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Federal State Budget Educational Institution
of Higher Education
Pacific State Medical University
of the Ministry of Health of the Russian Federation

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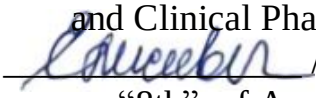
/ Eliseeva E.V./
"8th" of April 2025

COLLECTION OF ASSESSMENT TOOLS
Б1.О.21 Clinical pharmacology
of the basic educational program
of Higher Education

Specialty	**31.05.01 General Medicine for international students (in English)** (code, name)
Degree	Specialist's degree
Profile	02 "Healthcare" (in the field of providing primary health care to the population in medical organizations: polyclinics, outpatient clinics, inpatient/outpatient facilities of the municipal health care system)
Mode of study	**Full-time**
Period of mastering the BEP	**6 years** (nominal length of study)
Department	of Pharmacology and Clinical Pharmacology

Vladivostok, 2025

1. INTRODUCTION

1.1. Collection of Assessment Tools is a document that regulates the format, content, and types of assessment tools for continuous assessment, interim examination and final (state final) examination, and graded criteria for each type of assessment tools.

1.2. Assessment tools allows to evaluate the development of universal, general professional, and professional competencies (UCs, GPCs and PCs respectively) outlined in Federal State Educational Standard of Higher Education and defined in the basic educational program of higher education for the specialty 31.05.01 General Medicine for international students (in English), profile 02 "Healthcare" (in the field of providing primary health care to the population in medical organizations: polyclinics, outpatient clinics, inpatient/outpatient facilities of the municipal health care system).

(BEP HE for the 31.05.01 General Medicine for international students (in English) specialty, section 3 Learning Outcomes Requirements of the Basic Educational Program of Higher Education)

2. DOCUMENT BODY

2.1. Types of Assessment, Formats of Assessment Tools

No.	Types of assessment	Assessment Tools Format
1	**Continuous assessment**	**Tests**
		Mini-Case Studies
		Checklists
2	**Interim assessment**	**Checklists**
		Interview Questions

3. The contents of assessment tools for continuous and interim examination are prepared by the teacher of the course

Tests for continuous assessment

	Code	Competence description / name of labor function / name of work activity / text
S	31.05.01	General Medicine for international students (in English)
C	GPC-5	Is able to assess morphofunctional status, physiological states, and pathological processes in the human body when working to achieve objectives of professional activity
I		**ANSWER LEVEL 1 TEST QUESTIONS (ONE CORRECT ANSWER)**
		1. PHARMACODYNAMICS STUDIES +1) mechanisms of action of drugs 2) features of drug excretion 3) features of drug absorption 4) peculiarities of distribution of medicines 2. PHARMACOKINETICS STUDIES +1) patterns of absorption, distribution, transformation and elimination of drugs 2) mechanism of action of drugs 3) features of the interaction of drugs with receptors 4) the relationship between the chemical structure and biological activity of biologically active substances

3. MICROSOMAL BIOTRANSFORMATION OF MEDICINAL SUBSTANCES OCCURS IN
+1) liver
2) lungs
3) kidneys
4) intestines

4. APPARENT VOLUME OF DISTRIBUTION IS
+1) the ability of the substance to penetrate organs and tissues
2) absorption rate
3) Elimination rate
4) disintegration rate of the drug

5. ABSORPTION OF MOST DRUGS OCCURS IN
+1) small intestine
2) oral cavity
3) esophagus
4) stomach

6. BIOAVAILABILITY OF MEDICINAL SUBSTANCE IS THE AMOUNT OF THE DRUG
+1) entering the systemic circulation in relation to the administered dose
2) absorbed in the gastrointestinal tract
3) non-protein plasma
4) metabolized in the liver

7. M-CHOLINERGIC RECEPTORS ARE LOCALIZED IN THE
1) neurons of vegetative ganglia
2) carotid glomeruli
+3) cells of effector organs in the area of cholinergic fiber endings
4) chromaffin cells of adrenal medulla

8. FOR EMPIRIC ANTIBACTERIAL THERAPY OF BACTERIAL BRAIN ABSCESS, IT IS PREFERABLE TO USE A COMBINATION OF
+1) ceftriaxone+metronidazole
2) erythromycin+metronidazole
3) cefazolin+metronidazole
4) gentamicin+metronidazole

9. BETA-LACTAM ANTIBIOTICS IN A BACTERIAL CELL DISRUPT
+1) cell wall synthesis
2) protein synthesis at the ribosome level
3) cytoplasmic membrane permeability
4) RNA synthesis

10. ANTIBACTERIAL AGENT THAT HAS THE GREATEST ANTIANAEROBIC ACTIVITY IS
+1) metronidazole
2) ampicillin
3) gentamicin
4) tetracycline

11. MAIN PHARMACOLOGICAL EFFECT OF NON-STEROIDAL ANTI-INFLAMMATORY DRUGS IS
+1) anti-inflammatory effect
2) antiviral effect
3) hypotensive effect
4) hypolipidemic effect

		12. THE MAIN MECHANISM OF ACTION OF NSAIDS IS +1) antiprostaglandin 2) antibacterial 3) antihistamine 4) inhibition of antigen-antibody reaction 13. THE MEDICATION OF CHOICE FOR OSTEOMYELITIS IS 1) polymyxin B 2) fusidin sodium 3) penicillin +4) lincomycin 14. POLYPHARMACY IS +1) unreasonable prescription of a large number of drugs 2) sensitization 3) tolerance 4) withdrawal 15. TYPE A ADVERSE REACTIONS INCLUDE +1) toxicity associated with drug overdose 2) carcinogenic effects 3) idiosyncrasy, drug intolerance 4) drug dependence 16. TYPE D ADVERSE REACTIONS INCLUDE +1) carcinogenic effects 2) toxicity associated with drug overdose 3) idiosyncrasy, drug intolerance 4) drug dependence 17. THE MEDICATION OF CHOICE FOR TONSILLOPHARYNGITIS IS +1) amoxicillin/clavulanate 2) doxycycline 3) ceftazidime 4) ofloxacin
I		**ANSWER LEVEL 2 TEST QUESTIONS (MULTIPLE CORRECT ANSWERS)**
		1. EFFECTS OF CHOLINERGIC NERVE EXCITATION INCLUDE 1. relaxation of the bronchi +2. increasing bronchial tone 3. increased intraocular pressure +4. reduction of intraocular pressure +5. A-V conduction retardation 6. A-V conduction acceleration +7. increased secretion of salivary glands 8. weakening of salivary gland secretion +9. increased striated muscle tone 10. decreased striated muscle tone 2. FROM THE CARDIOVASCULAR SIDE, HALOTHANE CAUSES 1. tachycardia and increased blood pressure +2. bradycardia and hypotension +3. heart rhythm disturbance 4. practically does not affect the work of the heart 3.ALCOHOLIC ABSTINENCE SYNDROME MANIFESTS AS

+1. generalized tremor
2. bradycardia
+3. skin hyperemia and sweating
4. decrease in blood pressure

4. CEPHALOSPORINS WITH GOOD BLOOD-BRAIN BARRIER PENETRATION INCLUDE
1. cefazolin
2. cefuroxime
+3. ceftriaxone
+4. cefepime

5. NEUROAMINIDASE INHIBITORS INCLUDE
1. rimantadine
+2. oseltamivir
+3. zanamivir
4. acyclovir

6. RHEYE SYNDROME MANIFESTS IN CHILDREN UNDER 15 YEARS OF AGE AS _____ ASSOCIATED WITH ADMINISTRATION OF ACETYLSALICYLIC ACID
1. hearing loss, tinnitus, dizziness
2. dyspepsia
+3. brain encephalopathy
+4. liver and kidney dystrophy

7. NON-STEROIDAL ANTI-INFLAMMATORY DRUGS THAT SELECTIVELY INHIBIT COX-2 SYNTHESIS INCLUDE
+1. celecoxib
+2. nimesulide
3. diclofenac
4. ketoprofen

8. TETRACAINE
+1. has high toxicity
2. has a weak anesthetic effect;
3. used for conduction anesthesia
+4. used for terminal anesthesia

9. PROCAINE
1. has high toxicity
+2. used for conduction anesthesia
+3. used for infiltration anesthesia
+4. slowly penetrates the lipoprotein membrane of nerve endings

10. LOCAL ANESTHETICS INCLUDED IN THE GROUP OF SUBSTITUTED ACID AMIDES ARE
+1. lidocaine
+2. articain
3. tetracaine
+4. ropivacaine

11. LOCAL ESTER ANESTHETICS GROUP INCLUDE
+1. procaine

		+2. benzocaine +3. tetracaine 4. bupivacaine 12. AMIDE ANESTHETICS GROUP INCLUDES 1. anesthesin +2. mepivacaine +3. articain +4. lidocaine 13. WHEN CHOOSING A TOPICAL ANESTHETIC IN DENTAL PRACTICE, IT IS NECESSARY TO TAKE INTO ACCOUNT +1. whether the patient has concomitant pathology 2. the amount of carbohydrates consumed by the patient +3. the scope and nature of dental interventions +4. age limits

Assessment criteria

"Very good" – 91-100% correct answers of questions of every level
"Good" - 80-90% correct answers of questions of every level
"Satisfactory" - 70-79% correct answers of questions of every level
"Unsatisfactory" - less than 69% correct answers of questions of every level

Standardized case studies and checklists for **Б1.О.21 Clinical pharmacology** course

Case Study No.1

	Code	**Competence description / name of labor function / name of work activity / text**
S	31.05.01	General Medicine for international students (in English)
C	GPC-5	Is able to assess morphofunctional status, physiological states, and pathological processes in the human body when working to achieve objectives of professional activity
F	A/03.7	Prescribing treatment and monitoring its efficiency and safety
I		**READ THE PROVIDED CASE DESCRIPTION AND GIVE DETAILED ANSWERS TO THE QUESTIONS** Acetylsalicylic acid was prescribed for patient due to coronary artery disease. However, after some time, the patient had pain in the epigastric region and tar-like stool.
Q	1	Question: What purpose was acetylsalicylic acid prescribed for?
Q	2	Question: What is the cause of the complications?

Case Study No.1 Checklist

	Code	**Competence description / name of labor function / name of work activity / text**
S	31.05.01	General Medicine for international students (in English)
C	GPC-5	Is able to assess morphofunctional status, physiological states, and pathological processes in the human body when working to achieve objectives of professional activity
F	A/03.7	Prescribing treatment and monitoring its efficiency and safety
I		**READ THE PROVIDED CASE DESCRIPTION AND**

		GIVE DETAILED ANSWERS TO THE QUESTIONS Acetylsalicylic acid was prescribed for patient due to coronary artery disease. However, after some time, the patient had pain in the epigastric region and tar-like stool.
Q	1	Question: What purpose was acetylsalicylic acid prescribed for?
A		Correct answer: Acetylsalicylic acid inhibits platelet aggregation by inactivating COX-platelets, an enzyme that produces the cyclic endoperoxide precursor of thromboxane A2. Acetylsalicylic acid reduces the risk of atherothrombosis in coronary artery disease.
Q	2	Question: What is the cause of the complications?
A		Correct answer: The reason for this complication is the inhibition of the synthesis of prostaglandins E2 and I2 with the use of acetylsalicylic acid. Those prostaglandins have gastroprotective properties. Thus, with a lack of PGE2 and PG I2, there is a risk of gastrointestinal ulceration.
R2	Very good	The student has presented a complete answer, demonstrated systemic and deep knowledge of the educational material, developed the skills and abilities necessary to solve professional problems, proficiency in professional terminology
R1	Good/Satisfactory	The student has presented a complete answer demonstrating sufficient knowledge of the educational material, skills and abilities necessary to solve professional problems, and proficiency in professional terminology, but has made some inaccuracies that do not distort the main meaning The student has demonstrated a sufficient level of knowledge of the main educational material, professional skills and abilities, but made inaccuracies and errors in the answer
R0	Fail	The student made multiple errors of a fundamental nature in their answer

Case Study No.2

	Code	**Competence description / name of labor function / name of work activity / text**
S	31.05.01	General Medicine for international students (in English)
C	GPC-5	Is able to assess morphofunctional status, physiological states, and pathological processes in the human body when working to achieve objectives of professional activity
F	A/03.7	Prescribing treatment and monitoring its efficiency and safety
I		**READ THE PROVIDED CASE DESCRIPTION AND GIVE DETAILED ANSWERS TO THE QUESTIONS** The patient had bleeding during lung surgery, accompanied by a significant increase in fibrinolytic activity of the blood.
Q	1	Question: What drugs should be administered to a patient to stop bleeding?
Q	2	Question: What are the mechanisms for their action?

Case Study No.2 Checklist

	Code	Competence description / name of labor function / name of work activity / text
S	31.05.01	General Medicine for international students (in English)
C	GPC-5	Is able to assess morphofunctional status, physiological states, and pathological processes in the human body when working to achieve objectives of professional activity
F	A/03.7	Prescribing treatment and monitoring its efficiency and safety
I		**READ THE PROVIDED CASE DESCRIPTION AND GIVE DETAILED ANSWERS TO THE QUESTIONS** The patient had bleeding during lung surgery, accompanied by a significant increase in fibrinolytic activity of the blood.
Q	1	Question: What drugs should be administered to a patient to stop bleeding?
A		Correct answer: Hemostatic agents such as antifibrinolytic agents such as tranexamic acid
Q	2	Question: What are the mechanisms for their action?
A		Correct answer: Tranexamic acid is a competitive (at high concentrations - non-competitive) inhibitor of the activation of profibrinolysin (plasminogen) and its conversion to fibrinolysin (plasmin).
R2	Very good	The student has presented a complete answer, demonstrated systemic and deep knowledge of the educational material, developed the skills and abilities necessary to solve professional problems, proficiency in professional terminology
R1	Good/Satisfactory	The student has presented a complete answer demonstrating sufficient knowledge of the educational material, skills and abilities necessary to solve professional problems, and proficiency in professional terminology, but has made some inaccuracies that do not distort the main meaning The student has demonstrated a sufficient level of knowledge of the main educational material, professional skills and abilities, but made inaccuracies and errors in the answer
R0	Fail	The student made multiple errors of a fundamental nature in their answer

Interview questions

	Code	Competence description / name of labor function / name of work activity / text
S	31.05.01	General Medicine for international students (in English)
C	GPC-5	Is able to assess morphofunctional status, physiological states, and pathological processes in the human body when working to achieve objectives of professional activity
I		**ANSWER THE QUESTIONS**

		1. The content of pharmacology, its objectives. Its position among other medical disciplines. Relationship with other biomedical disciplines, especially physiology and biochemistry. The importance of pharmacology for practical medicine. 2. State Pharmacopoeia. Nomenclature of medicines. Search for new drugs: chemical synthesis of drugs, obtaining drugs from medicinal raw materials, biotechnology (cellular and genetic engineering). 3. Study methods used in pharmacology at stages: - preclinical (GLP) and clinical (GCP) trials. Ethics Committee. 4. Evidence-based medicine: basic principles and levels of evidence. 5. Define a section of pharmacology called pharmacokinetics. The main stages of pharmacokinetics: resorption, distribution, deposit, biotransformation, excretion. Describe the peculiarities of these processes in the children, pregnant women, and the elderly. 6. Substance biotransformation phases. Describe the peculiarities of these processes in the children, pregnant women, and the elderly. Ways of eliminating medications or their metabolites from the body. Describe the peculiarities of these processes in the children, pregnant women, and the elderly. 7. Quantitative measures (values) used in pharmacokinetics – drug plasma concentration curve, maximum concentration (C max), minimum effective concentration (MEC), bioavailability, drug clearance, elimination half-life ($T_{1/2}$). Methods for studying pharmacokinetics in experiment and clinic. 8. Types of doses: single (highest single), daily (highest daily), course; therapeutic (TD), age-related; toxic (LD). Dependence of pharmacological effect on dose and concentration of drug substance. Therapeutic index. 9. Side effects of drugs, types. Types of allergic reactions and mechanisms of their formation 10. Types of pharmacotherapy 11. Drug interaction: pharmaceutical and pharmacological. Mechanisms of drug incompatibility formation. Antidotes. 12. Routes of drug administration. Advantages and disadvantages. Selection of appropriate route for patient. 13. Specification of drug use during pregnancy. Categories of FDA. 14. General anaesthetics, features of general anaesthesia. Mechanism of general anaesthesia. Stages of anaesthesia. Requirements to general anaesthetics (properties of an ideal anaesthetic). Classification of general anaesthetics (inhalation and non-inhalation). Advantages and disadvantages. Principles of selecting and combining of general anaesthetics. 15. Pharmacology of peripheral muscle relaxants. Classification, pharmacological action. Pharmacokinetics and pharmacodynamics. Indications and contraindications for use. Drug interactions. Side effects. 16. Pharmacology of local anesthetics. Requirements for local anesthetics. Classification, pharmacological action. Pharmacokinetics and pharmacodynamics. Indications and contraindications for use. Drug interactions. Side effects. Use of nerve blockade in clinical practice. 17. Pharmacology of Opioid analgesics. Classification, pharmacological action. Pharmacokinetics and pharmacodynamics. Indications and contraindications for use. Drug interactions. Side

		effects. 18. Characteristics of non-narcotic analgesics, its difference from opioid analgesics. Synthesis of inflammatory mediators from arachidonic acid. Certain arachidonic acid metabolites and their main effects (pathological and physiological). Classification of NSAIDs. Pharmacokinetics and pharmacodynamics. Pharmacological action. Indications and contraindications for use. Drug interactions. Side effects. 19. Analgesic drugs from other pharmacological groups. 20. Pharmacology of vasoconstrictor drugs. 21. Pharmacology of drugs regulating hemostasis. 22. Pharmacology of drugs affecting calcium metabolism. Classification, pharmacological action. Pharmacokinetics and pharmacodynamics. Indications and contraindications for use. Drug interactions. Side effects. 23. Pharmacology of glucocorticosteroids (natural and synthetic). Classification, pharmacological action. Pharmacokinetics and pharmacodynamics. Indications and contraindications for use. Drug interactions. Side effects. Prevention of those side effects. 24. Pharmacology of antihistaminic drugs (blockers of H1-receptors). Classification, pharmacological action. Pharmacokinetics and pharmacodynamics. Indications and contraindications for use. Drug interactions. Side effects. 25. Vitamin D. Metabolism, actions. Pharmacodynamic and pharmacokinetic features of vit. D. 26. Antiseptics and disinfectants. Classification. Mechanism of action. Features. Spectrum of activity. Clinical use. 27. General principles of antibacterial chemotherapy. Indications for use of antibiotics. Side effects of antibiotics use. Prevention and correction. Mechanism of antibiotics resistance. Prevention. 28. Penicillins. Chemistry, properties and mechanism of action. Classification. Features. Spectrum of activity. Clinical use. Pharmacodynamic and pharmacokinetic features. Indications and contraindications. Side effects. 29. Cephalosporins. Chemistry, properties and mechanism of action. Classification. Features. Spectrum of activity. Clinical use. Pharmacodynamic and pharmacokinetic features. Indications and contraindications. Side effects. 30. Quinolones and derivatives. Classification. Mechanism of action. Features. Spectrum of activity. Clinical use. Pharmacodynamic and pharmacokinetic features. Indications and contraindications. Side effects. 31. Pharmacology of tetracyclins. Chemistry, properties and mechanism of action. Classification. Features. Spectrum of activity. Clinical use. Pharmacodynamic and pharmacokinetic features. Indications and contraindications. Side effects. 32. Pharmacology of amynoglycosides. Chemistry, properties and mechanism of action. Classification. Features. Spectrum of activity. Clinical use. Pharmacodynamic and pharmacokinetic features. Indications and contraindications. Side effects. 33. Pharmacology of macrolides. Chemistry, properties and mechanism of action. Classification. Features. Spectrum of activity. Clinical use. Pharmacodynamic and pharmacokinetic features. Indications and contraindications. Side effects.

		34. Pharmacology of antifungal drugs. Chemistry, properties and mechanism of action. Classification. Features. Spectrum of activity. Clinical use. Pharmacodynamic and pharmacokinetic features. Indications and contraindications. Side effects. 35. Pharmacology of drugs for Herpes virus infections. Chemistry, properties and mechanism of action. Classification. Features. Spectrum of activity. Clinical use. Pharmacodynamic and pharmacokinetic features. Indications and contraindications. Side effects.

4. Assessment criteria for learning outcomes

"Very good" grade is given to a student who possesses knowledge of the subject in full scope outlined in the curriculum, has a sufficiently deep insight into the subject; is able to answer all questions clearly, exhaustively, and with no outside help; structures their answers logically, with emphasis on the most important information; is able to analyze, compare, classify, summarize, refine, and structure the course content, giving particular attention to cause-and-effect relationships.

"Good" is given to a student whose knowledge of the subject is almost in full scope outlined in the curriculum (gaps are only present in the knowledge of some especially complex aspects); is able to answer questions exhaustively with little to no outside help; does not always put emphasis on the most important information, but does not make significant mistakes.

"Satisfactory" is given to a student who possesses the bulk of knowledge on the subject; has difficulties answering questions with no outside help, uses imprecise wording; makes mistakes in substantial number of their answers.

"Unsatisfactory" is given to a student who does not have the mandatory minimum of knowledge on the subject, is not able to give an answer even with additional guiding questions.

Appendix 1

Practical Skills Assessment Checklist

Practical Skill Name: Writing a prescription for a medication

C	GPC-5	Is able to assess morphofunctional status, physiological states, and pathological processes in the human body when working to achieve objectives of professional activity		
T	Prescribe an antibacterial medication for treatment of alveolar abscess to a patient weighing 85 kg with no history of allergic reactions to medications.			
	Action		Performed	Not Performed
1.	Correctly select the prescription blank/form		1 point	-1 point
2.	Correctly write the prescription in the selected prescription blank/form		1 point	-1 point
3.	Make no mistakes in Latin and English terminology		1 point	-1 point
4.	Correctly write the dosage form of the medication		1 point	-1 point
5.	Correctly write the route of administration		1 point	-1 point
	Total		6 points	

Assessment criteria:
"Pass" - at least 75% of required actions performed
"Fail" - 74% of required actions or less performed

Practical Skills Assessment Checklist

Practical Skill Name: Writing a prescription for a medication

C	GPC-5	Is able to assess morphofunctional status, physiological states, and pathological processes in the human body when working to achieve objectives of professional activity		
T	Prescribe an antibacterial medication for treatment of an abscess of the submandibular area to a patient with a history of allergic reactions to penicillins.			
	Action		Performed	Not Performed
1.	Correctly select the prescription blank/form		1 point	-1 point
2.	Correctly write the prescription in the selected prescription blank/form		1 point	-1 point
3.	Make no mistakes in Latin and English terminology		1 point	-1 point
4.	Correctly write the dosage form of the medication		1 point	-1 point
5.	Correctly write the route of administration		1 point	-1 point
	Total		6 points	

Assessment criteria:
"Pass" - at least 75% of required actions performed
"Fail" - 74% of required actions or less performed