contains 15 videos: anamnesis collection technique, physical examination of the child, additional examination methods, baby-minding, massage for children in the first year of life, organization of breastfeeding in maternity facilities, rickets, pneumonia, bronchial asthma, acute rheumatic fever, chronic pathology of gastroduodenal zone, celiac disease, urinary tract infections, diabetes mellitus, childhood acute viral respiratory infections.

this book are presented under their international non-patented generic names; brand names are marked with the special symbol (♠). The units of measurement used in this book are based on the International System of Units (SI system); non-standard units of measure occur occasionally. Standard "normal" ranges according to laboratory methods and sometimes slightly differ between laboratories.

Student must know	Student should be able to perform	Essential skills the student should develop
1. History of pediatrics and the basics of the RF legislation on maternity and childhood protection. 2. Patterns of intrauterine and extrauterine child growth and development, stages of child development, their functional and morphological characteristics, normal age-related values. 3. Breast feeding advantages, the principles of mixed and artificial feeding, complementary feeding features and nutrition of older children. 4. Principles of monitoring children's growth and practices of rising a healthy, harmoniously developed child. 5. Neonatal and early childhood diseases. 6. Definition, etiology, pathogenesis, clinical manifestations, diagnosis, treatment, prevention and prognosis of the most common childhood illnesses and infections. 7. Emergency care for life-threatening conditions, cardiopulmonary resuscitation (CPR)	1. Help the family to develop a healthier lifestyle, providing conditions for the harmonious physical and psychological development of children. 2. Carry out pre-natal prevention of the newborn and early childhood illnesses. 3. Teach the mother how to look after the newborn or prematurely born child. 4. Conduct a coherent prevention of morbidity, health promotion activities. 5. Taking and evaluating the history of the child's life and disease. 6. Perform a physical examination and evaluate the obtained result with respect to age criteria. 7. Evaluate the results of general clinical analyses, basic biochemical and immunological age indicators; as well as functional, instrumental and other additional examinations. 8. Establish the diagnosis, develop a plan of treatment and rehabilitation of the most common children's diseases. 9. Prescribe rational regimen and diet to the ill child. 10. Perform primary cardiopulmonary resuscitation and emergency care in the following cases: – hyperthermia (fever); – acute allergic conditions; – acute cardio-vascular and pulmonary insufficiency; – convulsive disorder; – accidental injuries	1. Methods of clinical examination of children and adolescents. 2. Interpretation of the laboratory results, findings of functional and instrumental methods for diagnosis of diseases in children and adolescents. 3. Development of a preliminary diagnostic algorithm for children and adolescents with follow-up examinations. 4. Development of a detailed diagnostic algorithm. 5. Development of basic diagnostic and treatment algorithms to provide first aid to children and adolescents in emergency and life-threatening cases

Additional educational materials are arranged according to the electronic library "Student advisor. Medical university digital library" (www.studmedlib.ru/extra). The present book offers 150 test tasks for the final knowledge control and preparation for the examination, which permit a better understanding of the specialized professional materials. Video materials on propedeutics of childhood diseases, child care and basic nosological units are produced as specifically selected clinical case scenarios, discussing the history of disease and examination algorithms, performing a preliminary clinical evaluation, with an introduction of additional examination methods, prescription of non-medical and medical treatment options, evaluation of the disease prognosis. These videos may serve as a guideline for the physicians-to-be in their professional activities.

The authors, editors and publishers hope that this textbook will contribute to the development of clinical thinking in pediatric students in making a final diagnosis, determining the algorithms for examination, treatment and disease prevention.

CHAPTER 1

HISTORY OF PEDIATRICS. MOTHER AND CHILD CARE IN THE RUSSIAN FEDERATION

GENERAL ISSUES OF PEDIATRICS. ORGANIZATION AND STRUCTURE OF PEDIATRIC SERVICE

Pediatrics (Greek — *παιδίον* — child and *ιατρεία* — treatment) is, according to the founder of Russian Pediatrics S.F. Khotovitsky (1847), "a science about distinctive features in the structure, functions and diseases of the child's body and based thereupon the healthcare and treatment of children". The primary goal of Pediatrics is healthcare and, in the case of illness, health improvement of the child, which allows him to fully realize his innate vital potential.

General practice doctor/family doctor is a therapist or pediatrician, with special training in the specialty "Family medicine", which gives him the right to consult all the family members, regardless of their gender or age in any medical issue (HENT, orthopedics, surgery, ophthalmology, neurology etc.), providing preventive, curative and rehabilitative assistance. He enlists other specialists for assistance only in exceptional cases.

The pediatric science and family doctor practice include, first of all, *developmental pediatrics and primary prevention*. The second component is *curative pediatrics*, or *pediatrics of diseases* (table 1.1). Primary prevention means determining the potential of a child's health — with what degree of health, physical and intellectual abilities, with what guarantees of active longevity the child enters adulthood. Treatment of sick children is a difficult task due to the following features: anatomical and physiological characteristics of the child's body, the high probability of complications and inadequate reactions not only to the disease itself, but to most medications used in the treatment process.

Table 1.1. Components of pediatric science and practice

The first component		**The second component**
Developmental pediatrics	Primary prevention	Curative pediatrics
		
Monitoring and protection of the child's healthy growth and development	System of measures for protection and promotion of child development	Diagnosis and treatment of the sick child

In the course of treatment, the pediatrician should choose the technologies and tactics which can not only save lives and maintain normal functionality, but also ensure development processes. This indicates significant differences between the treatment of childhood diseases and the treatment of adult diseases.

The pediatrician should be a sympathetic, sensible and intellectually developed person. He persistently communicates with the child and his parents, as well as the other relatives or tutors who are highly interested in the fate of their children and worry about their health.

Child therapy cannot be equal to therapy for adults, because there are important differences between children and adults: "*Children are not little adults, they represent a qualitatively different organism with its own characteristics and physiological aspects of life*" (fig. 1.1).

The following types of pediatrics may be conditionally distinguished in the single practical science: preventive, clinical, scientific, social and ecological (table 1.2).

Table 1.2. Types of Pediatrics

Type of pediatrics	Specification
Preventive	A system of measures that contribute to the prevention of diseases and disability: preventive vaccinations, asepsis, disease prevention, screening programs for the detection of hereditary diseases, routine medical examinations, etc.
Clinical	Diagnostics, treatment and staged rehabilitation of the ill child
Scientific	The formulation of paradigms that, at the current stage, guide the pediatrician in his practical work. Thomas Kuhn defined paradigms as "a disciplinary matrix, the totality of universally recognized scientific achievements, that, for a time, provide model problems and solutions for a community of researchers"

End of the table 1.2

Type of Pediatrics	Specification
Social	Optimal organization of health management, including economy and planning. The influence of social factors on children's health; the practice of medical care, implementation of preventive measures, the interrelation between physicians and public organizations, foundations; medical education and mass health education
Ecological	Studying the influence of natural factors on children's health; climatic, geographic and harmful environmental factors in particular areas

Pediatrician workplaces are child care environments (kindergartens, schools, orphanages), children's polyclinics and hospitals, private medical centers, children's diagnostic centers, pediatric emergency teams, maternity wards, various pediatric consulting rooms and centers, children's sanatoriums etc.

A pediatric polyclinic is an outpatient facility that provides preventive and curative services for children from their birth up to until the age 18 (17 years, 11 months and 29 days). The polyclinic is staffed by physician-pediatrician for each section of the district, an area in which the number of residing children should not exceed 800. The doctor and the nurse record all the information regarding the child's health state and condition in a standard form (form No 112/y).

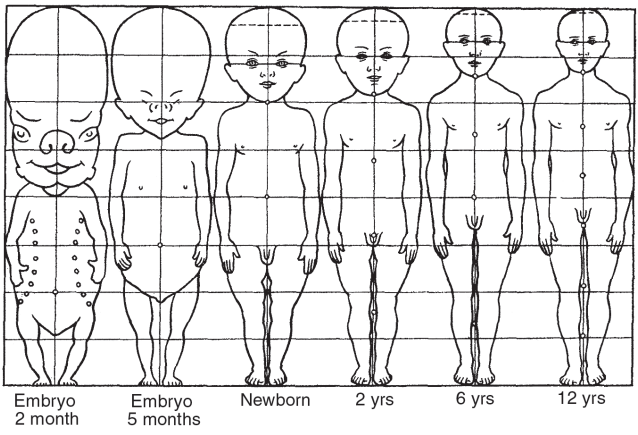


Fig. 1.1. Adults imitating children; the children' body proportions at different ages

The main functions of the polyclinic are presented in table 1.3.

Table 1.3. The main functions of the polyclinic

Preventive activities	Anti-epidemic activities	Curative activities
Prevention of diseases and developmental disorders; outpatient screening	Timely diagnostics and prevention of infectious diseases	Ambulatory care at home or at clinic with timely hospitalization in serious cases
Prenatal nurse home visit (home visits by public health nurses for pregnant women). 1st moth screening is provided by the doctor no less than 4 times; further on up to 1 year of age monthly check up in polyclinic. At the 2nd year of life — 4 times a year, at the 3rd year of life twice a year, further on once a year. Specialty medical check-ups as appointed	Scheduled vaccination. Monitoring of vaccinated children. Diagnostic and treatment of patients with infectious diseases	Sick Child Visits. Locally established "doctor-on-call" visits. The child's home treatment

Healthy child consulting room is a structural subdivision at the pediatric polyclinic, methodical center, providing preventive services to children and performing certain activities (table 1.4).

Table 1.4. Healthy child consulting room's basic activities

Activities	Activity implementation form
Promoting a healthy family lifestyle. Teaching parents the rules to raise a healthy child (daily routine, nutrition, physical training, child care etc.). Also, parental health education regarding children's hygiene habits, preventive measures for diseases and harmful deviations from the normal structural or functional state of the body	Scheduled attendance of healthy children younger than 1 year of age. Organization and attendance of groups of children (3–4 children) of the same age or with similar abnormalities, with the aim of health education and preventive activities. Organization and realization of activities on non-specific and specific prevention of rickets. Systematic work on preparation of children for preschool facilities. Organization and running of schools for young parents

Healthy child consulting room should be equipped with appropriate instructive literature and visual materials on the basic issues of *child's* healthy *growth and development*, as well as diseases prevention.

Children's hospital primary aim is providing children with comprehensive qualified inpatient care at the modern level of medical science. According to the patient service

area the hospitals are distinguished as municipal, district, regional and republican. According to the variety of departments they can be general and specialized ones. A pediatric hospital can provide integrated outpatient care. In this case, it is called combined hospital. A hospital *conducting clinic-based* research and educative activities is called teaching hospital. Basic medical record documentation filled out for a child is an inpatient medical record (Form No 003/y).

Other types of children's healthcare facilities are presented in table 1.5.

Table 1.5. Types of children's healthcare facilities

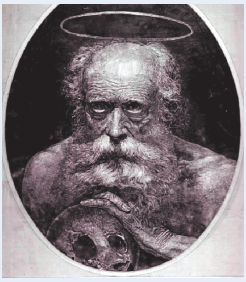
Designation	Specification
Health centre	A preventive institution destined to promote healthy lifestyle in children, to develop individual approaches to its implementation, combat risk factors associated with the development of diseases, education and awareness of the negative effects of tobacco, alcohol and drug use among children, prevention of socially significant diseases in the pediatric population
Private medical center	Private or joint stock curative, diagnostic and preventive institution licensed to provide appropriate medical care. The patients attending this institution receive diagnostic and treatment care on monetary (commercial) basis. These medical centers quite often provide the most modern diagnostic and treatment methods, unavailable in state budget institutions
Specialty clinic	Curative and preventive unit that provides medical examinations, continuous monitoring and treatment of children with particular diseases (tuberculosis, cardiovascular diseases e etc.)
Children's sanatorium	Curative and preventive facility located in the respective resort regions, that provides specialized medical care for ill children: climate therapy, thalassotherapy, mud therapy, mineral water treatments etc.
Hospice	Medical institution providing palliative care of patients with either a terminal or chronic illness

- Pediatrics is one of the major branches of medical science dealing with child development, care, diagnostic and treatment of childhood diseases.
- Care for a sick child requires special approach to any age from birth to adulthood; meanwhile good mutual understanding between the doctor and the parents seems indispensable.
- The doctor treating sick children needs to have a good knowledge in psychology, obstetrics, genetics and other sciences; he must know how the environmental and social conditions influence the children's health.

THE MOST INFLUENTIAL PHYSICIANS AND THEIR ROLE IN THE DEVELOPMENT OF PEDIATRICS

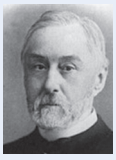
As an autonomous medical specialty pediatrics emerged relatively recently, because in antient times the same healer treated either adults or children. Ancient manuscripts of Armenian state of Urartu, Ancient Egypt, India, China, Babylon, Assyria etc. contain fragmentary notes and recommendations regarding child nutrition, care and treatment (table 1.6).

Table 1.6. The most influential physicians of antiquity and Middle Ages

Notable medical luminaries (date of birth — date of death)	Informative note
 **Hippocrates** (c. 460–377 B.C.)	The book "Nature of the Child" by Hippocrates contains information about the patterns of proper, stable growth and normal children's development. From the Hippocratic Oath: "*I swear... that I will carry out, according to my ability and judgment, this oath and this indenture.* *To hold my teacher in this art equal to my own parents; to make him partner in my livelihood; when he is in need of money to share mine with him; to consider his family as my own brothers, and to teach them this art, if they want to learn it, without fee or indenture; to impart precept, oral instruction, and all other instruction to my own sons, the sons of my teacher, and to indentured pupils who have taken the Healer's oath, but to nobody else*".
 **Avicenna** (c. 980–1037)	Avicenna (Abu Ali al-Husain ibn Abdallah ibn Sina), the most eminent of the Central Asian natural philosophers and physicians, in his book "The Canon of Medicine" paid great attention to the lifestyle as an important factor of health. He believed that *the essential considerations in the art of preserving health consist in maintaining equilibrium between the following concomitant factors: proper nutrition, moderation, equilibrium of temperament, physical activity, proper clothing, maintaining the purity of the air respired, safeguarding the composite.* His treatise refers to the benefits of cold bathing (including young children)

The development of scientific thought between XVII–XIX centuries was characterized by the progressive views of scientists, including the field of medicine. The prominent public figures like M.V. Lomonosov (1711–1765), turn their attention to the high child mortality rate and poor sanitary culture of the population. The health problems associated with child care became the concern of obstetricians and other profile doctors (table 1.7). This marked the beginning of pediatrics as a science. Russian doctors-scientists, who fostered a large number of highly qualified pediatricians, established the Russian pediatric school with a major emphasis on preventive medicine.

Table 1.7. The most influential scientists and physicians of Russia in the XVII–XIX c.

Full name (date of birth — date of death)	Referential note
 **N.M. Maximovich-Ambodic** (1744–1812)	N.M. Maximovich-Ambodic paid great attention to childcare and nutrition. He supported breast-feeding promoting mothers' and children's hygiene among the physicians and the population. In his book "The art of midwifery, or Wisdom of the mothercraft" he devoted a whole chapter to childcare, nutrition, common childhood illnesses and the methods of their treatment from birth to adolescence
 **S.F. Khotovitsky** (1796–1885)	Stepan Fomich Khotovitsky, lecturing at the St. Petersburg medical and surgical academy, outlined the anatomical and physiological characteristic of children of different age groups and their diseases, including infectious ones. He wrote the first Russian textbook in children's diseases entitled "Pediatrics", which contains progressive (for that period of time) information about prevention and treatment of various children's diseases, the causes of children's mortality, along with description of measures to reduce infant mortality rates
 **A.M. Makeev** (1829–1913)	Alexander Matveevich Makeev, prpofessor at the Moscow State University, suggested instillation of 2% lapis solution into the newborns' conjunctival sacs as a preventive measure against ophthalmoblenorrhea, which resulted in almost absolute elimination of this disease
 **K.A. Rauchfuss** (1835–1915)	According to Rauhfuss plans two children's hospitals were built in St. Petersburg and Moscow as well as the first sanatorium for children. He was not only a healthcare supervisor, but also a prominent scientist (he studied pyogenic arthritis in neonates, congenital heart defects, pleural effusion pleurisies etc.). He described the main clinical manifestation of pleurisy — Rauchfuss triangle
 **N.A. Filatov** (1847–1902)	Nil Fedorovich Filatov is *considered the founder of Russian clinical pediatrics.* He was the first to describe scarlatinella, known also as glandular fever, Filatov's disease) or infectious mononucleosis, and the initial symptoms of measles — pityriasiform desquamation of the buccal mucosa (the inner lining of the lips and cheecks), known as Filatov's symptom. His works "Semiotics and diagnostics of children's diseases", "Lectures on infectious diseases in childhood", "Clinical lectures", "Children's diseases: a concise textbook" have strongly contributed to the development of pediatrics. He founded the pediatricians society in Moscow, later developed into the Moscow pediatric society
 **A.A. Kisel'** (1859–1938)	Alexander Alexandrovich Kisel' dedicated himself to the study of tuberculosis, rheumatism, malaria in children and to training pediatricians. The focus of his scientific and practical work was disease prevention, promotion of healthy living conditions, correct regimen and nutrition for children

End of the table 1.7

Full name (date of birth — date of death)	Referential note
 **V.I. Molchanov** (1868–1959)	Vasily Ivanovich Molchanov dedicated himself to the study of the role of adrenal glands in the genesis of malignant diphtheria, the role of vegetative nervous system in the pathogenesis of scarlet fever and other acute children's infections, as well as the effect of social factors on the origin and pathogenesis of pediatric diseases etc. His works are extremely valuable for the practical healthcare. He and his colleagues Yu.F. Dombrovskaya and D.D. Lebedev wrote the textbook "Introduction to children's diseases"
 **G.H. Speransky** (1873–1968)	Georgy Nesterovich Speransky dedicated himself to the study of physiological characteristics, dietetics and pathology of early childhood. Special attention was paid to neonatal care. He is the author of works on eating and gastric disorders, pneumonia, sepsis, dysentery in children. G.N. Speransky played an active role in promotion of pediatric healthcare
 **A.F. Tur** (1894–1974)	Alexander Fedorovich Tur*'s* works are of great importance for Pediatric development in the URSS. He dedicated himself to the study of physiology, dietetics of early childhood, neonatal pathology, hematopoietic pathology e etc. He is the author of the students' guide "Introduction to pediatric diseases"

- The long-going process of pediatrics development as an independent scientific branch was running parallel with the first children's hospitals opening.
- The first children's hospital for 2–15 year old patients was established in 1802, in Paris. It became the European training center for pediatricians.
- In 1834, a pediatric hospital was opened in Petersburg.
- In 1835, course of pediatric diseases was included into the Russian medical student tutoring program.

Pediatrics as a separate discipline began to develop only in the first half of the XIX century. Three periods can be distinguished in the development of national pediatrics (table 1.8).

The early XX century was marked by the final establishment of pediatrics as a major medical specialty. The world's first pediatric faculty was opened in 1930 in Moscow. Two years later, in 1932, was founded the world's first pediatric higher educational institution — the Leningrad Pediatric Medical University. Eminent scientific pediatric schools have been established.

Table 1.8. Periods of development of national pediatrics

Period	Specification
The first	The emergence and development of pediatrics in the context of other specialties, principally Obstetrics and Therapy
The second	Russia is the first country in the world to introduce compulsory teaching of pediatrics at faculties of medicine. Pediatrics becomes an independent specialty
By the end of the second period Russia had 17 high medical schools, with 1000 "universal" doctors and 600 pediatricians graduating annually. 30 children's 750-bed hospitals; 9 maternity and 23 child consulting rooms; 19 nursery schools of 550 places; 30 baby food distribution centers were set up. Although the child mortality rate remained very high — 273 deaths per 1000 live births, 43% of children died before they had their fifth birthday	
The third	After the October Revolution, the care of mother and child, for the first time in world history, became state-run. In 1920, actions to control infectious diseases were carried out systematically; child consulting rooms were set up to provide preventive and curative care to the highest risk cohort (children 0–3 years). Simultaneously, were set up sanitary education and disease-prevention work was offered to parents. By 1940, the URSS had an established network of medical and preventive facilities, which was destroyed during the World War II. The USSR established a unique system of medical and preventive care for children, which was appreciated by WHO and proved to be a highly effective system of medical screening and rehabilitation of healthy and sick children. In the post-war period, the ruined healthcare facilities were restored and new polyclinics, hospitals, kindergartens, maternity and women's consulting rooms were built. Decrees: of 1974 — "On further development of industrial manufacturing of child-nutrition products", of 1980 — "On measures for further improvement of public healthcare"  The morbidity rates among children were steadily declining; such diseases as poliomyelitis and diphtheria were eliminated; the incidence rate of tuberculosis and other infectious diseases fell dramatically over time.

The most outstanding pediatricians of the XX–XXI c. are listed in table 1.9.

Table 1.9. The most outstanding pediatricians of the XX–XXI c.

Name (date of birth — date of death)	Referential note
 **J.F. Dombrovskaya** (1891–1976)	Julia Fominichna Dombrovskaya, a soviet pediatrician, corresponding member of the USSR Academy of Medical Sciences, doctor of medicine and professor, was awarded the Lenin prize in the field of science. Her works were devoted to the study of clinical history and treatment of allergies, infections, acute pneumonia, childhood functional disorders, and to the role of vitamins in physiological processes and in cases of pathologic conditions. She is the author of the textbook "Introduction to children's diseases" (along with co-authors V.I. Molchanov and D.D. Lebedev), which ran through five editions and for a long time retained its importance for education of pediatricians

End of the table 1.9

Name (date of birth — date of death)	Referential note
 **V.P. Bisyarina** (1912–1997)	Valentina Pavlovna Bisyarina was a remarkable physician, member of the USSR Academy of Medical Sciences, Doctor of Medicine, Professor, and the veteran of the Second World War. Her contributions have had a significant impact on the development of medical practice, for which she was given the honorary title of the Hero of Socialist Labor. Her pioneer research works on children's cardiovascular system in pulmonary tuberculosis and brucellosis have significantly contributed to the wide recognition of the Omsk School of Pediatrics and saved lives of many children the republics of the former Soviet Union
 **A.V. Mazurin** (1923–2001)	Alexander Vladimirovich Mazurin, Corresponding Member of the Russian Academy of Medical Sciences, M.D., Prof., laureate of the USSR State Prize in Science, veteran of the Second World War, Head of the Department of Propedeutics of childhood diseases at the 2nd Moscow State Medical University named after N.I. Pirogov, remarkable national pediatrician, hematologist and gastroenterologist, author of the textbook entitled "Propedeutics of Children's Diseases", which ran through three editions
 **L.A. Isaeva** (1925–1991)	Liudmila Aleksandrovna Isaeva was a clinician, member of the USSR Academy of Medical Sciences, M.D., Prof., Head of the Department and Clinic of Children's Diseases at the I.M. Sechenov Moscow State Medical University. Her scientific research areas of interest were bronchopulmonary diseases in children and pediatric endoscopy. She is one of the founders of the theory of systemic connective tissue disorders in children
 **Yu.E. Veltishev** (1930–2010)	Yuri Evguenievitch Veltishev was Member of the Russian Academy of Medical Sciences, D.M., Prof., Chief Scientific Consultant of the Moscow Research Institute of Pediatrics and Pediatric Surgery, Honored Scientist of the RF. Under his leadership, the Department of Mathematical Modeling and Disease Prognosis was established at the Moscow Research Institute of Pediatrics and Pediatric Surgery, which later developed into the Scientific Computing Center, storing more than 1,500 diagnostic signs of hereditary diseases and syndromes
 **I.M. Vorontsov** (1935–2007)	Igor Mikhailovich Vorontsov was a remarkable pediatrician, D.M., Prof., Honored Scientist of the Russian Federation, hematologist, cardiologist, allergist, children's healthcare coordinator and co-author, along with A.V. Mazurin, of the textbook entitled "Propedeutics of Children's Diseases", which became canonical and went through several editions

- In the USSR, the care of mother and child, for the first time in world history, became state-run. The main result: a system of free and accessible medical care for mothers and children, which was appreciated by WHO and proved to be the best in the world.
- Russia was the first country in the world to introduce compulsory teaching of pediatrics at the faculties of Medicine.
- The doctor treating sick children needs to have a good knowledge in psychology, obstetrics, genetics and other sciences; he must know how the environmental and social conditions influence the children's health.

LEGAL BASIS FOR THE MOTHER AND CHILD CARE IN THE RUSSIAN FEDERATION. LEGAL RESPONSIBILITIES OF A DOCTOR

The maternal and child health care development is an obligation of the State. In 1918, the Soviet government established the first in the world Department for the protection of motherhood and infancy, which started its activities by organizing such child care facilities as shelters for homeless mothers, children's consulting rooms and nurseries. In the beginning of the Soviet period, the principal goal of the child care institutions was to save children's lives and to protect children from disease and want. The decrees for this purpose were issued by V.I. Lenin: "On improving Child Nutrition", "On children's food foundation", "On government-financed children's alimentation", "On organization of alimentation in children's institutions", "On the establishment of the council for the protection of children". In 1922, the Central state research institute for maternal and neonatal care" (now RAMS Scientific centre of children's health) was established.

The constitution of the Russian Federation states that family, maternity and childhood are entitled to the state protection (Article 38). Thus, it is recognized that family and childbirth are not only of private interest but of national interest as well and require state support. As a primary institution of socialization, the family performs numerous important functions in shaping and maintaining children's health (fig. 1.2).

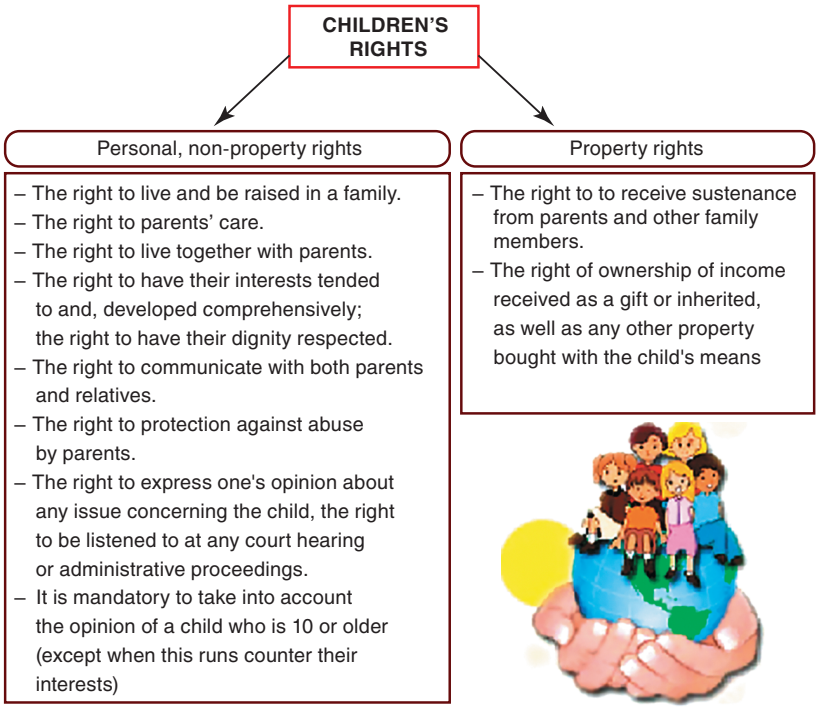


Fig. 1.2. Non-property and property rights of children