SIMULATION OF PRACTICAL SKILLS IN THE CARE OF CHILDREN AT PEDIATRIC HOSPITAL

Teaching guide for preparing for practical classes of 2-nd year foreign students in the specialty "Medicine"

МІНІСТЕРСТВО ОХОРОНИ ЗДОРОВ'Я УКРАЇНИ
Харківський національний медичний університет

SIMULATION OF PRACTICAL SKILLS IN THE CARE OF CHILDREN AT PEDIATRIC HOSPITAL

Teaching guide for preparing for practical classes of 2-nd year foreign students in the specialty "Medicine"

СИМУЛЯЦІЯ ПРАКТИЧНИХ НАВИЧОК ЩОДО ДОГЛЯДУ ЗА ДІТЬМИ В УМОВАХ ПЕДІАТРИЧНОГО СТАЦІОНАРА

Методичні вказівки для підготовки до практичних занять студентів-іноземців 2-го курсу за спеціальністю «Медицина»

Затверджено
Вченою радою ХНМУ
Протокол № 15 від 21.10.2025.

Харків
ХНМУ
2025

Simulation of practical skills in the care of children at pediatric hospital : teaching guide for preparing for practical classes of 2-nd year foreign students in the specialty "Medicine" / comp. T. V. Frolova, I. R. Siniaeva, I. I. Tereshchenkova, N. S. Osman. Kharkiv : KhNMU, 2025. 72 p.

Compilers T. V. Frolova,
I. R. Siniaeva,
I. I. Tereshchenkova
N. S. Osman.

Симуляція практичних навичок щодо догляду за дітьми в умовах педіатричного стаціонару : метод. вказ. для підготовки до практичних занять студентів-іноземців 2-го курсу за спеціальністю «Медицина» / упоряд. Т. В. Фролова, І. Р. Сіняєва, І. І. Терещенкова, Н. С. Осман. Харків : ХНМУ,2025. 72 с.

Упорядники Т. В. Фролова
І. Р. Сіняєва
І. І. Терещенкова
Н. С. Осман

Topic 1. Simulation of sick child's questioning and examination, their role in the assessment of the patient's general condition

The duration of the practical session – 2 hours.

Relevance of the topic.

The importance of questioning a sick child or his parents is difficult to overestimate.

Numerous studies have shown that a carefully conducted survey is the key up to 80 % of correctly established diagnosis. In addition, a thorough history collection provides an opportunity orient yourself in the nature of a specific disease, its individual manifestations, in recognizing the symptoms and initial signs of the disease, the role of hereditary, environmental, household and other factors. From the observance of ethical and deontological principles in relations between medical workers, sick children and their families, success in the treatment and rehabilitation of sick children largely depends on game.

Be able:

– to demonstrate knowledge of the main sections of medical history;

– methodically and correctly conduct questioning of sick children and their parents;

– to analyze the general condition of the patient and his state of consciousness and make a conclusion about their response belonging to the norm or a certain degree of violation;

– to classify the main disorders of consciousness – stupor, sopor, coma; to know the main signs;

– to determine the position of a sick child and make a conclusion about his compliance with the norm or the presence of a violation.

– to fill in the title page of the inpatient medical card.

Theoretical questions

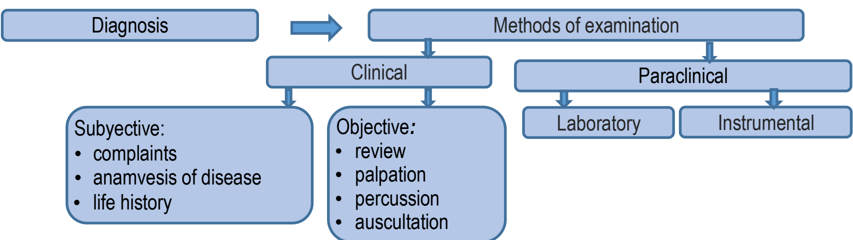
1. Deontological features and rules for questioning a child.
2. Simulation of taking an anamnesis from a sick child depending on age and summarizing the information obtained data.
3. The assessment simulation of the child's general condition.
4. Acquaintance with medical documentation, which is filled out on the basis of questioning sick child.
5. Simulation of filling out the title page of the inpatient medical card.

Introduction. For diagnosis, assessment of physical and neuropsychological development, function of the child's organs and systems are used clinical and paraclinical (laboratory, X-ray, instrumental, ultrasonic and other) examination methods (*scheme 1.1*).

As can be seen from the scheme, clinical methods include subjective and objective.

The subjective methods include: survey (complaints collection) of a sick child or his parents (interrogatio aegroti), history of illness (anamnesis morbi), history of life (anamnesis vitae).

Scheme 1.1



The objective methods of clinical examination, which every doctor must possess depending on the specialty, are examination (inspection aegroti), palpation (palpatio), percussion (percussio) and auscultation (auscultatio).

The additional methods include laboratory, instrumental, genetic, experimental, etc.

The first meeting between a doctor and a patient begins from questioning.

1.1. Deontological features and rules of questioning a child

In the process of questioning and treating children, medical workers need to communicate not only with children, but also with their relatives, which can sometimes complicate deontological requirements attempt, but you always need to behave wisely and correctly.

The regarding recommendations for collection anamnesis:

1. Establish the best possible contact with the child and his parents.
2. You should always introduce yourself before starting a dialogue.
3. You can shake hands if you think the child appreciates it.
4. Do not forget that the first impression, as a rule, remains the last.
5. Listen carefully to the child's mother.
6. Be a goodlooker!

During the survey, the doctor needs:

– ask open and understandable questions for the patient;

– give the child enough time to answer them without interrupting;

– depending on the age of the child or in the presence of unfavorable\suspicious circumstances, you can offer to talk to the child without the presence of the parents, if it is in the interests of the child;

– collect anamnesis from the words of parents if the child is nonspeaking because of age;

– allow older children to participate in the process of providing information, if they are capable to understand.

– if the child speaks another language, the help of an interpreter is needed for better communication or you can use supportive non-verbal signs.

Peculiarities of anamnesis collection depending on the child's age.

Children bellow 1 year: because the child cannot speak yet, the history of illness and life is collected from the mother.

When talking to the mother about the child's health, you should answer frankly, but not hyperbolize the negative consequences of the course of the disease or treatment, and in any case instill confidence in the child's recovery. This is especially necessary for mothers who are breastfeeding. It should be remembered that negative emotions have a harmful effect on the lactation process, can lead to its decrease and transfer of the baby to breast milk substitute feeding, which in most cases complicates the course of the disease.

Toddlers, preschoolers: At this age, the child is not yet able to explain his thoughts well, maybe come up with something and the doctor can easily influence complaints with his words. So in this case you cannot ask clarifying questions, you should just ask general questions such as: "What does it bother you?" , "Does something hurt?". Mainly there is a dialogue with parents. Be sure to find out-obstetric anamnesis and child development (adaptation, duration of breastfeeding, transferred diseases, etc.).

Schoolers and teenagers are sometimes prone to dissimulation: they may be afraid of injections, manipulations, some examination methods, may not understand the danger of their disease and for this will unwisely hide the manifestations of pathology that already exist to be very attentive when interviewing the patient, to enter into contact with him, to gain his trust, no to hurry, sometimes not to limit yourself to one professional conversation with the patient.

1.2. Simulation of taking an anamnesis from a sick child depending on age and generalization of findings

Anamnesis or questioning about the circumstances that warned and accompanied this with illness, is a very important point in general.

The collection of anamnesis is carried out according to the traditional scheme (passport part, complaints, anamnesis diseases, life anamnesis, allergic anamnesis, immunological anamnesis, epidemiologists medical history, genealogical history, materially).

Having found out the name, surname and age of the child, it is best to start collecting anamnesis from a mother, patiently giving her the opportunity to freely express everything that she considers appropriate to inform the doctor about your child's illness.

History taking usually begins with understanding reasons for appeals and complaints:

– "What bothers your child?" or, speaking to older/unaccompanied children, “What about you, does it bother you?"

– "How long ago did the complaints appear?" If there are several symptoms, ask about their order decline.

– "Has this happened before?"

– "Does anyone at home have similar symptoms?"

– In the case of infants and toddlers, data on feeding (any changes in the scheme, volume), activity of the child, weight gain or loss, sleep-wake, urination, defecation are clarified.

At the end of the mother's story, you should further question her about the history of disease **(anamnesis morbi)**: the time of starting the disease, the features of its onset and subsequent course, the nature of the temperature curve, and the main painful manifestations from all organ systems (stool, vomiting, cough, malaise, convulsions, subjective complaints, etc.). At the same time, it is necessary to find out in detail which treatment was already carried out earlier and what its results were.

The next a pediatrician begins to collect a **detailed history of the child's life (anamnesis vitae).** At the same time, it is necessary to find out:

– mother's age and obstetric anamnesis: complications of pregnancy (gestosis, threat of abortion, diseases during pregnancy), specifics of pregnant woman's diet, intake of folic acid/vitamin D supplements, number of pregnancies,

– the cases of childbirth in the mother, problems during childbirth: fetal distress, use of forceps or breech delivery, caesarean section, hospitalization in the neonatal intensive care unit, contacts with patients,

– gestational age, birth weight, assessment on the Apgar scale, features of the early period of adaptation a newborn to the conditions of the external environment,

– problems in the neonatal period: jaundice, infections, feeding problems.

– formation of physical and neuropsychological development,

– duration of breastfeeding,

– suffered illnesses, injuries, hospitalizations

– the correctness of carrying out and availability of preventive vaccinations and reactions to them,

– history of allergic reactions to food products or medicines, presence of allergic diseases in the child,

– the child is currently taking any medications.

– for school-aged children: the presence of any specific problems (academic, physiological or social (in communication with peers))

It is very important to clarify the behavioral history: data on the presence of behavioral problems that cause concern, according to age: aggression, isolation, self-harm, addiction to alcohol and psychoactive substances.

Family history: A family history of diseases such as epilepsy, diabetes, hypertension, asthma, tuberculosis, sickle cell disease, severe anemia, or thalassemia.

Social history: living conditions, primary caregiver, number of siblings, school attendance.

If the mother cannot accurately answer the questions, this should be noted in the medical history and, if necessary, contact the medical institution where the mother or the child was observed during the illness.

NB! A fully collected anamnesis contributes to the timely establishment of a diagnosis and high-quality treatment.

The obtained anamnesis data are analyzed by the doctor in order to form preliminary diagnostic hypotheses (conclusions):

Assessment of anamnestic data is carried out according to the plan:

1. Highlighting the main complaints dominating the anamnesis.
2. It is possible to connect complaints with each other, that is, combining symptoms into syndromes.
3. List of systems and organs involved in the main pathological process;
4. List of systems and organs involved in the accompanying pathological process.
5. The nature of the course of the main and accompanying diseases (acute – up to 1 month, prolonged – up to 3–6 months, chronic – over 3–6 months);
6. The most likely reasons that caused the disease.

An objective examination of the child is the next stage in making a diagnosis and, as a rule, it begins with an assessment of the patient's general condition.

1.3. Simulation of assessment of a child's general condition

An objective assessment of the general condition of a sick child is important in pediatric practice, because the volume of therapeutic measures, hospitalization in a hospital or in the intensive care unit, the organization of an individual nursing post, the prognosis of the disease depend on it.

NB! Underestimation and overestimation of the child's condition severity will affect the further course of the disease.

The general condition of the child is a broad concept that includes a set of indicators that characterize the functional capacity of various organs and systems of the body (nervous, respiratory, cardiovascular, etc.), the state of consciousness and the position of the sick child, the expression of intoxication symptoms.

The assessment of the general condition is based on the results of an objective clinical and, if possible, laboratory examination. Although it is necessary to clarify the well-being of the sick child, which, despite its subjectivity, often corresponds to the general objective state. But you can't focus only on well-being, because it often falsely reflects the child's condition. Yes, very often girls of pubertal age have numerous complaints related to autonomic dysfunctions, but the objective condition at the same time remains satisfactory. On the contrary, many cases are known when there are no complaints, but the general condition can be serious. First of all, this concerns chronic diseases and diseases with a latent course.

Depending on the general condition of patients, five degrees of severity are distinguished:

– satisfactory,
– medium severity,
– heavy,
– extremely heavy,
– terminal (agonal).

However, there is no clear boundary between them; but their approximate definition plays an important role in assessing the clinical course of the disease, the effectiveness of treatment, and the prognosis.

A healthy child is always cheerful, mobile, interested in surrounding objects and people.

The condition is assessed as **satisfactory** when the child has moderately pronounced manifestations of the disease, mild deterioration of well-being, moderate lethargy, restlessness, anxiety while maintaining activity.

The condition of **moderate severity** is manifested by a clear deterioration of well-being, pronounced disturbances in the functional activity of various organs and systems, a significant decrease in activity, unfavorable dynamics of the disease, drowsiness is observed along with lethargy and apathy.

A severe condition is manifested by distinct manifestations of the pathological process, a forced or passive position of the patient in bed, a significant decrease in appetite, suppression of the main body functions – breathing, blood circulation, urination, digestive and nervous system activity. The child periodically shows various stages of impaired consciousness (stupor, sopor, coma), and often convulsions.

An extremely (very) severe condition is characterized by a complicated course of the disease, which can lead to a fatal outcome, a sharp deterioration in the functional activity of the child's vital organs and systems, a passive position of the patient in bed, a lack of appetite, significant breathing and blood circulation disorders, severe disturbances in activity digestive and urinary systems; the condition is often accompanied by loss or darkening of consciousness, comatose manifestations.

The agonal state is manifested by signs of clinical death, namely, the absence of blood circulation and breathing, inhibited reaction of the pupils to light, a sharp decrease in blood pressure (collapse), absence of a pulse on large vessels, heart sounds, tendon and eye reflexes.

It should be noted that severe, very severe, and agonal conditions require immediate needs resuscitation measures, but the agonal condition also requires indirect heart massage, electrocardiostimulation, e.t.c.

One of the methods of clinical objective examination, which is used to assess the patient's general condition, is an examination (physical examination).

The main rules of the review:

1) during the examination, it is necessary to distract the child in order to reduce the level of discomfort for him. Depending on the age, you can talk with the child, for example, about his favorite games, cartoons, talk while reviewing the story, let him play with toys or a stethoscope, etc.;

2) parents or guardians must be with the child at all times during the examination (unless there are doubts about child abuse or neglect);

3) if possible, examine small children in the arms of their father/mother or guardian;

4) if the child is worried or crying, give the parents or guardians time to calm down;

5) before the examination, wash and disinfect your hands.

The observation and the physical examination.

The observation is an important diagnostic tool. It should start from the first moment you see the child, for example, when playing in the hallway, when greeting and during the history taking. Pay attention to how the child interacts with parents or caregivers.

NB! Try to identify as many signs (symptoms) as possible:

– general appearance: healthy/unhealthy, active/lethargic, discomfort, irritation, distress, malnutrition?

– does the child speak, cry or make any sounds?

– is the child alert, interested and looking around?

– sleepy appearance, vomiting,

– the ability to suck breast milk?

NB! Try to detect any signs of respiratory distress:

– participation of auxiliary muscles in breathing

– sinking of the lower part of the chest

– retraction

– rapid breathing (tachypnea)

– noisy breathing (stridor, wheezing, oral crepitation)

– forced position (sitting straight with support in the form of outstretched arms).

NB! Identify other signs: jaundice, pallor, cyanosis, thickening of finger joints, swelling, lymphadenopathy, rash, petechiae, etc.

NB! Assess the child's state of consciousness.

Consciousness is a form of reflection of the state of the child's brain, its ability to respond adequately to external stimuli and signals.

Normally consciousness is clear. Depending on the degree of the disorder of consciousness, the following types of depression of the central nervous system are distinguished:

Stupor is a disturbance of consciousness, manifested by stupor, while the patient does not always answer questions, language response is inhibited, answers to questions are delayed, short and incomplete. A similar condition is observed in contusions and some poisonings.

Sopor is a disturbance of consciousness, which is manifested by numbness (hibernation), the patient does not answer questions, reacts only to strong sound or mechanical stimuli, reflexes are preserved. A similar condition can be observed in infectious diseases and in the initial stage of uremia.

Coma is a state of deep depression of the central nervous system, which is manifested by a complete loss of consciousness, lack of reactions to external stimuli and reflexes, disorders of the functions of vital organs - breathing, blood circulation. The following types of coma are most common: apoplexic, diabetic, hypoglycemic, hepatic, uremic, epileptic.

In some conditions, so-called irritative disorders of consciousness can occur, which are expressed by excitation of the central nervous system – hallucinations and delirium.

Hallucinations are irritating disorders of consciousness manifested by distorted visual or auditory sensations of nonexistent images, visions, auditory or visual associations, etc.

Delusions are irritating disorders of consciousness that manifested by disordered and inadequate language reactions inspired by fantastic events or illusory facts.

NB! Assess the position of the sick child.

The following positions of the patient in bed are distinguished:

Active position of the patient in a bed – a position in which the patient can independently, without outside help, change his own position in a bed, on a chair, in a chair, etc.; at their own will or at the suggestion of the medical staff, move freely in and out of the ward, perform personal hygiene measures independently.

Passive is a position in which the patient cannot independently change his position, perform personal hygiene measures or take food.

Forced is the position when the patient acquires in order to reduce suffering; at the same time, painful or other unpleasant sensations are reduced – shortness of breath, pain, dyspeptic disorders, the general condition of the patient is relieved. Very weak and helpless unconscious patients are in this position.

Active-forced position, which the patient acquires in order to alleviate his condition.

Passive-forced position, determined by the doctor with the aim of more favorable course of the disease.

Thus, when collecting anamnesis, assessing the child's general condition, making a preliminary diagnosis, it is necessary to adhere to ethical and deontological principles, certain rules and sequences. Also take into account the age of the child.

1.4. Acquaintance with the medical documentation that is filled in based on questioning the sick child

The work of health care institutions is subject to certain legislative acts and is subject to mandatory accounting, therefore, every medical worker must strictly and in full compliance with the requirements and instructions keep medical documentation. All medical documentation, regardless of the institution, is divided into accounting and reporting.

The main forms of medical documentation at pediatric hospital:

– journal of patients' admission to the hospital and refusals of hospitalization – accounting form 001/o;

– medical card of an inpatient - accounting form 003/o;

– temperature sheet - accounting form 004/o;

– sheet of medical prescriptions - accounting form 003-4/o;

– card of the patient who was discharged from the hospital – accounting form 066/o;

– emergency notification of an infectious disease, food, acute occupational poisoning, unusual reaction to vaccination - accounting form 058/o;

– record book of infectious and parasitic diseases - form 060/o.

When a child is admitted to the hospital, the nurse of the reception department fills in the patient admission log (form 001/o), where the child's passport data, who referred the child (including by self-referral), and the diagnosis issued by the referring institution are entered. In case of refusal of hospitalization, fill in the journal of refusals of hospitalization (001-1/o) indicating the reason for refusal.

The nurse of the reception department fills out the title page of the medical card of the hospitalized patient, inserts the temperature sheet (form 004/o) and the prescription sheet – accounting form No. 003-4/o into the medical history. At the same time, the passport part of the statistical card of the patient discharged from the hospital (registration form No. 066/o) is filled out. After the examination, the child, along with a completed medical history, accompanied by a junior nurse, is sent to the department according to the profile of the disease.

It is necessary to pay special attention to the collection of complaints, anamnesis of the disease and life, objective research, which are one of the main points of making a correct diagnosis. During the initial examination of the child, an examination and treatment plan is drawn up. Keeping a medical history should reflect the dynamics of the course of both the main and concomitant diseases in the sick child, contain the interpretation of the obtained additional instrumental and laboratory data, the justification of therapy taking into account the etiology and pathogenesis of the main and concomitant diseases. When the child is discharged from the hospital, the parents are issued with an extract from the medical history, which briefly shows the course of the

disease, the results of clinical and laboratory tests, and recommendations for rehabilitation measures that should be carried out for the child. The card of the patient who was discharged from the hospital is filled out (form 066/o).

Data about a child admitted to the hospital is entered in the record sheet for the movement of patients and hospital beds (form 007/o), which is filled out by a nurse and signed by the head of the department, and in his absence – by the senior resident or the doctor on duty.

In the temperature sheet (form 004/o), (*see Appendix 1*), the dynamics of the sick child's temperature reaction (morning and evening), blood pressure and pulse are indicated daily in the form of a graph; weight and growth when entering the hospital and in the following – 1 time in 7–10 days; the date of hygiene baths, changes of underwear, results of examination for pediculosis are indicated; daily – defecation of the child, daily amount of urine. The temperature sheet is filled out by a nurse.

In the list of medical prescriptions (form 003-4/o), the doctor prescribes: medical and protective regime, dietary nutrition, medicinal products that the patient receives, indicating the routes of administration of the drug (oral, intramuscular, intravenous), doses and frequency of administration. The nurse must indicate the time the patient took the drug or the time of the injection, and put her own signature. In addition, in the doctor's appointment letter, the necessary additional methods of examination of the child are noted, indicating the date of the examination; the nurse notes the performance and puts her signature.

In the journal for registration of infectious diseases, the passport data of the sick child, the diagnosis of the infectious disease, the date of the disease and the measures taken are recorded. The reporting documentation of the hospital consists: a quarterly report for each department; semi-annual report – once every six months; annual report – once a year.

In addition to the listed official documentation, for the convenience and clearer work of the medical staff in the departments, there is also other arbitrary documentation. The nurse keeps a journal of the movement of patients (the number of children who left and arrived at the department). The shift transfer log, which indicates the number of children who are in the department, the names and diagnoses of children who have entered and left; the names of patients who have a fever and their temperature is noted, the condition of seriously ill children, the names of children prepared for the procedure prescribed by the doctor (diagnostic or therapeutic).

Appendix 1

Temperature chart

Card No _______ Patients full name ____________________________________ Ward No

Date_____

Physician

Day in Hospital			1		2		3		4		5		6		7		8		9		10		11	
P	BP	T^0	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E
140	200	41																						
120	175	40																						
100	150	39																						
90	125	38																						
80	100	37																						
70	75	36																						
60	50	35																						
Respiratory rate																								
Weight																								
Daily fluid intake																								
Diurnal diuresis																								
Defecation																								
Change of bed linen																								

1.5. Simulation of filling in the title page of the medical card of an inpatient

The medical card of an inpatient (form No. 003/o) (*see Appendix 2*) is the main medical document that is filled out for each patient who receives inpatient medical treatment and is kept in all health care institutions that provide inpatient care.

The nurse of the reception department of the health care facility fills in the items of the title page of the inpatient medical card. In paragraphs 1–9 of the form No. 003/o, indicate the date (date, month, year) and time (hours, minutes) of hospitalization, the patient's surname, first name, patronymic, gender (male, female), date of birth (number, month, year), age (number of complete years, for children: up to 1 year – months; up to 1 month – days), name and number of the identity document, country code, citizen of which city, permanent place of residence/residence (if the inpatient is a child, the place of residence of his parents or legal representatives is indicated), place of work, position (for children, pupils, students - the name of the educational institution; for the disabled - type and group of disability), name and code of the health care facility that refers the patient to the hospital.

The item10, including the clinical diagnosis, are filled out by the attending physician. The doctor of the receiving department fills out a specially designated sheet "Record of the doctor at the receiving department", which briefly indicates the medical history and life data, the patient's objective condition, diagnosis, treatment and examination results.

In the item №11, the attending physician notes the final clinical diagnosis, which consists of the main diagnosis, complications of the main diagnosis and accompanying diseases. The primary clinical diagnosis is coded by the attending physician according to the International Classification of Diseases and Related Health Care Problems of the Tenth Revision (ICD-10).

Under the table on the title page of this form, upon discharge or death of the patient, the number of days spent in bed is indicated, while: the day of hospitalization and the day of discharge (death) are counted as one day.

During the patient's stay in the hospital, form N 003/o is kept in the folder of the attending physician. The doctor makes entries in the diary about the state of health and treatment of the patient with periodicity from hourly to weekly depending on the condition of the patient and the place of his stay (intensive care ward, department of anesthesiology and intensive therapy, department of surgical, therapeutic, psychiatric profile, etc.). Records should fully reflect changes in the patient's condition (deterioration, improvement, full recovery) and the entire process of treatment or rehabilitation during the hospital stay. On the day of the patient's discharge from the hospital, the doctor's record should

be as detailed as possible. Diary entries must be written briefly and clearly, and the date and time of the patient's examination must be indicated. Diary entries are certified by the signature of the attending physician.

When the patient is discharged, the attending physician prepares a discharge epicrisis, in which he briefly summarizes the data on the patient's condition during hospitalization and discharge, substantiates the clinical diagnosis, indicates the performed examinations and treatment measures, analyzes their effectiveness, gives recommendations for further treatment and the patient's regimen.

Form N 003/o is signed by the attending physician and the head of the department.

Form No. 003/o contains all data on the patient's condition during the entire period of stay in the hospital, organization and treatment, as well as data on objective, functional, X-ray, laboratory and other examination methods. The card of an inpatient in an electronic format must contain all the data that is on the paper information carrier.

The medical card of an inpatient is a legal document that must be filled out clearly and legibly. Any abbreviations, corrections and additions are strictly prohibited.

Losing medical history from the department is a criminal matter and is punishable by law.

After the patient is discharged, the doctor sends the card to the statistics office for processing. Form No. 003/o is kept in the archives of the medical institution for 25 years.

Appendix 2

Ministry of health of Ukraine Name of establishment		MEDICAL FORM No 003/0 Approved by the order of Ministry of health of Ukraine 26.07.99 N 184

MEDICAL CARD No ________

Hospitalization									Department ____________ room N___
Date	(date,		mo,		yr)		(arrival time)		
Discharging date									In current year has been hospitalized O first O repeatedly total___ times

Hospital stay____________________________

Blood group__________________ Rh-factor_________________________ RW_________________________

(date, mo, yr)

High sensibility or drug intolerance____

(drug name, character of drug side effect)

____

1. **Family name, first name of child** ____

___________________________ 2. sex: male – 1, female– 2 ☐ 3. Age ____________ ____________________

(date, mo, yr)

4. Permanent residence: town – 1, village – 2 ☐ ____

(write address: region, community)

____

Phone number

5. Workplace, speciality ____

____

(for pupils, students- the name of education establishment; for children - the name of child's establishment, school; for invalids – kind and group of disability

6. Reffered by ____

(name of medical establishment)

7. Hospitalized urgently – 1, after_____ hours from the beginning of disease, receipt of trauma; in the planned order – 2 ☐

8. Directional diagnosis (before hospitalization)____

____

9. Diagnosis on hospitalization ____

____

10. Clinical diagnosis ____

____

The date of making the diagnosis:_____________________________ Doctors name________________________

(sign)

11. Clinical diagnosis:

a) Main ____

____

____

b) Complications

____

____

c) accompanying diagnosis ____

____

Topic 2. Simulation of anthropometric measurements in children of different ages: measurement of body mass and length, head and chest circumference. Simulation of determination and assessment of vital functions of a child: methodology and technique of definition of pulse, respiratory indicators, blood pressure and pulse oximetry in children. Initial assessment of the child's condition when identifying signs that threaten the child's life

2.1. Simulation of anthropometric measurements in children of different ages

Anthropometry (from the Greek anthropos – man and metreo - to measure) is a set of methods for assessing group and individual morphological features of a child's body. The need for anthropometric studies is determined by the great variability of human body size, especially that of a child.

The methodology of anthropometric studies is unified and involves measuring the body with standard measuring instruments (scales, height meters, centimeter tape). The data collected in the process of anthropometric examination are subjected to variational and statistical processing and are presented in the form of tables, graphs and diagrams. Anthropometric measurements supplement and clarify the data of the external examination, make it possible to more accurately determine the level of physical development of the child. Repeated anthropometric measurements make it possible to monitor the dynamics of physical development and to take into account its changes in comparison with the standard. The following anthropometric indicators of physical development are usually determined in children: body length (height); body weight; head circumference; chest circumference.

Systematic anthropometric control allows timely detection of violations of the child's physical development (lag or advance), which are the first signs of the occurrence or existence of any disease. At the same time, the procedure for using different types of devices for measuring body weight and length is important, and the technique of conducting anthropometric studies differs depending on the age of the child, as well as on his general condition.

When a child is admitted to hospital, he must undergo anthropometric studies. It is most reasonably to perform this manipulation at the admission department. Anthropometric studies enable the doctor to make a correct and opportune diagnosis (particularly in cases of loss of body weight), rather than to assess the physical development of the child only. Techniques of carrying on anthropometric studies differ depending upon the child’s age, as well as his general state.

Measurement of an infant’s length. Infants are measured in a clean dry diaper on a calibrated length board, 80 cm long and 40 cm wide (*Fig. 2.1*). There is a motionless cross plank at the beginning of the board. At the end of the scale there is a mobile cross plank easily moving on a scale.

The order of measuring is as follows: Hold the infant's head in such a position that the lower corner of an eye-socket and the upper edge of an ear tragus are on one line.

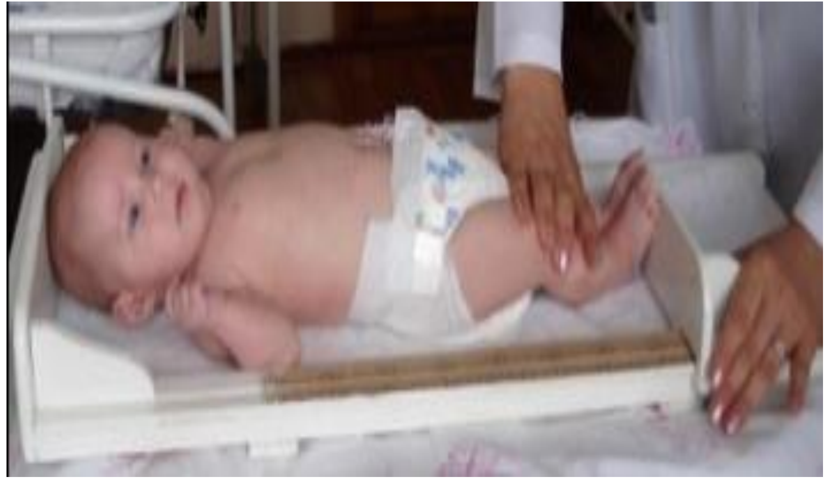


Fig. 2.1. Measurement of an infant's length

Straighten the legs by easily pressing on the knees. The measurer aligns the infant's trunk and legs, extends both legs, and brings the footboard firmly against the feet. The distance between the mobile and the motionless planks corresponds to the child's height. Write the length measurement on the chart. The accuracy (precision) of such measuring is ±0.5 cm.

Measurement of child's and adolescent's height. The measuring is carried out with a height meter, a wooden board 2 metres and 10 centimetres long, 8 or 10 centimetres wide, 50×75 cm thick. Two scales (in centimetres) are marked on the vertical board: one (to the right) is for height measuring in a standing position (*Fig. 2.2 A*), another (to the left) is for height measuring in a sitting position (*Fig. 2.2 B*). On the level of 40 cm from the floor there is a folding bench attached to the vertical board for the height measuring in a sitting position.

The order of measuring. The child is measured standing with his heels, buttocks, and shoulders touching a flat upright surface.

With his heels together, legs straight, arms at sides, shoulders relaxed, a child looks straight ahead. Bring the perpendicular headboard down to touch the crown of the head. The measurer's eyes should be parallel with the headboard. Read the measurement to the nearest 0.1 cm and record it on the chart. Measures should agree within 1 cm.

A

B

Fig. 2.2. Height measuring over age three:
A – in a standing position: B – in a sitting position

Weighing of children. At the age under 2–3 years, infants are weighed on electronic (*Fig. 2.3*) or pan baby scales (*Fig. 2.4*). Electronic scales show more precise results of weighing, therefore their use for weighing infants is more reasonable.

Fig. 2.3. Weighing an infant on electronic scale

Fig.2.4. Pan baby scale

The technique of weighing is as follows: at first, a diaper is weighed. In order to determine the infant's weight, it is necessary to subtract the weight of a diaper from the scales values. The accuracy of weighing is ±10 mg.

Children over 3 years are weighed in a standing position on mechanical (*Fig. 2.5*) or electronic scales (*Fig. 2.6*). For being weighed, a child should be undressed before and then stand motionless in the middle of the scales plate. It is recommended to weigh people in the morning, on an empty stomach, preferably after urination and defecation.

Fig. 2.5. Mechanical scale

Fig.2.6. Electronic scale

Head circumference is measured with a flexible, nonstretchable tape over the most prominent part of the occiput and just above the supraorbital ridges.

Chest circumference in infants is measured in a supine position at rest. (*Fig. 2.7*) The measure tape is positioned on the back just below the angles of scapulae, in front above the nipples. Read the measurement to the nearest 0.1 cm. Measuring girls at the age of puberty, position the tape above the mammary glands at the level of the fourth rib.

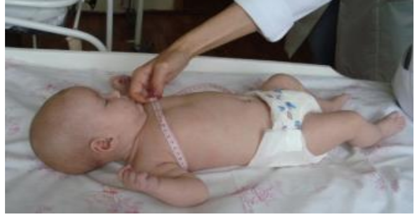


Fig. 2.7. Chest circumference measuring in infants

The chest circumference in older children is measured while standing with calm breathing (arms down, calm breathing), and if possible, at the height of inhalation and with full exhalation (*Fig. 2.8*).

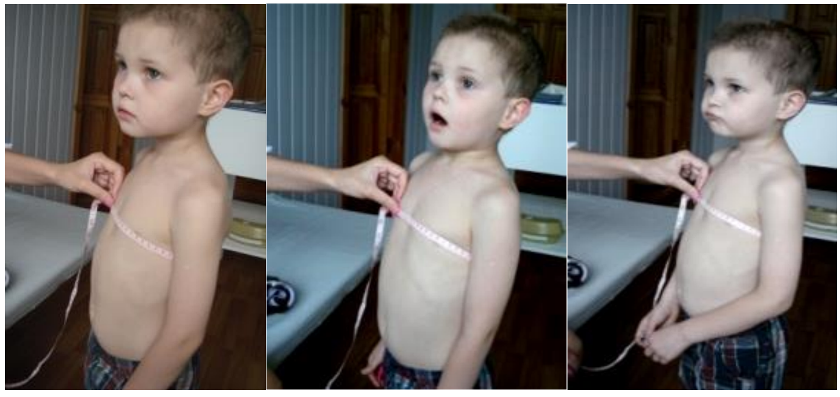


Fig.2.8. Chest circumference measuring in older children

2.2. Simulation of the determination and evaluation of the child's vital functions: the method and technique of determining the pulse, respiratory indicators, blood pressure and pulse oximetry in children.

Counting Respirations

Breathing should be counted for one full minute (60 sec). If the breathing is regular, it can also be counted for 30 seconds and the number multiplied by two.

1. Prepare to count respirations by keeping fingertips on the patient's pulse. (A patient who knows you are counting respirations may not breathe naturally.)

2. Count respirations for 1 full minute for an infant, holding the stethoscope at the nostrils (*Fig. 2.9*). Children normally have an irregular, more rapid rate.

3. In older children respirations can also be counted by placing a hand lightly on the patient's chest or abdomen (*Fig. 2.10*). Observe the rise and fall of the patient's chest. One full cycle of respiration consists of an inspiration and an expiration.

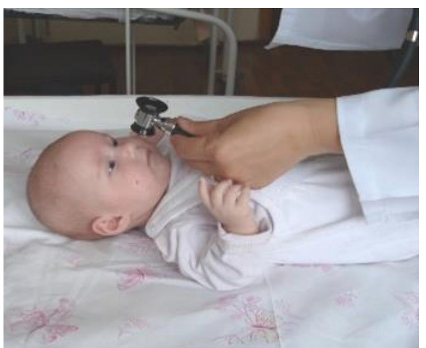


Fig. 2.9. Counting respiration in infant

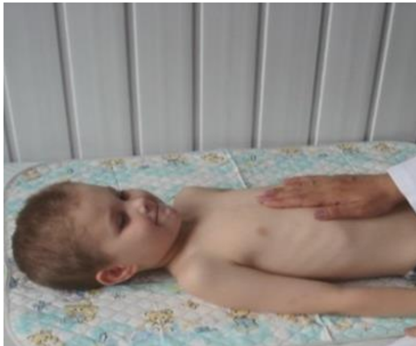


Fig. 2.10. Counting respiration in older child

Assessing the pulse. The pulse is the number of heart beats per minute. Measuring the pulse can give very important information about the health of a person. Any deviation from normal heart rate can indicate a medical condition. Fast pulse may signal the presence of an infection or dehydration. In emergency situations, the pulse rate can help determine if the patient's heart is pumping. The pulse measurement has other uses as well.

Reading a pulse. Pulses are manually palpated with fingers (*Fig. 2.11*). To obtain a reasonably accurate resting pulse rate, make sure the person is calm and has been resting for 5 min before reading the pulse. Bear in mind that any stimulants, taken prior to the reading will affect the rate. Place fingertips of first, second and third fingers over the artery, and count the pulse beats for 1 full minute.

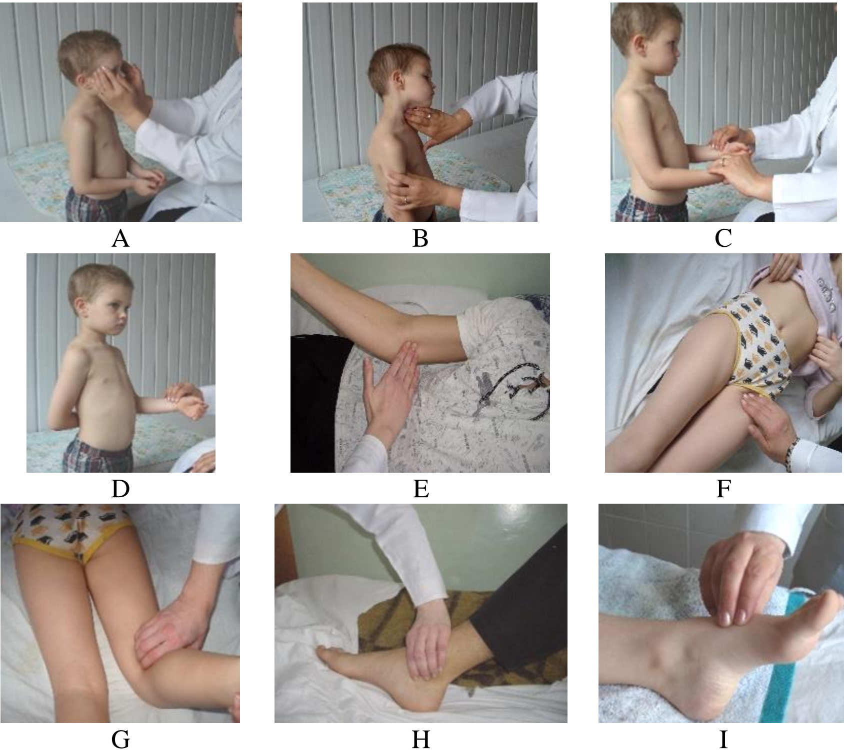


Fig. 2.11. Common pulse sites: A – a. temporalis. B – a. carotis.
C – a. radialis on both hands. D – a. radialis on one hand. E – a. ulnaris. F – a. femoralis.
G – a. poplitea. H – a. tibialis posterior. I – a. dorsalis pedis

Normal ratio of pulse and respiration in health is **4:1.** The ratio is increased in primary cardiac disease and decreased in respiratory pathology.

Measuring the blood pressure (BP). Blood pressure is the force exerted on the walls of blood vessels as blood flows through them. When heart contracts, it sends a surge of blood through the blood vessels and pressure increases. This is called systolic pressure. When heart relaxes between beats, blood pressure decreases. This is diastolic pressure.

When we take the blood pressure, we measure both systolic arterial pressure (SAP) and the diastolic one (DAP), and record them as numbers. For example, if a blood pressure reading is 126/76, the systolic is – 126 and the diastolic – 76. The numbers are calculated in millimeters of mercury and recorded as 126/76 mmHg. The blood pressure varies during the day. The factors influencing the blood pressure include physical activity, medications, emotional and physical condition.

Blood pressure measurement using the sphygmomanometer. To take the blood pressure, the person should be sitting comfortably and relaxed (*Fig.* 2.12).

Fig.2.12. Measuring blood pressure using the sphygmomanometer

1. Position the patient's arm so the anticubital fold (inside elbow area) is level with the heart. Support the patient's arm with your arm or a bedside table.
2. Center the bladder of the cuff over the brachial artery approximately 2 cm above the anticubital fold. The arrow should line up with the artery. Proper cuff size is essential to obtain an accurate reading. Be sure the index line falls between the size marks when you apply the cuff. Position the patient's arm so it is slightly flexed at the elbow.
3. Palpate the radial pulse and inflate the cuff until the pulse disappears. This is a rough estimate of the systolic pressure.
4. Place the stethoscope diaphragm over the brachial artery and the earpieces in your ears.
5. Inflate the cuff to 30 mmHg above the estimated systolic pressure and hold it there by tightening the knurled knob.
6. Release the cuff pressure slowly by turning the knurled knob just until you hear the hiss of air being released (no greater than 5 mmHg per second).
7. The level at which you consistently hear the heartbeats through the stethoscope is the systolic pressure. The needle on the gauge should also start a pulsing movement at this point. Record this value as the systolic pressure.
8. Continue to release the cuff pressure until the sounds muffle and disappear. The point at which you no longer hear sounds and the needle on the gauge stops its pulsing movement is the diastolic pressure. Record the value from the gauge.
9. Record the blood pressure as systolic over diastolic ("120/70" for example).

Table 2.1 lists normal ranges of pulse (heartbeats per minute), respiration (breaths per min) and blood pressure (BP) for different ages.

Table 2.1

Normal ranges of pulse (heartbeats per minute), respiration (breaths per min) and blood pressure (BP) for different ages

Age	Pulse ranges	Respiration ranges	SAP	DAP
Newborns	140–160	40–60	70	35
6 mo	130–135	35–40	90	1/2–1/3of SAP
1 yr	120–125	30–35	90	60
2 years	110–115	30–35	92	1/2–1/3of SAP
3–4 years	105–110	30–35	95	1/2–1/3of SAP
5 years	100	25	100	1/2–1/3of SAP
6–8 years	90–95	20–25	102	1/2–1/3of SAP
10 years	80–85	20	105	1/2–1/3of SAP
Above 12 years	70–75	16–18	110	1/2–1/3of SAP

Blood pressure measurement using a digital monitor

Because the digital monitor is automatic, it is the most popular blood-pressure measuring device. The blood pressure measurement is easy to read, because the numbers are shown on a screen.

The digital monitor is easier to use. It has a gauge and stethoscope that is one unit, and the numbers are easy to read. It also has an error indicator, and deflation is automatic. Inflation of the cuff is either automatic or manual, depending on the model. This blood pressure monitoring device is good for hearing-impaired patients, since there is no need to listen to heart sounds through the stethoscope.

1. Put the cuff around the arm. Turn the power on, and start the machine.
2. The cuff will inflate by itself with a push of a button on the automatic models. On the semiautomatic models, the cuff is inflated by squeezing the rubber bulb. After the cuff is inflated, the automatic mechanism will slowly reduce the cuff pressure.
3. Look at the display window to see blood pressure reading. The machine will show systolic and diastolic blood pressures on the screen. Write down blood pressure, putting the systolic pressure before the diastolic pressure.
4. Press the exhaust button to release all of the air from the cuff.

To repeat the measurement, wait 2 to 3 minutes before reinflating the cuff.

- Routine blood pressure measurements in children may be performed in children beginning around age 3 years. In younger children and infants, measure the blood pressure only if the history or physical exam suggests a problem.
- As in adults, proper cuff size is essential. The bladder width should cover no more than 2/3 of the child's upper arm and the bladder length should cover approximately 3/4 of the arm circumference. A cuff that is too small will inflate the pressure reading and a large cuff will give an artificially low pressure.
- Unlike in adults, the diastolic reading in children is the point at which the sounds first become muffled rather than the point at which they disappear completely.

Sustained hypertension over several readings in children should prompt a search for its cause. In infants and young children, hypertension is most often due to a specific cause. In older children and adolescents, a specific cause is less likely to be found and may resolve by adulthood.

BP is relatively low in infants owing to the low pumping force of the heart and the greater width of the vessels, and the greater elasticity of the arterial walls.

BP values after one-year also can be calculated by the following formula:

– **SAP averages *90 + 2n.*** (Max. level – $105 + 2n$ and Min. level – $75 + 2n$);

– **DAP averages *60 + n*** (Max. level – $75 + n$ and Min. level – $45 + n$), where ***"n"*** is the child's age in years.

The sum of the pulse rate and SBP values in all periods of childhood after 1 year old is about 200.

The information about vital signs are registered into the temperature chart

Pulse oximetry is an easy-to-use and effective method of non-invasive determination of arterial blood oxygen saturation (SaO2 saturation) and heart rate using a pulse oximeter (*Fig. 2.13*). Saturation (SaO2) is the degree of saturation of blood with oxygen, which is measured as a percentage. Normally, the percentage of O2 in the blood should be at least 95%. If this indicator is lower, it indicates the development of oxygen deficiency and urgent measures should be taken.

Fig. 2.13. The pulse oximeter

Principle of pulse oximeter operation. The pulse oximeter works on the principle of infrared illumination of internal tissues. The basis for measuring oxyhemoglobin is the pulse wave, so the device always shows two values: the percentage of saturation and the pulse rate (*Fig. 2.14*).

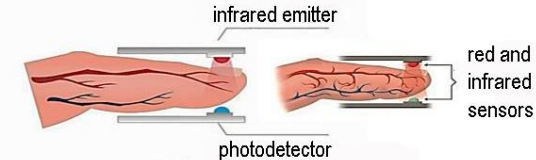


Fig. 2.14. Principle of pulse oximeter operation

LEDs and a photo-recording sensor (photodetector) are used to measure parameters in the pulse oximeter.

Two light waves (infrared) of different lengths pass through a finger placed inside the device and are absorbed differently by reduced hemoglobin (deoxyhemoglobin) and oxyhemoglobin. That is, blood in which erythrocytes are saturated with oxygen does not absorb light in the same way as impoverished blood with a reduced concentration of this necessary element. The device is calibrated for SaO_2 values of 75–99 % with a minimum error of 2 %.

Pulse oximeters are produced in several modifications, with an excellent location of the sensor and photodetector, and which can be worn on:

• finger or toe – gives the most accurate data;

• earlobe – the received data are accurate; in addition, such a sensor responds the fastest to changes in saturation;

• chest (with the help of a special belt), which gives, although not the most accurate evidence, but over a long period of time;

• hand brush located on the bracelet – the most convenient, but shows only approximate data.

A pediatric pulse oximeter differs from an adult one in the size or design of the sensor. In the standard version, the device has the form of a clothespin (*Fig. 2.15*), for newborns and infants – a silicone or rubber fingertip, which does not compress the vessels when worn for a long time on the arm or leg (*Fig. 2.16*).

Fig.2.15. Pulse oximeter for young children

Fig.2.16. Pulse oximeter for newborns and infants

Methodology of pulse oximetry. The sensor of the pulse oximeter should be fixed on a finger, toe or earlobe. In this case, the limbs should be warm, since the data will not be reliable if the limbs are very cold (*Fig. 2.17*). The percentage of hemoglobin saturation with oxygen is usually displayed on the pulse oximeter display, the pulsation is accompanied by sound signals, and the heart rate is also displayed.

Before using a pulse oximeter, you need to study the technical capabilities and focus on each specific model.

Fig. 2.17. Methodology of pulse oximetry

Hemoglobin oxygen saturation of more than 95 % when breathing room air indicates adequate oxygenation.

If the saturation drops below this level, care must be taken to provide the child with oxygen. If in a child who receives 100 % oxygen through a non-reversible mask, the saturation drops below 90 %, then additional measures should be taken (auxiliary or artificial lung ventilation).

NB! In newborns and children of the first three months of life, the blood saturation level can be 85–92 %. When breathing room air and on the condition that the child has no signs of breathing disorders, this indicator is the norm.

2.3. Primary assessment of the child's condition when identifying signs that threaten the child's life.

I. Assessment of the child's condition is carried out with the aim of identifying the problem as soon as possible or detecting signs that threaten his life. The state assessment is performed in a certain sequence and includes four stages (*Table 2.2*).

Table 2.2

Examination steps of children

Steps	Evaluation
1. Evaluation of the general child's appearance	Audiovisual examination, skin color, position, movements, work of breathing, blood circulation. It is carried out within a few seconds when an injured child is detected
2. Initial assessment of the condition	Evaluation according to the "ABCDE", "SAVDE" algorithms. This stage involves the assessment of the body's vital functions and pulse oximetry
3. Research of the second order	Determination of the disease history (anamnesis) according to the "SAMPLE" algorithm and a complete physical examination "from head to toe"
4. Research of the third order	Laboratory, X-ray and other additional tests that make it possible to make a more accurate diagnosis

At the first stage – assessment of the general appearance of the child – attention is paid to:

– skin color, namely the presence of an unusual complexion (paleness or marbling, cy-anosis), the presence of bleeding;

– increased breathing (inflating the wings of the nose, drawing in), weakness or lack of attempts to inhale, unusual sounds during breathing (wheezing, expiratory "grunting", "whistling" breathing);

– consciousness (reaction to appeal and reassurance, facial expression/look, speech/shout), muscle tone.

The second stage: the initial assessment of the child's condition, which is carried out within a few seconds when an injured child is identified using the "ABCDE" algorithm, provided that the child is conscious and has no alarming symptoms. This stage involves assessment of vital body functions and pulse oximetry.

Primary assessment of the condition according to the "ABCDE" algorithm:

A (Airway) – airway patency

B (Breathing) – breathing

C (Circulation) – blood circulation

D (Disability) – neurological examination, glycemic profile

E (Exposure) – full examination of the undressed patient.

Let's consider the first three of them.

1. When assessing the patency of the upper respiratory tract (A – Airway), you should:

– assess movements of the chest and abdomen;

– determine the presence of breathing noises and air movement;

– feel the presence of air movement near the patient's mouth and nose.

The presence of obstruction of the upper respiratory tract will be discussed:

– increased respiratory effort, pulling in the chest (inspiratory shortness of breath);

– pathological noises during inhalation (wheezing, stridor or whistling);

– lack of air movement and breathing noises, despite an attempt to inhale (this indicates a complete obstruction of the upper respiratory tract).

2. Assessment of breathing (B – Breathing) involves the determination of:

– respiratory rate (number of respiratory movements in 1 minute;

– respiratory efforts;

– depth and amplitude of breathing;

– characteristics of respiratory sounds in the respiratory tract and lungs (auscultation);

– SpO2 (conducting pulse oximetry);

– symmetry of breathing.

Note.

1. The method of calculating the frequency of breathing is given upper.

2. The method of conducting pulse oximetry is presented upper.

NB! An alarming sign when assessing the respiratory rate is: a respiratory rate of more than 60 per minute. for children of younger age, and 40 – for children of middle and older age.

Types of respiratory rate disorders:

tachypnea – an increase in the frequency of respiratory movements above the maximum value of the age norm ;

bradypnea – a decrease in the frequency of respiratory movements below the minimum value of the age norm;

apnea – a delay in breathing for more than 15 seconds. (the exception is infants);

dyspnoea – violation of the depth and frequency of breathing.

NB! An indication for carrying out auxiliary methods of ventilation or artificial ventilation of the lungs is a slowing of breathing less than 20 respiratory movements per minute. in younger children and 10 breathing movements in middle-aged and older children.

Signs of respiratory effort include:
– swelling of the wings of the nose;
– retraction of the chest;
– head nods or paradoxical breathing.
Retraction of the chest in combination with:
– "whistling" breathing or snoring on inhalation indicates obstruction of the upper respiratory tract;
– whistling sounds during exhalation make it possible to suspect obstruction of the lower respiratory tract;
– expiratory "grunting" or difficulty breathing indicates a parenchymal lesion of the lungs;
– head nods and/or paradoxical breathing (in severe cases).
Other signs of respiratory effort include:
– prolongation of inhalation or exhalation (violation of the ratio of inhalation to exhalation);
– mouth breathing;
– "grabbing" air with the mouth using additional muscles
3. Assessment of blood circulation (C – Circulation). The study of blood circulation involves the assessment of the function of both the cardiovascular system and target organs.
During the examination of the function of the cardiovascular system, it is important to evaluate:
– skin color and visible mucous membranes, skin temperature;
– heart rate;
– heart rhythm;
– pulse (peripheral and central) (methodology of determination upper);
– blood pressure (methodology is given upper);
– capillary filling time;
– overload of the heart (palpation of the liver and determination of the filling of the jugular veins).
Heart rate (HR).
The results of heart rate calculation should correspond to the child's age, activity level and clinical condition (*Table 2.3*).

Table 2.3

Heart beats depending on age

Age	Heart beats
Newborn	120–170*
0–3 mon	100–150*
3–6 mon	90–120
6–12 mon	80–120
1–3 years	70–110
3–6 years	65–110
6–12 years	60–95
12+ years	55–85

NB! A heart rate of 60 beats per minute or less in children of the first year of life is an indication for starting indirect heart massage.

Blood pressure (BP measurement methodology and age-standard indicators are presented upper).

Among the deviations from normal blood pressure indicators, the following are distinguished:

Hypotension is a decrease in the level of systolic blood pressure below the minimum values of the age norm.

Hypertension – an increase in the level of systolic blood pressure above the maximum values of the age norm.

Assessment of vascular systemic peripheral resistance is carried out by measuring **capillary refill time (CRT)** or the "white spot" symptom. It is better to carry out this parameter in a neutral temperature environment (that is, at room temperature).

Technically, the time of **capillary filling** (recapillarization) in small children is measured on the palm or foot, in older ones – on the nail plate or sternum. In order to study this parameter, you should press on the specified area for 5 seconds, then stop pressing and see how long it takes for the skin in the place of pressure to restore its previous color. The norm is 2 seconds. Prolongation of capillary filling time in most cases is a symptom of centralization of blood circulation, dehydration, shock and hypothermia.

When studying the function of target organs, the following should be assessed:

– brain perfusion (mental state);

– skin perfusion (capillary filling time);

– renal perfusion (diuresis).

Additional information for general reference.

The first-order assessment of the child's condition can be supplemented with second-order studies (determining the history of the disease (anamnesis) according to the "SAMPLE" algorithm, a complete physical examination "from the top of the head to the heels") and third-order studies (laboratory, X-ray and other additional tests that make it possible to make a more accurate diagnosis).

NB! If alarming symptoms or threatening conditions are detected, the child's condition is assessed according to the "CABDE" algorithm and measures are taken to eliminate them.

Primary assessment of the condition according to the "CABDE" algorithm:

C – blood circulation (Circulation)

A – airway patency (Airway)

B – breathing (Breathing)

D – neurological examination, glycemic profile (Disability)

E – full examination of the undressed patient (Exposure)

Topic: 3. Simulation of child care at pediatric hospital

Relevance of the topic. Caring for healthy children and children undergoing treatment in a hospital is one of the components of maintaining health, and in case of illness, it is an integral part of the treatment process. The components of care for sick children include the implementation of hygienic procedures: hygienic baths, timely change of underwear and bedclothes, careful care of seriously ill children and children with fever, prevention of the formation of bedsores, which contributes to the rapid recovery of the child and to the reduction of complications of the disease.

In children, in comparison with adults, an increase in body temperature is observed more often, which is associated with the peculiarities of thermoregulation. Care for children with fever depends on the nature of the temperature and the reaction of the child's body to its increase.

Goal. Master the skills of caring for a child with fever.

3.1. Simulation of caring the children with fever

Fever is one of the most common symptoms in children. The most common cause of fever in children is the presence of an inflammatory process in the body.

The high body temperature (38.5 °C and above) may be accompanied by a worsening of the child's general condition, refusal to eat, appearance of drowsiness or increased excitement, vomiting, etc. However, in most cases, children tolerate an increase in temperature well even to 38.5–39.0 °C.

Body temperature measurement in children can be carried out by several methods, each of which has its own advantages and disadvantages: measuring body temperature in the rectum, axillary region, in the oral cavity, determining the temperature on the tympanic membrane and skin in the frontal area.

Rectal thermometry. It is considered the gold standard of temperature measurement. But it has its drawbacks: a slower decrease in rectal temperature in relation to internal temperature when the body temperature is reduced and vice versa. Contraindications to rectal thermometry: surgery on the rectum or perineum; the presence of an inflammatory process in the rectum, congenital anorectal defects, fistula or neutropenia against the background of fever.

Axillary thermometry. Thermometry performed by this method is not accurate, but the American Academy of Pediatrics recommends using this method as a screening test in newborns due to the high risk of perforation of the rectum with a rectal thermometer.

Oral thermometry. The accuracy of oral thermometry is higher than when measured by the axillary method, but lower than when measured by rectal thermometry. Its accuracy increases with the age of the child, mainly due to the possibility of using the correct measurement technique.

Tympanic thermometry. The blood temperature in the vessels that supply the tympanic membrane and their location are very close to the blood vessels that carry blood to the hypothalamus, the center of thermoregulation. Therefore, this part of the body is ideally located for measuring internal temperature.

Temporal thermometry. Temporal thermometry can be used as a screening method at home, but this method is not accurate enough for medical facilities where measurement accuracy is required.

Taking into account that each of the methods has its own shortcomings, it is impractical to single out one of the methods as the "gold standard".

Norms of body temperature for different methods of thermometry are given in *Table 3.1*. The method is chosen according to the child's age.

Table 3.1

Norms of body temperature in different methods **of thermometry**

Measurement method	Reference values, °C
Rectal thermometry	36,6–38,0
Axillary thermometry	36,5–37,5
Oral thermometry	35,5–37,5
Tympanic thermometry	35,8–38,0
Temporal thermometry	36,5–37,5

The choice of measurement method depending on a child's age is given in *Table 3.2*.

Table 3.2

The choice of measurement method depending on a child's age

Age of the child	Method
≤ 2 years	Rectal and axillary thermometry
2–5 years	Rectal, tympanic, temporal and axillary thermometry
≥ 5 years	Oral, tympanic, temporal and axillary thermometry

Assessment of the degree of intoxication:

• increased excitability or decreased activity;
• breathing disorders (tachypnea, involvement of auxiliary muscles);
• pallor of the skin, the presence of rashes;
• violation of peripheral blood circulation (cold extremities);
• atypical crying in a child (weak, sonorous);
• decrease in fluid intake or decrease in its excretion with urine

The presence any of these signs can indicate the presence of a serious disease in a child, the presence of two or more signs increases this probability.

In *Table 3.3* are given the stages of caring for a sick child with different types of fever.

Table 3.3

Stages of child care in different types of fever

Type of fever	"Pink" fever: – heat production corresponds to heat output; – the child's skin is bright pink, with moderate or high humidity; – the extremities are warm to the touch; – the general condition and behavior are slightly disturbed	"White" fever: – centralization of blood circulation and spasm of skin vessels; – chills; – pallor; – marble skin pattern; – cyanosis of lips and limbs; – headache; – worsening of the general condition
Care	– ensure peace; – air humidification; – intake of a sufficient amount of liquid (increasing the temperature by one degree requires an additional injection of liquid at the rate of 10 ml per 1 kg of the child's body weight): cooled (warm) weak tea, compote, fruit juice, rehydration solutions (rehydron, Hooman's electrolyte"); – free from excess clothing; – physical methods of cooling – wiping with water, vinegar or alcohol – are not recommended	At the first stage, it is necessary to normalize the processes of heat production and heat transfer: – give the child warm drinks; – apply a warm heating pad to the child's limbs; – cover with a blanket. After the disappearance of chills and normalization of skin color: – dress the child normally according to his well-being and the temperature of the environment; – ensure peace; – air humidification; – intake of a sufficient amount of fluid (an increase in temperature by one degree requires an additional injection of fluid at the rate of 10 ml per 1 kg of the child’s body weight): cooled (warm) weak tea, compote, fruit juice, rehydration solutions (rehydron, "Human Electrolyte"); – do not use physical cooling methods

3.2 Simulation of prevention and treatment of diaper dermatitis in children

Topicality. Urticaria - inflammation of the skin exposed to friction or prolonged contact with moisture or secretions (sweat, urine, bowel movements, etc.). Diarrhea in a child is usually localized in natural folds of the skin, on the buttocks, in the lower part of the abdomen; their severity can vary from mild hyperemia to wetting, cracks, erosions. They are found in all children.

One of the manifestations of diaper rash is diaper dermatitis – a pathological condition of the skin, which periodically occurs as a result of physical, chemical, enzymatic (digestive tract enzymes) and microbial factors affecting the skin in the area of contact with the diaper.

Goal. Master the skills of caring for a child with diaper rash.

Method of care. For the prevention of diaper dermatitis, the European Association of Dermatologists has developed effective methods – ABCDE:

– A(air) – aeration,

– B (barrier) – protection and preservation of the barrier properties of the epidermis,

– C (cleaning) – cleaning,

– D (diaper) – careful selection of diapers and changing them as soon as possible after defecation,

– E (education) – teaching parents about proper care.

Care and treatment of diaper rash (diaper dermatitis) depends on the degree of skin damage (*Tabl. 3.4*).

Table 3.4

Care and treatment of diaper dermatitis depending on the degree of skin damage

Stages of diaper dermatitis	Care
I – slight erythema	Hygienic bath (washing) Drying the skin with blotting movements Maximum aeration Elimination of factors that caused erythema Use of protective creams
II – moderate erythema	Hygienic bath (washing) Drying the skin with blotting movements Maximum aeration Elimination of factors that caused erythema Use of protective creams
III – erythema, peeling of the skin	Hygienic bath (washing) Drying the skin with blotting movements Maximum aeration Elimination of factors that caused erythema Moisturizing the skin if necessary
IV – erythema, the appearance of papules	hygienic bath (washing) drying the skin with blotting movements maximum aeration elimination of factors that caused erythema use of drying, reparative means

Stages of diaper dermatitis	Care
V – erythema, papules, pustules, the appearance of erosion, the possible addition of a fungal infection of Candida Albicans (fluffy red rash on the skin with raised edges) or bacterial flora	Hygienic bath (washing) Drying the skin with blotting movements Maximum aeration Elimination of factors that caused erythema Use of drying, reparative means The appointment of antifungal or antibacterial or steroid topical agents

3.3 Simulation of giving children hygienic baths

Topicality. Caring for healthy children and children undergoing treatment in a hospital is one of the components of maintaining health, and in case of illness, it is an integral part of the treatment process. Hygienic and therapeutic baths are one of such components of care.

Goal. Master the technique of conducting hygienic and therapeutic baths.

Method. When carrying out hygienic procedures for children, their choice depends primarily on the age of the child. For older children, the best option would be to carry out a hygienic shower.

Algorithm of actions when taking a hygienic shower:

– Entrance to the patient, introduction, explanation of the course and purpose of the procedure.

– Hygienic treatment of hands, drying of hands. Putting on gloves.

– Wearing a disposable apron.

– Washing the shower cabin with a brush and soap and disinfecting it with a disinfectant solution by wiping twice with an interval of 15 minutes.

– A bench is placed in the bath or shower cabin.

– The patient is moved to the bath with the help of the medical staff. The water temperature should be 37–38°C

– The medical staff helps the patient wash in a certain sequence: head, trunk, limbs, inguinal folds, perineum.

– Wiping the patient with a towel.

– Helping the patient get dressed.

– Transportation of the patient to the ward.

For infants, the optimal option for hygienic procedures will be a hygienic bath. Algorithm of its implementation.

1. It is necessary to prepare the appropriate equipment:

– Baby bath for bathing a baby.

– Pitcher.

– Water thermometer.

– Terry glove or sponge.

– Baby soap or baby shampoo.
– A clean diaper or a stand in the bathtub.
– A flannel diaper or a soft towel.
– A set of clean underwear: a diaper, rompers, a shirt, a blouse, a beanie.
– Baby oil.
– Sterile cotton balls and sterile tweezers in a kraft bag or bix.
– Tray for dropping used balls.
–Container for dumping used linen.
– Accumulator container with a disinfectant solution and a clean rag.
– Container for dumping rags.
– Container for disposing of used gloves.

2. Preparation for the procedure:
– Prepare a sheet, a changing kit or a set of clean underwear on the changing table (pre-treated with a disinfectant solution).
– Wash the bathtub (pre-treated with a disinfectant solution) with hot water.
– Fill the bathtub first with cold water, then hot water to the required temperature (36–37 °C). Measure the temperature in the bath with a water thermometer.
– Fill the jug with water 1 °C lower than the water in the bathroom and place it next to it.
– Place a clean diaper or a special stand on the bottom of the bath.
– Undress the child in bed.
– If necessary, wash the child (in case of bowel movements).

3. Execution of the procedure:
– Carefully submerge the child in the bath, holding the child's head and left shoulder with the left hand so that the water reaches the nipple line.
– Wash the child with the right hand using a terry glove, starting from the hairy part of the head, then wash the neck, trunk, limbs, thoroughly wash the natural folds, lastly the genitals and the perineum.
– Throw the used glove in a special container for their collection.
– Take the child out of the bath with two hands so that the child's face is turned towards you, grasp the child's chest in the armpit area with your palms, fixing his back and the back of the neck with your fingers.
– Place the child next to you on the left forearm face down, supporting him by the left thigh.
– Take the pitcher with your right hand and pour clean water over the child. Return the jug to its former place.
– Take a clean flannel diaper (towel) with your right hand and cover the child with it. Dry the child's skin with careful blotting movements.
– Transfer the baby to the changing table, remove the wet flannel diaper from it and discard the diaper in a container for discarding used linen.

– Treat natural skin folds according to the algorithm.
– Dress the child
4. Finish the baby bath and changing table in accordance with the requirements of current orders.

3.4 Simulation of prevention and treatment of bedsores in children of different ages

Topicality. Bedsores are dystrophic or ulcerative-necrotic changes in soft tissues (skin, subcutaneous tissue, muscles) that occur in places subjected to constant or long-term pressure. More often, bedsores occur in weakened children who are on strict bed rest in the area of the sacrum, shoulder blades, elbows and heels, where soft tissues are squeezed between the surface of the bed and the bone protrusion.

The formation of bedsores is facilitated by poor skin care, an uncomfortable bed, untimely changing of bed linen, which leads to impaired blood circulation in the skin. In addition, factors that can significantly affect the risk of bedsores should be taken into account, in particular: the nutritional status of the child; hemodynamic instability, skin moisture (dryness and excessive moisture increase the risk of bedsores); violation of sensitivity and body temperature.

In infants, bedsores occur most often in case of severe disorders of the nervous system.

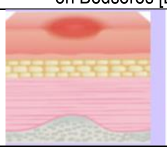
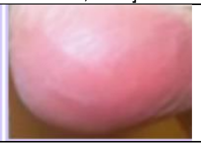
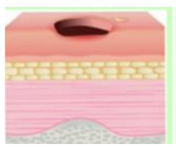
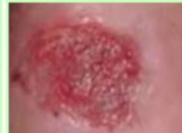
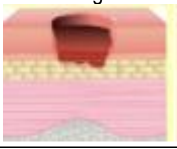
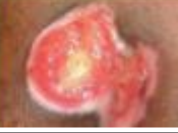
Goal. Master the method of prevention and treatment of bedsores.

Method. When caring for a child who is forced to be in a supine position and belongs to the group of risks for the development of bedsores, it is necessary firstly understand the mechanism and stages of the development of bedsores and preventive and therapeutic measures (*Tabl. 3.5*).

Table 3.5

Stages of the development of bedsores and preventive and therapeutic measures

Classification (of the European Expert Commission on Bedsores and the National Expert Commission on Bedsores [E&NPUAP, 2009].	Preventive and therapeutic measures
Stage I: Persistent redness of the skin area. The integrity of the skin is not disturbed, but there is a limited zone of persistent redness (erythema), which is most often located above the protruding bone. This area may be painful, firmer or softer, warmer or cooler than the surrounding areas of skin. The appearance of such a zone usually indicates a high risk of bedsores	You cannot: – do a massage; – use alcohol solutions to treat the affected area. General measures aimed at prevention: – ensuring stability of optimal temperature and humidity in the ward; – periodic change of position of the sick child in bed – keeping the skin clean; – hygienic washing after the act of defecation and urination; – constant airing of the skin; – use of skin moisturizers.

Classification (of the European Expert Commission on Bedsores and the National Expert Commission on Bedsores [E&NPUAP, 2009].	Preventive and therapeutic measures
 	Treatment measures: – changing the position of the child's body so that the affected area of the skin does not come into contact with the surface of the bed
Stage II: Partial loss of skin thickness. Partial loss of the thickness of the skin, which looks like a flat open ulcer with a moist or dry pink bottom of the wound without necrotic masses and signs of damage to deeper tissues. It can also look like a blister filled with serous or serous-bloody fluid.  	You cannot: – do a massage; – use alcohol solutions to treat the affected area. General measures aimed at prevention: – ensuring stability of optimal temperature and humidity in the ward; – periodic change of position of the sick child in bed; – keeping the skin clean; – hygienic washing after the act of defecation and urination; – constant airing of the skin; – use of skin moisturizers; Treatment measures: – bedsores and the skin around them should be washed every time the dressing is changed; – it is necessary to apply special anti-bedsore bandages; – application of wound-healing ointments
Stage III: Complete loss of skin thickness. Damage to the entire skin (dermis and subcutaneous fatty tissue). The depth of the wound depends on the anatomical features of the part of the body where it is located (for example, bedsores on the ears, back of the head, or ankles can be flat, and on the buttocks – very deep). Subcutaneous fat can be seen in the wound, but bone, tendon, or muscle cannot be seen or felt. There may be pockets and tunnels and/or necrotic masses, but the latter allow the depth of skin damage to be seen.  	You cannot: – do a massage; – use alcohol solutions to treat the affected area. General measures aimed at prevention: – ensuring stability of optimal temperature and humidity in the ward; – periodic change of position of the sick child in bed; – keeping the skin clean; – hygienic washing after the act of defecation and urination; – constant airing of the skin; – use of skin moisturizers. Treatment measures: – bedsores and the skin around them should be washed each time the dressing is changed; – clean bedsores are washed with saline solution or drinking water; – use of necrolytic means; – prescribing anti-inflammatory drugs

Classification (of the European Expert Commission on Bedsores and the National Expert Commission on Bedsores [E&NPUAP, 2009].	Preventive and therapeutic measures
Stage IV: Deep tissue damage (muscles or bones are visible). The tissue damage is so deep that you can see (or feel) the bones and tendons and/or muscles. There may be necrotic masses or scabs, and pockets and tunnels are often present. The depth of the wound depends on the anatomical features of the part of the body where it is located, in particular, where there is no subcutaneous (fatty) tissue, the wounds may be shallow. Spread to muscles, tendons, fascia sharply increases the risk of osteomyelitis. 	You cannot: – do a massage – use alcohol solutions to treat the affected area General measures aimed at prevention: – ensuring stability of optimal temperature and humidity in the ward – periodic change of position of the sick child in bed – keeping the skin clean – hygienic washing after the act of defecation and urination – constant airing of the skin – use of skin moisturizers Treatment measures: – bedsores and the skin around them should be washed every time the dressing is changed. – clean bedsores are washed with physiological solution or drinking water. – bedsores with signs of infection, necrosis, scab should be washed with antimicrobial solutions under pressure to clean the wound. – surgical treatment of the wound

At first, paleness of the skin appears, which is later replaced by redness, swelling and peeling of the epidermis. The appearance of blisters and skin necrosis indicates more pronounced local disorders and may be the result of underestimation by medical personnel of the primary symptoms of bedsores. In severe cases, not only soft tissues, but even the periosteum and the surface layer of bone tissue undergo death. Rapid attachment of infection can lead to sepsis.

3.5 Simulation of changing underwear and bed linen, provision of physiological bowel movements

Topicality. Caring for children who are being treated in a hospital is extremely important for the overall outcome of treatment. This especially applies to children whose activity is limited and they are on strict bed rest. The correct and timely change of bedclothes and underwear will have not only hygienic importance, but will also be an effective means of preventing bedsores in patients. That, combined with adequate provision of physiological stools, will ensure a comfortable stay of patients in the hospital and speed up the recovery process.

Goal. Master the technique of changing underwear and bed linen, ensuring physiological bowel movements.

Method. Along with other hygienic measures, a regular change of bed linen is an integral part of the treatment process. It is carried out in the department

once every 7–10 days or according to the level of pollution. This is usually done after a hygienic bath or if the child's condition is severe and it is on strict bed rest - after a proper toilet.

If a sick child eats in bed, the linen must be changed every time after a meal in order to remove crumbs, food remains and straighten out folds. Changing bed linen includes changing sheets, pillowcases, duvet covers. Usually, together with the change of bed linen, the change of underwear is carried out.

If the patient can sit, the nurse transfers him from the bed to a chair and changes the bedding. There are two ways to change the bedclothes if the child is on a strict bed rest (*Fig. 3.1*).

1. The first method:

– a dirty sheet is rolled with a roller from the side of the head and feet;

– remove it;

– a clean sheet, rolled up on both sides, like a bandage, is placed under the cross of a sick child;

– spread a clean sheet according to the length of the bed.

2. The second method:

– the sick child is moved to the edge of the bed;

– roll the dirty sheet lengthwise;

– in the free place they spread the clean;

– the patient is transferred to a clean sheet;

– on the other side, the dirty is removed;

– spread a clean sheet.

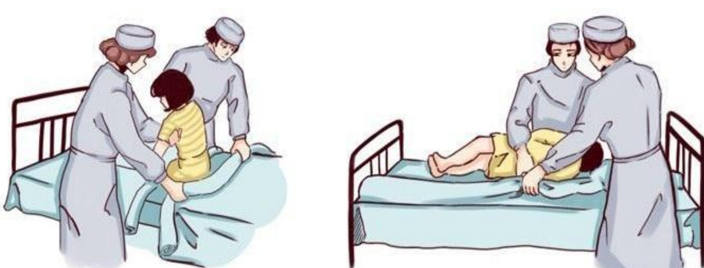


Fig. 3.1. Changing bed linen

Changing underwear. Older children, who are in a satisfactory condition, change clothes independently, and younger patients are helped by the medical staff (*Fig. 3.2*). While changing the underwear of a seriously ill child, who is on strict bed rest, the nurse grabs the edge of the shirt, pulls it off over the head, and then frees the hands. Clean underwear is put on in the reverse order. If the patient's arm is damaged, the sleeve is first removed from the healthy arm, and then from the diseased arm. Put on the shirt first on the sick hand, and then on the healthy hand.

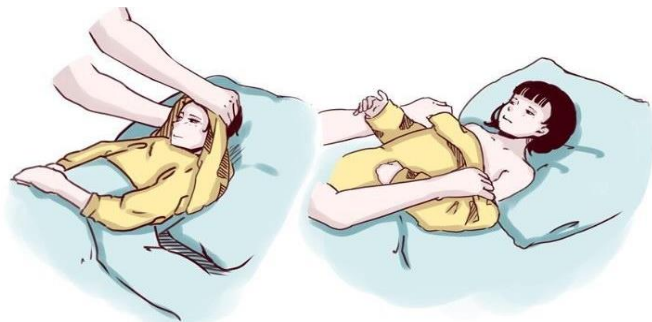


Fig. 3.2. Changing underwear

Dirty (separately bed and underwear) linen is collected in plastic containers with lids or polyethylene bags and taken out of the ward to a special room. There must be a daily supply of linen in the department.

Provision of physiological bowel movements. Every day the nurse monitors physiological stools and records this information in the temperature sheet. In the event of the appearance of pathological impurities, a change in the frequency of bowel movements or a change in the consistency of feces, the nurse must immediately inform the doctor. In the nurse's list, the number and nature of stools (mushy, formed, thin, presence of pathological impurities) are indicated daily.

In order to prevent bedsores the nurse should clean the child's toilet after each act of defecation and urination.

The choice of technique depends on the condition of the child. If the condition is satisfactory or medium severity, it is recommended to wash the child with warm running water; girls from front to back so that fecal masses with water do not fall into the area of the external genital organs, that to prevent the occurrence of a urinary tract infection. If the child is on strict bed rest, cotton swabs soaked in warm running water are used to clean the skin. After washing, it is enough to carefully dry the skin with a soft diaper wetting movements; for problems arising during the care of the skin of infants, all natural folds are lubricated with baby oil or a special protective cream.

If the child is on strict bed rest, a vessel (enamelled or rubber) is placed on him or a urinal holder (disposable or reusable) is provided. A child who is allowed to stand up must use an individual potty. The vessel, reusable urinal or pot is washed daily with hot water and detergents, then must be treated with special disinfectants. If the child does not control the physiological defecation and urination, which is related to a serious condition or age characteristics, disposable diapers (diapers) are used, which are selected according to the age of the child and changed in a timely manner. It should be remembered that the use of diapers does not exclude the appearance of diaper rash.

3.6 The main types of enemas used in pediatric practice. Simulation of giving enemas in children of different ages

Topicality. An enema is the introduction into the intestines through the rectum of various liquids for therapeutic purposes or for the purpose of conducting diagnostic procedures. All types of enemas in the hospital are performed as prescribed by a doctor.

In pediatric practice, enemas are usually used to empty the intestines (cleansing), inject medicinal substances (medicinal), wash the intestines (siphoning). Indications for their use are constipation, acute poisoning, intestinal infectious diseases. Cleansing and siphon enemas are prescribed before instrumental research and operations. Medicinal enemas are prescribed for the purpose of administering medicinal preparations of general and local purpose, reducing temperature, etc.

Contraindications to the use of enemas are acute inflammatory processes of the anus, gastrointestinal bleeding, prolapse of the rectum, oncological diseases of the rectum, etc.

Goal. To master the technique of conducting cleansing, siphon, and therapeutic enemas.

Method.

Cleansing enemas for children are performed to clean the intestines.

Before conducting an enema, it is necessary to prepare:

– a rubber with a hard or soft tip (the volume depends on the age of the child) (*Tabl. 3.6*);

– a vessel with water of the appropriate temperature;

– oilcloth;

– vaseline;

– diaper;

– disinfectant solution for surface treatment and used means.

Stages of the procedure:

– wash, disinfect hands, put on rubber gloves;

– fill the canister with water, check whether there is any air left in it;

– lubricate the tip with vaseline (or any other) oil to facilitate the introduction into the intestine;

– put a disposable diaper on the changing table, couch or bed;

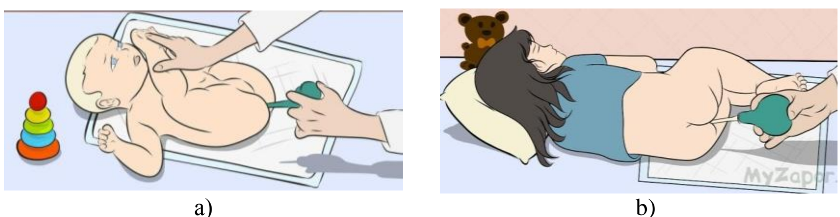
– lay the child: infant – on the back (*Fig. 3.3 a*), older than one year – on the left side with the legs brought to the stomach (*Fig. 3.3 b*);

– with the left hand, spread the child's buttocks, and with the right hand, carefully insert the tip of the enema into the rectum by 3–5 cm for younger children, and 6–8 cm for older children, first in the direction of the navel, then parallel to the coccyx. At the same time, the infant needs to raise his legs;

– slowly squeezing the rubber canister, inject the liquid;

– the tip should be removed from the rectum without squeezing the fingers on and after that the buttocks should be compressed for a few minutes so that the liquid does not get out;

– remove rubber gloves and dispose of them;
– clean and disinfect the used rubber;
– after the enema, you should definitely wait for defecation and examine the child's stool.



a) b)

Fig. 3.3. Method of enema administration to children of different ages:
a) in infant; b) in older child

Table 3.6

The amount of liquid for a cleansing enema and the temperature of the water depending on the age

The age	0–2 mon	6 mon	6 mon – 1 year	After 1 year
Volume	30 ml	50–80 ml	100 ml	100 + 100 × (n – 1), where n – the age of child
Water temperature	30–31 °C	27–28 °C	26–25 °C	20–22°C

3.7 Simulation of a sick child's caring and ensuring his physiological needs depending on age: maintenance of water balance, care of the oral cavity, toilet of the eyes and nose, care of the external auditory canal, toilet of nails and hair care

Topicality. The organization of care for a sick child involves taking into account not only the peculiarities of his psychological state during the illness, but also the peculiarities of the structure and functioning of all body systems depending on age. As the child grows, properly organized care and proper provision of his physiological needs, depending on age, will prevent the occurrence of diseases and contribute to the healthy, harmonious development of the child. Age-related anatomical and functional features of the child's organs and systems, which are characterized by the imperfection of local immunity, require medical personnel to strictly comply with hygienic requirements.

Goal. Master the technique of caring for a sick child and providing for his physiological needs.

Method. Children's age is characterized by certain features of the work of all body systems, metabolism is no exception. Special attention is paid to maintaining the water balance. Since the high level of extracellular fluid, as well as imperfect mechanisms of fluid fixation in cells and intercellular structures cause the development of dehydration of the body in various infectious diseases,

violations of the temperature regime, insufficient intake of water with food. Dehydration (water loss) is accompanied by severe disturbances in the child's general condition. Children's need for fluids is much higher than that of adults.

Children should receive the necessary amount of water to drink. In infant period, if the child is breastfed, an additional amount of water is usually prescribed in case of need and is approximately equal to the volume of one feeding. In diseases accompanied by diarrhea, vomiting, and fever, the amount of fluid that the child should receive depends on the severity of the manifestations of dehydration (exicosis) and the type of pathological losses.

It should be noted that a sick child may refuse to eat and drink, so when caring for him, it is absolutely necessary to count the liquid that the child drank and secreted.

If necessary, depending on the clinical symptoms and degrees of exicosis, in addition to oral rehydration, infusion therapy may be prescribed.

The most physiological and effective method of administration of intravenous solutions is slow drip administration or with the help of infusion machines, which prevents such complications as volume overload and, accordingly, systemic hyperhydration. The calculation of the child's fluid requirement per hour is more physiological compared to the daily determination, as it creates conditions for preventing complications during infusion therapy. It is advisable to calculate the physiological need for liquid according to the formula that was proposed back in 1957 by M.A. Holiday and W. Segar (*Tabl. 3*.7).

Table 3.7

Physiological daily fluid requirements (according to Holliday-Segar, 1957)

Weight	Volume of fluid/24h	Volume of fluid/1h
First 10 kg (0–10 kg)	100 ml/kg/day	4 ml/kg/1hour for first10 kg of body mass;
Next 10 kg (11–20 kg)	1 000 + 50 ml/kg/day	40 ml + 2 ml/kg/1hour for the next 10 kg of body mass;
> 20 kg	1 500 + 20 ml/kg/day	60 ml + 1 ml/kg/1hour for the each 1 kg for the child with body mass > 20 kg.
BUT NOT MORE THEN 2 400 ml/day		

An example of calculating the need for liquid according to the Holiday-Segar method: in a child with a body weight of 28 kg, the daily physiological need for liquid is: (100 ml × 10 kg) + (50 ml × 10 kg) + (20 ml × 8 kg) = 1660 ml/day.

Current pathological losses are determined by weighing dry and used diapers, determining the amount of vomitus or using the calculations proposed by E. Yu. Veltishchev:

– every 1 °C of temperature above 37 °C for 6 hours – 10 ml/kg/day;

– vomiting – 20 ml/kg/day;

– intestinal paresis – 20–40 ml/kg/day;
– diarrhea – 25–75 ml/kg/day;
– perspiration in younger children – 30 ml/kg/day (in adults – 14.4 ml/kg/day).

Treatment of **the oral cavity** with mold:
– prepare 2% soda solution and cotton-gauze tampons
– wash hands thoroughly with soap and disinfect
– wear rubber gloves
– with separate cotton-gauze swabs soaked in soda solution, treat the mucous membrane of the oral cavity in the following sequence: tongue, hard palate, cheeks.

The eye toilet is performed 2 times a day (in the morning and in the evening before bathing):
– prepare cotton swabs (for each eye separately) and cooled boiled water;
– wash hands thoroughly with soap and disinfect;
– soak cotton swabs in water, squeeze;
– pass from the outer corner of the eye to the bridge of the nose with a cotton swab soaked in boiled water;
– use a separate tampon for each eye;
– wipe the eye slits with a dry napkin following the same rules.

The nasal toilet is performed twice a day: in the morning and in the evening:
– prepare cooled boiled water and cotton wool;
– wash hands thoroughly with soap and disinfect;
– make flagella up to 2–3 cm long and 3–4 mm in diameter from cotton wool;
– wet the flagella in water;
– use a separate flagellum for each nasal passage;
– with rotational movements, insert the flagellum into the nasal cavity to a depth of 1.0–1.5 cm and in this way remove the remnants of mucus or crusts until the restoration of free breathing through the nose;
– if necessary, repeat the procedure once more.

Care of the **external auditory canal** is carried out as necessary:
– prepare cooled boiled water and cotton wool;
– wash hands thoroughly with soap and disinfect;
– make flagella up to 2 cm long and 3–4 mm in diameter from cotton wool;
– wet the flagella in water;
– pulling the auricle back and up with the left hand, insert the flagellum into the external auditory canal;
– make several rotational movements;
– take out the flagellum;
– if necessary, the flagellum is changed, and the manipulation is repeated.

N.B.! In the first year of life, it is enough for the mother to handle only the child's auricle on her own, since the external auditory canal is short this year and there is a danger of injuring the tympanic membrane.

Toilet nails. The child's nails are trimmed at least once a week so that the length of the free edge does not exceed 1–1.5 mm. Nails are cut carefully, only with scissors with blunt ends (they are rounded on the fingers and in a straight line on the feet). After cutting the nails, the scissors must be wiped with a cotton ball soaked in 70 % ethyl alcohol or another disinfectant solution.

Hair care. Washing the head, combing the hair, braiding braids. Each child should have their own comb. Head washing is usually carried out (depending on the patient's condition) once every 7 days.

Children who are on strict bed rest are washed as follows:

– the child's head is raised and fixed at the level of the neck with the help of a roller or a pillow;

– a pelvis is placed at the head end of the bed;

– to prevent the laundry from getting wet during washing, the child is covered with a fabric that does not allow moisture to pass through;

– lather the head with shampoo or soap and carefully rinse with warm water, taking care not to overcool the child;

– dry the hair with a towel or hair dryer.

Topic 4.1. Simulation of children's nutrition at hospital: feeding of an infant's; nutrition of older children. The technique of preparing milk mixtures and feeding a baby from a bottle. Completeness and rationality of nutrition. Nutrition of a nursing woman. Feeding of seriously ill children

Actuality. According to UNICEF definition, good nutrition is the bedrock of child survival and development.

Nutrition during childhood is the foundation upon which health, growth, and cognitive development are built. Research consistently emphasizes the importance of providing children with a balanced diet rich in essential nutrients to support their physical and mental development.

Foods for special medical purposes (diets) is an integral part of the general treatment process, therefore its provision is important for recovery and contributes to the development of the child at any age.

The aim is to be able to organize a child's nutrition in the hospital, to organize the feeding of a child in the first year of life – the technique of breastfeeding, preparation of a formula for artificial feeding; organization of nutrition for an older child.

Soft skills:

1. Breastfeeding techniques
2. Formula preparation for a child on artificial feeding
3. Complementary feeding recommendations: assess the child's readiness, cooking, food products selection
4. Dietary nutrition depends on the disease

Objectives of the initial level of knowledge:

1. To know the anatomical structure of the human body (general anatomy department).
2. To know the physiological aspects of the gastrointestinal tract (physiology department).
3. To know the basics of medical deontology when working in a pediatric hospital (propaedeutics of pediatric department).

Feeding of children is carried out by a doctor's recommendations under the nurse control in the hospital. Two main principles are used in the organization of children's nutrition, they are individual and group. An individual diet means food preparation for each child personally. The group principle takes into consideration foods for special medical purposes and depends on pathology. The mode of child's feeding depends on the age and nature of his illness.

Breast feeding

The most rational nutrition for infantas is breast feeding. When baby is sick it's need in breast milk most of all. Feeding can be moderated depends on the

disease and general condition of the child. The doctor composes the diet, create a menu, which note into the medical card and the nurse control that the mother or the person who cares for the child follows it. A breastfeeds woman should follow the usual rules of hygiene. Hygienic requirements must be followed strictly in hospital conditions.

Normative principles and strategies regarding breastfeeding problems of infants and young children in Ukraine correspond to international documents.

WHO and UNICEF launched the Baby-friendly Hospital Initiative (BFHI) in 1991 to help motivate facilities providing maternity and newborn services worldwide to implement the Ten Steps to Successful Breastfeeding. The Ten Steps summarize a package of policies and procedures that facilities providing maternity and newborn services should implement to support breastfeeding. In 2018, WHO revised the Ten Steps based on the 2017 guideline on protecting, promoting and supporting breastfeeding in facilities that provide maternity and newborn services.

WHO has called upon all facilities providing maternity and newborn services worldwide to implement the Ten Steps. The implementation guidance for BFHI focuses on integrating the programme across healthcare systems to facilitate universal coverage and ensure sustainability over time. The guidance outlines nine key national responsibilities to scale up implementation of the Ten Steps (*Fig. 4.1.1*).

In the conditions of emergencies and, in particular, military operations, breastfeeding takes on a special meaning, contributing to the full nutrition of the child, the formation and maintenance of physical, psychological and mental health, is an essential factor in financial savings and the prevention of various diseases.

Infographic highlighting benefits of breastfeeding, why it's important to continue doing so during a disaster, barriers to breastfeeding during disasters and how first responders can help is shown in *Fig. 4.1.2*

The correct personalized technique is important for full-fledged breastfeeding. It can be chosen taking into account the anatomical and physiological characteristics of the mother and her child.

The main criteria for the mother’s and infant’s position during feeding is complete relaxation of the mother and the most comfortable conditions for the child. There are several positions of mother and child during feeding (*Fig. 4.1.3*).

The main rule is to hold the child close to the breast so that the nipple points to baby’s nose, shape the breast so that the child can grasp it more deeply. It is important to place the fingers at the distance from the areola, parallel to the baby's lips.

Figure 4.1.1. The Ten Steps to Successful Breastfeeding

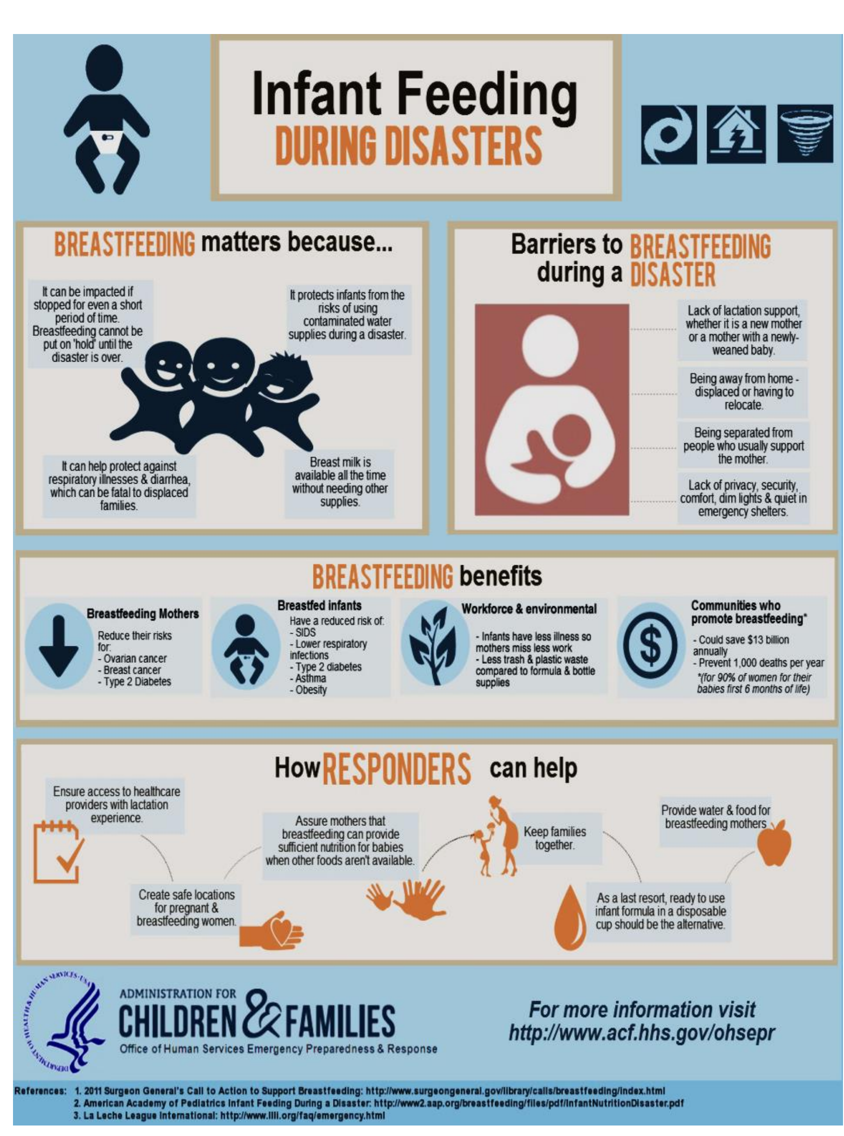


Figure 4.1.2. Infant feeding in disasters

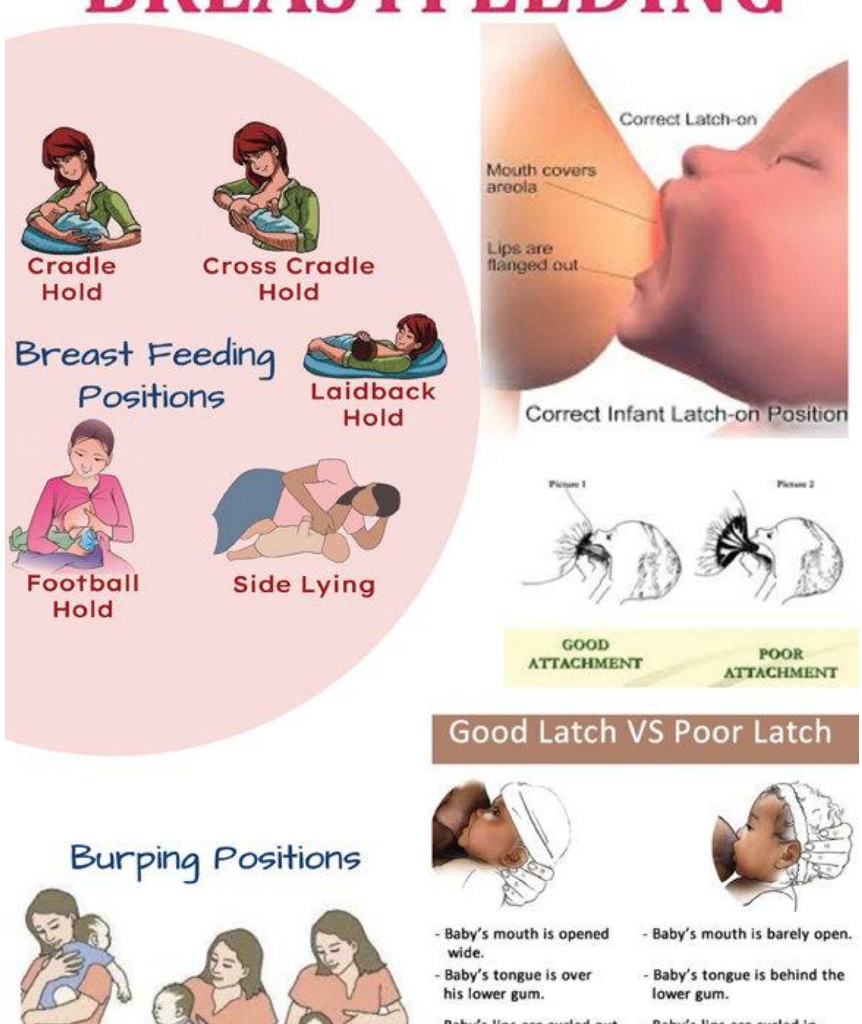


Figure 4.1.3. Breastfeeding positions

Breast attachment recommendations:

Initial position: the child is located very close to the breast; the nipple is directed to his nose. If you order the nipple directly into the mouth, there is a risk that the baby's jaws will be too close to the nipple and it can cause the mother’s pain. When a child is ready, he turns its head from side to side, opens its mouth and lowers its tongue to the lower gums. If the mouth is not open, you can run the lower part of the areola along its lips.

It is necessary to support the child so that the foundation of his head and shoulders rests on the mother's palm. The mother's hand should not press on the back of the head. It is important to give good support to the child's body so that it is comfortable for him to suck, to press him tightly to the mother, the tummy to the mother's belly, to support the neck area and between the shoulder blades with the palm of his hand. If the child is located horizontally, then the thumb should be located under the "upper" ear, the index finger and others – under the "lower". The lower lip is bent during breast feeding, the tongue lies on top of the gums.

The child is tightly pressed to the breast, deeply grasps the nipple and areola, the nipple touches the border of the hard and soft palate. The bottom of the areola is deeper in the mouth than the top. If you slightly move the baby away from the breast, you can see that his lips are open, the lower lip is completely bent, the angle between the upper and lower lip is at least 140°, the tongue covers the chest. The spout can either be on the side or slightly touching the breast. If the child grabs the breast shallowly, the mother should gently squeeze the gums with her finger so as not to damage the nipple, remove the breast and apply it again.

Breast milk expressing. Properly organized feeding and normal lactation, as a rule, does not require breast milk expressing. At the same time, (following the doctor's recommendation) in the first days to establish and maintain normal lactation, in case of temporary contraindications to breastfeeding the child, or if additional feeding is necessary, breast milk expressing is necessary. Expressed milk can be stored: at t = +18…20 °C – no more than 12 hours; at t = +4…-5 °C – up to 48 hours; at -18…-20 °C – up to 4 months.

Contraindications to breastfeeding

Despite the fact that a child of the first year of life should receive breast milk, in some cases breastfeeding is not possible. According to WHO recommendations, the following newborns should not receive breast milk:

- Children with phenylketonuria.
- Children with galactosemia.
- Children with maple syrup disease.

The following categories of children are recommended by the WHO (if necessary) to be fed with adapted formulas:

- Children with a body weight of less than 1 500 g.

- Premature, born before the 32nd week of gestation.
- Neonates who are at risk of hypoglycemia due to impaired metabolic adaptation, or with an increased need for glucose (for example, those who are born prematurely or with insufficient weight for gestational age, children of mothers with diabetes), and/or if their glucose blood level does not respond to optimal breastfeeding.

Contraindications to Breastfeeding from mother's side:

- when mothers are receiving diagnostic or therapeutic radioisotopes, or have had exposure to radioactive materials (for as long as there is radioactivity in the milk);
- for mothers who are receiving certain medications, anti-metabolites or chemotherapeutic agents;
- for mothers taking certain "street drugs";
- for mothers with certain infectious diseases (see below).

Maternal Infections and Breastfeeding

1. Human Immunodeficiency Virus (HIV).
2. Hepatitis C Virus (HCV), Hepatitis B Virus (HBV), Cytomegalovirus (CMV), Tuberculosis, Human T-Lymphotrophic Virus Type I and Type II (HTLV-I, HTLV-II), Herpes Simplex Virus (HSV, West Nile Virus (WNV), Zika Virus, Rubella, Varicella-Zoster Virus (VZV).
3. Bacteria (mastitis and breast abscesses may lead to the presence of bacterial pathogens in human milk).

The updated recommendations on feeding a baby from a bottle take into account its physiological features and needs in the feeding process, they pay attention to the pace, duration and intensity of the infant's feeding process, and therefore such feeding is called caring. It is better because it simulates breastfeeding and allows the child to control the rate of milk flow. This feeding is different from traditional feeding, when the baby is given a bottle and expected to eat at a constant rate and finish the portion even if he has stopped eating. Careful feeding allows the child to eat in the needed quantities and prevents discomfort and overfeeding.

It can help babies who combine breast and bottle feeding to ease the transition between breast and bottle because of similarity of this technique to breastfeeding.

It is necessary to feed the baby when it shows hunger signs, and stop feeding in case of signs of satiety. Crying is a late sign of hunger, so try to feed the baby before crying.

The person feeding the baby should adopt a comfortable position that allows to see the baby's face and talk to it while feeding (*Fig. 4.1.4*)].

The technique of formula preparing

Adapted formulas of industrial production can be liquid, ready-to-use and powder, which are prepared before use. Also, formulas are distributed into:

- Infant formulas (from 0 to 6 months).
- Infant formulas for further feeding (from 6 months to 12 months and from one year to 3 years).

Milk formula in the powder form usually used more often and is a more economical. Preparation of the formula is carried out in accordance with the recommendation for use. You must wash your hands with soap immediately before preparing the formula. You should prepare in advance: clean ware (a special children's graduated bottle with a capacity of 200–250 ml with a distribution price of 10 ml – see *Fig. 4.1.5*), a pacifier, a container for preparing the formula, a measuring spoon, a formula for feeding the baby and boiled water for formula dilution.

Fig. 4.1.4. Baby feeding from a bottle

Fig. 4.1.5. Graduated bottle for feeding

The water must be equal to the recommended in the instructions for formula preparing. After that, you should measure the necessary amount of the formula, pour it into a container with water, stir it well, bring it to a temperature of 37–38 °C and fill the bottle for baby's feeding. The hole in the nipple should be small so that the formula flows out in drops (20–30 drops per minute). If the formula has cooled, you can warm it in a bottle in a water bath, but only the amount of formula that is needed for one feeding.

NB! The use of unboiled water, unsterilized bottles, as well as improper dilution of the formula can cause digestive disorders in children. Bottles, which are used individually for feeding or artificial feeding should be carefully pre-processed. At first, the bottle is soaked in a 2 % solution of baking soda, then washed from the inside with a special brush, rinsed twice with water and boiled for 20–25 minutes, or placed in a special sterilizer. This is especially necessary for bottles that are used to feed infants of the first 3 months of life.

Bottles are sterilized in a dry oven for 45 minutes in the hospital. The nipple for feeding should be washed and boiled for 10–15 minutes after each feeding. Keep nipples in a sterile, tightly closed glass container.

Use of liquid milk formulas

For the formula preparation with transfer into an ordinary baby bottle

1. Wash your hands thoroughly and sterilize the bottle and nipple for feeding the baby.
2. Make sure that the package with the formula is hermetically closed.
3. Heat the closed bottle with the formula in a water bath and dry it thoroughly with a paper towel. It is forbidden to use a microwave oven to heat the product.
4. Shake the bottle with the heated formula thoroughly before opening.
5. Pour the exact amount of formula according to the age of the baby into the baby feeding bottle.
6. It is forbidden to add water to the finished formula.
7. Check the temperature of the prepared food on the back of the wrist (37 °C).
8. Do not use the remaining formula for the next feeding.

Paced bottle feeding is shown in *Fig. 4.1.6.*

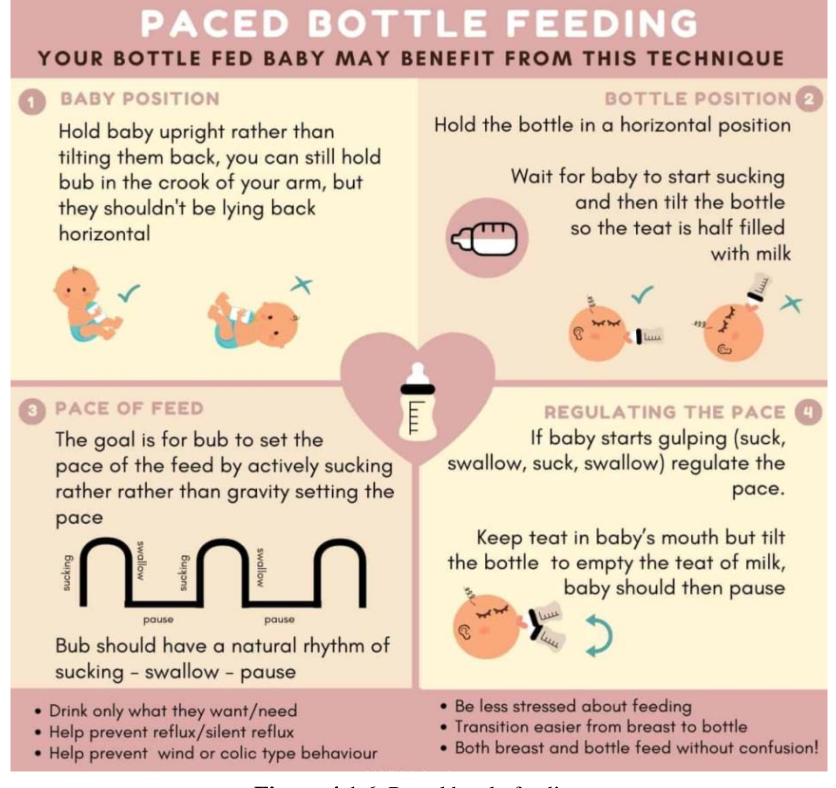


Figure 4.1.6. Paced bottle feeding

NB! *Never leave your baby alone with a bottle to prevent choking.*

Supplementary food introduction

Complementary feeding – the introduction of additional food into the diet of a child older than 5 (6) months according to the plan, while maintaining breastfeeding or formula feeding.

Modern recommendations for complementary feeding of the European Association of Pediatric Gastroenterologists, Hepatologists, and Nutritionists (ESPGHAN).

1. The first complementary food. It is considered impractical to develop separate recommendations regarding the introduction of complementary foods for breastfed or formula-fed children; As a "gold standard", exclusive breastfeeding should be followed for at least 4 months (17 weeks) or up to 6 months (26 weeks).

The introduction of liquid complementary food is recommended to start at the age of 4 months. In the period from 5 to 6 month when the child develops the motor skills, the consumption of dense food is possible. Therefore, it is important to give food of the right consistency and in the right way. At the same time, breastfeeding is continued in parallel with the complementary food introduction.

***2. Complementary food products*.** Complementary food should be introduced at age from 4 to 6 month old. The child should be offered food that is varied in consistency, taste, and smell. Whole cow's milk is not recommended to be introduced into the diet of a child under 12 months because of the risk of iron-deficiency anemia developing. The consumption of a large amount of protein during the complementary feeding increases the risk of body weight excess and obesity, so the consumption of protein should not exceed 15 % of the total energy. The iron need is very high during the complementary feeding introduction; therefore, it is necessary to ensure the receipt of products rich in iron, especially for breastfed children; Sugar or salt should not be added to complementary foods, and the child's consumption of sweetened drinks and juices should also be avoided. A vegetarian diet can be used only under the supervision of a doctor and nutritionist, with the mandatory additional intake of vitamins of group B, D, iron, zinc, calcium, proteins, LCUFA.

3. Complementary food and food allergy. Allergenic products can be introduced starting from the age of 4 months, at any time under the supervision of a specialist, since it is during this period that the formation of immune tolerance is possible.

4. General rules for the complementary food introduction.

- ✓ The first supplement should be better introduced during the second morning feeding (9–11 am) to see the child's reaction.
- ✓ Food should be without added sugar and salt.
- ✓ Give the first complementary food to the child when he is calm and not tired.
- ✓ Start with 0.5–2 h. spoons. If they refuse, do not insist, try later.
- ✓ If the reaction is normal (no rash, no stool changes), double the dose the next day.

✓ Gradually bring the child's first complementary food to the age norm (80–200 g).

✓ If there is an allergic reaction or other intolerance reaction – refuse to introduce this supplement for three days, in case of relapse – do not give this product again.

✓ Every new complementary food product must be single-component (only zucchini, cabbage, broccoli, etc.).

✓ Mixed products can be given when the child has already familiarized himself with all the products separately.

✓ It is not advisable to introduce new products three days before and after vaccinations.

Recommendations for complementary foods:

1 complementary food: from 6 months: vegetable puree, 2 complementary food: from 6.5–7 months – porridge without the addition of milk, then – 5–10 % milk porridge (buckwheat, rice, corn), 3 complementary food – from 7.5–8 months – milk products (kefir, yogurt, cheese).

Organization of children's nutrition in hospital

Pediatric patients and the diseases that lead to their hospitalizations are unique from adult patients. Nutrition is even more important in pediatric patients because they require the substrates for daily metabolism with the added cost of growth. Pediatric patients have different percentages of muscle and fat mass and higher resting energy requirements than adults. An illness that leads to hospitalization may lead to significant changes in nutrition needs. Malnutrition results in increased immune system vulnerability with greater frequency of infection, higher morbidity and mortality rates, and longer hospital stays. Nutrition support in the critically ill child helps reduce the risk of energy and/or protein malnutrition, improves survival, and reduces associated morbidity and mortality. The standards are intended to provide healthcare professionals with the latest information available to help guide the nutrition care of hospitalized pediatric patients.

Hospital food guidelines

• The standard menu for acute hospitals should be energy-dense and high-protein, providing at least 40 % of energy from fat.

• A healthy-eating menu should be available for patients who are not malnourished or at risk of malnutrition. This menu should provide around 35 % of energy from fat.

• A menu with at least 50% energy from fat should be available for patients with a poor appetite, high energy requirements and low food intake.

• Texture-modified menus should be available for patients with chewing or swallowing difficulties. These should provide at least 40 % energy from fat.

• The standard menus must reach the minimum recommended daily amount (RDA) for protein and all vitamins and minerals.

• All menus must take into account the ethnic and religious needs of patients.

• All menus must, where possible, take into account patients' preferences.

• Patients must receive accurate descriptions of menu dishes to allow them to make informed choices. Figture menus must be available to aid patients with low literacy skills or poor vision.

• Menus must be developed in consultation with the hospital's clinical nutritionist/dietitian or the health board's clinical/community nutritionist/dietitian, the catering manager and the nutrition steering committee. Standard recipes should be used, where appropriate.

• Only evidence-based therapeutic diets should be prescribed.

• The nutritional status of the patient must be considered when therapeutic diets with a low fat content are indicated.

• The eating abilities and nutritional status of patients on texture-modified diets must be continually assessed.

• The clinical nutritionist/dietitian or physician should be aware of the patient's use of 'alternative diets' and the influence these might have on nutritional status.

• Feedback from patients about the acceptability of the food provided should be sought.

• The nutrient content and portion size of food should be audited per dish annually, or more often if the menu changes.

• In the planning stage, it should be documented that the nutrient content of the food is sufficient. This should be carried out in consultation with the clinical nutritionist/dietitian.

• Nutrient databases should be improved, with more reliable data on nutrient losses with different food-service systems.

Menu composition

The guidelines below show the basic menus that every acute hospital should provide.

It is important to remember that normal low-fat, healthy-eating guidelines are not suitable for most patients in acute hospitals as such food will not provide enough concentrated energy to meet their needs.

Basic menu requirements

Below is a basic list of the minimum amounts of different foods each type of menu should provide to patients every day.

Where necessary, amounts of fruit and vegetables may be reduced on energy-dense menus, because fruit and vegetables are high in fibre and provide a feeling of satiety or fullness, thus reducing the appetite for other foods.

Since micronutrients may be lost during food preparation and requirements for some micronutrients may be higher in illness, it should be considered whether or not some patients might benefit from a vitamin-mineral supplement.

Topic 4.2. Personal protective equipment for the health care workers, taking into account the degree of infectious danger (indications for the use, rules, and sequence of putting on and taking off)

Relevance of the topic.

In recent years, the causative agents of both already known and newly emerging diseases (COVID-19, HIV infection, mycoplasmosis, campylobacteriosis, etc.) have clearly manifested themselves in the epidemiological arena. There is an increase in the incidence of socially determined infections as tuberculosis, syphilis, malaria, diphtheria even though a great success in the fight against them was previously achieved. The conditions of martial law bring their own characteristics both to the prevention of disease at the front among the military and among the population undergoing significant migration changes. Nosocomial infections have become widespread. The main reasons are well known: violation of the anti-epidemic regime, low hygiene culture of the staff, formation of antibiotic-resistant hospital strains, retard in the development of modern disinfectants and sterilization equipment. A particularly important problem today is the prevalence of hospital- acquired infections among the health care workers.

General goal: study of the main methods and means of personal protection (PP) for the health care workers (HCW), taking into consideration the degree of infectious danger of protection in the conditions of the threat of its occurrence. Formation of abilities and skills necessary for workers to use personal protective equipment (PPE).

Specific goals-skills:

1. To know the basic concepts of personal protective equipment for health care workers.
2. To know how to identify indications for the use of PPE depending on the level of infectious danger.
3. To be able to demonstrate the methods of using PPE.

The goals of the initial level are to be able to:

1. Know the anatomical structure of the human body (department of General Anatomy).
2. Know the histological structure of the skin (department of Histology).
3. Know the physiological aspects of thermoregulation (department of Physiology).
4. Know the main characteristics of pathogens (department of Microbiology).
5. Know the basics of medical deontology when working in a hospital, including a pediatric one (department of propaedeutics of internal medicine and/or pediatrics).

Perform the proposed tasks to find out whether your entry level of knowledge meets the required level, then, compare the correctness of the solution with the standards.

The list of theoretical questions for the topic being studied:

1. The prevention of nosocomial infections as a component of occupational safety in health care.
2. The concept of dangerous infectious diseases.
3. The concept of personal protective equipment for medical workers.
4. Types of personal protective equipment for health care workers depending on the level of infectious threat.
5. The technique of using personal protective equipment for medical workers.
6. Degrees of infectious danger (depending on biological agents).
7. Indications for the use of PPE.
8. Rules and sequence of putting on and taking off PPE.

List of practical skills

1. Assess the level of infectious danger.
2. Master the technique of using personal protective equipment for medical workers.
3. Assess the need to replace personal protective equipment for health care workers.
4. Demonstrate skills in disposing of the used PPE.
5. Prepare the necessary equipment for replacing PPE.

Nosocomial infection

Hospital-acquired infection (HAI) is any clinically expressed disease of microbial etiology that affects a patient during hospitalization or visiting the medical institutions. This also applies to the medical staff during the process of their professional activities, regardless of whether or not symptoms of illness are or are not detected during the period when these individuals are in the hospital (up to 3 days after discharge from the hospital). In order to control nosocomial infections, a commission for the prevention of HAI is created in the health care institution, whose powers extend to all departments and services.

Most often, the causative agents of nosocomial infections are antibiotic-resistant strains of Staphylococcus aureus, Pseudomonas aeruginosa, Proteus, Escherichia coli, Klebsiella, Serratia, Candida fungi, as well as various associations of these microbes. The sources of nosocomial infections in hospitals are patients with acute and chronic forms of purulent-septic diseases and asymptomatic carriers of pathogenic microorganisms among patients and staff.

Depending on the localization of the pathogen, its release from the body of the patient or the carrier occurs through various organs and tissues, the respiratory tract, the gastrointestinal tract, the genitourinary tract, etc.

The spread of pathogens of nosocomial infections occurs in two ways: airborne and contact. The main factors of transmission are hands, air, numerous objects of the external environment (bed linen, dressing material, instruments, equipment, etc.).

Danger of nosocomial infection:

1) for the patient:

– the course of the main disease worsens;

– lethality in generalized form up to 60 %;

2) for health care and the state:

– disruption of hospital work, up to temporary closure;

– an increase in the patient's stay in the hospital (on average, one case of HAI extends the patient's stay in the hospital by 13–17 bed-days);

– additional costs for treatment of patients, labor of personnel, etc.

Ways of transmission of nosocomial infection:

– aerosol (air droplet and air dust);

– contact (through instruments, bed linen, furniture);

– parenteral (when administering medications);

– fecal-oral (soiled hands);

– alimentary (through food).

The main reasons for the growth of nosocomial infection today:

– weakening of the natural immunity of the population as a result of an unfavorable environmental situation;

– significant increase among hospitalized people from high-risk groups;

– concentration of a large number of patients and staff in multi-story buildings;

– complication of surgical interventions, increase in their duration, traumaticity, widespread use of endoscoFig equipment, that is difficult to sterilize;

– insufficiently substantiated use of antibiotics;

– insufficient thorough disinfection of the instruments for injections and other tools;

– increasing the duration of the patient's stay in the hospital;

– weakening of attention to strict observance of hygienic and sanitary and anti-epidemic regimes in hospitals.

Prevention of nosocomial infections:

1) architectural planning measures:

– rational placement and zoning of the site;

– ensuring the isolation of ward sections, departments, operating rooms, offices, wards;

– compliance with hygienic norms of the square and volume of hospital premises;

2) strict adherence to the sanitary and anti-epidemic regime:

– optimal microclimate, effective ventilation, regular sanitation of the air;

– medical control of staff health;

– high-quality disinfection and sterilization of the equipment, bed linen, etc.;

– regular control of bacterial contamination of environmental objects;

– detection and isolation of infectious patients;

– compliance with the rules of personal hygiene by staff and patients;

3) increasing the resistance of patients and staff:
– the optimal mode of work and rest;
– rational nutrition;
– sufficient stay in the fresh air;
– planned and emergency immunization.

When medical personnel come in contact with the patient, medical workers have to wear rubber gloves, as well as perform hygienic, surgical treatment of hands and regular hand washing.

Hygienic treatment of the hands of personnel established by the order of the Ministry of Health of Ukraine «On the approval of methodological recommendations "Surgical and hygienic treatment of the hands of medical personnel» dated September 21, 2010 No. 798. During procedures and surgeries accompanied by the formation of splashes of blood, secretions, excreta, medical staff wears a mask, eye protection (goggles, shields). In case of contamination of any means of personal protection, they must be replaced.

It is forbidden to put caps on used needles. Each staff member who comes to work at the department undergoes:

– a complete medical examination, including an examination by an otorhinolaryngologist and dentist, bacteriology swab tests from the mucous membrane of the nasopharynx for the presence of pathogenic staphylococcus;

– a short briefing on the implementation of basic sanitary and anti-epidemic measures in the area of work entrusted to him.

All working personnel are a subject to dispensary observation for the detection and treatment of carious teeth, chronic inflammatory diseases of the nasopharynx, as well as for the detection of carriers of pathogenic staphylococcus. In the event of nosocomial infections among patients, an extraordinary medical examination of all department staff is carried out, as well as an extraordinary bacteriological examination for carriers.

Dangerous infectious diseases

For the needs of epidemiological observation, the following groups are identified:

Group 1. Infectious diseases that have/may have international significance and require immediate response. This group includes diseases that, in the event of an identification (case/outbreak) of which there is a potential threat of their introduction into the territory of Ukraine (outbreaks in neighboring countries, increased population migration from endemic countries, movement of infected or contaminated goods, luggage, cargo, vehicles, postal parcels, human remains) immediate operational response measures are taken (viral hemorrhagic fevers of unknown etiology, smallpox (natural), Zika virus, dengue fever, acute poliomyelitis, influenza caused by an identified influenza virus, yellow fever, malaria, meningococcal infection, etc.). For infections of this group at the level of the country and/or at the level of the relevant administrative-territorial units,

the authorities responsible for epidemiological observation develop operational response plans and calculations of the need for necessary resources.

Group 2. Infectious diseases that can cause a significant level of morbidity/mortality (pneumococcal infections (including streptococcal pneumonia, group B), tetanus, leishmaniasis, leptospirosis, listeriosis, giardiasis, etc.). The purpose of epidemiological observation of the specified infectious diseases is the development and implementation of specific measures to ensure enhanced protection of public health: prevention of the occurrence and spread of diseases, reduction of morbidity and mortality levels.

Group 3. Infectious diseases and/or conditions for the identification of which there are no effective methods of epidemiological control (observation). This group includes diseases for which measures are being taken to gradually cover epidemiological observation (toxoplasmosis, trichinellosis, Haemophilus influenzae, etc.). Infectious diseases of the specified group require the development and application of measures of epidemiological control (observation) and response to overcome them and prevent their spread.

Personal protective equipment

Personal protective equipment (PPE) is chosen according to the nature of interaction with the patient and the potential way of getting infection. In health care, PPE is used to protect mucous membranes, respiratory tract, skin, and clothing from contact with infections.

Each medical worker must be able to use personal protective equipment, assess risks and decide which PPE to use and when.

Managers of health care institutions must organize training of medical staff and provide them with the required amount of PPE.

Training participants must learn the rules for choosing, putting on, taking off and disposing of PPE.

Personal protective equipment used by medical workers must meet the requirements of the state standards.

Personal protective equipment should be used if it is impossible to avoid or sufficiently limit the risks to the life and health of staff by technical means of collective protection or measures, methods or rules for organizing work. In health care, PPE is used to protect mucous membranes, respiratory tract, skin, and clothing from contact with infections. Every healthcare worker must know how to use PPE, assess risks and decide which means of protection to use and when. Personal protective equipment for health care workers is used exclusively for its intended purpose in accordance with the operating instructions, which must be understandable for workers.

Normative regulation

Since January 15, 2019, the procedure for providing health care workers with personal protective equipment has been regulated by the Minimum requirements for safety and health protection when medical workers use personal protective

equipment at the workplace, which was approved by the order of the Ministry of Social Policy dated November 29, 2018 No. 1804 (hereinafter – Requirements). According to the Requirements for work in harmful and dangerous working conditions, as well as work related to pollution or those performed in adverse meteorological conditions, medical workers are issued special clothing, special shoes and other PPE according to the established standards. The employer is obliged to purchase, issue and maintain personal protective equipment at his own expense.

The standards for issuing personal protective equipment and sanitary clothing depend on the specialization of the medical staff. Thus, medical workers of operating rooms, delivery and postpartum wards, dressing and plaster cast rooms (doctors and nurses) are provided free of charge with regular PPE, which includes:

- waterproof apron;
- rubber gloves.
- for work in operating rooms with electric tools, the following are issued:
- dielectric galoshes;
- for working with quartz lamps – protective glasses.

Doctors working in procedure rooms, gynecology, dermatology, venereology, surgery, urology, and stomatology departments, as well as medical staff of the offices, should be given a waterproof apron and rubber gloves free of charge.

Provision of PPE for medical workers during the COVID-19 epidemic

Managers of health care facilities must organize training of medical workers and provide them with the required amount of PPE. Training participants must learn the rules of how to choose, put on, take off and dispose of protective equipment.

The following PPE is used to protect medical workers from coronavirus infection:

- mask;
- respirator;
- gown;
- gloves;
- protective shield/goggles.

Pay attention! Personal protective equipment used by medical workers must meet the requirements of the state standards.

Biosafety suits (*Fig. 4.2.1*). Soft and lightweight, with taped or hermetically sealed seams, with knitted sleeve cuffs or finger loop, anti-static conditioning and can be combined with other PPE. It should also be waterproof, light-colored, long-sleeved, and ankle-length. It is worn with overshoes to protect the skin and clothing from the patient's biological secretions during aerosol-generating procedures, disinfection, or when there is a close contact with a person with a suspected or confirmed case of COVID-19.

Compliance with DSTU EN 14126:2008 and DSTU EN 13034:2017, DSTU EN 14605:17

Fig. 4.2.1. Biosafety suits

Single-use insulating medical gowns (*Fig. 4.2.2*). Soft and lightweight, with taped or hermetically sealed seams, with knitted sleeve cuffs or finger loops, anti-static conditioning and can be combined with other types of PPE. The gown must be water-resistant, light-colored, long-sleeved, mid-calf-length, with straps that fasten around the waist and neck. Like the suit, the gown is worn to protect the skin and clothing from the patient's biological secretions during aerosol-generating procedures, disinfection, or when there is close contact with a person with a suspected or confirmed case of COVID-19.

Compliance with DSTU EN 14126:2008 and DSTU EN 13034:2017, DSTU EN 14605:2017

Fig. 4.2.2. Single-use insulating medical gowns

Surgical masks (*Fig. 4.2.3*) are made of hypoallergenic, odorless non-woven material. The outer and inner surfaces should be of different colors, on rubber bands, with a clip on the bridge of the nose. Masks should not interfere with free breathing. Compliance with DSTU EN 14683:2014 (*Fig. 4.2.5, 4.2.6*).

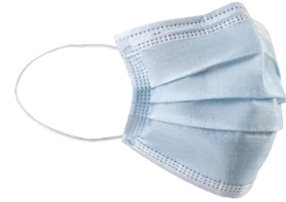


Fig. 4.2.3. Surgical masks

The mask is designed to reduce the release of pathogens of infectious diseases from the respiratory tract. A mask must be worn by patients to reduce the spread of infections in closed premises, or by those who are working in aseptic conditions, such as performing surgeries.

A surgical mask protects health care workers from getting large drops and splashes of the patient's biological fluids on the mucous membranes.

When should you use a mask:

• patients with cold symptoms or infection transmitted by droplet-aerogenous route should wear a mask – it will limit the potential spread of respiratory secretions;

• medical staff must wear a mask to protect themselves during the provision of medical care and in the presence of the risk of large drops and splashes of the patient's biological fluids (coughing in a patient with bronchiectasis, washing a surgical wound, etc.);

• healthcare workers must wear a mask during procedures and manipulations that require sterility to protect the patient from possible infections.

you should also wear a mask:

• patients with respiratory symptoms – cough, runny nose;

• healthy people who are in places of large crowds, for the purpose of additional protection.

The mask prevents unnecessary touching of the face with hands. The risk of infection on the mucous membranes is significantly reduced.

How to put on the mask: put the rubber bands behind the ears, spread the mask so that it covers the nose and mouth, press the nose plate.

The mask should be changed as soon as it becomes wet.

Do not touch the outer part of the mask with your hands. If touched, wash your hands with soap or use an alcohol-based antiseptic.

The mask should be changed every two hours.

The mask cannot be reused.

Gauze masks cannot be used, they do not provide an adequate level of protection.

How to remove the mask: do not touch its outer surface – remove the mask by the rubber bands, roll it up and throw it in the garbage.

Respirators of protection class FFP2 and higher

Respirators (*Fig. 4.2.4*) are designed to protect against fine aerosols. Maximum protection against solid and liquid aerosols at a concentration of up to 12 MPC for FFP2 and up to 50 MPC for FFP3. The respirator must be made of non-woven filter material, be equipped with a nose clip (nose clip) and a nose obturator. The inner part of the respirator should be made of soft hypoallergenic non-woven material. The respirator must meet the requirements of DSTU EN 149:2017 "Individual respiratory protective equipment. Filtering half-masks for protection against aerosols. Requirements, testing, marking".

Fig. 4.2.4. Respirators

Another name for respirators is anti-aerosol respirators. They should be used when working with patients with airborne infections: tuberculosis, measles, chicken pox, etc.

During some procedures (bronchoscopy, tracheal intubation, sanitation of the tracheobronchial tree, sputum collection, etc.), pathogenic microorganisms enter the air with very small particles – a finely dispersed aerosol. A surgical mask cannot protect against their inhalation. In these cases, it is necessary to use respirators of protection classes FFP3 and FFP2.

Respirators should also be used to care for patients who have an infection with unknown routes of transmission.

When caring for a patient with a coronavirus infection, medical workers are recommended to use a respirator with a protection class not lower than FFP2.

How to put on a respirator:

• long hair should be tied in a ponytail, men should shave;

• if you wear glasses, you should take them off and treat your hands;

• put rubber bands on the front part of the respirator and slide your palm under them;

• put the respirator cup to your face, put the upper rubber band over the back of your head, the lower one over your ears;

• spread the respirator on the face, squeeze the nose plate with the fingers of both hands;

• check that the rubber bands of the respirator do not cross – for this, it is enough to look at yourself in the mirror.

After each putting on, the so-called palm test should be done. Hold your hands in front of the respirator and take a sharp breath in or out. If you feel that air passes between the respirator and the skin, the respirator needs to be adjusted on the face.

Remember that respirators do not provide reliable protection for unshaven people, let alone those with beards.

During the care of patients who have infections with contact or droplet transmission, the outer surface of the respirator may become contaminated with microorganisms. Therefore, they can be used only as a one-time equipment. The respirator should also be replaced as soon as it becomes wet. Usually, manufacturers of respirators indicate the maximum period of use – no more than eight hours of continuous work or one work shift.

Medical staff who help patients with infectious diseases that are transmitted by droplets in the air must undergo a fit test to check the tightness of the respirator fit. Such a test should be done at least once a year.

Safety glasses (*Fig. 4.2.5*). Indirect ventilation, clear plastic lenses with anti-fog and anti-scratch coating. Adjustable straps ensure a secure fit. Alternatively, there can be a flexible frame that easily adjust to all facial contours and is placed with even pressure. Reusable safety glasses must be resistant to cleaning and disinfection. Compliance with DSTU EN 166:2017.

Fig.4.2.5. Safety glasses

Protective shields (*Fig. 4.2.6*) must completely cover the face, in particular, from the sides and along the length. Made of clear plastic material with anti-fog and anti-scratch coating. An adjustable strap is needed for a tight fit on the head and a comfortable fit.

The protective shield must be resistant to cleaning and disinfection. Compliance with DSTU EN 166:2017.

Fig. 4.2.6. Protecive shiellds

Powder-free nitrile gloves (*Fig. 4.2.7*) ave a long cuff, talc-free gloves, nitrile, elastic, for single use, are universal. Compliance with DSTU EN 455-1:2014, DSTU EN 16523-1:2018.

Fig. 4.2.7. Powder-free nitrile gloves

When to use gloves:

• when a foreseeable direct contact with blood or other body fluids, mucous membranes and potentially infected materials;

• when a direct contact with patients who are infected with pathogens transmitted by contact way;

• when working with potentially contaminated equipment and surfaces used in patient care.

Gloves should not be washed or sanitized with disinfectants for reuse. Microorganisms cannot be completely removed from their surface, in addition, the integrity of the glove structure is lost.

Gloves are put on last of all means of personal protection, necessarily over the cuffs of the gown.

How to remove gloves:

• catch it at the level of the palm with the other gloved hand and carefully remove it;

• hold the removed glove with the other gloved hand;

• slide the fingers of the ungloved hand under the remaining glove on the wrist and remove it by wrapping it over the first glove.

Who should provide medical workers with personal protective equipment?

The medical institution where they are working. According to the order of the Ministry of Social Policy dated November 29, 2018 No. 1804 "On the approval of the minimum safety and health requirements for the use of personal protective equipment by employees at the workplace", paragraph 1, section 2.

What disinfectant solutions are effective against the SARS-CoV-2 virus?

It is recommended to use disinfectants with specific activity against RNA-containing lipophilic viruses for disinfection in centers of contamination with the new coronavirus that causes the disease COVID-19. It is determined during the state registration of the disinfectant. The disinfectant concentration and exposure time recommended by the manufacturer should be kept. Chlorine-containing agents, hydrogen peroxide, and disinfectants with an alcohol content of at least 60 % are effective against the SARS-CoV-2 coronavirus.

Who in health care facilities should be provided with respirators first of all?

Respirators of protection class FFP2 and higher in a medical institution that provides medical care to patients with COVID-19 should be used by medical workers involved in aerosol-generating procedures: staff of resuscitation and pathological anatomical departments, intensive care wards. In accordance with the Order of the Ministry of Health of Ukraine dated March 28, 2020 No. 722 "Organization of medical care for patients with the coronavirus disease (COVID-19)".

Are UV lamps effective for disinfecting premises where patients with COVID-19 have been?

Air disinfection using shielded UV irradiators does not affect the transmission of SARS-CoV-2. The use of shielded UV irradiators is effective for air disinfection during airborne infectious diseases. The SARS-CoV-2 virus is contained in rather large drops of mucus, which are secreted during sneezing and coughing by a sick person and which do not stay in the air for a long time. Open UV-irradiators can be used exclusively as an additional method, after surface treatment with disinfectant solutions.

Scheme of the oriented basis of independent activity of students are given in *Table 4.2.1*.

Table 4.2.1

The oriented basis of independent activity of students

№	Stages of activity	Means of activity	Self-control criteria
1	Establishing psychological contact with the sick child and his parents	Implementation of deontological standards, attention and kindness	Adequate reaction of the patient to the examination, goodwill of the child's mother during the conversation with the student
2	Establishing the level of infectious threat	Basic knowledge of microbiology. Execution of regulatory documents	Microbiological and pathophysiological features of infection transmission
3	Assessment of the use of PPE depending on the level of infectious threat	Basic knowledge of microbiology, histology and pathophysiology. Execution of regulatory documents	Microbiological and pathophysiological features of infection transmission. The technique of using PPE
4	Assessment of the sequence of putting on and taking off PPE	Execution of regulatory documents	Anatomical structure of the human body. Indications and contraindications for the use of PPE depending on the level of infectious threat. The technique of using PPE
5	Assessment of respirator use techniques	Execution of regulatory documents	Anatomical structure of the human body. Indications and contraindications for the use of a respirator depending on the level of infectious threat
6	Assessment of gloves use technique	Execution of regulatory documents	Anatomical structure of the human body. Indications and contraindications for the use of gloves depending on the level of infectious threat

Below is shown Graphological structure: "Sequence of use of PPE"

Gown → Mask or respirator → Protective glasses or shield → Gloves

Fig. 4.2.8. Sequence of use of PPE

Biological pathogenic agents are divided into four degrees of danger according to the level of their infectious danger (*Table 4.2.2*).

Table 4.2.2

Classification of biological agents

Group 1	Biological pathogenic agent that is unlikely to cause human disease
Group 2	Biological pathogenic agent that can cause human disease and can become dangerous for workers; unlikely to spread in the population; there is usually an effective prevention or treatment
Group 3	Biological pathogenic agent that can cause serious human diseases and pose a serious danger to workers; may pose a risk of spreading in the population, but there is usually effective prevention or treatment
Group 4	Biological pathogenic agent that causes serious illness in humans and poses a serious threat to health care workers; it has a high risk of spreding in the population; as a rule, there is no effective prophylaxis or treatment

NB! All viruses already detected in humans, which have not been evaluated, should be assigned, at least, to group 2, if there is no evidence of a low probability that they can cause disease in humans.

Bibliography:

1. Basic duties and professional actions of nurse in children's hospital: manual for practical classes for 3-rd-year international students of medical faculty / comp. T. V. Frolova, I. I. Tereshchenkova, I. R. Siniaieva et al. Kharkiv : KNMU, 2021. 64 p.
2. Pediatric Physical Examination / O. V. Katilov [et al.]. Vinnytsia : Nova Knyha, 2018. 504 p.
3. Tüzün Y, Wolf R, Bağlam S, Engin B. Diaper (napkin) dermatitis: A fold (intertriginous) dermatosis. *Clin. Dermatol*. 2015;33(4):477-482. DOI: 10.1016/j.clindermatol.2015.04.012
4. Benitez Ojeda AB, Mendez MD. Diaper Dermatitis. In: *Stat Pearls*. Treasure Island (FL): Stat Pearls Publishing; January 31, 2023.

References:

1. How to check Vital Signs (Return Demonstration) https://www.youtube.com/watch?v=iZYtwU-IKAU
2. Infant Vital Signs Pediatric Nursing Assessment Newborn NCLEX Review https://www.youtube.com/watch?v=pXrGIZOLz4k
3. La Leche League International: Disaster: Breastfeeding Is a Life Line
4. La Leche League International: Eight Strategies for Breastfeeding During a Natural Disaster

Навчальне видання

СИМУЛЯЦІЯ ПРАКТИЧНИХ НАВИЧОК ЩОДО ДОГЛЯДУ ЗА ДІТЬМИ В УМОВАХ ПЕДІАТРИЧНОГО СТАЦІОНАРА

Методичні вказівки для підготовки до практичних занять студентів-іноземців 2-го курсу за спеціальністю «Медицина»

Упорядники Фролова Тетяна Володимирівна
Сіняєва Ірина Ревазівна
Терещенкова Ірина Іванівна
Осман Наталія Сергіівна

Відповідальний за випуск І. Р. Сіняєва

Комп'ютерна верстка О. Ю. Лавриненко

Формат А5. Ум. друк. арк. 4.5. Зам. № 25-98.

Редакційно-видавничий відділ
ХНМУ, пр. Науки, 4, м. Харків, 61022
izdatknmurio@gmail.com, vid.redact@knmu.edu.ua

Свідоцтво про внесення суб'єкта видавничої справи до Державного реєстру видавництв, виготівників і розповсюджувачів видавничої продукції серії ДК № 3242 від 18.07.2008 р.