MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION
MINISTRY OF SCIENCE, HIGHER EDUCATION AND INNOVATION OF THE KYRGYZ REPUBLIC
Kyrgyz-Russian Slavic University
named after the first President of the Russian Federation B.N. Yeltsin

Department of Therapy No1 (Pediatrics and Dentistry)

FUND OF ASSESSMENT TOOLS

by discipline

OCCUPATIONAL DISEASES

(Occupational Diseases)

Curriculum: 310501_25_1 ld in.plx
Field of study: 560001 "General Medicine" (for international students)
Qualification: Doctor
Mode of study: Full-time
Semester: 6 (3 year, 2 semester) | Form of control: credit

The Fund of Assessment Tools is designed to control students' knowledge in the field of study (specialty) PHYSICIAN (DOCTOR) in the discipline " PROFESSIONAL CYCLE Nursing "

"The Fund of Assessment Tools was reviewed and approved at the meeting of the department of

THERAPY-1 OF PEDIATRICS AND DENTAL SPECIALTIES

Head of Department
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1. PASSPORT OF THE FUND OF APPRAISAL TOOLS

2. TEST TASKS

Test tasks are used for current and midterm control of knowledge. The correct answer is marked in bold (in the printed version, the correct answers are indicated in a separate key sheet).

2.1. Section 1. Occupational pathology. Pulmonary dust diseases

1. Which of the following types of dust has the highest fibrogenic activity?

a) A) Organic dust of vegetable origin
b) **B) Silica (crystalline SiO_2) at >70%**
c) C) Coal dust
d) D) Metal dust from welding aerosols
e) E) Asbestos dust

2. Silicosis is characterized by the following type of X-ray changes:

f) A) Cavity infiltrates in the lower lobes
g) **B) Nodular and nodular shadows (ILO type p, q, r) with predominant localization in the upper and middle lobes**
h) C) Diffuse enhancement of the pulmonary pattern
i) (D) Hydrothorax
j) E) Uniform darkening in the lower lobes

3. The most significant pathogenetic mechanism of silicosis is:

k) A) Direct toxic effect of SiO_2 on alveolocytes
l) **B) Macrophage activation with the release of fibrogenic cytokines (TGF-β, TNF-α) and silicotic nodule formation**
m) C) Immediate allergic reaction
n) D) Disruption of the surfactant system of the lungs
o) E) Direct bactericidal activity of dust

4. What is the most common complication of silicosis?

p) A) Pulmonary hemorrhage
q) **B) Pulmonary tuberculosis (silicotuberculosis)**
r) C) Exudative pleurisy
s) D) Lung cancer
t) E) Pneumothorax

5. The criterion for the etiological diagnosis of chronic dust bronchitis is:

u) **A) Work experience in dusty conditions of at least 5-10 years when exceeding the maximum permissible concentration of dust**
v) B) Presence of cough and dyspnea without association with occupational history
w) C) Positive dynamics in antibiotic therapy
x) D) High eosinophil content in sputum
y) E) Reversibility of bronchial obstruction in bronchodilators

6. Asbestosis, in contrast to silicosis, is characterized by:

z) A) Preferential lesion of the upper lobes and the formation of nodules
aa) **B) Preferential involvement of the lower lobes, the presence of pleural plaques and an increased risk of mesothelioma**
bb) C) Rapid progression within 1-2 years
cc) D) Absence of respiratory disorders
dd) E) Reversibility of changes after termination of contact with dust

7. Occupational bronchial asthma (PBA), in contrast to non-occupational asthma, differs in:

ee) A) A more severe course without connection with work
ff) **B) Onset of symptoms in the workplace and their improvement outside of working hours/on vacation**
gg) C) Failure to respond to bronchodilators
hh) D) Predominantly neutrophilic inflammation
ii) E) Absence of specific IgE antibodies

8. Anthracosis is a pneumoconiosis that occurs when inhaled:

jj) A) Silica dust
kk) **B) Coal Dust**
ll) C) Asbestos dust
mm) (D) Beryllium dust
nn) E) Welding aerosol

2.2. Section 2. Diseases from physical and toxicochemical factors

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9. The leading clinical syndrome of the initial stages of vibration sickness from local vibration is:

oo) **A) Sensory polyneuropathy with the phenomenon of "dead finger"**
pp) B) Vestibulopathy
qq) C) Toxic encephalopathy
rr) D) Chronic obstructive pulmonary disease
ss) (e) Anemia

10. The antidote for acute intoxication of FOS (organophosphate compounds) is:

tt) (a) Unitiol
uu) **B) Atropine + cholinesterase (oxim) reactivator**
vv) C) Deferoxamine
ww) D) Atropine-free dipiroxime
xx) (E) Naloxone

11. Chronic lead intoxication is characterized by the following triad of symptoms:

yy) A) Tremor, salivation, gingivitis
zz) **B) Astheno-vegetative syndrome, polyneuropathy, lead colic with basophilic granularity of erythrocytes**
aaa) C) Jaundice, hepatomegaly, ascites
bbb) D) Raynaud's syndrome, angiospasm, thrombocytopenia
ccc) E) Cough, hemoptysis, fever

12. Micromercuralism is clinically manifested primarily by:

ddd) A) Lead colic and erythrocytopathy
eee) **B) Mercury tremor, eretism (psychovegetative syndrome), gingivitis**
fff) C) Bronchial asthma and alveolitis
ggg) D) Acute renal failure
hhh) E) Aplastic anemia

13. The main antidote for acute mercury intoxication is:

iii) A) Atropine
jjj) **B) Unitiol (2,3-dimercaptopropanol-1-sulfonate sodium)**
kkk) C) Naloxone
lll) (d) Flumazenil
mmm) E) Calcium gluconate

14. Toxic pulmonary edema as a complication of acute occupational poisoning is most likely to be exposed to:

nnn) A) Lead compounds
ooo) **(B) Nitrogen and chlorine oxides**
ppp) C) Organic solvents
qqq) (D) Mercury compounds
rrr) E) Carbon monoxide at low concentration

15. Dead finger syndrome (Raynaud's phenomenon of occupational etiology) is characteristic of:

sss) A) Chronic lead intoxication
ttt) **B) Vibration sickness from exposure to local vibration**
uuu) C) Dust bronchitis
vvv) D) Chronic beryllium disease
www) E) Chlorine intoxication

16. LDH (ankle-brachial index) <0.9 in the practice of an occupational pathologist indicates the following:

xxx) A) Normal peripheral blood flow

yyy) **B) Presence of peripheral arterial disease, possibly related to occupational atherosclerosis or vibration disease**

zzz) C) Venous insufficiency of the lower extremities

aaaa) (d) Thrombocytopenia

bbbb) E) Arterial hypertension

17. Production factors causing occupational diseases of the musculoskeletal system include:

cccc) A) Ionizing radiation

dddd) **B) Static muscle strain, forced working posture, stereotyped movements**

eeee) C) Noise and vibration

ffff) (D) Toxic substances

gggg) (E) Biological factors

18. Berylliosis refers to:

hhhh) A) Pneumoconioses from weakly fibrogenic dust

iiii) **B) Granulomatous diseases with an immunopathological mechanism (similar to sarcoidosis)**

jjjj) C) Occupational COPD

kkkk) D) Acute toxic alveolitis

llll) E) Occupational bronchial asthma of the IgE-mediated type

19. When conducting an examination of the working capacity of a patient with stage I silicosis with stage I DN without complications, it is recommended to:

mmmm) A) Immediate disability of group I

nnnn) **B) Transfer to a dust-free job without reducing qualifications; in case of a decrease in earnings - an additional payment**

oooo) C) Continuation of work without restriction

pppp) D) Hospitalization in a round-the-clock hospital

qqqq) E) Surgical treatment

20. Acute occupational poisoning (AO) shall be documented as:

rrrr) A) Chronic occupational disease

ssss) B) Work-related injury

tttt) **C) Acute occupational disease (intoxication) resulting from a single exposure to a toxic substance**

uuuu) D) General disease

vvvv) E) Household intoxication

3. SITUATIONAL TASKS

Situational tasks check the levels "To Be Able" and "To Possess" (PC-7, PC-8). They are used in practical classes, midterm and intermediate control.

Task 1. Miner's silicosis

> The patient is 54 years old, a mine miner with 26 years of experience. Complaints of increasing shortness of breath with moderate exertion, dry cough. Chest X-ray: bilateral symmetrical nodular shadows (ILO q type) in the middle and upper zones, increased pulmonary pattern. FVC: VC 72%, FEV_1/FVC 78%. Sanitary and hygienic characteristics: the concentration of dust with a SiO_2 content of >30% exceeded the MPC by 5-8 times throughout the entire period of operation.

Questions:

1. Formulate a preliminary diagnosis (underlying disease) with an indication of the stage.
2. Name the leading occupational risk factor and substantiate the relationship between the disease and the profession.
3. List the necessary additional research methods to verify the diagnosis.
4. Determine the treatment tactics and principles of medical rehabilitation.
5. Resolve the issue of working capacity.

Response standard:

1. Diagnosis: Stage II silicosis, interstitial-nodular form. Respiratory failure of the first degree.
2. Occupational factor: systematic inhalation of mixed dust with a high content of crystalline SiO_2. Experience of 26 years, multiple exceedance of the MPC confirm professional genesis.
3. high-resolution chest CT; full spirometry with bronchodilator; DSL; consultation with a TB specialist + tuberculin tests/QuantiFERON; bronchoscopy with BAL if necessary.
4. There is no etiological treatment. Sparing mode, exclusion of further contact with dust; inhaled bronchodilators for bronchial obstruction; mucolytics; prevention and treatment of infections; sanatorium-resort treatment.
5. Ability to work: continued work in contact with dust is contraindicated. Stage II and DN I – III disability group; referral to the MSEC with documentation of professional genesis.

Task 2. Vibration disease

> A 42-year-old man has been working as a jackhammer operator for 14 years. Complaints of numbness and whitening of the fingers of the hands in the cold, aching pain in the hands after work, decreased sensitivity in the fingertips. Vibration sensitivity data is reduced. The cold test is positive (whitening of the II–III fingers after 2 minutes at a temperature of 10°C). Capillaroscopy: spasm of the capillaries.

Questions:

6. Make a diagnosis indicating the stage according to the domestic classification.
7. What are the mechanisms of vascular and nerve damage in vibration sickness?
8. List the methods of functional diagnostics used for this disease.
9. Prescribe treatment.
10. What are the criteria for VTE in this disease?

Response standard:

6. Vibration disease of stage II (moderately pronounced manifestations) from the impact of local vibration: Raynaud's syndrome, sensory polyneuropathy of the upper extremities.
7. Mechanisms: long-term microvibration injury → angiospasm of arterioles and capillaries → ischemia of peripheral nerves → demyelination → sensory disorders.
8. Methods: pallesthesiometry (vibration sensitivity), cold test, capillaroscopy of the nail bed, ENMG (velocity of conduction along sensitive fibers), finger thermometry.
9. Treatment: cessation of contact with vibration; vasodilator (calcium channel blockers, pentoxifylline); neurotropic vitamins (B_1, B_6, B_{12}); physiotherapy (radon, hydrogen sulfide baths); reflexology.
10. VTE: at stage II – transfer to work without vibration; in case of a decrease in qualification – the establishment of the III disability group with an additional payment; with progression – group II.

Task 3. Acute carbon monoxide poisoning

> A 36-year-old worker was taken by ambulance from production. He lost consciousness in the boiler shop with faulty ventilation. BP 100/70, heart rate 110 beats / min, SpO_2 92% (pulse oximetry). The skin is bright pink. HbCO at CO oximetry 32%. ECG: sinus tachycardia, diffuse ST changes.

Questions:

11. Formulate a diagnosis.
12. Explain the pathogenesis of disorders in this poisoning.
13. Why does pulse oximetry give falsely high SpO_2 values?
14. Name the specific treatment and justify its use.
15. What is the prognosis and tactics after stabilization?

Response standard:

11. Acute occupational carbon monoxide (carbon monoxide) poisoning, severe (HbCO>25%). Toxic hypoxia. Impaired consciousness.
12. CO binds competitively to hemoglobin (affinity 250 times higher than O_2), forming COHb, which is unable to tolerate O_2. Additionally, CO binds to mitochondrial cytochrome oxidase → tissue respiration block.

13. A standard pulse oximeter determines the ratio of oxyHb to deoxyHb from two wavelengths; COHb absorbs light in a similar way to oxyHb → falsely "normal" saturation.
14. Specific treatment: normobaric 100% O_2 through a tight-fitting mask – accelerates COHb dissociation (T1/2 decreases from 4-5 hours to 60-90 minutes). In severe poisoning, hyperbaric oxygen therapy (HBO) in a hyperbaric chamber (2-3 atm) is used.
15. Prognosis: HbCO>25% risk of delayed neurological syndrome. After stabilization, there is a neurologist's observation, EEG, and neuropsychological testing in 4-6 weeks.

Task 4. Chronic lead intoxication

> Battery operator 48 years old, experience 18 years. Complaints of cramping abdominal pain (lead colic), weakness, irritability, memory loss. Lead border along the edge of the gums. CBC: anemia (Hb 98 g/l), basophilic granularity of red blood cells. Lead in the blood is 520 µg/l (N<100).

Questions:

16. Make a diagnosis indicating the severity.
17. What is the pathogenesis of anemia in lead intoxication?
18. Prescribe complex (antidote) therapy.
19. What organs and systems are affected by chronic lead intoxication?
20. Resolve the issue of disability and rehabilitation.

Response standard:

16. Chronic occupational lead intoxication of the III degree (severe): asthenovegetative syndrome, lead colic, toxic anemia (Pb of blood 520 µg/l).
17. Lead inhibits δ-aminolevulinate dehydratase and ferrochelatase → impaired heme synthesis → sideroblastic/hypochromic anemia; In addition, hemolysis.
18. Complex therapy: EDTA (sodium calcium edetate) intravenously; D-penicillamine orally; Succimer (DMSA) when intravenous administration is not possible. Before the start, ensure hydration.
19. Affected systems: nervous (polyneuropathy, encephalopathy); blood (toxic anemia); kidneys (lead nephropathy); gastrointestinal tract (colic, hepatosis); cardiovascular (AH).
20. Immediate suspension from lead handling. Treatment in the hospital. After the normalization of Pb in the blood, consider a change of profession. In case of persistent disability – MSEC.

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4. PATIENT SUPERVISION TASK

Patient supervision is a mandatory element of current and intermediate control. Each student supervises one patient with an occupational disease during the semester. The results are drawn up in the form of an educational medical history.

4.1. Algorithm for examining the patient

- Collection of complaints (with an emphasis on the connection with production factors).
- Collection of medical history (onset, course, previous treatment).
- Collection of professional anamnesis: professional route; sanitary and hygienic characteristics of working conditions; work experience in contact with a harmful factor; personal protective equipment.
- Collection of life history (past diseases, allergological, family anamnesis).
- Physical examination of organs and systems.
- Analysis of laboratory data (CBC, OAM, blood biochemistry, specific occupational pathological tests).
- Analysis of instrumental data (X-ray/CT, PFT, ENMG, etc.).
- Formulation of a preliminary diagnosis.
- Differential diagnosis (at least 2 nosologies).
- Formulation of clinical diagnosis.
- Prescription of treatment (etiological, pathogenetic, symptomatic).
- Determination of the prognosis and recommendations for working capacity.

4.2. Criteria for assessing the educational medical history

Evaluation criteria	Max. points	In fact
Completeness and quality of professional history	20	
Correctness of physical examination	15	
Interpretation of laboratory and instrumental data	20	
Validity of clinical diagnosis	15	
Quality of differential diagnosis	15	
Prescription of treatment with justification	10	

Resolving the issue of working capacity	5	
TOTAL	100	

4.3. Assessment scale

Points	Evaluation	Criterion	Standings
90–100	Excellent	Full implementation of all points	Credited
75–89	Good	Minor gaps in differential diagnosis	Credited
60–74	Satisfactory	Incomplete differential diagnosis, errors in treatment	Credited
<60	Unsatisfactory	Gross errors in diagnosis/treatment	Not credited

5. TASKS FOR BOUNDARY CONTROL

5.1. Midterm Control No1 – Section 1 "Occupational Pathology. Dust Diseases"

Format: 20 test questions + 1 situational task. Completion time: 45 minutes.

Variants of test questions: from the bank of tests p. 2.1 (questions 1-8) + additional ones on topics 1.3-1.9 of the RPD.

5.2. Midterm Control No2 – Section 2 "Diseases from Physical and Toxicochemical Factors"

Format: 20 test questions + 1 situational task. Completion time: 45 minutes.

Variants of test questions: from the test bank p. 2.2 (questions 9–20) + additional ones on topics 2.1–2.12 of the RPD.

5.3. Criteria for assessing mid-term control

Component	Max. points	Criterion	Min. Threshold
Test control (20 questions)	60	3 points for the correct answer	36 points (12 correct)
Situational task	40	according to the criteria of clause 3	24 points
TOTAL	100	—	60 points

6. QUESTIONS FOR THE DIFFERENTIATED TEST

The test includes: 1) a theoretical question; 2) situational task. The grade is based on a cumulative system of points, taking into account current academic performance.

Section 1. The subject of occupational pathology. Dust diseases

1. The concept of occupational disease. Classification of occupational diseases according to the etiological principle.
2. Tasks and organization of occupational medicine in the Kyrgyz Republic. The role of the shop doctor.
3. Preliminary and periodic medical examinations of employees: goals, regulatory framework, organization.
4. Fibrogenic effect of dust: factors that determine its intensity. Theories of the pathogenesis of pneumoconiosis.
5. Silicosis: etiology, pathogenesis, classification, clinical picture, diagnosis, treatment.
6. Silicotuberculosis: features of the clinic, diagnosis and treatment.
7. Anthracosis. Silicosiderosis. Silicatose: common features and differences from silicosis.
8. Asbestosis: clinic, radiological signs, cancer risk, MSE.
9. Chronic Dust Bronchitis: Criteria for Etiological Diagnosis, Treatment, Prevention.
10. Occupational bronchial asthma: etiological factors, diagnosis, clinic, treatment.
11. Berylliosis: pathogenesis, clinical forms, treatment, prevention.
12. Pneumoconiosis of electric welders: clinical and morphological features.
13. Principles of medical and social expertise in pneumoconiosis. Criteria for establishing disability groups.
14. Medical and labor rehabilitation of patients with occupational diseases of the respiratory system.

Section 2. Diseases from physical factors. Toxicochemical occupational diseases

15. Vibration disease: etiology, pathogenesis, classification, clinical presentation under the influence of local vibration.
16. Vibration Disease from the Impact of General Vibration: Clinical Syndromes, Diagnosis.
17. Methods of functional diagnosis of vibration disease. Differential diagnosis.
18. Treatment and ITU for vibration sickness. Medical prevention.
19. Occupational diseases of the musculoskeletal system: types, clinical forms, MSE.
20. Autonomic polyneuropathy of occupational etiology: diagnosis, differential diagnosis.
21. Chronic lead intoxication: pathogenesis, classification, clinic, antidote therapy.
22. Chronic mercury intoxication (micromercuralism): clinic, diagnosis, treatment, prevention.
23. Intoxication with benzene and its homologues: target organs, clinic, ITU.
24. Acute occupational poisoning with irritating substances (chlorine, nitrogen oxides): pathogenesis of toxic pulmonary edema, emergency care.
25. Acute occupational carbon monoxide poisoning: pathogenesis of hypoxia, clinic, treatment.

26. Intoxication of FOS (organophosphate compounds): mechanism of action, clinic, antidote therapy.
27. Acute occupational pesticide poisoning: classification, principles of diagnosis and treatment.
28. Basic principles of diagnosis of acute occupational poisoning. Documentation of acute occupational poisoning.
29. Occupational Diseases of Workers Exposed to Ionizing Radiation: Clinical Acute and Chronic Radiation Sickness.
30. Examination of working capacity in acute and chronic occupational intoxications. Benefits for persons with occupational diseases.

Evaluation criteria for differentiated credits

Points	Evaluation	Content criterion	Standings
86–100	Excellent (A)	Complete, systematic answer; correct solution of the problem; competent justification of diagnosis and treatment	Credited
71–85	Good (B)	Minor inaccuracies in treatment or differential diagnosis	Credited
56–70	Satisfied. (C)	The answer is incomplete; errors in the details of pathogenesis or treatment	Credited
41–55	Satisfied. (D)	Significant gaps; The problem has been partially solved	Credited
26–40	Shortage. (E)	Significant errors; The problem has not been solved	Not credited
0–25	Dissatisfied. (FX)	Lack of knowledge; Diagnosis not made	Not credited

7. TOPICS OF REPORTS WITH PRESENTATIONS

The topic is chosen by the student from the list or agreed with the teacher. Requirements: no more than 30 slides, report 10 minutes + discussion 5 minutes.

7.1. List of topics

1. Influence of new factors of the production environment (nanodust, EMR, biological agents) on the health of workers.
2. Principles of medical and social expertise in occupational diseases.
3. Modern ideas about the pathogenesis of pneumoconiosis: the role of oxidative stress and apoptosis.
4. Organization and conduct of preliminary and periodic examinations of persons working in conditions of exposure to dust.
5. Criteria for the etiological diagnosis of dust bronchitis: evidence base.
6. Differential diagnosis of asbestosis with idiopathic pulmonary fibrosis and sarcoidosis.
7. Modern Ideas on the Pathogenesis of Vibration Disease: Neurovascular Mechanisms.
8. Differential diagnosis of vibration disease with Raynaud's disease, systemic vasculitis.
9. Differential diagnosis of occupational diseases of the upper extremities.
10. Differential diagnosis of lead intoxication with acute abdomen, porphyria.
11. Effects of benzene and its homologues on women's reproductive health and children's health.
12. Historical aspects of the study of the etiology, clinical presentation and treatment of chronic mercury intoxication.
13. Occupational bronchial asthma: modern methods of immunological diagnosis.
14. Acute poisoning with nitric oxides: toxic pulmonary edema – pathophysiology and emergency care.
15. Radiation sickness in professional practice: diagnosis and treatment.

7.2. Criteria for evaluation of the report

Criterion	Max. points	In fact
Correspondence of topic and content	15	
Scientific relevance and evidence base	20	
Logic and structure of presentation	20	
Presentation quality (data visualization)	15	
Knowledge of the material, answers to questions	20	
Compliance with the regulations	10	
TOTAL	100	

8. CONSOLIDATED ASSESSMENT SYSTEM

The final grade is formed according to the cumulative system during the semester. To be admitted to the test, you must score at least 60 points in the current and midterm control.

Form of control	Specific gravity, %	Max. points	Min. for admission
Current control (attendance, activity, oral questioning)	20	20	12
Midterm control No1 (tests + task, Section 1)	15	15	9
Midterm Control No2 (tests + task, Section 2)	15	15	9
Patient Supervision / Case Study	20	20	12
Report with presentation	10	10	6
Differentiated credit (theoretical question + problem)	20	20	12
TOTAL	100	100	60

Note: for students who scored more than 60 points in total on the current and midterm control, the teacher has the right to give a credit without a survey.

Conversion of points into grades (KRSU scale)

% of points	Alphabetic	Traditional	Standings
90–100	A (Excellent)	5	Credited
80–89	B (Good)	4+	Credited
70–79	C (Good)	4	Credited

60–69	D (Satisfied)	3	Credited
50–59	E (Satisfied)	3–	Credited
<50	FX / F	2	Not credited