Ministry of Education and Science of Ukraine
V. N. Karazin Kharkiv National University

THE MEDICAL SUPERVISION OF INFANTS IN THE CHILDREN'S OUT-PATIENT DEPARTMENT

Methodical instructions
for students of 6th course of medical faculty

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Methodical recommendations is worked out on the basis of the Program of discipline of «Pediatrics with pediatric infectious diseases» for students of higher medical educational institutions of III–IV levels of accreditation, authorized by Ministry of Health of Ukraine. This recommendation is intended for the 6th years English-speaking medical students.

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LIST OF NOTATIONS

BF – breast feeding

BMI – Body mass index

IDA – iron deficiency anemia

HC – Head circumference

L – Length

Kg – Kilogram

PMD – Psychomotor development

W – weight

WHO – World Health Organization

INTRODUCTION

Procedure of preventive medical examination of the child aged up to 3 years includes: assessment of the child health, assessment physical and psychomotor development, assessment of child feeding and nutrition, early detection and prophylaxis of most common deficiency conditions (rickets, anemia) in infants, vaccination, advising parents on child care, child development, prevention of accidents and injuries, etc.; determining tactics further medical observation and examination of the child by the results of mandatory medical checkups.

Basic care for all newborns should include promoting and supporting early and exclusive breastfeeding, keeping the baby warm, increasing hand washing and providing hygienic umbilical cord and skin care, identifying conditions requiring additional care and counseling on when to take a newborn to a health facility. Newborns and their mothers should be examined for danger signs at home visits. At the same time, families should be counseled on identification of these danger signs and the need for prompt care seeking if one or more of them are present. Newborns with who have preterm birth or low birth weight are sick or are born to HIV-infected mothers need special care.

ASSESSMENT OF PHYSICAL DEVELOPMENT OF CHILD

Preventive medical examination of the child aged up to 3 years includes assessment of physical development, which is performed at each of the required medical examination of a child under 3 years. The nurse conducts measurements of length (height) (L), weight (W), and head circumference (HC) of the child.

The results of measurements are entered in the corresponding graphs. This makes it possible to see the trend of physical development of children over time and identify the problems of physical development.

It is important to use graphs of the physical development of the child for the appropriate gender, because boys and girls develop differently. On each graph drew curves. Curves on the charts of the physical development of the child, help in the interpretation of indicators of physical development of the child (Table 1).

Table 1

Evaluation of separate parameters of physical development by growth charts (weight, height, head and chest circumference)

Percentile range	Estimation
> 95 %	Extremely excessive
90–95 %	Excessive
75–90 %	Above the average
25–75 %	Average
25–10 %	Less than average
10–5 %	Low
< 5 %	Extremely low

The graphs of correlation of length (height)/age.

The length of the body is measured in a horizontal position (lying) in children aged 0–2 years. The height upright baby (standing) – in children aged 2–5 years. On the graph, the horizontal axis displays the values of the age, and the vertical axis - the value of the length/height of the body in centimeters. Child age is determined in full weeks from birth to 3 months; in full month – from 3 to 12 months; and in full years and months – will continue. Estimation of physical development corresponds to percentile ranges.

The graphs of correlation of length (height)/age are used to determine hypotrophy, but is not used to determine overweight or obese.

It is possible to estimate physical development using empiric formulas.

Formulas for calculation body length in children

1. For children aged < 6 months: L (cm) = L birth + 3 x age in months;

L (cm) = 66 – 2,5 x (6 – age in months).

2. For children aged 6 -12 months: L (cm) = 64 + age in months;

L (cm) = 66 + 1,5 x (age in months – 6).

*3. For children aged **2–12 years**:*L (cm) = age (yr.) × 6 + 77.

Formulas for calculation body weight in children

*1. For children aged < 6 month:*Weight (kg) = weight of birth + 800 gr. x age in months

2. For children aged 6–12 month: Weight (kg) = (800 x 6) + 400 x (age in months – 6);Weight (kg) = (age in months + 9)/2

3. For children aged 1–13 years: Weight (kg) = 2 x (age in years + 5)

4. For children aged > 13 years: Weight (kg) = 5 x age in years – 2

The graphs of correlation of body mass index/age:

Body mass index (BMI) is used for screening on overweight and obesity in child after 2 years old. On this graphic on the horizontal axis displays the values of the age in full weeks, months, or years and months. The vertical axis represents BMI. Body mass index is given by the value of body weight divided by height squared (kg / m^2).

Normal BMI =18 – 25 kg/m²

BMI greater than 25 kg/m² – overweight;

BMI greater than 30 kg/m² – obesity.

Paratrophy and *obesity* are the conditions which are characterized by the superfluous body weight of the child. Paratrophy is specified to breastfed and early age children with the superfluous body weight which is no more then 10–20 % of norm and characterized by increased hydrolability of tissue. The term obesity is used for elder children.

Hypotrophy is deficiency of body weight more then 10 %, which is caused by weight loosing or poor weight gain corresponding to the age.

Classification of Hypotrophy:

I degree (mild) – the deficiency of 10–20 % of the body weight;

II degree (moderate) – the deficiency of 20–30 % of the body weight;

III degree (severe) – the deficiency more than 30 % of the body weight.

Head circumference (HC).

HC at birth is approximately 35 cm. HC is increasing + 2 cm/month during first 3 months, + 0.5 cm/month up to age 9 months.

Dynamics of the physical development

In order to deduce about physical development of the child should be assessed all graphs of physical development and observation of the child. For the definition of the dynamics of the physical development of the child the dynamics of indicators of physical development should be analyzed, which marked on the graph of the results of several reviews. Dynamics can point to a good and sustainable physical development of the child, or the child has a risk of problems, and should be re-inspected.

Normally" schedule physical development of the child will be parallel to the median (the line that marked 0 on each graph or 25–75 %) and the lines of the standard deviations. Most children develop "on schedule", which passes through avarege median or between them and more or less parallel to the median.

Schedule can go above or below the median. When interpreting graphs physical development of the child should be mindful of the following situations that may indicate a problem or a risk:

1. graph of physical development crosses the line of stundart deviation;
2. explosive growth or decreasing of graph of physical development;
3. absence of positive dynamics of physical development (weight of lenth doesn't increase).

In case if dynamics of the physical development is not "normally" it is necessary: to determine the cause of abnormalities in physical development, eliminate conditions threatening the life of the child; assess nutrition; make comprehensive approach with the assistance of physicians specialists (children endocrinologists, genetics, child neurologist, other as indicated); conduct consultations with feeding and nutrition; appropriate treatment in case of illness.

ASSESSMENT OF PSYCHOMOTOR DEVELOPMENT OF CHILD

The main criteria of psychomotor development (PMD) are:

• Motility - is the ability to move independently and purposively.

• Static - is the ability to keep body or its parts in necessary position.

• Sensory reaction – is development of particular responses to different stimuli, such as light, sound, pain, touching.

• Speech – is formation of expressive speech and understanding of speech.

• Mental development – is ability to show positive or negative emotions, development of social age.

Particularities PMD of newborn

Motility of newborn is chaotic, a little tremor is present. Position of the body is flexed. Newborn baby have a symmetrical physiological muscular hypertonic in all position. Arms are bent in all joints and pressed to the thorax. Legs also bent in all joints and slightly abducted in thighs.

Static. After birth the eyes are closed, but the baby sees from the first day of life. The existence of vision can be tested by bringing the light near baby's eyes. If the child is not sleeping he will turn his head towards the light. If baby sleep, similar reaction will occur by blinking the eyes. For checking of sight the doctor carries a bright object at distance of 30–40 cm above the eyes of the child in lying position from side to another -the eyes of the child should what the movement of object 2–3 weeks – the child fixed the sight at a bright object.

Sensory reaction. Fetus can hear strong sounds. A healthy newborn reacts more to the different strengths of auditory stimuli. For estimation of hearing doctor clamps his hands at distance of 30–40 cm of the ears of the child, the reactions of newborns are blinking, tremors, opening his month and sucking movement, crying. At the end of 1 month baby turns his head to towards the sound.

Estimation of unconditional neonatal reflexes

Sucking reflex is positive till 3 months.

Kussmaul's searching reflex: a doctor touches a child's skin in the area of the corner of the month and a child turns his head towards the irritator (the reflex is positive till 2–3 months).

Lips reflex – a doctor gently taps by a finger on the lips, and a child brings the lips out almost forming a trunk (the reflex is positive till 2–3 months).

Babkin's reflex: a doctor presses the palm of the child. The child opens his month and bends his head forward to the chest (the reflex is positive till 2–3 months).

Upper grasping reflex: a child holds the doctor's finger tightly attached his hands (the reflex is positive till 2–3 months).

Lower grasping reflex: doctor presses his thumb against the sole and a child bends toes on the lower extremities (the reflex is positive till 2–3 months).

Babinski's reflex: a doctor scratches the sole on the external edge from heel to toes and a slow dorsal extension of the big toe and some extent-extension of the other toes takes place (the reflex is positive till 4–6 months).

Moro reflex: a doctor claps with the both hands on the surface in distance of 15–20 cm from the child and a child at first spreads his arms widely apart and extends his fingers and then brings his arms to the initial position (the reflex is positive till 4 months).

Defense reflex: a doctor puts a newborn on the abdomen and infant reflectory turns his head to the side (the reflex is positive till 4–6 months).

Stepping reflex: a doctor holds a child for armpit and supports his head, and child presses his leg on the table and makes some step forward (the reflex is positive till 2 months).

Crawling (Bauer's) reflex: a doctor puts the child on abdomen and presses child's foot by his hand, and a child tries to lift his head and to crawl (the reflex is positive till 4 months).

Galant's response: a doctor puts a child on side and runs along paravertebral lines from neck to bottom by his first and second fingers, and a child arches his trunk in direction of the irritator (the reflex is positive till at 3–4 months).

Pere's reflex: a doctor puts a child on the abdomen and presses slightly along his vertebral spinous processes from coccyx up to the neck by his index finger. It can cause a short apnea, raising of the head and pelvis (form of lordosis), flexion of the limbs, hypertone of muscles, defecation and urination (the reflex is positive till 3–4 months).

Kerning's reflex: a doctor bends the leg of child in the knee and hip joints (in lying position), then it is not possible to extend leg in the knee joint (the reflex is positive till 4 months).

Symmetric cervical tonic reflex: a doctor bends child's head of a passively while child is in lying position, and upper extremities are flexed and lower extremities are extended (the reflex is positive till 2 months).

With age some new reflexes appear in a child.

Upper Landau reflex: a child in lying position on abdomen can lift his head and upper part of the body (the reflex appears at the 4 months).

Lower Landau reflex a child in lying position on the abdomen can extend and raise legs simultaneously(the reflex appears at the 5–6 months).

Sideward support reaction: a doctor slightly pushes a child, which is sitting. The child supports using his hand (the reflex appears at the 7 months).

Parachute reaction: a doctor holds a child at his waist with the back up and put him down, and a child extends his hand and feet, taking a protective position (the reflex appears at the 7–9 months).

The rules of estimating the unconditioned reflex: should take place in warm room**,** one hour after feeding and not on empty stomach, and should be estimated corresponding 5 criteria:

✓ Their present or absent

✓ Symmetrical or not
✓ Time of occurrence and disappearance
✓ Correspondence of the expressiveness of the reflex to the age of child.

Particularities of PMD of different age child.

PMD of child aged 1month. Motility: physiological hypertonia of muscle decreases; chaotic limb movements disappearance, unconditioned reflex are highly expressed. Static: an infant begins to hold a head in horizontal position and lies on the abdomen. Sensory: a consideration of the environment and auditory concentration short time are appeared. Speech: a child can told single sound in form "a""u". Emotional status: a child negatively reacts to strong auditory and visual stimuli irritant.

PMD of child aged 2 months. Motility: a child can turn head in different directions. Static: a child keeps his head in vertical position and beholds head in position on abdomen. Sensory: a child has prolonged visual reaction to moving objects and expressed concentration of sound, watches attentively on mother, touches her breast. Speech: a child makes short sounds frequently. Emotional status: a child reacts by smiling while his mother is conversing with him.

PMD of child aged 3 months. Motility: the majority unconditioned reflexes begin to disappeared Kussmaul, lips, Babkin's, grasping. The child can to reach for a toy, muscle tone is normal. Static: a child holds well his head in position on abdomen, his hand is closed, a baby makes an attempt to press his legs against the table in vertical position. Sensory: child responses to auditory stimuli by more actives reactions. Speech: a child makes sounds often in a long duration and +r-r-r. Emotional status: a child reacts by smiling and joyful movements of arms and legs, at the sight of the mother.

PMD of child aged 4 months. Motility: the most unconditioned reflexes disappeared (Moro grasping, crawling), a child grabs a toy better, he can turn from supine position to the abdominal, upper Landau reflex appears. Static: a baby makes attempt to press his legs against the table if supported by the armpit. Sensory: a child recognizes his mother and he is interested in toys. Speech: a child can make melodic sound, sound can speak sounds «m», «b» Emotional status: a child laughs out loud when somebody talks to him.

PMD of child aged 5months. Motility: a child has coordinated movements, back muscles develop and a child can turn from supine position to the abdominal and vise-versa, he also can to move towards the toy and grab it.

Static: a child can sit with supports. Sensory: a child recognizes of family people and expresses joy at the sight them. Speech: an infant can make different other melodic sounds; can speak sounds «m», «b». Emotional status: a child takes a toy from hand of other children, a baby can have different mood, intonations of speaking.

PMD of child aged 6months. Motility: a child has more active coordinated movement, can play with his legs. Static: a child starts sit without supports tries to crawl. Sensory: a child can recognize of family people and expressed joy

at the sight them. Speech: a child says separate syllables like «ba-ba», «ma-ma» without understanding their sense. Emotional status: emotions of child are differently and adequate.

PMD of child aged 7 months. Motility: a child starts to crawl, tries to get object by all means, and changes the position of body for it. Static: sits with straight back and starts to stand with supports, he makes springy movements like dancing. Sensory reaction: can recognize of family people and expressed joy at the sight them. Speech: a child continues babble. Emotional status: a baby can play with unfamiliar people, repeats some actions of other people, if he is tired he demands the attention of mother.

PMD of child aged 7 months. Motility: a child takes toys by both hands and holds them a short time. Static: he crawls on the abdomen, propelling his hands forward, independently sits and stands. Sensory reaction: a baby shows something by hands; understand «yes» or «no». Speech: a baby continues babble clearly «ba», «ma», «y», «yes».Emotional status: a child has adequate emotional reactions in response to communication.

PMD of child aged 9 months. Motility: a child can play independently with different toys and especially throws toys, swinging his hands and legs. Static: a child can sit well without support of hand, can stand well with support. Sensory reaction a child adequately responses on simple questions and requests such as «give me the doll», «sit down here», he know his name, responds to musical sound by dance movements. Speech: he clear doubles of syllables, «ba-ba», «ma-ma». Emotional status: a child easier to come into contact to an emotional, playful, his language level is higher; he repeats the actions of other children.

PMD of child aged 10 month. Motility: number of purposeful movements is increased, a child can fold pyramid, so-called «forceps grab» is expressed, a child takes a small object by elongated index finger and the thumb. Static: a child well stands, crawls on the surface of different height. Sensory reaction: child imitates the movements of adults, «talking» on the phone. Speech: a child begins to say words, his vocabulary is reserved few words, he actually understands it. Emotional status: a child manifests by variety of facial expression and voice responses.

PMD of child aged 11 month. Motility: so-called«pliers' grab» is expressed; a baby takes a small object by the curved index finger and the thumb's cushion. Static: a child crawls on the hand and knees with cross – coordination's, stands without supports, does steps forward with the supports of both his hands. Sensory reaction: a child carries out simplex requirement and requests, he understands such terms as «can», «can not», and understands interdictions «sit silently», do not take. Speech: one syllable words are replaced by two syllables. Used a simplified words «lya-lya», «tik-tok», «kitty-kitty», «aff-aff». Emotional status; a child waves his hand in farewell, he is happy at the arrival of other children, selective attitudes towards other children appear.

PMD of child aged 12 month. Motility: a child expresses mimic movements. Static: a baby walks along without support or with support of one arm. Sensory: a child adequately responses to an environment. Speech; language of a child is reserved 8–12 words. Emotional status: he becomes inquisitive, happy and he can play with other children's electively with laugh. There is evidence of regards for parents; this is shown when a child is asked to hug them.

It is very important to know that children can have different speed of PMD. Therefore, after estimating the expressiveness of all of 5 criteria representation of unconditioned reflex, it is necessary to compare the received date with the age of child. Prolonged disease and insufficient upbringing can lead to permissible lag of all parameters – only by one stage. Such as a delay of the development of neurons system is considered functional. The lag of PMD by two and more stages indicates a pathological delay in development and such case diagnosis of encephalopathy. It normal development of the child by 2 years of age all criteria should come to end. If this does not happen after 2 years of age, concrete diagnosis is made (oligophrenia, hydrocephaly, and epilepsy).

Delay of psychomotor development during the year on 1 additional month, during the 2-nd year on 3 months, during the 3 th year on 6 month doesn't permit to give neurologic diagnosis (Table 2).

Table 2

Tactics of the doctor according to the results of the psychomotor development of the child

Results	Tactics
Indicators of psychomotor development correspond to the age of the child	A further observation. Advice on caring for the purpose of development.
It is indicated the backlog of appearance skills of babies on 1 month on the first year of life	Advice on care for development and corrective exercises. Re-examination after 1 month. If you find any lag kept at re-examination after 1 month, child should been consulted a neurologist for children.
The backlog of appearance of skills on 3 months in children by age from 1 year to 2 years	Advice on care for corrective exercises of development. Re-examination after 1–3 months. If the detected gap persists, should consult a neurologist for children.
The backlog of appearance of skills on 6 months in children by age from 2 years to 3 years	Advice on care for corrective exercises of development. Re-examination after 3–6 months. If the detected gap persists, should consult a neurologist for children.

PRINCIPALS OF NUTRITION OF INFANTS

Breastfeeding and complementary feeding are a critical aspect of caring for infants and young children. Appropriate feeding practices stimulate bonding with the caregiver and psycho-social development. They lead to improved nutrition and physical growth, reduced susceptibility to common childhood illnesses and better resistance to cope with them. Improved health outcomes in young children have long-lasting health effects throughout the life-span, including increased performance and productivity, and reduced risk of certain non-communicable diseases. The Global Strategy for Infant and Young Child Feeding, endorsed by WHO Member States and the UNICEF Executive Board in 2002. Its aims were to revitalize efforts to protect, promote and support appropriate infant and young child feeding. It builds upon past initiatives, in particular the Innocent Declaration and the Baby-Friendly Hospital Initiative, and addresses the needs of all children including those living in difficult circumstances, such as infants of mothers living with HIV, low-birth-weight infants and infants in emergency situations. The Strategy is the guiding framework through which WHO prioritizes research and development work in the area of infant and young child feeding, and provides technical support to countries to facilitate implementation.

The World Health Organization recommends that infants start breastfeeding within one hour of life, are exclusively breastfed for six months, with timely introduction of adequate, safe and properly fed complementary foods while continuing breastfeeding for up to two years of age or beyond. Promoting appropriate feeding for infants and young children is recommended by WHO in the Global strategy on infant and young child feeding.

The first set of the recommendations connected with importance to support the immediate beginning of the BF to install it:

1. Everything should be done for the bodily contact between the woman and the newborn is established as soon as possible.

2. It is necessary to assist each mother in ensuring that BF begins as early as possible, within an hour after the delivery.

3. The responsibility of the staff is to provide the child with the earliest beginning of the BF and its continuation. It is necessary to teach a woman to correctly overcome typical postdelivery difficulties.

4. If for some reason mother is temporarily separated from the newborn, it is necessary to teach her principles of expression of breast milk to establish and maintain lactation.

5. The institution in which the childbirth took place must provide the mother with the opportunity to stay with the infant in the same room. Only in exceptional cases it is possible to take the child for medical manipulations for a while, which can not be done in the ward.

6. BF at the request of the baby is an integral part of caring for. Mother needs to be supported in her opinion.

The second block relates to practical issues of breastfeeding and the introduction of additional products in the diet of baby:

7. It is essential to prevent women with the use of any additional products and fluids in the nutrition of the newborn, if it's not mother's milk. Except cases, when such foods/liquids are admitted by doctors.

8. It needs to teach the mother to recognize the signals of the newborn, who is ready to eat and receive the mothering care; and respond to them in the accepted framework.

9. For preterm babies, who are temporarily unable to BF, oral and sucking stimulation may be beneficial without eating. It can be carried out until the full BF begins.

10. Sometimes there is relevancy to feed full-term newborns without BF. For the organization of feeding in the hospital or clinic, it is recommended to use such devices a spoon, a cup or a sucking bottle.

11. To feed a premature baby, it is better to use a spoon or cup than a sucking bottle.

The third set of recommendations contains information on creating a supportive feeding environment:

12. The management of the institution that provides maternity services should be concerned with the development of policy in the field of BF. The document must be fixed on paper and be systematically presented to the staff and patients.

13. The medical staff, which is involved into the provision of food for children (including BF), is required to have appropriate knowledge and practical skills to support childbirth.

14. Institutions working with pregnant women and their families are obliged to bring to their attention the benefits of BF.

15. The policy of natural feeding involves the protection, promotion and support of BF. Even after discharge from the clinic, the institution should provide continuous support and assistance to women in the practice of BF.

Also, the document provides for a list of notes that need to be addressed.

The recommended time to establish a bodily contact between the skin of the woman and the skin of the newborn is 10 minutes. Most often this should be organized much faster, within 2–3 minutes. It is not necessary to interrupt the contact during the first hour of the baby's life, if the health of him and his mother permit. The ideal duration of physical contact is at least 2 hours. The medical staff of the institution should observe the probable manifestations of stress in the mother and the baby.

The maximum positive result is shown at the beginning of BF within an hour from the moment of delivery. In children born in full time, the desire to take a breast sometimes occurs after 15–20 minutes after delivery. Some extensions of the recommended terms are possible. If due to the specifics of a mother's or a baby's condition it is impossible to start BF immediately, it is the best to start it as soon as possible.

Expression of breast milk can be used to stimulate lactation or effective sucking, even if mother is constantly with the baby.

It is necessary to support the desire of the mother bodily contact with the child and express the milk, strongly promote this if the baby is in intensive care unit. These actions will contribute manifestation of congenital reflexes.

Liquids other than breast milk, can be given only by doctor's prescriptt-ion, if there are indications. Lacks of knowledge, skills or time in the medical staff of the hospital are not an indication to assign additional nutrition for newborn.

Information about the using of baby's pacifiers must be explained for family the most fully. So that decision about the use or non-use was deliberate.

It is inappropriate to promote artificial food, pacifier or other products of feeding in a medical institution, which provides maternity and child care. Medical staff can not present for the mothers a bottle or other items for artificial feeding. To minimize BF problems, it is necessary to encourage mothers to breast feed as often and as long as they want it.

After 6 months the mother's breast milk doesn't provides children's body all necessary nutrients. Therefore, there is a necessity of introduction of complementary foods. WHO has developed recommendations for the introduction of complementary food. The aim of the introduction of complementary food is not only supplement the nutrition of baby and provide his body with the essential elements, but also gradually accustommed to solid adult food.

According to the recommendations of WHO, optimal age of infant for introduction of complementary food is 6–8 months. Up to six months, the baby's gastrointestinal tract has not been formed sufficiently yet, not all the necessary enzymes are made for the assimilation of another, except for mother's milk or a special milk formula. Until 9–10 months in the child stable stereotypes to eat only liquid food can developed, and overcoming them for the infant will be painful and difficult process.

Signs of readiness of the child for the introduction of complementary foods: maturity of the digestive system; reduction of the popping solid food reflex; the appearance of the first tooth; the preparedness of baby confidently and longtime to be in the upright position; emotional readiness for new gustatory sensation.

There are recommendations on the three versions of the complementary food introducing: porridge, vegetables, and meat. The fruits are not recommended

before the introduction of porridges and vegetables. This is due to the fact that up to the 8–9 months the baby's gastrointestinal tract is not ready for assimilate fruits and fruit juices. Vegetables and porridges are believed to inhabit the intestine with the necessary bacteria for digestion of the fruit. According to the WHO's opinion, kefir is not considered as complementary foods because it isn't solid food. The WHO supplements scheme includes kefir only as an additional meal from 8 months. The use of cow's milk is recommended by the WHO only since 12 months. Any scheme of complementary food introducing suggests that the portions will systematically increase from half teaspoon to 100–200 gr. The first dishes for complementary food is prepared exclusively with one-component only. Each next component is introduced only after full addiction to the previous (6–7 days).

Providing sound and culture-specific nutrition counseling to mothers of young children and recommending the widest possible use of indigenous foodstuffs will help ensure that local foods are prepared and fed safely in the home. The agriculture sector has a particularly important role to play in ensuring that suitable foods for use in complementary feeding are produced, readily available and affordable.

In addition, low-cost complementary foods, prepared with locally available ingredients using suitable small-scale production technologies in community settings, can help to meet the nutritional needs of older infants and young children. Industrially processed complementary foods also provide an option for some mothers who have the means to buy them and the knowledge and facilities to prepare and feed them safely. Food fortification and universal or targeted nutrient supplementation may also help to ensure that older infants and young children receive adequate amounts of micronutrients.

PREVENTION OF THE RICKETS

Human milk contains little vitamin D and contains too little phosphorus for babies who weigh less than 1500 g. Infants weighing less than 1500 g need special supplementation (vitamin D, calcium, phosphorus) if breast milk is their primary dietary source. Recommending a vitamin D supplement from the first week of life for susceptible infants who are breastfed is safe and effective and, therefore, should be considered.

The United States Institute of Medicine recommends an upper level of intake of 1000 IU/d and 1500 IU/d in infants aged 0–6 months and 6–12 months, respectively. An adequate intake of 400 IU/d has been suggested for infants aged 0–12 months. The recommended daily allowance is 600 IU/d thereafter. The US Endocrine Society's Clinical Practice Guideline suggests 400–1000 IU/d may be needed for children younger than 1 year; they also recommend 600–1000 IU/d for children aged 1 year or older. Internationally, the European Society for Paediatric Gastroenterology, Hepatology, and Nutrition also suggests an oral supplement of 400 IU/d until age 1 year.

Adequate ultraviolet light or 10 mcg (400 IU) orally (PO) daily of a vitamin D preparation and an adequate dietary supply of calcium and phosphorus prevent rickets. Prevention of rickets is antenatal and postnatal (Tables 3, 4, 5).

Table 3

Antenatal specific prevention of Rickets

	Start of prevention	Daily doses of vitamin D	Period of taking
Health pregnant	28–32 weeks	500 IU	6–8 weeks
Pregnant with chronic diseases	28–32 weeks	1000–2000 IU	8 weeks

Table 4

Postnatal prevention of Rickets (for full-term newborns)

	Age of the beginning of prevention	Daily doses	Period of taking
I	1–2 month	500 IU	Every day during 3 years (total doses – 180 000 IU)
II	On 2, 6, 10 month of life	2 000 IU	Every day during 30 days (total doses – 180 000 IU) Them before 3 years 2–3 time in years, with interval 3 month between other.
Newborns from risk groups of rickets, who were born with clinical symptoms of congenital rickets and insuf–ficient mineralization of bone tissue	From 10^{th} day of life	2 000 IU	Every day during 30–45 days. From now forward, 3 times/ year with course duration minimum 30 days with interval 3 month between courses.
Children, who for a long time receive anticonvulsant therapy (phenobarbital, seduxen, diphenin) corticosteroids, heparin.		2 000 IU	Every day during 30–45 days. From now forward, 2–3 times/ year with interval 3 month between courses.

Table 5.

Postnatal prevention of Rickets (for preterm newborns)

	Start of prevention	Daily doses	Period of taking
Preterm I degree	10–14 days of the life	500 – 1000 IU	Every day during before 6 month of life. Then 2000 IU/day during 1 month 2–3 time in years, with interval 3–4 month between other.
Preterm II–III degree	10–20 days of the life	1000 – 2000 IU	

PREVENTION AND TREATMENT OF ANEMIA

Antenatal prophylaxis of anemia in women starts from the 2nd half of pregnancy by prescriptions of iron containing drags or multivitamins enriched with iron. For repeated or multiple pregnancy, an obligatory is admission of iron during the 2nd and 3rd trimester.

Postnatal prophylaxis is performed for children at high risk of developing iron deficiency anemia (IDA). This group includes all premature babies; born from multiple pregnancy and with complication of the second half of pregnancy (gestosis, fetoplacental insufficiency, complications of chronic diseases); children with intestinal dysbacteriosis, food allergy; children who are artificially fed; which grow well ahead of the generally accepted standards of physical development. Regular diagnostics of the possible development of an IDA is foreseen and, if it is determined, prophylactic doses of iron (0.5–1 mg/kg/day) are prescribed for 3–6 months.

Dietary IDA can be prevented by starting supplemental iron when infants are weaned off breast milk or regular formula at age 8–12 months; 1–2 mg/kg/d of elemental iron is usually sufficient to prevent iron deficiency anemia. This should be continued until the child more or less eats regular table foods as the main source of calories. Treatment of iron deficiency anemia needs a higher dose of iron, usually 6 mg/kg/d of elemental iron, for at least 3 months.

Infants of vegan mothers who exclusively breast feed have risk to develop megaloblastic anemia and neurologic signs due to B_{12} deficiency. These infants should be given B_{12} supplementation corresponding to the age:

0–6 months: 0.4 mcg
7–12 months: 0.5 mcg
1–3 years: 0.9 mcg
4–8 years: 1.2 mcg
9–13 years: 1.8 mcg
>14 years: 2.4 mcg

Treatment of B_{12} deficiency: 0.2 mcg/kg for 2 days; follow by 1,000 mcg/day for 2–7 days; follow by 100 mcg/day for 2–7 days; then 100 mcg/week for 1 month. Maintenance: 100 mcg IM/SC monthly.

Dose of B_{12} supplementation for pernicious anemia: 30–50 mcg IM/SC once daily for 2 weeks for total dose of 1,000 mcg to 5,000 mcg administer concomitantly with 1 mg/day of folic acid for 1 month. Maintenance dose is 100 mcg IM/SC monthly.

Because 50–100 % of premature babies can develop late anemia from 20–25th day of life and gestation age of 27–32 week, with body weight 800–1600 gr., (while decreasing of the concentration of hemoglobin below 110 g/l, the number of red blood cells is below $3.0x10^{12}$/l, reticulocytes less than 10 %), in addition to supplemental iron (3–5 mg/kg/day) and sufficient administration

of protein (3–3.5 g/kg/day), it is prescribed the erythropoietin s/c, 250 IU/kg/day three times a week for 2–4 weeks with vitamin E (10–20 mg/kg/day) and folic acid (1 mg/kg/day). More prolonged use of erythropoietin, such as 5 times a week, with its gradual decrease to 3 times, is prescribed to children with severe intrauterine and postnatal infection, as well as children with a low reticulocytic response to therapy.

Parenteral iron should be used only on a purely special indication, due to the high risk of local and systemic adverse reactions. Daily dose of elemental iron for parenteral way is: for kids aged 1–12 months – up to 25 mg/day; aged 1–3 years is 25–40 mg/day; over 3 years – 40–50 mg/day.

Contraindications for ferrotherapy are: aplastic and hemolytic anemia, hemochromatosis, hemosiderosis, sideroahrastic anemia, thalassemia, others types of anemia, not associated with iron deficiency in the body.

PRINCIPLES OF VACCINATION

Immunization is the process whereby a person is made immune or resistant to an infectious disease, typically by the administration of a vaccine. Vaccines stimulate the body's own immune system to protect the person against subsequent infection or disease.

Table 6

Contraindications for vaccination

Vaccines	Contraindications
All vaccines and toxoids	Severe complications from the previous dose in the form of anaphylactic reaction or toxic erythema. Allergic reaction to any component of the vaccine, toxoid. Acute illness or exacerbation of chronic illness. Congenital combined immunodeficiency, primary hypo-gammaglobulinemia. Immunosuppressive therapy.
All live vaccines	Congenital combined immunodeficiency and malignant neoplasm, pregnancy, HIV infection.
BCG	The child's body weight is less than 2500 g. Complications after the previous administration of the vaccine (lymphadenitis, cold abscess, ulcer of skin more than 10 mm in diameter, keloid scar, BCG- osteitis, generalized tuberculosis). Tuberculosis and tuberculosis in history. Defects of the system of phagocytosis (chronic granulomatous disease, deficiency of adhesion of leukocytes). Generalized BCG infection, BCG – osteitis, found in other children in the family.
Oral vaccine against polio-myelitis (OPV)	Severe forms of hypogammaglobulinemia. Members of families where there are persons with contraindications to the introduction of OPV
Pertussis	Convulsion in the history (vaccination is carried out by DT or a vaccine with an acellular component of pertussis)
Live measles vaccine, live parotitis vaccine, rubella vaccine or trivaccine (measles, mumps, rubella)	Allergic reactions to aminoglycosides. Anaphylactic reactions to egg white. Introduction of blood products.

The main criterion in addressing the issue of contraindications to the introducing of a specific vaccine is a list of contraindications, defined in the instructions for its use.

Planned immunization with the vaccines, antitoxins can be delayed until the end of the acute manifestations of the disease and exacerbation of chronic diseases and are carried out after recovery or during the remission of chronic disease.

Immunosuppressive therapy is cytotoxic therapy, including monotherapy with cyclosporin A, corticosteroids in immunosuppressive doses, radiotherapy. Corticosteroid therapy is recognized as immunosuppressive if it is more than 2 mg/kg/day for prednisolone and lasts for more than 14 days provided that systemic use is performed.

Immunization for the prevention of measles, mumps and rubella after the blood transfusion (whole blood, plasma, immunoglobulins, red blood cells mass), with the exception of the laundered red blood cells, in the terms indicated in the instructions on use of the vaccine, but not earlier than 3 months, can be done.

After emergency prophylaxis of tetanus with anti-tetanus human immunoglobulin, vaccination BCG for a newborn is carried out according to a generally accepted scheme. If the interval between vaccination against measles, mumps, rubella and the introduction of a blood transfusion with a therapeutic or prophylactic purpose of less than 14 days, vaccination against these infections should be repeated.

The schedule of preventive vaccinations is a regulatory act of the Executive Committee, which ensures the formation of public health policy, which establishes a list of mandatory preventive vaccinations and the optimal timetable for their implementation.

Calendar of preventive vaccinations includes four sections:

1. vaccinations by age,
2. vaccination by condition of health,
3. immunizations, conducted in endemic and enzootic areas with epidemic indications,
4. recommended vaccinations.

Table 7

Schedule of vaccination in Ukraine

Age	Vaccine against diseases					
1 day	Hepatitis B					
3–5 days		BCG				
2 month	Hepatitis B		Diphteria Pertussis Tetanus	Poliomyelitis	Homophilus influenza b	
4 month			Diphteria Pertussis Tetanus	Poliomyelitis	Homophilus influenza b	
6 month	Hepatitis B		Diphteria Pertussis Tetanus	Poliomyelitis		
12 month					Homophilus influenza b	Measles Mumps Rubella
18 month			Diphteria Pertussis Tetanus	Poliomyelitis		
6 years			Diphteria Tetanus	Poliomyelitis		Measles Mumps Rubella
14 years				Poliomyelitis		
16 years			Diphteria Tetanus			
Next every 10 years of life			Diphteria Tetanus			

QUESTIOS FOR SELF-CONTROL

1. What are the most important criteria of children's growth?
2. What methods of assessment physical development can be useful?
3. Assessment of dynamic of baby's growth.
4. What criteria of PMD?
5. Parameters of normal PMD corresponding the age.
6. Promotion of breastfeeding.
7. Prophylaxis of rickets and anemia in infants.

THE LIST OF PRACTICAL KNOWLEDGE

1. Assessment physical development of infant according graphs.
2. Assessment PMD of infant.
3. Investigation of infant with hypotrophy.
4. Assessment nutrition of infant.
5. Assessment neonatal reflexes.
6. Determination of rickets and anemia in infant.

TESTS

1. The boy is 2 years old. The parents have complaints on deviation in neuropsychological development. He has the head circumference of 51 cm. How can you estimate this anthropometric index if it included in percentile space 90–95 %?

A. Extremely excessive
B. More than average
C. Excessive
D. Less than average
E. Low

2. The newborn infant was born of 37 week of gestational age. The body mass at birth is 2800,0 g, the length 50 cm, the head circumference is 36 cm, the chest circumference – 34 cm. Assess the physical development of the newborn infant.

A. Physical development is normal
B. Retardation of physical development
C. The newborn infant is small for gestation (intrauterus hypothrophy)
D. Appropriate-for-dates
E. Large-for-dates

3. The child 4 m.o. His body weight at birth was 3200 g, at 4 m.o. – 4700 g., thickness of subcutaneous tissue is decreased only on the trunk and limbs. What is your conclusion about baby's weight?

A. Normal body weight

B. I degree of hypotrophy
C. II degree of hypotrophy
D. III degree of hypotrophy
E. Parathrophy
4. Obesity II grade is excess of body mass index:
A. 10–25 %
B. 25–30 %
C. 30–49 %
D. 50–100 %
E. 100 %
Standards of answers to tasks: 1 – c, 2 – a, 3 – b, 4 – c.

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