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FEDERAL STATE BUDGETARY EDUCATIONAL INSTITUTION OF HIGHER EDUCATION "ROSTOV STATE MEDICAL UNIVERSITY"

MINISTRY OF HEALTH OF THE RUSSIAN FEDERATION

FACULTY of therapeutic and prophylactic

Evaluation materials

discipline**Immunology**

Specialty 05/31/01 MEDICINE

2023

1. List of competencies formed by the discipline (in full or partially)

Professional (PC):

Code and name general professional specialty	Indicator(s) of achievements of general professional qualifications
PC2. Conducting an assessment patient with interest diagnosis	ID-1 PC2 Able to collect complaints, anamnesis of the patient's life and illness, analyze information received ID-2 PK2 Can justify Necessity and scope laboratory, instrumental research, the need to refer patients to consultations with medical specialists ID-3 PK2 Can interpret the results of the collected information about the patient's morbidity, data obtained during laboratory and/or instrumental examinations, during consultations of patients with specialist doctors. ID-4 PK2 Can The wire differential examination immune-mediated character from other problems

2. Types of assessment materials in accordance with the forms of competencies being carried out.

Name Competencies	Types of assessment materials	number of tasks **for 1 competency**
PC-2	Closed tasks	25 with explosion standards
	Open type tasks: Situational tasks Interview questions Exit assignments	75 with explosion standards

PC-2:

Closed type tasks:

Task 1. Instructions: Choose one correct answer. Indicators of adaptive humoral immunity from wear and tear: 1. Content of immunoglobulins of classes A, M, G in the blood serum.
2. Absolute number of circulating CD4.+- lymphocytes
3. TLR expression on peripheral blood monocytes.
4. Synthesis of reactive oxygen species.
*Standard answer:*1. Content of immunoglobulins of classes A, M, G in blood serum.

Task 2. Instructions: Choose one correct answer. What PIDs are observed in B-cell deficiency 1. Hyper-IgE syndrome

2. Bruton's disease
3. Chronic candidiasis affects the skin.
4. DiGeorge syndrome
Standard answer: 2. Bruton's disease

Task 3. Instructions: Choose one correct answer. Primary immunodeficiencies are
1. A heterogeneous group of genetic diseases, which are based on mutations of various genes of one or more components of the immune system. 2. Acquired clinical immune syndrome, characterized by a decrease in the effector components of the immune system.

3. Specific immunological unresponsiveness of the body.
4. Induced dysfunctions of the immune system due to the causes of exposure.

*Standard answer:*1. A heterogeneous group of genetic diseases, which are based on mutations in specific genes of one or more components of the immune system.

Task 4. Instructions: Choose one correct answer.
The active stage of the autoimmune process is characterized by the following changes in the immune system.
1. Hypergammaglobulinemia IgM, IgG.
2. Properdin content
3. Increased bactericidal activity.
4. Hypogammaglobulinemia.
Standard answer: 1. Hypergammaglobulinemia IgM, IgG.

Task 5. Instructions: Choose one correct answer. Rheumatoid factor is 1. Autoantibodies of the Ig G and/or Ig M class to the Fc fragment of Ig G.
2. Autoantibodies of the Ig G and Ig M classes to the Fc fragment of Ig M.
3. Autoantibodies of the Ig G and/or Ig M class to the Fab fragment of Ig A.
4. Immunoglobulins class D.
Standard answer: 1. Autoantibodies of the Ig G and/or Ig M class to the Fc fragment of Ig G.

Task 6. Instructions: Choose several correct answers.

For active immunization do not use:

1. Live vaccines
2. Kill vaccines
3. Antitoxins
4. Immunoglobulins
5. Recombinant vaccines.
6. Vector vaccines.
7. Specific antibodies.

Standard answer: 1,2,5,6

Task 7. Instructions: Select several incorrect answers Selective IgA deficiency is characterized by

1. Decrease in serum blood level IgA <0.07 g/l.
2. Normal IgG level.
3. Normal IgM level.
4. Decrease in the number of B-lymphocytes.
5. IgM hypogammaglobulinemia.
6. Changes in T-lymphocyte differentiation.
7. Increase in the number of T-lymphocytes.

Standard answer: 1,2,3

Task 8. Instructions: Choose several correct answers.
In the acute phase, with an immediate type of allergy, a pathogenetically significant fixation of IgE antibodies occurs on:

1. Macrophages
2. T-lymphocytes
3. Mast cells
4. Basophils
5. Neutrophils
6. B lymphocytes
7. NK lymphocytes

Standard answer: 3, 4

Task 9. Instructions: Choose several incorrect answers. List cytokines with proinflammatory effects:

1. IL-12
2. TNF
3. IL-10
4. TFR
5. IL-6
6. IL-8

Standard answer: 1,2, 5, 6

Task 10. Instructions: Choose several incorrect answers. Targets for making killers:

1. Gram-positive microbes.
2. Allergens
3. Infected cellular viruses.
4. B lymphocytes
5. Hepatocytes
6. Transformed tumor cells.

7. B lymphocytes
8. CD 95+ cells

*Standard answer:*3,6,8

Task 11. Instructions: Before your statement, which must be replaced with the alternatives given in the table on the right. From the given alternatives, you must choose those that correctly complete the given statement. If you agree with the given alternative, circle the answer “yes” in the table. If you do not agree with the given alternative, circle the answer “no” in the table.

The criteria for CVID are:

Yes	No	inadequate response to vaccination
Yes	No	difficulty swallowing food
Yes	No	absence of isohemagglutinins
Yes	No	reduction in the number of switched memory B cells
Yes	No	decrease in the total level of serum immunoglobulins < 9 g/l
Yes	No	decrease in the total level of serum immunoglobulins < 4.5 g/l
Yes	No	sweating
Yes	No	private sinopulmonary infections
Yes	No	headache
Yes	No	ineffectiveness of standard courses of antibacterial therapy

Correct answer:

Yes	No	inadequate response to vaccination
Yes	**No**	difficulty swallowing food
Yes	No	absence of isohemagglutinins
Yes	No	reduction in the number of switched memory B cells
Yes	**No**	decrease in the total level of serum immunoglobulins < 9 g/l
Yes	No	decrease in the total level of serum immunoglobulins < 4.5 g/l
Yes	**No**	sweating
Yes	No	private sinopulmonary infections
Yes	**No**	headache
Yes	No	ineffectiveness of standard courses of antibacterial therapy to relieve symptoms

Task 12. Instructions: Before your statement, which must be replaced with the alternatives given in the table on the right. From the given alternatives, you must choose those that correctly complete the given statement. If you agree with the given alternative, circle the answer “yes” in the table. If you do not agree with the given alternative, circle the answer “no” in the table.

The alarming consequences of primary immunodeficiencies include:

Yes	No	the need for long-term, sometimes intravenous, antibiotic therapy to relieve infection (up to 2 months and

		longer)
Yes	No	bronchial asthma, persistent
Yes	No	Frequent, severe sinusitis.
Yes	No	severe course of the bronchopulmonary form with frequent relapses.
Yes	No	provide during vaccination with weakened vaccines (BCG, polio).
Yes	No	heaviness after eating
Yes	No	repeated episodes of anaphylaxis
Yes	No	pain in the abdominal area
Yes	No	severe infections suffered at least 2 times (for example, meningitis, osteomyelitis, sepsis)
Yes	No	BKM intolerance
Yes	No	presence of a family history (facts of imminent death from an obstacle)

Correct answer:

Yes	No	the need for long-term, sometimes intravenous, antibiotic therapy to relieve infection (up to 2 months or longer)
Yes	**No**	bronchial asthma, persistent
Yes	No	Frequent, severe sinusitis.
Yes	No	severe course of the bronchopulmonary form with frequent relapses.
Yes	No	provide during vaccination with weakened vaccines (BCG, polio).
Yes	**No**	heaviness after eating
Yes	**No**	repeated episodes of anaphylaxis
Yes	**No**	pain in the abdominal area
Yes	No	severe infections suffered at least 2 times (for example, meningitis, osteomyelitis, sepsis)
Yes	**No**	BKM intolerance
Yes	No	presence of a family history (facts of imminent death from an obstacle)

Task 13. Instructions: Before your statement, which must be replaced with the alternatives given in the table on the right. From the given alternatives, you must choose those that correctly complete the given statement. If you agree with the given alternative, circle the answer “yes” in the table. If you do not agree with the given alternative, circle the answer “no” in the table.

Primary immunodeficiencies with a predominant impairment of antibody synthesis include the following nosologies:

Yes	No	Hyper-IgE syndrome
Yes	No	DiGeorge syndrome
Yes	No	Bruton's disease
Yes	No	Marshall syndrome

Yes	No	Common variable immune deficiency
Yes	No	Louis-Bar syndrome
Yes	No	Transient hypogammaglobulinemia of children
Yes	No	Wiskott-Oldpeach syndrome
Yes	No	Selective IgA immunodeficiency
Yes	No	SCID
Yes	No	NAO

Correct answer:

Yes	**No**	Hyper-IgE syndrome
Yes	**No**	DiGeorge syndrome
Yes	No	Bruton's disease
Yes	**No**	Marshall syndrome
Yes	No	Common variable immune deficiency
Yes	**No**	Louis-Bar syndrome
Yes	No	Transient hypogammaglobulinemia of children
Yes	**No**	Wiskott-Oldpeach syndrome
Yes	No	Selective IgA immunodeficiency
Yes	**No**	SCID
Yes	**No**	NAO

Task 14. Instructions: Before your statement, which must be replaced with the alternatives given in the table on the right. From the given alternatives, you must choose those that correctly complete the given statement. If you agree with the given alternative, circle the answer “yes” in the table. If you do not agree with the given alternative, circle the answer “no” in the table.

Diagnostic signs of hereditary angioedema

Yes	No	the development of edema is induced by mast cell mediators
Yes	No	thickening and thickening in the area of edema is a characteristic sign
Yes	No	fast
Yes	No	swelling duration is 5-8 hours
Yes	No	recurrent dense swelling of the hands and feet lasting from 2 to 5 days
Yes	No	attacks of acute abdominal pain, may be accompanied by diarrhea and vomiting, lasting about 10 hours,
Yes	No	provoking factors for the development of edema can be stress, mechanical impact
Yes	No	effect of the use of systemic corticosteroids, antihistamines
Yes	No	For diagnosis, it is necessary to determine the level of C1-INH, its functional activity and the content of the C4 component.
Yes	No	for the important determination of specific IgE levels
Yes	No	for the important determination of total neutrophil count

Correct answer:

Yes	**No**	the development of edema induces mast cell mediators
Yes	**No**	thickening and thickening in the area of edema is a characteristic sign
Yes	**No**	fast
Yes	**No**	swelling duration is 5-8 hours
Yes	No	recurrent dense swelling of the hands and feet lasting from 2 to 5 days
Yes	No	attacks of acute abdominal pain, may be accompanied by diarrhea and vomiting, lasting about 10 hours,
Yes	No	provoking factors for the development of edema can be stress, mechanical impact
Yes	**No**	effect of the use of systemic corticosteroids, antihistamines
Yes	No	For diagnosis, it is necessary to determine the level of C1-INH, its functional activity and the content of the C4 component.
Yes	**No**	for the important determination of specific IgE levels
Yes	**No**	for the important determination of total neutrophil count

Task 15. Instructions: Before your statement, which must be replaced with the alternatives given in the table on the right. From the given alternatives, you must choose those that correctly complete the given statement. If you agree with the given alternative, circle the answer "yes" in the table. If you do not agree with the given alternative, circle the answer "no" in the table.

Changes in the immune factor during the development of bacterial HIV infection

Yes	No	Lack of distinctive antibodies to HIV antigens
Yes	No	Positive ELISA result for HIV antibody detection
Yes	No	Decrease in the number of peripheral blood monocytes
Yes	No	Decreased C1-INH function
Yes	No	Hypergammaglobulinemia
Yes	No	Inhibition of the production of pro-inflammatory cytokines
Yes	No	Increase in the relative number of CD4+ T lymphocytes
Yes	No	Decrease in the relative content of CD8+ T-lymphocytes
Yes	No	Inversion of CD4+/CD8+ correspondence
Yes	No	Absence of mature B lymphocytes in circulation
Yes	No	Absence of NK in circulation

Correct answer:

Yes	**No**	Lack of distinctive antibodies to HIV antigens
Yes	No	Positive ELISA result for HIV antibody detection
Yes	**No**	Decrease in the number of peripheral blood monocytes
Yes	**No**	Decreased C1-INH function
Yes	No	Hypergammaglobulinemia
Yes	**No**	Inhibition of the production of pro-inflammatory cytokines
Yes	**No**	Increase in the relative number of CD4+ T lymphocytes
Yes	**No**	Decrease in the relative content of CD8+ T-lymphocytes

Yes	No	Inversion of CD4+/CD8+ correspondence
Yes	**No**	Absence of mature B lymphocytes in circulation
Yes	**No**	Absence of NK in circulation

Task 16. Establish a correspondence between the phenotypic characteristics of T-lymphocytes and their decrease:

1. CD3+CD4+	A. T-lymphocytes in the stage of late activation
2. CD3+CD8+	B. T-regulatory lymphocyte (suppressor)
3. CD3+CD4+ CD25+FoxP3+	B. T-lymphocyte helper (inducer)
4. CD3+ HLA DR+	D. Cytotoxic T-lymphocyte

And

Correct answer: 1-B, 2-G, 3-B, 4-A.

Task 17. Establish a correspondence between the cellular elements of the immune system and their regulation.

1. monocytes-macrophages	A. Have antigen-specific suppressor regression
2. killer actions	B. Transforms into plasma antibody-producing cells.
3. B lymphocytes	B. They are antigen-presenting cells that control the processes of phagocytosis.
4. T-regulatory lymphocytes.	G. destroy their own transformed cells (infected, cancerous) regardless of the nature of the damage

Correct answer: 1-B, 2-G, 3-B, 4-A.

Task 18. Establish a correspondence between the humoral factors of the immune system and their regulation.

1. Ig A	A. Surface receptors, a marker of a mature B cell
2. Ig M.	B. basic immunoglobulin chain, transplacental Ig
3.IgG	B. Immunoglobulin of mucous membranes, secretory immunoglobulin, provides mucosal immunity
4.Ig D	G. Pentamer, first synthesized in response to infection

Correct answer: 1-B, 2-G, 3-B, 4-A.

Task 19. Establish a correspondence between a cytokine and its main regulation.

1. Interleukin-4 (IL-4)	A. Anti-inflammatory mediator
2. Interleukin-6 (IL-6)	B. The main mediator of the Th-1 immune response, activates T-effectors, NK.
3. Interleukin-10 (IL-10)	B. The main mediator of the Th-2 immune response, mediates the synthesis of Ig E
4. Interferon-gamma	D. Pro-inflammatory cytokine, mediates the synthesis of CRP, an endogenous pyrogen

Correct answer: 1-B, 2-G, 3-A, 4-B.

Task 20. Establish a correspondence between immunogram parameters and their values in practically healthy adults.

1. Ig A	A. 1-100 IU/ml
2. Ig M.	B. 9-12 g/l
3.IgG	B. 1.1-1.9 g/l
4. Ig E	G. 0.9-1.1 g/l

Correct answer: 1-B, 2-G, 3-B, 4-A.

Task 21. Specify the correct sequence of actions when identifying X-linked agammaglobulinemia.
A. Conducting genetic studies to identify a β-tyrosine kinase defect B. Assessing immune effects.

B. Collection of anamnestic data, identification of possible deaths from the situation D. Collection of complaints and examination of the patient
D. Determination of blood protein fraction levels *Correct answer*: G; IN; D; B; A

Task 22. What is the sequence of actions when diagnosing HAE A. Conducting a study to identify a defect in the SERPING1 gene B. Determining the functional activity of complement component C1
B. Collection of anamnestic data, identification of burns at the NAE clinic among relatives D. Collection of complaints and examination of the patient
D. Determination of the content of component component S4, component inhibitor component S1
Correct answer: G; IN; D; B;A

Task 23. What are the steps to take when preparing to prescribe ASIT in a patient with allergic rhinitis?
A. Choosing the ASIT method
B. Conducting skin tests and/or laboratory diagnosis of a causally significant allergen.

B. Collection of anamnestic data, identifying the connection between the manifestations of rhinitis and the influence of various factors.
D. Collection of complaints and examination of the patient

E. Assessment of deviations for ASIT and allergy diagnostics in vivo
Correct answer: G; IN; D; B; A

Task 24. What is the sequence of movements during a manifested diagnostics of VIDS, chronic herpetic infection?

A. General clinical and biochemical laboratory examination B. Assessment of immune effects

B. Collection of anamnestic data, identification of bacterial immune-mediated structures in relatives.

D. Collection of complaints and examination of the patient

D. Characteristics of the characteristics of antibodies to HSV-1,2; CMV, EBV, HHV-6 *Correct answer*: G; B, B, D, A

Task 25. Specify the correct sequence of actions to determine the autoimmune system.

A. General blood test

B. Biochemical blood parameters, including acute phase indicators and markers of tissue destruction.

B. Collection of anamnestic data, identification of possible cases of AIZ in relatives

D. Collection of complaints and examination of the patient

D. Analysis for the manifestation of autoantibodies and assessment of the immune factor. *Correct answer:*G; IN; D, B, A

Open type tasks:

Task 1.

Boy A., 12 years old. A child from pregnancy, weight in the light of 2500 g, height 50 cm. Physical and neuropsychic development is consistent with age. Preventive vaccinations according to the calendar, without documents. Family history: One of the older brothers died at the age of 5 years after severe pneumonia. The clinical debut of the disease was at the age of 6 years, when recurrent obstructive bronchitis was noted, treated inpatiently for two-second polysegmental pneumonia complicated by pleurisy. Due to the severity of the condition, massive antibacterial therapy and the introduction of fresh frozen food were carried out. He was discharged with an improvement in his condition, but continued to be bothered by a cough with purulent sputum, and periodic rises in temperature. A year later, a diagnostic bronchoscopy was performed and deforming bronchitis with bronchiectasis was discovered. The patient was subsequently hospitalized three times over the next year for two cases of pneumonia. During the interhospital period, symptoms of chronic intoxication were noted, symptoms of cardiopulmonary failure increased, and symptoms of chronic sinusitis were added. When assessing the immune factor: CD3 – 86%, CD4 – 44%, CD8 – 42%, CD16 – 14%, CD19 – 0%, IgA 0.02 g/l, IgM – 0.05 g/l, IgG – 0 .4 g/l. Make a preliminary diagnosis.

*Standard answer:*Primary immunodeficiency. X-linked agammaglobulinemia. Bruton's disease.

Task 2.

A 27-year-old woman was admitted to the clinic with acute lobar pneumonia and herpes zoster. Over the past 5 years, she has been randomly hospitalized with pneumonia. After conservative treatment, the patient was discharged from the clinic in satisfactory condition without any residual symptoms of the disease. IN

No children from birth or frequently recurring infectious diseases of the respiratory system were noted. When collecting anamnesis, it was possible to show that there were episodes of diarrhea that were observed in the patient's adolescence. The examination revealed: Hb level -115 g/l, the content of neutrophils and lymphocytes was within normal limits. No changes in the gastrointestinal tract were detected. When assessing the immune factor: CD3 – 72%, CD4 – 44%, CD8 – 28%, CD16 – 18%, CD19 – 10%, IgA 0.02 g/l, IgM – 0.5 g/l, IgG – 2 .4 g/l. NST spont. 94 years old, NST stim. 152 USD, K steam. 1.5; Central Election Commission – 37 USD Antigen-specific IgG could not be detected, despite the fact that the patient received a booster dose of tetanus vaccine 1 year ago. A preliminary diagnosis was established: "Primary immunodeficiency state. Common variable immune deficiency. Hypogammaglobulinemia." What are the diagnostic criteria for making a diagnosis of "Common variable immune deficiency".

Standard answer: marked decrease in IgG level (in 2 repeated studies in adults – less than 4.5 g/l); inadequate response to vaccination (lack of characteristic antibodies); consequences of the secondary genesis of hypogammaglobulinemia;

Task 3. Patient K., 15 years old, complained of periodic swelling in the face, soft tissues of the lower and lower extremities, frequent acute respiratory viral infections, ending in laryngospasms with hospitalization in the ENT department up to 6-8 times a year. From the medical history: since childhood, he has been prone to ARVI up to 6-10 times a year with a protracted form. Swelling in the face, torso and soft tissues of the extremities occurs spontaneously. From chronic diseases: hr. tonsillitis, recurrent laryngitis with a noticeable effect from treatment with antibiotics, antihistamines and glucocorticoids. Allergy history is not burdened. The older brother and dad suffer from recurrent angioedema. Make a preliminary diagnosis.

Standard answer: Primary immunodeficiency state. hereditary angioedema.

Task 4. Patient K. 7 years old. He was taken by ambulance to the emergency department with suspected pneumonia. From the anamnesis: according to the mother, boys often suffer from purulent infections. At 7 months he suffered from bronchiolitis; at 2 years, 3 episodes of otitis media; bilateral conjunctivitis (antibiotic therapy); At the age of 6, purulent sinusitis was diagnosed. Upon examination: the doctor on duty assessed the child's condition as serious. Temperature 39⁰. The boy is lethargic, adynamic, and his emotional tone is sharply reduced. The skin is pale. The cough is frequent and painful. Mixed shortness of breath is evident. Percussion over the lungs on the right reveals dullness of the pulmonary sound from the scapular spine downward and anteriorly, turning into dullness and spreading to the anterior axillary line. Breathing over the area of shortening of the sound is weakened, in the interscapular area there are single creping rales. With additional examinations (assessment of immune effects): CD3 – 80%, CD4 – 44%, CD8 – 35%, CD16 – 18%, CD19 – 9%, IgA 0.2 g/l, IgM – 0.5 g/l , IgG – 3.4 g/l. A preliminary immunological diagnosis was established: Primary immunodeficiency state. Common variable immune deficiency. Hypogammaglobulinemia. Which variant of primary immunodeficiency does this nasology relate to?

*Standard answer:*Immunodeficiencies with exclusive deficiency of antibody synthesis.

Task 5. The patient, 19 years old, has been smoking since he was 11 years old, was referred from the tuberculosis clinic to clarify the diagnosis. From the anamnesis: in childhood I was often sick, including all childhood infections. At the age of 15 he was convicted and served in juvenile detention. Within 3 months of staying in natural I became ill

obstructive purulent bronchitis, sinusitis, otitis. The R-gram revealed focal pneumonia in the lobe of the left lung. The patient received drug therapy, but over the course of 2 years suffered pneumonia 3 times in the lobes of the left lung. After another exacerbation, the patient transferred to the tuberculosis institute, where he received massive specific therapy, but subfibrolites, weakness, sweating, enlarged cervical and axillary lymph nodes remained, and the fraction of γ-globulins in the blood serum was significantly reduced. A preliminary immunological diagnosis was established: Primary immunodeficiency state. Hypogammaglobulinemia. Which variant of primary immunodeficiency does this nosology belong to? Name the various faults.

*Standard answer:*Immunodeficiencies with exclusive deficiency of antibody synthesis.

1. Selective deficiency of immunoglobulin A.
2. Common variable immune deficiency.
3. X-linked agammaglobulinemia. Bruton's disease.

Task 6. Boy 2 years old. The mother complains of frequent acute respiratory infections in the child, with frequent bronchitis, the presence of pyoderma, plantar warts, herpetic rashes on the lips once every 2-3 months. The child's appearance is a "fish-shaped" mouth, low-set ears, Mongoloid eyes. There is a history of convulsive syndrome. On physical examination: congenital malformation of the cardiovascular system - aortic arch extended to the right side (Tetralogy of Fallot), underdevelopment of the thymus. Laboratory data: leukocytes - 5.3 x 10^9/l, lymphocytes - absolute number 0.6 x 10^9/l. Make a preliminary diagnosis?

Standard answer: Preliminary diagnosis: Primary immunodeficiency state of insufficiency of the cellular component of the immune system - DiGeorge Syndrome.

Task 7. Patient V., 21 years old, was hospitalized urgently with swelling of the face (lips, chin), spreading to the neck and increasing symptoms, difficulty breathing, hoarseness, barking cough. No rashes were detected, there was no hearing. The swelling increased and gradually progressed after dental treatment (tooth extraction), after which approximately 36 hours had passed. The emergency medical team included prednisolone 90 mg, suprastin 1%-2 ml - all without effect. I haven't noted any episodes of these events in the past, incl. local anesthesiologists. There are no allergy sufferers among my relatives, but my grandmothers had similar severe swelling; she died of laryngeal edema at the age of 45. Objectively: the condition is serious, temperature 37.2. Skin and mucous membranes have natural color and moisture. Swelling of the lower part of the face - lips, chin, neck, indistinguishable in color from healthy areas of the skin. There are no rashes or scratches. The mucous membrane of the oral cavity, palate, and uvula is swollen, traditional, color without plaques or rashes. NPV-26 per minute, AP-110/60. The heart tones are shining and pure. Inhaled breathing is external, with difficulty breathing, vesicular, without local changes. The abdomen is soft and painless. The liver and spleen are not enlarged. A preliminary diagnosis has been established: Primary immunodeficiency state. Hereditary angioedema. How much additional laboratory testing is needed in a particular clinical situation?

Standard answer: Laboratory reasons: 1) level of C4 component of the complement system.
2) level and functional activity of the C1 inhibitor,
3) antibodies to C1 inhibitor
4) genetic research

Problem 8. The parents of a two-year-old boy came to the clinic to see their child. At the age of 10 months, a malformation of the aorta was detected. The child often suffers from infectious diseases. Six months ago I was treated for pneumonia. Two months ago, otitis media was diagnosed, which developed against the background of bronchitis. In the first days of life, roads periodically approach. Currently he is being treated for candidiasis, the development of which his parents associate with long-term antibiotic therapy. Observed by an endocrinologist due to insufficiency of the parathyroid glands. The child has low nutrition, the ears are low, the eyes are slanted, the bridge of the nose is wide. The examination revealed thymic hypoplasia and lymphocytopenia. A preliminary diagnosis has been established. Primary immunodeficiency. Di Giorgia syndrome. Name the diagnostic DiJoggia syndromes.

Standard answer: decrease/absence of CD3+ T-lymphocytes during the first three years of life; congenital malformations (heart); a\hypoplasia of the thymus; hypocalcemia; deletion of chromosome 22q11.2.

Task 9. A 20-year-old female patient was admitted to the emergency department with complaints of swelling of the face, tongue, and skin of the ears. From the anamnesis it is known that the complaints appeared after severe emotional stress. Also, over the last year, swelling of the forearms and legs was periodically observed, which provoked injuries (the patient plays in a student handball team), reached large sizes by the third day, and gradually went away on their own. There is no allergic history. Family history: The patient's grandfather suffered from some kind of edema of young age. On examination: the skin and mucous membranes are of normal color. The area of the face and ears is significantly expanded due to pronounced swelling, which does not decrease when the finger is placed on the indentations. A preliminary diagnosis has been established: Primary immunodeficiency state. Hereditary angioedema. What conditions need to be addressed in a differential diagnostic search in this clinical situation?*Standard answer:*Allergic angioedema (histamine); extractive angioedema (against the background of autoimmune, lymphoproliferative, oncopathology); hypothyroidism; Rossolimo-Melkersson syndrome; drug intolerance; uricary vasculitis; hypoproteinemia; cirrhosis of the liver.

Problem 10. Boy M., 13 months. The child from the first pregnancy was born at term. Was breastfed for up to 6 months. Physical and neuropsychic development lags behind age. Preventive vaccinations are not necessary. From the anamnesis it is known that the child suffered from pneumonia at the age of 7 months. Due to the severity of the condition, massive antibacterial therapy was carried out with loud dynamics. Repeatedly suffered pneumonia at 12 months, complicated by purulent otitis. Laboratory testing revealed a decrease in the concentration of globulins in the proteinogram (1 g/l). A preliminary diagnosis has been established. Primary humoral immunodeficiency. What additional laboratory tests need to be reinstated.

Standard answer: Assessment of immune effects (CD3+, CD4+, CD8+, CD16+, CD19+, IgA, IgM, IgG, CEC, phagocytic activity of neutrophils in the NBT test).

Problem 11. Boy, 1 year 2 months. He was admitted to the purulent surgery department of a children's hospital with an extensive abscess in the right gluteal region and an increase in body temperature to 39.5°C. There is a pustular rash on the skin, recurrent and difficult to respond to antibiotic therapy. He suffered from bacterial pneumonia, local BCG vaccine infection, and purulent lymphadenitis. On examination: delayed physical development, cookies +4 cm, enlarged spleen. During laboratory

examinations: general blood test - leukocytes - 12x10⁹/l, segmented neutrophils 75%, ESR 20 mm/hour; in the immunogram - IgG 14 g/l, IgA 1.5 g/l, IgM 1.3 g/l. A preliminary diagnosis has been established: Primary immunodeficiency, unspecified. Disorders in which part of the immune system would you expect to be diagnosed?
*Standard answer*The above diseases (soft tissue abscess, pustular rash, difficult to respond to antibacterial therapy, local vaccine BCG infection, purulent lymphadenitis) are characteristic of disorders in the phagocytic component of the immune system.

Problem 12. Boy K., 15 years old. He was born full term and the pregnancy proceeded normally. Preventive vaccination - on time and without the state. Complains of periodic dry cough, fever up to subfebrile levels. From the anamnesis it is known that up to three years of age, uncomplicated acute respiratory infections occurred up to 8 times a year. At the age of 4 years, he was admitted to the hospital with a diagnosis of bilateral polysegmental pneumonia. Massive antibacterial therapy and transfusion of intravenous immunoglobulin were carried out (without determining the levels of serum immunoglobulins). Over the last year, acute respiratory infections have been noted up to 1-2 times a month, complicated by sinusitis. Regarding taking broad-spectrum antibacterial drugs up to 6 times a year.

Immunogram data:

Lymphocytes%			Immunoglobulins g/l	
Leukocytes 10x9/l			IgA	0.04
Population and subpopulation of lymphocytes			IgM	1.5
	%	Abs.	IgG	12.1
CD3	76			
CD4	45		NST test (cu)	
CD8	28		NST sp.	80
CD16	12		NST Art.	156
CD19	14			

Make a preliminary diagnosis.
Standard answer: Selective immunoglobulin A deficiency.

Problem 13. A 60-year-old patient was hospitalized by ambulance in the otolaryngology department due to new swelling of the neck. The swelling grew gradually, at the time of examination there was no redness, the skin over the area of edema was cold and pale. It is known that 2 years ago he underwent a liver transplant for cirrhosis and is receiving therapy with immunosuppressants (cytostatics). He is being observed by a cardiologist for hypertension and coronary heart disease (takes ACE inhibitors, beta-blockers, statins, antiplatelet agents). An ambulance paramedic administered 12 mg of dexamethasone intravenously without effect. At the time of hospitalization, the patient is moderately adequate. The condition is severe (due to the localization of angioedema). The skin is pale. On the surface of the front of the neck there is soft tissue swelling, pale, painless, no rashes, no eyeball. Vesicular breathing into the lungs, no wheezing. Heart sounds are rhythmic and muffled. Heart rate - 72 per minute, blood pressure 160/90 mm Hg. Art. The abdomen is soft and painless. The liver and spleen are not enlarged. A preliminary diagnosis was made: Acquired angioedema. Carry out additional laboratory tests.

*Standard answer:*Laboratory findings:
1) level of C4 component of the complement system.
2) level and functional activity of the C1 inhibitor,
3) C1q concentration

Problem 14. A 72-year-old woman received corticosteroid treatment for giant cell arteritis for 6 months. During the therapy period, the patient experienced painful blistering rashes in the supraorbital region, along the trigeminal nerve on the right, three times. Despite the fact that each of the attacks of recurrent herpes zoster was successfully stopped by oral administration of acyclovir in the patient, after each relapse of the viral infection, signs of postherpetic neuralgia were noted. Currently, there are single blistering rashes above the right eye socket on the skin of the forehead, painful. Pain in the head on the right with radiation to the right eye and teeth on the right. When assessing the immune factor: CD3 – 61%, CD4 – 29%, CD8 – 31%, CD16 – 18%, CD19 – 20% Ig A – 2.4 g/l, IgM – 1.6 g/l, IgG – 14.1 g/l, CEC 160 USD A preliminary diagnosis was made: Giant cell arteritis. Herpes zoster, vesicular form, exacerbation. Trigeminal neuralgia. Secondary immunodeficiency state. What are the possible reasons for the reactivation of herpesvirus infection in this patient?

Standard answer: in this clinical situation, there is a conservative use of glucocorticosteroids, which has a depressing effect on the immune patient, which is possible, and therefore, for the activation of herpetic infection.

Task 15. Patient S., 22 years old. Complaints of fatigue, weakness, headache, low-grade fever. A month ago there was casual sexual contact, 2 weeks after which symptoms of genital herpes appeared. In connection with this they sought medical help. A preliminary diagnosis has been established: Primary herpetic infection of the genital organs, localized form, mild severity. Name the methods for diagnosing herpes virus infection.

Standard answer: Methods for diagnosing herpes virus infection.
1) Virological
2) Serological
3) Molecular genetic (PCR)
4) Immunofluorescent
5) Immunocytochemical

Problem 16. Patient K., 35 years old, works as an IT specialist, went to the clinic. Over the past year, there have been complaints of constant fatigue and decreased performance. Notes impaired memory integrity, physical fatigue, muscle pain. Over the last 3 days, the patient has developed a vesicular-papular rash on the lip border after a short low-grade fever, and enlarged cervical lymph nodes. Doesn't take medications. A preliminary diagnosis was established: acute herpetic infection (labial), localized form, mild severity. Formulate a damage plan.

Standard answer: Examination plan: OBC, OAM, Biochemical blood test; Assessment of the immune factor (CD3+, CD4+, CD8+, CD16+, CD19+, IgA, IgM, IgG, CEC, phagocytic activity of neutrophils in the NCT test).

Problem 17. Patient B., 17 years old. Complaints about private ARVI. Suffers from chronic rhinosinusitis, chronic tonsillitis with frequent exacerbations. In the last six months, there were mechanical boils on the upper and heavy limbs, on the back, and near the chest, which were treated surgically. Sent by surgeon for examination.

Immune impact assessment data: CD3 - 61%, CD4 - 35%, CD8 - 26%, CD16 - 11%, CD19 - 18%, Ig A - 0.5 g/l, IgM - 1.2 g/l, IgG . – 14.3 g/l, CEC 150 USD, NST spontaneous. 80 USD, NST stim. 160 years old A preliminary diagnosis has been established: Recurrent furunculosis. Chronic rhinosinusitis. Secondary immunodeficiency state by cellular type. Make a plan for additional concern for the patient.

Standard answer: Additional studies: CBC, OAM, biochemical blood test, necessarily blood glucose, glycosylated hemoglobin; bacteriological culture from the nose, pharynx, discharged boil with determination of sensitivity to antibiotics.

Problem 18. A 25-year-old patient, 2 months ago suffered from severe tonsillitis and tracheobronchitis, for which a course of antibacterial therapy is prescribed. From the anamnesis: after graduating from university 2 years ago, he began working as a teacher in an elementary school and often suffered from ARVI. He rarely sought medical help and treated himself. After a course of antibiotic therapy, there is general weakness, periodic sore throat, and in the evening the body temperature rises to 37.2-37.40. For additional examinations: ELISA: IgM to CMV - serum OD – 0.3, OD critical. – 0.28, avidity of the IgG index to CMV 36%, avidity of the IgG index to HSV 1 and 2 92%, no antibodies to EBV. Make a preliminary diagnosis.

Standard answer: Preliminary diagnosis: acquired, Cytomegalovirus infection, acute form, mild degree.

Problem 19. Patient, 29 years old. Suffering from chronic prostatitis after suffering mycoplasma and trichomes 2 years ago**O**over infection. He was treated by a urologist, but the effect of the therapy was inconsistent. Over the past year, there have been 3 casual unprotected sexual contacts. Complaints of weakness, fatigue, headaches, periodic rises in temperature to low-grade levels, enlarged inguinal lymph nodes, constant sore throat. Over the past year, an increase in frequency (once a month) and worsening of the course of labial herpes has been noted (long-lasting, more than 7 days, non-healing ulcers on the lips, despite taking acyclovir in therapeutic dosages and local provoviral ointments). When assessing the immune factor: CD3 – 41%, CD4 – 17%, CD8 – 23%, CD16 – 22%, CD19 – 20% Ig A 2.8 g/l, IgM – 1.8 g/l, IgG – 14 . 8 g/l, CEC 190 USD, NST spontaneous. 98 USD, NST stim. 140 USD

What infectious pathology needs to be first (confirmed) in this patient.

*Standard answer:*HIV infection.

Problem 20. A 37-year-old woman sought medical help due to a sharp decrease in weight and periodic rises in body temperature in the evening to 37.5.0C. From the anamnesis it is known that about six months ago the patient received a blood transfusion for acute gastrointestinal tract problems. Upon examination: palpation reveals an increase in the submandibular, axillary and inguinal lymph nodes. White spots appear in the oral cavity. An immunogram was performed: CD3 – 48%, CD4 – 10%, CD8 – 36%, CD16 – 29%, CD19 – 19% Ig A 3.2 g/l, IgM – 2.8 g/l, IgG – 13.9 g/l, CEC 150 USD, NST spontaneous. 80 USD, NST stim. 120 USD A preliminary diagnosis has been made: AIDS. Based on what changes in the immune status can one assume the presence of HIV infection?

*Standard answer:*CD4+ T lymphocytes are the main targets of HIV, so a decrease in this trend in laboratory examination is a reason for further diagnostic testing (immunoblot).

Problem 21. Patient K., 17 years old. Complaints of increased fatigue, lethargy, irritability, often suffering from ARVI with sore throat, increased body temperature

up to 38₀For which he repeatedly received antibacterial therapy (semi-synthetic penicillins, cephalosporins). Objectively: the skin is clean, pale, there are single vesicular rashes on the upper lip, painful. The tonsils are enlarged, hyperemic, and there are no plaques. The occipital and submandibular lymph nodes enlarge to the size of a bean. In the UAC there is lymphocytosis, moderate leukocytosis. Immune impact assessment data: CD3 – 63%, CD4 – 32%, CD8 – 30%, CD16 – 18%, CD19 – 20% Ig A – 2.1 g/l, IgM – 1.4 g/l, IgG – 13.5 g/l (according to Mancini), CEC 50 USD, NST spontaneous. 70 years old, NST stim. 130 USD A preliminary diagnosis has been established: Acute herpetic gingivitis and pharyngotonsillitis, mild course, localized form. Secondary immunodeficiency state. Assess the immune effect.

*Standard answer:*Assessment of the immune effect according to the immunogram: inhibition of the acceleration process of T-lymphocytes (CD3 - 63%), disruption of their differentiation processes, decrease in the immunoregulatory index (IRI = 1.1). There is an increase in the content of natural killer cells (CD16 - 18%), B-lymphocytes (CD19 - 22%), and the main classes of immunoglobulins. The spontaneous phagocytic activity of neutrophils in the NCT test is suppressed.

Problem 22. A 5-year-old patient suffered a severe sore throat and tracheobronchitis 2 months ago, for which he was hospitalized in the infectious diseases department, where he underwent a course of antibacterial therapy. From the anamnesis: from the age of 2, I started Aliexpress kindergarten and began to often suffer from ARVI. They rarely sought medical help and treated themselves. After treatment in the infectious diseases department, general weakness is observed, sore throat periodically occurs, and in the evening the body temperature rises to 37.2-37.4C.₀. For additional examinations: ELISA: IgM to CMV - serum OD – 0.3, OD critical. – 0.28, IgG avidity index to CMV 36%, antibodies to HSV, EBV are absent. Make a preliminary diagnosis.

*Standard answer:*Preliminary diagnosis: Cytomegalovirus. infection, consciousness, acute form, mild degree.

Problem 23. A patient, 7 years old, 5 months ago, suffered from infectious mononucleosis and was treated as an outpatient. During this time, I suffered from acute respiratory viral infection twice, and suffered from lacunar tonsillitis twice, with 8% of atypical mononuclear cells detected in a blood test. On examination, the patient was in moderate condition, temperature 37.4°C. There is moderate congestion without discharge, tonsillar lymph nodes up to 2 cm, posterior cervical lymph nodes up to 1.5 cm. Liver +1 cm, spleen +1 cm. Clinical blood test: hemoglobin 115 g/l, leukemia - 6.5 x 109/l, p/i-2%, s/i-28%, l-60%, m-10%, atypical mononuclear cells - not detected. , ESR 12 mm/hour. Serological examination showed IgM VCA (+), IgG EA (+), IgG NA (+). Positive result for EBV DNA in blood lymphocytes and saliva in PCR. A preliminary diagnosis has been established: Epstein-Barr infectious mononucleosis of viral etiology, prolonged course with relapses. Describe the pathogenetic features of the infectious process caused by the Epstein-Barr virus.

Standard answer: Definite transformation and uncontrolled proliferation.
infected B lymphocytes due to disturbances in their apoptosis. In conditions of suppression of the T-cell immunity, this ensures lifelong persistence of the virus, the development of malignant tumors, and autoimmune diseases.

Problem 24. A 10-year-old child often has blistering rashes on the lips and around the nose, more often after hypothermia or prolonged exposure to insolation. The rash is accompanied by malaise and an increase in body temperature to 37.1C.₀. The bubbles, after lasting 2-3 days, burst, forming erosions. On physical examination of the skin

on the face in the area of the nasolabial triangle there are single vesicles, painful on palpation. Against the background of a hyperemic lower lip, an ulceration of 3-4 mm in diameter is observed, painful when food enters. The submandibular lymph nodes are painless, enlarged and not fused to each other or to individual tissues. Body temperature 36.5$_0$C. No pathologies from other organs and systems were identified. Make a preliminary diagnosis?

*Standard answer:*Preliminary diagnosis: Chronic persistent herpesvirus - immune infection, reactivation. Acute herpetic gingivostomatitis, localized form, mild severity.

Problem 25. Patient V., 25 years old, complains of weakness, headache, sore throat, aphthous rashes on the opening upper lips, low-grade fever that arose after an acute respiratory viral infection and persisted for 3 weeks. Suffers from labial herpes, recurrent aphthous stomatitis. Over the past six months, I have noticed 4 episodes of rashes lasting 5-7 days. In connection with this, she sought medical help. A preliminary diagnosis has been established: Chronic persistent herpesvirus infection. Acute gingivostomatitis. Leave the differential diagnostic search.

Standard answer: differential diagnostic search: fungal infections (candidiasis), bacterial infections (staphylococci, streptococci); parasitic infections; HIV infection; syphilis; tuberculosis; pegeria infection; allergens (food allergies); chronic diseases (diabetes mellitus; anemia; gastrointestinal disease).

Problem 26. A 25-year-old female patient came in due to 3 interrupted pregnancies at 6, 8 and 24 weeks. According to the presented medical documentation, after the second interrupted pregnancy, she was treated for recurrent EBV infection and received a course (10 days) of interferon therapy and valacyclovir. Despite the fact that the next pregnancy ended at 24 weeks, with the death of a morphologically healthy fetus. From the anamnesis: the patient's brother died at the age of 20 from a stroke. The patient has suffered from migraines since childhood, for which she is seen by a neurologist on an outpatient basis. A preliminary diagnosis has been established: Primary antiphospholipid syndrome. Habitual miscarriage. Name the serological markers used to diagnose antiphospholipid syndrome.

Standard answer: Serological markers of antiphospholipid syndrome: 1). Antibodies to cardiolipin isotypes IgG or IgM.
2). Antibodies to β2-glycoprotein IgG and/or IgM isotypes.
3). Lupus anticoagulant
Markers must be identified on two or more study occasions at least 12 weeks apart.

Problem 27. Patient P., 4 years old. Complaints about private ARVI 6-10 times a year (the child does not attend kindergarten), of a protracted nature, poor weight gain in the child, decreased appetite, bowel disorders such as persistent constipation. Repeatedly treated by gastroenterologists and pediatricians without effect. Objectively: The skin is pale. Reduced nutrition. Psycho-emotional development in accordance with age. Lymph nodes accessible to palpation are not enlarged. Hyperemia of the palatine arches. The tongue is moist and covered with a white coating. The stomach is swollen. Palpation of the abdomen is slightly painful along the large intestine. Diuresis is adequate. Stool once every 5-7 days after

enemas. During the examination: CBC: red blood cells 3.6 x 1012/l, hemoglobin 96 g/l; serum iron 4.0 μmol/l; Ig G to HSV - avidity index 86%, Ig G to CMV - avidity index 86%, no antibodies to EBV, ANCA, ASCA - negative, Ig A to gliadin 2.5 U/ml (normal up to 12 U/ml), Ig G to gliadin 96 g/l (normal up to 25 g/l). A preliminary diagnosis has been established: Celiac disease (gluten enteropathy), period of manifestation. Iron-deficiency anemia. What is the mandatory scope of immunological examination for suspected celiac disease (celiac enteropathy).

*Standard answer:*antibodies to tissue transglutaminase, to endomysium, to deaminated gliadin peptides.

Problem 28. A 33-year-old female patient complains of pain in the metacarpophalangeal joints, difficulty starting to clench her hands into fists in the morning, weakness, and periodic sensitivity of her fingertips to cold. The above symptoms appeared approximately 4 weeks ago after hypothermia. Objectively: body temperature 36.7°C. Symmetrical swelling of all metacarpophalangeal hands, pain during passive movements in the metacarpophalangeal and proximal interphalangeal joints, a positive symptom of compression of the foot, whitening of the distal phalanges of the fingers in the cold, alternating with blueness in the heat. Blood tests: leukocytes – 7.5x109/l, ESR – 38 mm/h. ANF – negative. Rheumatoid factor – negative. Make a preliminary diagnosis?*Standard answer*: Preliminary diagnosis: Rheumatoid arthritis, seronegative, II degree of activity, functional failure I degree. Raynaud's syndrome.

Problem 29. Patient A., 45 years old, complains of severe pain when walking in the right knee and hip joints, intensifying towards the end of the day, a decrease in the range of motion in the right hip joint. From the medical history: he has been suffering from chronic prostatitis with frequent exacerbations for 10 years, joint pain has been bothering him for the last 3 years, and 6 months ago he suffered from purulent conjunctivitis. Without examination, he periodically takes NSAIDs with effect. He denies any injuries. Objectively: Local pain on palpation of the right hip joint. The range of active movements is limited due to pain. The remaining connections are without external connections. A preliminary diagnosis was made: Reactive arthritis of the right hip joint. Urethro-oculosynovial syndrome (Reiter's disease) Chronic prostatitis. What infection and what immunological diseases should be diagnosed in this case?

Standard answer: Chlamydia trachomatis infection: IgA, IgM, IgG to chlamydia trachomatis, antibodies (IgG) to outer membrane protein momp, plasmidial protein pgp3, heat shock protein hsp60 chlamydia trachomatis. Additionally, PCR of ureteric discharge is indicated.

Task 30. A 58-year-old woman sought medical help, suffering for the last 4 years from a paroxysmal cough with scanty sputum, frequent febrile fever, lack of a lasting effect from multiple courses of antibiotic therapy, the use of antileukotriene drugs and inhaled glucocorticosteroids (and therefore was treated several times). . inpatient treatment, was constantly monitored on an outpatient basis). From the anamnesis: heredity is aggravated (mother has bronchial asthma); Myalgia and arthralgia have been a concern since childhood; during year-round treatment of rhinitis. During examination: blood eosinophilia 11-12%, sputum 50-99%, IgE – 163 IU/ml. There is no data for helminthic infestation, infection with chlamydia and mycoplasma pneumonia, or activation of herpes group viruses. External respiration function: FEV1-31%, Tiffno index – 51.3, bronchodilator test is positive.

Radiographically, there is a parietal darkening in the maxillary sinuses, and a subtotal darkening in the frontal sinus on the left. With spiral tomography, ground glass changes occur in the first segments of the brain. Fibrotracheobronchoscopy revealed signs of mucous endobronchitis. In addition, bacteriological culture of sputum and identification of specific IgE to Aspergillus fumigates were performed, excluding allergic bronchopulmonary aspergillosis. Determination of signs of IgE (ImmunoCap) to a mixture of allergens of weeds, meadow grasses, tree allergens, epidermal allergens, house dust mites, Alternaria - negative. She was examined by a neurologist and diagnosed with severe muscular-tonic syndrome and essential tremor. Make a preliminary diagnosis?

Italian reactions: Preliminary diagnosis: Systemic eosinophilic vasculitis (Churg-Strauss syndrome), chronic progression during.

Problem 31. Patient K., 44 years old, has severe pain in the proximal interphalangeal joints in the hands, wrist and ankle joints in a state of instability, limited mobility, stiffness in these joints in the morning until 2 o'clock, convulsions, paresthesia of the upper extremities, general weakness and malaise. According to the medical history, the disease, pain and swelling in the proximal interphalangeal joints of the hands arose about 5 years ago, with morning stiffness for 1 hour and limited mobility. Then, during the course of the disease (within 2 years), the wrist and ankle joints were involved with the occurrence of prolonged morning stiffness. Periodically increase body temperature to 37.8°C and pain occurs in the nails of the phalanges of the fingers. Over the past year I have reduced my weight by 12 kg. A preliminary diagnosis has been established: Rheumatoid arthritis. Name the classification criteria for rheumatoid arthritis.

Standard answer: ACR/EULAR 2010 classification criteria for rheumatoid arthritis:

A. Clinical signs of damage to the joints (swelling and/or pain during objective testing) (0-5 points)

B. RF and ACDC tests (0-3 points, at least 1 test required)
C. Acute phase indicators (0-1 point, at least 1 test required)
D. Duration of synovitis (0-1 point)

Problem 32. The patient, 21 years old, a flight attendant, was admitted to the intensive care unit of the OKB with complaints of swelling of the legs and face, and an increase in temperature to 38.5°C. The patient developed three boils from May to August, the last one in the groin area, after opening which a copious purulent discharge was obtained. During treatment with ampicillin, skin rash and hearing loss appeared. Subsequently, anemia, acute renal failure, formation of ESR, and leukopenia developed, for which the patient was treated in a district hospital. Upon admission: TAM: protein - 0.66%, sugar - none, leukemia - up to 10 in the field of view. UAC: Er-2.8x1012/l; Hb – 60g\l; ESR-75 mm/hour; lake-2x10^{9}/l; p/o - 12%; C – 37%; M - 7%; Lf - 8%. Immunogram: CD3+ - 52%; CD4+ – 35%; CD8+ - 17%; CD16+ - 16%; CD20+ – 24%; IgM – 0.9 g/l; IgG – 7.0 g/l; IgA – 1.2 g/l. Make a preliminary diagnosis.

Standard answer: Non-specific septicemia, secondary immunodeficiency of mixed type.

Problem 33. Patient D., 4 years old, came to the clinic on the 6th day with complaints of increased body temperature to 38.9, weakness, rash, nasal congestion, snoring during sleep and sore throat. We were treated at home with antibiotics (amoxicillin). Objectively: temperature 38.6, condition of moderate severity. On examination: the skin is pale with maculopapular elements in the cheeks, forearms, and thighs; at

examination of the pharynx - enlarged tonsils with white overlay in the lacunae; enlarged anterior cervical and posterior cervical lymph nodes are palpated. The abdomen is soft and painless on palpation, the liver protrudes from under the edge of the costal arch by 1.5 cm, the spleen by 1 cm. Stool and urination are normal. A preliminary diagnosis has been established: Infectious mononucleosis, typical form, moderate severity. Make a plan for additional inspections.

*Standard answer:*Additional studies: Enzyme immunoassay: HSV.1 and 2, CMV - IgM, IgG, avidity index; EBV – IgM, IgG VCA, IgG EA, IgG NA, degree of immune effect.

Problem 34. A 41-year-old man complained of the gradual development of swelling of the lips, eyelids and slight swelling of the tongue, difficulty breathing after a minor injury to the oral cavity. After intramuscular injection of 8 mg of dexamethasone, the swelling disappeared only in the evening of the next day. Upon examination, no deviations from the norm were identified. From the anamnesis: for several years in a row there have been episodes of increased blood pressure, for the relief of which captopril is taken. For this reason, they did not contact a specialist; the drug was selected independently. None of my relatives made such complaints. A preliminary diagnosis was made: Angioedema, unspecified. Carry out additional laboratory tests.

*Standard answer:*Laboratory findings:
1) level of C4 component of the complement system.
2) level and functional activity of the C1 inhibitor,
3) C1q concentration

Problem 35. During a tooth extraction in a 32-year-old patient in a dental office, after the administration of Ultracaine, symptoms such as severe pallor of the skin, politeness, cold pot, difficulty breathing, dizziness, and palpitations appeared. Blood pressure - 60/20 mm Hg. art, pulse - 100 per minute. A preliminary diagnosis was established: Anaphylactic shock. What type of reaction is anaphylactic shock?

Standard answer: Anaphylactic shock is associated with IgE-mediated allergic reactions (instant hypersensitivity). When the antigen is re-introduced in a previously sensitized mechanism, mast cells degranulate and biological active substances are released - histamine, serotonin, acetylcholine, kinins, heparin, prostaglandins, etc., which leads to a generalized vasodilation of the blood vessels and the absence of vasopressive substances.

Problem 36. An ambulance team was called for a 6-year-old boy. 1 hour after the injection of okpa-sodium (ampicillin + oxacillin) (prescribed for the treatment of pneumonia in a local pediatrician), a magnetic rash appeared all over the body, a sharp headache, difficulty breathing. From the anamnesis it is known that at the age of 2 years the child fell ill with mild purulent otitis, was treated with Augmentin, to which there was a reaction in the form of a significant allergic reaction that occurred after taking cetirizine. When examining the child, it is necessary to slow down. There is a urticarial rash on the skin of the trunk and limbs. Difficulty in exhaling, respiratory rate - 46 in 1 minute. Auscultatory breathing continued evenly in the direction of scattered fine bubbling and crepitating rales. The boundaries of the heart are not expanded, the tones are muffled. The pulse is thread-like, with a frequency of 140 per minute. Blood pressure – 70/30 mm Hg. Art. The abdomen is soft and painless on palpation. Free urination. A preliminary diagnosis has been established. Define the concept of “anaphylactic shock”.

*Standard answer:*Anaphylactic shock of moderate severity. Drug allergies (penicillins). Anaphylactic shock (AS) is acute circulatory failure as a result of anaphylaxis, which continues with a decrease in systolic blood pressure (BP) below 90 mmHg. Art. or 30% of the operating level and leading to hypoxia of vital organs.

Task 37. Calling an ambulance paramedic to your home. A 35-year-old patient complains of high fever, runny nose, body aches, headaches, weakness, painful spots and ulcers on the body. I got sick 3 days ago and took aspirin as prescribed by my local doctor. On the 2nd day after taking aspirin, first painful red spots appeared on the skin, then blisters and ulcers. Objectively: the patient's condition is serious, temperature 38.5°. On the skin of the back in the armpits, in the groin areas, multiple painful erythemas, blisters, erosions. The affected skin looks like scalded boiling water. The mucous membrane of the oral cavity is sharply hyperemic, and there are erosions in places. NPV - 26 per minute, blood pressure

- 110/60, pulse - 110 beats per minute, rhythmic. The abdomen is soft and painless.
Presumable diagnosis: Lyell's syndrome (acute epidermal necrolysis). Describe this state of immunopathogenesis.
Standard answer: The main pathogenetic mechanism of acute toxicity
allergic syndrome is the development of nonspecific generalized vasculitis (from serous to necrotic) as a result of types III and IV allergic causes, the role of a hapten of which is a drug that is fixed on mucous proteins and skin.

Problem 38. A 25-year-old patient came to see an allergist-immunologist. Complaints: watery nasal discharge, nasal congestion, redness, lacrimation and sound of the eyes, increasing when going outside in July - August. Periodically uses suprastin tablets and vasoconstrictor nasal drops without lasting effect. Daily activity during this period is reduced, sleep is slightly disturbed if you sleep with the windows open. Heredity: my father had allergic rhinitis in childhood. Allergy history: food allergy in childhood. The diagnosis was made: Allergic rhinoconjunctivitis, seasonal, intermittent, moderate severity, exacerbation. What type of hypersensitivity underlies the development of allergic rhinitis?

*Standard answer:*Type 1 hypersensitivity reaction: IgE-mediated (instant hypersensitivity).

Problem 39. The parents of a 2-year-old child sought medical help due to suddenly appearing flower spots on the body and swelling of the right ear. The night before the child ate a lot of strawberries. History of urticaria, consumption of tomatoes and citrus fruits in large quantities. If you eat the above foods in small portions and rarely, this will not happen. Objectively: the condition is satisfactory, active, on the extremities of the skin and against the background of visible urticarial rashes, swelling of the soft tissues of the right ear. Vesicular respiration. Heart sounds are rhythmic and sonorous. The abdomen is soft and painless. Chair 1 time in 2 days, decorated, independently. Make a preliminary diagnosis.

Standard answer: Acute urticaria. Angioedema edema. Food intolerance.

Problem 40. A 58-year-old patient, 12 days after the administration of antitetanus serum for a glass cut on his leg, had a fever of 38.$_0$C, a mobile rash has appeared, abdominal pain, discomfort behind the sternum, aching joints,

weakness. Allergy history is not burdened. The diagnosis was made: Serum sickness, moderate, mixed (visceral, articular) form. Explain the mechanism of the observed symptoms.

Standard answer: Based on serum blood disease type III hypersensitivity. In response to the first injection of a vaccine or serum, the algorithm synthesizes characteristic antibodies, which, upon repeated contact with the allergen, provide circulating immune complexes that are fixed on the inner wall of blood vessels, which leads to the activation of complement (C3a, C4a and C5a), which leads to increased permeability. vessels.

Problem 41. Patient M., 54 years old, with end-stage chronic renal failure, due to life circumstances, received a kidney transplant. 10 days after the operation, the patient began to complain of weakness and malaise. Objectively: decreased diuresis, increased serum creatinine levels, proteinuria. Selective renal arteriography did not reveal the presence of a renal fracture in the graft. Ultrasound of the kidney also did not reveal any urinary tract problems. What mechanism can we think about in this case?

Standard answer: Transplant (kidney) rejection reaction. The transformer rejection reaction of type IV and type II developers causes hypersensitivity to Jell and Coombs.

Problem 42. Patient M., 48 years old, was admitted to the allergy department on a referral from a drug treatment clinic. Complaints: as a result of the procedure in the mouth, eyes, the appearance of blisters and dark red spots on the skin, an increase in body temperature to 38°C. From the anamnesis: for 3 days the patient was treated at a narcological clinic for chronic alcoholism (more than 10 medications were prescribed: diazepam, vitamins B1, B6, clodine, etc.). There is no allergic history. Objectively: The general condition is severe, consciousness is clear. The mucous eyelids are hyperemic with erosive and hemorrhagic lesions. When preparing the oral cavity, there are blisters, erosions, and a red border of the lips covered with hemorrhagic crusts. Skin: isolated spots, blisters all over the body, blisters with bright contents on the palms and soles.

limbs. Make a preliminary diagnosis.
Standard attacks: Stevens-Johnson syndrome, moderate course.

Problem 43. Patient L., 48 years old, was admitted to the allergy department with complaints of a single erythematous rash in the area of the left hand and skin hearing. From the anamnesis: the rash appeared 4 days after taking non-steroidal anti-inflammatory drugs (diclofenac) and a B complex of vitamins (milgamma). For the first time, such a rash (in the same place - the back surface of the left hand brush) appeared 3 years ago after taking NSAIDs, and was treated on an outpatient basis. Objectively: skin – on the dorsum of the left hand there is a limited hyperemic spot of d = 6 cm, isolated erythematous rashes are noted in the abdominal skin area. Mucous, clean. Make a preliminary diagnosis.

Standard attacks: Fixed dermatitis of the hand area of the hands of exogenous etiology (drug, diclofenac).

Problem 44. A 40-year-old patient developed dizziness and blurred vision after 15 minutes of intravenous excretory urography; after 2 minutes he stopped answering questions and lost consciousness. Objectively: the skin is pale,

pulse 32/min, blood pressure 60/20 mmHg. Art. From the anamnesis: no adverse reactions are caused, no early intravenous contrast agents were administered, no side effects. A preliminary diagnosis was made: Anaphylactoid shock. Explain the mechanism of the observed symptoms.

*Standard answer:*Radiocontrast agents cause direct activation. complement system, as well as a direct (without the participation of the immune system) histamine-liberatory effect.

Problem 45. Patient S., 49 years old. She sought medical help with complaints of the development of a massive purple infiltrate on the right buttock at the site of monomycin injection (on the 7th day), which was prescribed for the treatment of pneumonia. A preliminary diagnosis was made: Arthus phenomenon. Explain the mechanism of the observed symptoms.
*Standard answer:*Type 3 Regulation of hypersensitivity (immune complex) - the first state of hypersensitivity, which causes immune complexes in the blood and damage to the microvasculature of tissues and organs..

Task 46. Patient N., 57 years old, PCR - SARS Cov-2 RNA (nasopharynx, oropharynx swab) - determination. On the 3rd day the disease was hospitalized in a Covid hospital. Complaints: increased body temperature to 38.6 C, dry cough, nasal congestion, anosmia, headache. Concomitant pathology: primary hypothyroidism, drug compensation (euthyrox 50 mcg/day), prediabetes (metformin 1000 mg/day). Excess weight (BMI 27.4 kg/m2). Objectively: SpO2 96%, respiratory rate 18-20 minutes, pulse 90 per minute, rhythmic, blood pressure 135/90 mm. rt. Art. During the examination: CT scan of the chest: no pathology of the lungs was detected, CT scan 0. CBC. Erythr – 5.16*1012/l, hemoglobin – 157 g/l, LC – 9.1*109/l, LF – 14.9%, mon – 13.4%, eosis – 1.4%, granules – 69.7%. Biochemical blood parameters. ALT
– 30.3 U/l, AST 31 U/l, CRP – 70.4 mg/l, LDH – 309 U/l. Coagulogram – fibrinogen - 8.1 g/l, D-dimer 0.62 mg/l. The diagnosis was made: Coronavirus infection COVID - 19, confirmed, mild in duration. How is the severity of the condition determined?

Standard answer: The severity of the condition is due to the presence of organic substances, an increase in CRP to 70.4 mg/l, fibrinogen to 8.1 g/l.

Task 46. Patient A., 83 years old, PCR - SARS Cov-2 RNA (nasopharynx, oropharynx swab)
- understanding. On the 5th day, the disease was hospitalized in a Covid hospital. Complaints: increased body temperature to 37.4 C, weakness, shortness of breath during physical exertion, headache. Concomitant pathology: ischemic heart disease. Heart rhythm disturbances of the type of persistent tachy-bradysystolic form of atrial fibrillation. Ventricular extrasystole 1st grade according to Ryan. CHF 2A, FC3. Objectively: SpO2 94%, respiratory rate 20-21 minutes, pulse 61-120 per minute, arrhythmic, blood pressure 105/60 mm. rt. Art. During examination: CT scan of the OGK. CT signs of bilateral polysegmental interstitial pneumonia of moderate to severe severity, CT2 (28%). UAC. Erythr – 4.72
* 1012/l, hemoglobin – 142 g/l, LC – 5.2*109/l, LF – 28.5%, mon – 18.4%, eosis – 0.9%, granules – 59.64%. Biochemical blood parameters. ALT – 30.2 U/l, AST 31.5 U/l, CRP – 15.1 mg/l, LDH – 387 U/l, creatinine 107 μmol/l, urea 4.16 mmol/l. Coagulogram – fibrinogen - 3.8 g/l, D-dimer level 1.58 mg/l. IL-6 level is 10.48 pg/ml (normal 0-7 pg/ml). The diagnosis was made: Coronavirus infection COVID - 19, confirmed, moderate severity. Bilateral polysegmental viral pneumonia, DN0. How is the severity of the condition determined?

*Standard answer:*The severity of the condition is determined by the patient's age, the presence of concomitant phenomena, hemodynamic instability, lung damage, and an increase in IL-6 to 10.48 pg/ml.

Task 46. Patient L., 15 years old, was admitted to the department with complaints of cough, difficulty breathing through the nose, attacks of difficulty breathing 2-3 times a day 3-4 times a week. After inhalation of salbutamol, self-sensitivity does not increase. From the anamnesis of the disease it is known that recurrent attacks of respiratory failure at the age of 2 years against the background of ARVI and during flowering of plants. He was not systematically treated or observed. In the first year of life there was atopic dermatitis. Objectively: the general condition is severe, the skin is pale, moderately moist, there is no fluid. The chest is round in shape, symmetrically adjacent to the current society. Nasal breathing is difficult. Percussion: all box light above the ground surface. Auscultation weakened breathing, dry wheezing over the entire surface of the earth. Respiratory rate 28 per minute. Heart sounds are muffled, the rhythm is correct, heart rate is 80 beats per minute, blood pressure is 110/70 mm Hg. O2 96 Body T 36.6 C. Peak flowmetry indicators - 250 l/min. Diagnosis: Bronchial asthma, allergic form, severe course, severe exacerbation, threat due to asthmatic status. DN 1-2. Propose a plan of diagnostic measures in a specific situation.

Standard answer:
1) UBC, OAM, biochemical blood test
2) chest radiography, spirography, ECG
3) allergy chip (Alex or ISAK)

Task 47. A 25-year-old man consulted a doctor with complaints of periodic urticarial rashes on the chest over the last year and, therefore, accompanied by considerable attention. rashes of various sizes appeared, appeared for no apparent reason and disappeared after 6-12 hours, while periodically appearing on other areas of the skin of the back and chest. The "attacks" of skin rashes described above were repeated 2-3 times a week. The patient's history revealed 4 cases of angioedema, which resolved spontaneously within 48 hours. Objectively - there are urticarial orienting elements on the chest and back. General condition is satisfactory. The diagnosis was made: Chronic idiopathic urticaria, moderate exacerbation. Suggest a damage plan

Standard answer:
1) UBC, OAM, biochemical blood test
2) determination of antibodies to helminths: Giardia, roundworm, causative agent of toxocariasis, opisthorchiasis, trichinella, echinococcus (ELISA).

Task 48. Patient M., 35 years old, upon admission complains of swelling and pain in the right ankle joint and small joints of the right foot, hands, morning stiffness for up to 30 minutes, redness of the skin over them, limitation of movements in them. From the anamnesis it was established that there were sudden attacks of pain in the joints of the right foot for about 6 months. Self-administration of analgesics leads to a slight reduction in pain. Objectively: swelling, redness of the skin and increased body temperature over the joints. The range of active and passive movements is limited due to pain. Internal organs without visible changes. A preliminary diagnosis has been established: Rheumatoid arthritis. Make a worry plan.

Standard answer:
1) CBC, BAM, biochemical blood test, CRP
2) RF, ACCP (Anti-CPC)

3) Assessment of the immune factor: with determination of subpopulations of T-lymphocytes, natural killer cells and B-lymphocytes, immunoglobulins A, M, G, CEC, NCT test.

Task 48.
A 28-year-old patient complains of skin rashes with symptoms of lichenification, excoriation on the flexor surface of the elbow and knee joints, the back of the neck, and shins. These symptoms are observed from the age of 6, exclusively in the autumn-spring period. The history contains indications of exudative-catarrhal diathesis in the first year of life. The diagnosis was made: Atopic dermatitis, adult form, moderate course, exacerbation. Prescribe additional measures.

Standard answer:
A) determination of eosinophilic cationic protein (ECP) and allergochip (Alex-2 or ISAC) B) bacteriological and mycological culture in studies of skin and mucous membranes

Task 49.
Patient K., 28 years old, complains of pain in the knee, wrist, metacarpophalangeal, ankle, sacroiliac joints, morning stiffness for up to 3 hours, increased body temperature up to 37C, weight loss. I took NSAIDs without effect. UBC: hemoglobin 104 g/l, er. – $3.5x10_{12}$/l, ESR 38 mm/h, CRP 32 mg/l, rheumatoid factor 45 mU/ml. Immunogram: CD3–81%, CD4–54%, CD8 – 19%, CD16 – 8%, CD19–12%, IgA – 3.1 g/l, IgM – 2.1 g/l, IgG – 14.3 g/l; CEC 130 USD; NST spont. 80 USD, NST stim. 142 USD, K steam. 1.7. What disease requires a differential diagnostic search?

*Standard answer:*rheumatoid arthritis, reactive arthritis, ankylosing spondylitis, paraneoplastic syndrome.

*Task 50.*The patient, 18 years old, fell ill yesterday when his temperature rose to 38.5 C, headache, runny nose, and moderate pain when swallowing appeared. The condition upon admission is moderate, body temperature is 38.5 C. The tonsils are enlarged, hypertrophied, covered with a white coating, which is easily removed. There is a moderate increase and density of regional lymph nodes up to 2 cm (submandibular, cervical, retropharyngeal). The liver is not enlarged. In the position on the right side, the edge of the enlarged spleen is palpated. Feces and mocha are common colors. Presumable diagnosis: infectious mononucleosis caused by the Epstein-Barr virus. Acute tonsillitis. Make a plan for additional examination to clarify the diagnosis and assess the severity.

Standard answer:
1) CBC, BAM, biochemical blood test, CRP
2) Determination of antibodies to herpes group viruses (ELISA): HSV 1 and 2 - IgM, IgG + avidity index, CMV - IgM, IgG + avidity index; EBV - IgM VCA, IgG VCA, IgG EA, IgG NA
3) PCR (nasopharyngeal swab) for HSV 1 and 2, EBV, CMV
4) Bacteriological culture from the nose and throat (before prescribing antibiotic therapy).

Task 51. A 45-year-old patient consulted a doctor at a dermatovenerological dispensary with complaints of the appearance of blisters in the red border of the lips and general malaise. The bubbles first appeared 4 years ago. For the first 4 years, rashes occurred only in winter, and then they began to appear at other times of the year. In the last year, there were exacerbations up to 8 times, relapses of rashes were accompanied by general malaise, an increase in temperature to 38 degrees. The diagnosis was made: Chronic.

persistent herpes virus infection with frequent exacerbations (labial herpes). Make a plan for additional inspections.

Standard answer:

1) CBC, biochemical blood test
2) Assessment of immune effects: with determination of subpopulations of T-lymphocytes, natural killer cells and B-lymphocytes, immunoglobulins A, M, G, CEC, NST test.

Task 52. A 30-year-old patient consulted an allergist with complaints of an attack of suffocation, cough, impaired nasal movement, and hearing loss. The above symptoms appeared after getting a job in a circus with unusual scenes. Since childhood, he had a history of suffering from allergic rhinitis, which only bothered him when in contact with cats. He notes that during the vacation period his condition improves significantly. The diagnosis was made: Bronchial asthma, alcoholic, identified, mild persistent, for the first time. Allergic rhinitis, year-round, moderate severity. Question: What additional conditions do the patient need to undergo?*Standard answer:*Phadiatop ImmunoCAP sigE antibodies to mixtures of the most common inhalant allergens (tree pollen, grass, pet hair allergens, house dust mites, mold) or allergy chip (Alex-2 or ISAC).

Task 53. A 30-year-old patient is in the hospital for pneumonia. An injection of cefotaxime 0.1 IM was given. Immediately after the injection, the patient's vision became dark, her speech slowed down, she became dizzy, and lost consciousness. On examination, the skin is pale, moist, cold, AD: 40/10 mm Hg. art., heart rate - 100 per minute. Establish a preliminary diagnosis.

*Standard answer:*Preliminary diagnosis: Anaphylactic shock, severe course. Drug allergy (cephalosporins).

Task 54. A 22-year-old female patient complains periodically (4-5 times a year) of blisters on the red border of her lip and a painful whitish ulcer on the roof of her mouth. Real exacerbation within the last 3 days after hypothermia. Notes an increase in body temperature to 37.2.$_0$Happy evening. construction materials have been spilled in the same areas over the past 3 years. At the time of examination: on the border of the lip on the right there are groups of small bubbles, painful on palpation.
The submandibular lymph nodes are enlarged and painful. On the membrane at the borders of the hard and soft palate to the left of the center there is erosion of irregular shape with polycyclic edges, surrounded by a rim of hyperemia, sharply painful on palpation. A preliminary diagnosis has been established: Chronic persistent herpes virus infection, exacerbation (labial herpes). Aphthous stomatitis. What diseases should a differential diagnostic search be carried out in this clinical situation?*Standard answer:*A differential diagnostic search is carried out taking into account the unclear etiology of oral ulcers: viral (including HIV infection), bacterial (including syphilis), fungal, parasitic infection; allergic stomatitis; injuries and dental problems; autoimmune diseases (Crohn's disease, gluten intolerance); leukemia.

Task 55. Child, 12th day. The first urgent birth in a 27-year-old mother, exacerbation of genital herpes before childbirth. In the first days of life, the child had tremors in his hands; by the 5th day of life, jaundice of the skin appeared and increased. Neurological symptoms increased, convulsions and high-pitched crying appeared. On the 8th day, three single vesicular elements with transparent contents appeared in the trunk,

body temperature stabilized to 39 °C. The diagnosis was made: Congenital infection of the herpes simplex virus, generalized, severe. What additional tests need to be ordered to verify the diagnosis:

*Standard answer:*1) study of the blood serum of the newborn and mother simultaneously quantitatively for Ig M and Ig G to HSV using ELISA;
2) examination of fingerprint smears with rashes on mucous membranes, skin, blood (leukoconcentrate), urine, livor for the presence of HSV genetic material using the PCR method

Task 56. Patient I., 35 years old. He is observed by a gastroenterologist with a diagnosis of Crohn's disease, receives topical corticosteroids, azathioprine 100 mg orally. Over the course of 6 months, during treatment, frequent (once a month) blistering rashes on the lips, wings of the nose have been noted, and acyclovir has been taken with a significant effect.
What is the reason for the development of VID in this case?
*Standard answer:*The cause of this condition is most likely caused by medications used to treat Crohn's disease. It is known that azathioprine has an immunosuppressive effect - due to hypoplasia of lymphoid tissue, a decrease in the number of T-lymphocytes, impaired Ig synthesis, the appearance of atypical cytocytes in the blood and suppression of cell-mediated causes of their occurrence.

Task 57. Patient X, 40 years old. Observed by an oncohematologist with a diagnosis follicular lymphoma. She received 8 courses of chemotherapy according to the regimen. bendamustine + rituximab (BR), with further positive therapy with rituximab once every 2 months - 2 years at the moment. Over the past year, frequent (once a month) exacerbations of rhinosinusitis have been noted, for which she was repeatedly treated with long courses of antibiotics without a positive result. She was referred to a consultation with an allergist-immunologist to clarify the cause of this condition.

The conclusion was drawn: leukocytes - 3.9×10*9/l; L -20%; ESR - 18 mm/hour.
Immunogram data:

Lymphocytes 20%			Immunoglobulins g/l	
Leukocytes 3.9x10x9/l			IgA	0.7
Population and subpopulation of lymphocytes			IgM	0.6
	%	Abs.	IgG	6.3
CD3	85			
CD4	50		NST test (cu)	
CD8	33		NST sp.	87
CD16	9		NST Art.	145
CD19	1			
			Central Election Commission (cu)	40

Assess the immune effect.
*Standard answer:*The processes of acceleration and differentiation of T-lymphocytes are preserved. (IRI=1.5). There is a decrease in the content of B-lymphocytes, hypogammoglobulinemia of classes A, M, G. The induced phagocytic activity of neutrophils in the NCT test is suppressed.

Task 58. Patient M., 41 years old, contacted an allergist-immunologist with complaints of low-grade fever for 6 months, general weakness, sweating, especially at night; lack of appetite; loss of body weight by more than 5 kg; periodic rises in temperature to 38.0-39.0 C and the appearance of sore throat, dry mouth, periodic abdominal pain. On examination: the condition is moderate, temperature - 37.0 0C, the skin is pale and clean. When palpating the lymph nodes, there is a symmetrical increase in the submandibular, anterior and posterior cervical, subclavian, cubital, and axillary groups of the lymph nodes. They are painful, the skin over them is not changed. The oropharynx is not hyperemic, the tonsils are loose, there are no plaques. The tongue is thickly coated with a grayish crumb-like coating. Sighing is vesicular breathing. Pulse - 90 beats. per minute, rhythmic. Blood pressure - 110/70 mmHg. Heart sounds are rhythmic, the abdomen is soft, painful on palpation along the large intestine. The liver and spleen are not palpable. Stool and urine output without sun. Preliminary diagnosis: AIDS. What conditions are necessary to confirm the diagnosis?

This answer: First, an ELISA should be performed - HIV p24 antigen and antibodies to HIV types 1 and 2 (HIV Ag/Ab Combo); The second stage (diagnosis confirmation) is effective immunoblotting to determine the specific combination of HIV proteins, ensuring the connection of antibodies to HIV from the added serum.

Task 59. Girl M., 20 years old, was admitted to the infectious diseases hospital with complaints of a sore throat, fever up to 38.0 C.0, nausea, heaviness in the right hypochondrium. From the anamnesis: the patient considers herself ill for about a week, when complaints of a sore throat, increased temperature when swallowing, and an increase in body temperature to 38-39°C first appeared. Started taking amoxicillin on my own, without effect. Objectively upon admission (7th day of illness): the condition is of moderate severity. Body temperature 38.7°C. Skin with additional coloring. In the oropharynx: the mucous membranes of the posterior wall of the pharynx and palatines are hyperemic, the tonsils are enlarged, and in the lacunae the white plaque is opened with a spatula. The submandibular, mental and posterior cervical lymph nodes are enlarged to 3 cm, dense, moderately painful on palpation. The liver is palpated 2 cm below the edge of the costal arch. Research data: ELISA: EBV VCA-IgM (+), VCA-IgG (+), EA-IgG (+), NA-IgG (-). ELISA: CMV IgM (-), IgG (+), IA - 65.71%. The diagnosis was made: Infectious mononucleosis caused by the Epstein-Barr virus. If a disease occurs, a differential examination should be performed.

*Standard answer:*Differential diagnosis is carried out taking into account the following diseases: diphtheria of the oropharynx; adenoviral infection; lymphogranulomatosis; acute leukemia; primary HIV infection; cytomegalovirus infection; toxoplasmosis.

Task 60. Girl N., 5 days. The condition is serious - due to the phenomena infectious toxicosis, sudden failure of the II–III degree (on mechanical ventilation), intrauterine viral-bacterial infection: bilateral pneumonia, enterocolitis. A child from the 4th pregnancy, which proceeded with the threat of miscarriage. During pregnancy, CMV DNA was detected in the mother's blood, urine, and saliva. The birth was spontaneous, premature (at 37 weeks). On objective examination: the color of the skin is icteric with a gray tint, pronounced marbling, edematous syndrome. The abdomen is distended, the anterior abdominal wall is moderately edematous, hepatosplenomegaly (liver +5 cm from below the costal margin, spleen +6.5 cm from below the costal margin), scanty, acholic stool. The diagnosis was made: Congenital generalized cytomegalovirus infection. What additional laboratory tests are needed to confirm the diagnosis?

*Standard answer:*1) study of the blood serum of the newborn (and the mother, the substrate - blood serum) simultaneously quantitatively for Ig M and Ig G to CMV using ELISA;

2) examination of fingerprint smears with rashes on mucous membranes, skin, blood (leukoconcentrate), urine for the presence of CMV genetic material using the PCR method

Task 61. Boy M., 13 months. The child from the first pregnancy was born at term. Was breastfed for up to 6 months. Physical and neuropsychic development lags behind age. Preventive vaccinations are not necessary. From the anamnesis it is known that the child suffered from pneumonia at the age of 7 months. Due to the severity of the condition, massive antibacterial therapy was carried out with loud dynamics. Repeatedly suffered pneumonia at 12 months, complicated by purulent otitis. Laboratory testing revealed a decrease in the amount of globulins in the proteinogram (1 g/l). What forms of primary immunodeficiencies should this disease be differentiated from?

This disease should be differentiated from primary immunodeficiencies with defects in antibody synthesis: CVID, selective immunoglobulin A deficiency, X-linked agammaglobulinemia (Bruton's disease); and diseases occurring with secondary hypogammaglobulinemia.

Task 62. Boy K., 15 years old. He was born full term and the pregnancy proceeded normally. Preventive vaccination - on time and without the state. Complains of periodic dry cough, fever up to subfebrile levels. From the anamnesis it is known that up to three years of age, uncomplicated acute respiratory infections occurred up to 8 times a year. At the age of 4 years, he was admitted to the hospital with a diagnosis of bilateral polysegmental pneumonia. Massive antibacterial therapy and transfusion of intravenous immunoglobulin were carried out (without determining the levels of serum immunoglobulins). Over the last year, acute respiratory infections have been noted up to 1-2 times a month, complicated by sinusitis. Regarding taking broad-spectrum antibacterial drugs up to 6 times a year.

Immunological examination data:

Lymphocytes%			Immunoglobulins g/l	
Leukocytes 10x9/l			IgA	0.05
Population and subpopulation of lymphocytes			IgM	1.5
	%	Abs.	IgG	12.1
CD3	76			
CD4	45		NST test (cu)	
CD8	28		NST sp.	80
CD16	12		NST Art.	156
CD19	10			

Upravon diagnosis: Selective deletion immunoglobulin A. Name diagnostic criteria for this phenomenon.
*Standard answer:*Diagnosis criteria – Selective IgA Deficiency: Age over 4 years; IgA less than 0.07 g/l, IgG and IgM within the reference results; consequences of the reverse genesis of hypogammaglobulinemia.

Task 63. Patient V., 30 years old. I contacted an allergist-immunologist with complaints during the period of spontaneous swelling of the facial skin (cheeks, eyelids), which disappeared on its own after 36-48 hours. With words, swelling is pale, dense, unexpected, accompanied by a feeling of fullness. The first appearance of edema was noted at 6 months

back. At the same time, I consulted a gynecologist due to menstrual irregularities, and COCs were prescribed. We came to the hospital once for angioedema of the skin in the facial area. Treatment was carried out with antihistamines and corticosteroids, without a positive effect, the swelling was resolved independently on the 2nd day. Preliminary diagnosis: PID with a defect in the complement system: Hereditary angioedema (HAE). What types of HAE do you know?

*Standard answer:*Disease classification:
- HAE type I is caused by a decrease in the amount and functional activity of C1-INH in plasma (85% of all cases of HAE);
- HAE type II, caused by a decrease in the functional activity of C1-ING, while the level of C1-ING remains within normal limits or increases (15% of all cases of HAE);
- HAE type III with a normal level of C1-ING with mutations in the gene: blood coagulation factor XII; plasminogen; angiopoietin 1; kininogen 1 (NAO – KNG1), etc.

Task 64. Patient A., 40 years old, contacted an allergist-immunologist with complaints of attacks (up to 2 times a day, 1-2 times a night) of suffocation, difficulty wheezing, cough with difficult to separate sputum, shortness of breath due to minor physical conditions. , constant nasal congestion, mucopurulent nasal discharge. When collecting anamnesis, it was remote that the patient noted exacerbation of the disease 3 times a year, associated with ARVI and taking NSAIDs (acetylsalicylic acid - ASA). An examination by an ENT doctor revealed polyposis sinusitis. Polypotomy was performed. A short-term improvement was noted. A year later, the polyps recurred. Objectively: nasal breathing is difficult, expiratory shortness of breath, respiratory rate - 20 per minute. Auscultation - hard breathing, the mass compresses wheezing across all lung fields. Blood pressure - 130/70 mm Hg. Art. PS - 84 per min. Heart sounds are muffled and rhythmic. The abdomen is soft and painful. Spirography: vital capacity 68%, FEV1 – 52% of the required values, reversibility of obstruction (bronchodilator test with salbutamol 400 μg) – 27%. Formulate the diagnosis: Bronchial asthma, moderate, persistent, exacerbation of moderate severity. Polypous rhinosinusitis, recurrent. Intolerance to NSAIDs. Describe the mechanism of development of “aspirin-induced bronchial asthma”.

*Standard answer:*The basis of the disease is caused by genetic factors, mathematics of arachidonic acid. Important mediators involved in the pathogenesis are cysteinyl leukotrienes (LT) - LTC4, LTD4, LTE4, which exhibit pro-inflammatory and bronchoconstrictor causes. When exposed to various pathogenic stimuli (for example, respiratory viruses), in patients with hypersensitivity to ASA/NSAIDs, the concentration of LT significantly increases, which leads to accelerated activation of the formation of arachidonic acid from phospholipid membranes in cells.

Task 65. Boy S., 1 year 2 months, was admitted with complaints of cough, shortness of breath, and increased body temperature to 38°C. From the anamnesis it is known that for the first time at the age of 1.5 months he fell ill with an acute respiratory infection, received intramuscular ampicillin, there was no effect, the child was hospitalized in the hospital with a diagnosis of acute bronchiolitis, moderate severity, DN 2 degrees. Upon admission, the child had abundant hemorrhagic pinpoint rashes throughout the body. In the UBC: red blood cells - 3.5 × 1012/l; Hb- 100g/l; leukocytes - 4.2×109/l; s / I neutrophils -68%; p/i neutrophils - 2%; eosinophils - 2%; monocytes – 5%; lymphocytes – 15%; ESR - 10 mm/hour; platelets - 75x109/l. The child was examined by a hematologist, who made the following conclusion: symptomatic coagulopathy, grade I anemia, normochromic, of mixed etiology. During the year of observation, he suffered from acute bronchitis, bilateral community-acquired pneumonia with a protracted course, and acute left-sided otitis media. Platelets in dynamics from 22x10/9/l to

66.7x10/9/l. Objectively: The skin is pale in color, the skin is suddenly dry, abundant hemorrhagic pinpoint petechial rashes all over the body, in places hematomas, elements of peeling and microcracks in the folds, ecchymoses, blood in the stool. Make a preliminary diagnosis.

*Standard answer:*Primary immunodeficiency. Wiskott-Aldrich syndrome.

Task 66. A child aged 1 year and 9 months, often ill, suffered from pneumonia in the year of the child, was hospitalized for examination due to progressive imbalance and unsteadiness. Objectively: on the skin of the torso there are spots up to 1 cm in diameter of a “café au lait” color, on the reverse side there is a discolored area of skin, dry skin. On the bulbar conjunctiva of the cardiovascular asterisk, injection of scleral vessels. Lymph nodes without environment. The muscular system is developed, strength and tone are reduced. Osteoarticular system: movements in the joints are completely extensive and painless. Vesicular breathing during inspiration occurs in all parts, there is no wheezing. Cardiovascular system: without features. The abdomen is round, not enlarged, deep parts can be palpated in all parts, painless. The liver is at the edge of the costal arch, the spleen is not palpable. The stool is irregular, formed, without pathological impurities. There are no dysuric moods. Nervous system: no seizures or meningeal symptoms. At the conclusion of the ultrasound, thymic hypoplasia was diagnosed. MRI revealed brain degeneration. A preliminary diagnosis has been established: Primary immunodeficiency. Ataxia-telangiectasia (Louis-Bar syndrome). Order additional laboratory testing to confirm the diagnosis.

*Standard answer:*alpha-fetoprotein, effectiveness of immune action, genome sequencing.

Task 67. A 3-year-old boy with a history of episodes of purulent lymphadenitis. Lymph node abscesses were opened independently, painlessly. A year ago I suffered from double pneumonia. Boils on the skin have an average lifespan. I was treated by a dermatologist for streptoderma. On examination, the following were stigmatized: a wide protruding forehead, a wide nose and bridge of the nose, dry skin, elongation at the elbow bends. Multiple scars on the neck and in the axillary region on the left after opening nodular abscesses. Primary immunodeficiency – Job's syndrome (hyper-IgE syndrome) is suspected. Order additional laboratory testing.

Etolon answer: CBC (eosinophils), IgE, degree of immune influence (including phagocytic activity of neutrophils), genome sequencing.

Task 68. A 6-month-old girl from the 3rd pregnancy, which occurred against the background of oligohydramnios, from 2 term births, with a weight of 3250 g, an Apgar score of 7-8 points, in satisfactory condition on the second day, was transferred to the intensive care unit in an average category condition for due to the underlying disease – congenital heart disease, discharged on the 6th day.

Plastic surgery of the ventricular septal defect was performed, the postoperative period was difficult, sternal dehiscence, sepsis, and mediastinitis were noted, which resolved 28 days after the surgical procedure. The absence of the thymus was detected intraoperatively in the child. Condition on admission: general condition of moderate severity, active, mobile, reacts calmly to examination. The skin is pale, without pathological elements; there is a postoperative scar along the midline in the sternum area. Tissue turgor is reduced, the subcutaneous fat layer is thinned. The mucous membrane of the oropharynx is pink, there are no plaques. Nasal breathing at rest. A group of small cervical lymph nodes that are not fused to each other and other tissues is palpated. What disease can be suspected in a child?

*Standard answer:*Primary immunodeficiency - DiGeorge syndrome.

Task 69. A 52-year-old woman complained of a rash located under the left mammary gland, surrounded by hyperemia, representing blisters, eroded in places, some healing in the form of changes. The patient complained of an accompanying rash, pain, increased skin sensitivity, and hearing. Formulate a diagnosis.

*Standard answer:*Acute herpetic infection Varicella Zoster virus.

Task 70. A 35-year-old man turned to an allergist-immunologist with complaints of private colds, accompanied by a rise in temperature to 38 degrees and herpetic rashes on the lips. During the interview, the man realized that six months ago he had a mild form of coronavirus infection, however, according to the patient, he had no time to be sick, and he was treated with antibiotics (he doesn't remember the name) and dexamethasone injections inside the muscles. He recovered after 5 days, but since then the nurse has been taking antibiotics and injecting dexamethasone every time for 2-3 weeks. The diagnosis was made: Chronic persistent herpes virus infection with frequent exacerbations (labial herpes). Secondary immunodeficiency state, drug-induced (GCS). Describe the mechanism of development of an immunodeficiency state in a specific clinical situation.

*Standard answer:*Long-term administration of GCS inhibits the NF-κB pathway with subsequent suppression of the formation of proinflammatory cytokines IL-1, IL-2, IL-6, TNF-α and IFNγ and prostaglandins; causes anergy and apoptosis of lymphocytes, the release of immature nail trophy from the bone marrow, which is expressed in lymphopenia and neutrophilia. As a result, the cellular response decreases, the production of pro-inflammatory cytokines, the activity of phagocytosis and chemotaxis decreases, which contributes to the development of opportunistic phenomena.

Task 71. A 50-year-old woman complained of private respiratory diseases (9 times a year), long-term acute respiratory infections. Exacerbation of embryonic labial herpes. From the anamnesis it is known that 1.5 years ago the patient was diagnosed with rheumatoid arthritis, seronegative. Receives therapy with methotrexate 20 mg/week IM for 1 year. CBC: leukocytes – 8.2×10^9/l; lymphocytes – 20%; monocytes – 10%; ESR - 10 mm/hour. Total protein – 60 g/l, CRP – 5.5 mg/l (N=1-6 mg/l). Immune impact assessment: CD3+-55%, CD4+-39%, CD8+-16%, CD16+-18%, CD19+-17%, IgA- 1.0 g/l, IgM- 1.4 g/l, IgG- 10 ,1 g/l, CEC - 50 c.u. Assess the immune effect.

*Standard answer:*Recovery processes T lymphocytes oppressed. Processes T-lymphocyte differentiation is not impaired, IRI is more than 2. The content of natural killer cells is increased. The number of B-lymphocytes is within the reference results, their functional activity is preserved.

Task 72. Woman, 50 years old. She complained of periodic increases in temperature up to 37.3, weakness, fatigue for 6 months, and the appearance of labial herpes on the lips once every 2 months. From the anamnesis it is known that 6 months ago she suffered from severe influenza, after which the above complaints appeared. Before the flu, labial herpes bothered me once a year, more often after hypothermia. Upon examination, the condition was satisfactory, temperature 37.0°C. The skin is pale, mucous membranes are clean, nasal breathing is free. The pharynx is calm, tonsillar lymph nodes up to 2 cm, posterior cervical chains up to 1.5 cm. The liver is not enlarged, the spleen is not palpable. Stool and diuresis are normal. The diagnosis was made: Chronic persistent herpesvirus infection. Secondary immunodeficiency state. Prescribe additional measures.

*Standard answer:*KBC, OAM, BAC, assessment of immune effects

Task 73. A 60-year-old patient came to the clinic with complaints of a dry cough, general malaise, cyclic fatigue during physical exertion, and persistent private respiratory diseases. I often noticed streaks of blood in my sputum and lost weight. Weight loss is associated with frequent exacerbations of bronchitis. A month ago I was treated for candidiasis, referring to oral hygiene. Over the past 6 months, she has been bothered by frequent dyspeptic disorders. Fluoroscopy revealed an irregularly shaped shadow in the hilar zone of the left lung. During bronchoscopy, the left lower lobe bronchus is narrowed and a tumor is visible in its lumen, bleeding when touched. Tomography of the lung confirms the presence of a tumor in the lung area. No metastases were detected in the mediastinal lymph nodes. Additional laboratory examination revealed signs of anemia, decreased levels of leukocytes, platelets, IgG, IgM, IgA. Within what syndrome did the symptoms of immune dysfunction develop?

*Standard answer:*Clinical signs of immune dysfunction (infectious, asthenic, hematological, dyspeptic syndrome) arising against the background of paraneoplastic syndrome (often accompanied by a cancerous tumor).

Task 74. Patient T., 7 years old, suffered infectious mononucleosis 5 months ago. During this time, I suffered from acute respiratory viral infection twice, and suffered from lacunar tonsillitis twice, with 8% of atypical mononuclear cells detected in a blood test. On examination, the patient was in moderate condition, temperature 37.4°C. There is moderate congestion without discharge, tonsillar lymph nodes up to 2 cm, posterior cervical chains up to 1.5 cm. Liver +1 cm, spleen +1 cm. Serological examination showed IgM VCA (+), IgG EA (+), IgG NA (+). Positive result for EBV DNA in blood lymphocytes and saliva in PCR. Formulate a preliminary diagnosis:

*Standard answer:*Epstein-Barr infectious mononucleosis of viral etiology, prolonged due to relapses.

75. A 40-year-old woman consulted an allergist-immunologist with complaints of recurrent angioedema of the face and upper extremities. The first swelling occurred six months ago, the patient cannot remember any provoking factors, then the swelling recurred once a month. Recently there have been episodes - 1-2 times a week. As described, the swelling is dense and cold. A week ago, she was hospitalized with increasing angioedema of the face; she was treated with glucocorticosteroids, to no avail; while taking prednisolone, the swelling of the face continued to increase, and self-limited after 2 days. Objectively: the patient is emotionally agitated, actively gesticulates, and has low nutrition. Concomitant chronic diseases: autoimmune thyroiditis, is a substitute for therapy with thyroid drugs (euthyrox). She is seen as an outpatient by a dermatologist for vitiligo, and notes an increase in the area of discolored skin over the past 3 years. Quantitative and functional disease of C1, an inhibitor, was carried out within the reference results. A preliminary diagnosis was made: Acquired angioedema. Suggest the reason for the development of this condition.

*Standard answer:*since the patient suffers from comorbid autoimmune pathology: vitiligo and autoimmune thyroiditis. On examination, good signs of hyperthyroidism and progression of vitiligo are noted. One can assume decompensation of the autoimmune process that binds antibodies to the C1 inhibitor and the development of angioedema.

CRITERIA for assessing competencies and measurement assessments

Grade "unsatisfactory" (not accepted) or Otsu formation Competencies	**Grade "satisfactorily" (passed) or satisfactory (threshold) level of development Competencies**	**Rated "good" (passed) or sufficient level development Competencies**	**Excellent rating (passed) or high level development Competencies**
failure to student on one's own about exchange knowledge when revealed work, absence independence in use skills. Absence Love formation Competencies indicates negative state of the art academic discipline	student go independence in application of knowledge, skills and abilities for decision making Full work in accordance with sample, data teacher, by tasks, solution what happened Pokano teacher, it should be considered that competence formed on satisfactory level.	student go on one's own application of knowledge, skills and abilities given that tasks, similar samples that Peoderd Availability formed competencies for taller level. Availability such on sufficient level indicates sustainable fixed practical skills	student go ability to Complete independence in choosing a path solutions non-standard tasks within disciplines with usage knowledge, skills and functions, received as in development progress discipline data, such and corresponding disciplined, follows Steytat competence formed on high level.

Test control measurement criteria:

percentage of incorrect answers	Marks
91-100	Great
81-90	Fine
70-80	satisfied
Less than 70	unsatisfactory

When measuring tasks with multiple correct answers, one error is allowed.

Interview measurement criteria:

Mark	Descriptors		
	strength of knowledge	**ability to explain (offers) essence, processes, do conclusions**	**logic and subsequence answer**
Great	strength of knowledge, knowledge of basic processes subject matter being studied areas, the answer varies in depth and completeness disclosure of the topic; defeat terminological apparatus; logic and consistency answer	high ability explain the essence production, events, draw conclusions and generalizations, providing reasoned answers, give example	high logic and subsequence answer
Fine	solid knowledge of the main processes being studied subject area, different depths and full disclosure of the topic; impact terminological apparatus; free usage monologue speech, however, you are right - one or two inaccuracies in the answer	ability to explain essence, processes, events, draw conclusions and generalizations, give reasoned answers, give example; however law one - two inaccuracies in the answer	logic and subsequence answer
satisfy No	satisfactory knowledge of technology subject matter being studied area, answer, differing insufficient depth and completeness of the topic; knowledge of basic theoretical issues. Several are allowed errors in content answer	satisfactory ability to give reasoned answers and provide example; satisfied formed analysis skills production, technology. Several are allowed errors in content answer	satisfactory logic and subsequence answer
dissatisfaction really	poor knowledge of the subject area being studied, shallow opening Topics; poor knowledge basic theoretical issues, weak analysis skills production, technology. Before a serious decision errors in content answer	inability to give reasoned Oh	Otsu logic and by sequence answer

Criteria for measuring situational tasks:

Mark	Descriptors			
	understanding Problems	analysis Steuasia	skills solutions Steuasia	professional thinking
Great	complete implication roles. All requirements, submitted to adania, filled	high benefit analyze situation, draw conclusions	high benefit choose method solutions problems, faithful solution skills situations	exceptional level professional thoughts
Fine	complete implication roles. All requirements, submitted to adania, filled	benefit analyze situation, draw conclusions	benefit choose method solutions roles faithful solution skills situations	residual level professional thoughts. one or two are born ethnicity in response
satisfy No	astastic implication roles. majority requirements submitted to adania, filled	satisfactory 1st ability analyze situation, draw conclusions	satisfactory and skills solutions situations, falsity with choice of method the solution of the problem	residual level professional thoughts. inspires more a bunch of inaccuracies in answer either the error in the sequence solutions
dissatisfaction really	epunderstanding roles. legs requirements, submitted to I'm sorry, no filled. No Tveta. Did not have experiments to solve country house	izkaya benefit analyze situation	insufficient solution skills situations	missing