MINISTRY OF HEALTH OF UKRAINE
Danylo Halytsky Lviv National Medical University

Department: Healthcare Management, Pharmacotherapy and Clinical Pharmacy

Head of the department: DSc, MD, Prof. Zimenkovsky A.B.

STUDENT'S JOURNAL
"PRODUCTION PRACTICAL TRAINING IN CLINICAL PHARMACY"

Student (full first and last name)

_____

Faculty of: Pharmacy (full-time education)

Year 5 Group __

Practice base (hospital)

_____

Lviv-20 __

Student _____
(full first and last name)

carries out practical training in Clinical pharmacy at

_____
(name of the inpatient hospital)
___

in _____
(city, region)

Terms of the practical training: from "__"_____ 20 ___ till "__"_____ 20 __

University practical training supervisor _____

_____
(official position, surname, name, and patronymic)

Immediate supervisor from practice base (inpatient hospital) _____

_____
(official position, surname, name, and patronymic)

The student started on "__"_____ 20 ___ finished on "__"_____ 20 ___

Signature of the responsible person _____

L.S.

GENERAL STATEMENTS

Academic elective discipline “Practical training in Clinical Pharmacy” for students-pharmacists (full-time form of education) is carried out on the 5th year 10th semester after winter exam session. The amount of practical training in Clinical Pharmacy equals 1 credit (1 week).

Fulfillment of the practical training in Clinical pharmacy at the inpatient hospital departments provides acquirement of professional experience by the students. Practical tasks include providing patients with pharmaceutical care directed on different categories of patients, particularly those who require special attention (pregnant, lactating women, children of different age groups, elderly and old-aged etc.) and involve prevention, detection and solution of drug-related problems, especially drug-drug interactions, inappropriate dosage of drugs or pharmacotherapy duration etc. Students work 6 hours daily during 5 days of the working week. In their free time, they fulfill the individual work. The students’ immediate supervisors of the practical training are doctors from the appropriate hospital departments.

Before starting practical training the student must get instructions from the University department practical training supervisor, get the syllabus, student’s journal of practical training, and a practical training assignment.

When at the practice base at the hospital, the student has to handle the journal of practical training to the immediate supervisor from the practice base, undergo occupational safety training, and specify the plan of the practical training.

During the practical training, the student must strictly observe internal regulations of the hospital.

The report on the practical training in Clinical pharmacy is formed by the student according to the timetable of the practical training and the additional guidelines of the supervisors from the University and the practice base.

The aim of the practical training in Clinical Pharmacy is as follows: consolidation of the theoretical knowledge in clinical pharmacy and improvement of practical skills in providing patients with pharmaceutical care.

Main tasks of the practical training in Clinical pharmacy are as follows:

- mastering the principles and gaining skills of pharmaceutical care providing for the purpose of efficacy and safety of pharmacotherapy enhancement;
- gaining skills in search, analysis and presentation of information about drugs i.e. the implementation of information and consulting about drugs among healthcare professionals and different population groups;
- mastering of medical deontology principles and codes of conduct of a pharmacist, in particular in relationships with doctors, pharmacists and clinical pharmacists, patients;
- adoption of skills in pharmacotherapy assessment;
- acquaintance with medical documentation about drugs.

According to the requirements of the Educational program discipline, “Production practical training in Clinical pharmacy” promotes **competences** acquisition by students as follows:

- ***Integral:*** The ability to apply the acquired general and professional competences to solve complex problems in professional pharmaceutical activities, including those of a research and innovation nature; providing professional activities in the relevant position, including the manufacture/development of drugs, their storage, quality control, delivery, distribution, dispensing, and supply of drugs, as well as consulting, providing information on drugs, and monitoring adverse drug reactions and/or ineffectiveness of drug therapy; realization of innovation.

general:

GC-01. The ability to abstract thinking, analysis, and synthesis.
GC-02. The knowledge and understanding of the subject area; understanding of professional activity.
GC-03. The ability to communicate in the national language both orally and in writing.
GC-04. The ability to communicate in a foreign language (mainly English) at a level that ensures effective professional activity.
GC-05. The ability to assess and ensure the quality of work.
GC-06. The ability to work in a team.
GC-08. The ability to preserve and multiply moral, cultural, scientific values and achievements of society based on an understanding of the history and patterns of development of the subject area, its place in the general system of knowledge about nature and society, and in the development of society, technology and technologies, to use various types and forms of motor activity for active recreation and leading a healthy lifestyle.
GC-09. Skills in the use of information and communication technologies.

special (professional, substantive):

SC-01. The ability to integrate knowledge and solve complex pharmacy/industrial pharmacy problems in broad or multidisciplinary contexts.
SC-03. The ability to solve pharmacy problems in new or unfamiliar environments in the presence of incomplete or limited information, taking into account aspects of social and ethical responsibility.
SC-04. The ability to clearly and unambiguously convey one's own knowledge, conclusions, and arguments in the field of pharmacy to specialists and non-specialists, in particular to people who are studying.
SC-05. The ability to demonstrate and apply communication skills and fundamental principles of pharmaceutical ethics and deontology in practical activities.
SC-07. The ability to conduct sanitary and educational work among the population to prevent common diseases, to prevent dangerous infectious, viruses and parasitic diseases, as well as to promote the timely determination and

maintenance of adherence to the treatment of these disease according to their medical-and-biological properties.

SC-08. The ability to provide counseling concerning OTC and prescription medications and others pharmaceutical products; to provide pharmaceutical care when selecting and dispensing OTC medications by assessing the risk/benefit, compatibility, taking into account the biopharmaceutical, pharmacokinetic, pharmacodynamic and physicochemical characteristics of the medications, indications, and contraindications based on the patient's health status.

SC-09. The ability to provide first aid for patients and victims in extreme situations and emergencies.

SC-10. The ability to monitor the effectiveness and safety of the drug use based on their clinical and pharmaceutical characteristics.

SC-15. The ability to analyze the socio-economic processes in pharmacy, forms, methods and functions of the pharmaceutical supply system and its components in the world practice, indicators of need, efficiency and availability of pharmaceutical aid in terms of health insurance and reimbursement of the drugs.

The learning outcomes:

PR 01. Possess specialized conceptual knowledge in the field of pharmacy and related fields, taking into account modern scientific achievements and being able to apply them in professional activities.

PR 02. Critically understand and analyze scientific and applied problems in the field of pharmacy.

PR 03. Possess specialized knowledge and abilities/skills for solving professional problems and tasks, including for the purpose of improving knowledge and procedures in the field of pharmacy.

PR 04. Communicate freely in the national and English languages orally and in writing to discuss professional problems and results of activities, presentation of scientific research and innovative projects.

PR 05. Assess and ensure the quality and efficiency of activities in the field of pharmacy in standard and non-standard situations; adhere to the principles of deontology and ethics in professional activity.

PR 06. Develop and make effective decisions to solve complex problems of pharmacy personally and based on the results of joint discussion; formulate the goals of one's own activity and the activity of the team, taking into account social and industrial interests, the general strategy, and existing limitations, determine the optimal ways to achieve goals.

PR 08. Develop and implement innovative projects in the field of pharmacy, as well as related interdisciplinary projects taking into account technical, social, economic, ethical, legal, and environmental aspects.

PR 09. Formulate, argue, clearly and concretely convey to specialists and non-specialists, including those seeking higher education, information based on

own knowledge and professional experience, the main trends in the development of world pharmacy and related industries.

PR 10. To conduct sanitary and educational work among the population for the purpose of prevention and in the event of outbreaks of dangerous infectious, viral, and parasitic diseases.

PR 11. Determine the advantages and disadvantages of drugs of natural and synthetic origin of various pharmacological groups, taking into account their chemical, physicochemical, biopharmaceutical, pharmacokinetic, and pharmacodynamic features and the type of dosage form. Recommend drugs and other products of the pharmacy assortment with the provision of advisory assistance and pharmaceutical care.

PR 12. Provide pre-medical assistance to patients in emergency situations and victims in extreme situations.

PR 13. Record cases of adverse reactions when using drugs of natural and synthetic origin; evaluate factors that can affect the processes of absorption, distribution, deposition, metabolism, and excretion of drugs and are determined by the condition and characteristics of the human body and the pharmaceutical characteristics of drugs.

PR 24. Use the data from clinical, laboratory, and instrumental studies to monitor the effectiveness and safety of the use of drugs.

PR 26. Plan and implement professional activities on the basis of normative legal acts and recommendations for proper pharmaceutical practices.

PR 27. To contribute to the preservation of health, in particular the prevention of diseases, the rational prescription, and use of drugs.

Plan and content for carrying out practical training in Clinical pharmacy

№	Contents of the fulfilled work	Number of days
1.	Getting familiar with the work at the certain department of the inpatient hospital and medical documentation fulfillment. Providing recommendations on the rational administration of drugs from the medication list purchased by the hospital for budget funds and received by the hospital department in accordance with the order requirement.	1
2.	Systematization of information represented in the simulated inpatient prescription paper.	1
3.	Providing of pharmacotherapy assessment in the simulated inpatient prescription paper (analysis of prescriptions advisability, propriety of dosage, route of administration and duration of drug intake, detecting cases of prescribing contraindicated drugs etc.)	1
4.	Identification of potential drug interactions in a simulated inpatient prescription paper. Assessment of possible outcomes of simultaneous administration of several drugs.	1
5.	Forming elements of pharmaceutical care directed towards the patient, physician and the nursing staff. Final control.	1
	Total	**5**

The list of practical skills and abilities that are to be gained by the 5th year student of the Faculty of Pharmacy during the practical training in Clinical pharmacy:

1. Identification of pharmacotherapeutic group of drugs represented in the requirement order.
2. Identification of the main indications of drugs represented in the requirement order.
3. Identification of the main contraindications of drugs represented in the requirement order.
4. Identification of the typical potential adverse reactions of drugs represented in the requirement order.
5. Ability to use Register of Drugs.
6. Ability to use WHO Model Lists of Essential Medicines.
7. Detecting potential drug interactions in the simulated inpatient prescription paper.
8. Assessment of possible outcome of potential drug interactions in the simulated inpatient prescription paper.
9. Determining the correct dosage of drugs in the simulated inpatient prescription paper taking into the account patient's age, main disease and comorbid disorders.
10. Detecting the conformity of drug administration duration in the simulated inpatient prescription paper to the requirements of appropriate clinical practice.
11. Detecting the conformity of drug administration route in the simulated inpatient prescription paper.
12. Detecting the cases of administration of contraindicated drugs in the simulated inpatient prescription paper.
13. Detecting cases of absence of required (indicated) drugs in the simulated inpatient prescription paper.
14. Evaluating of rationality of drug administration in the simulated inpatient prescription paper due to activity of Formulary System.
15. Estimation of the drug prescription expediency in the simulated inpatient prescription paper.
16. Estimating cases of simultaneous administration of drugs that belong to the same pharmacotherapeutic group or include the same active ingredient (in the simulated inpatient prescription paper).
17. Providing pharmaceutical care directed on a physician.
18. Providing pharmaceutical care directed on a nursing staff.
19. Providing patient-directed pharmaceutical care.
20. Ability to devise a conclusion about rationality of pharmacotherapy according to the results of inpatient prescription paper analysis.

MAIN PART

The student's journal of production practical training in Clinical pharmacy is an official document that reflects the daily work of the student, its content, and amount.

In the journal, students present the results of an individual task consisting of 2 parts.

The first part of the individual task consists in providing recommendations for rational administration of medications included into the list of drugs procured by the hospital for budget funds and are directed to the certain department according to the requirement order (provided by the Nursing staff supervisor at the certain department of the inpatient hospital).

Recommendations for the proper administration of each drug included in the requirement order are represented by the students in the form of a list of 13 items as follows:

1. Trade name (TN) of the drug*
2. International Nonproprietary Name (INN) of the drug**
3. ATC-code of the drug and the pharmacotherapeutic group it belongs to**
4. Availability of the drug in the WHO Model Lists of Essential Medicines (URL: *https://www.who.int/groups/expert-committee-on-selection-and-use-of-essential-medicines/essential-medicines-lists*).
5. Indications for the drug application (according to the specifics of the hospital department)**
6. Dosage form and route of administration, its correctness**
7. Correct dosage (single dose, dosage regimen (frequency), duration of administration of the drug)**
8. Potential and real interactions of the drug**
9. Contraindications for drug use**
10. The typical predictable adverse drug reactions (ADRs)**
11. Elements of the pharmaceutical care directed on the patient.
12. Elements of the pharmaceutical care directed on a physician.
13. Elements of the pharmaceutical care directed on a nursing staff.

Footnotes: * according to the requirement order; ** according to the data from patient information leaflets (PILs) represented in State Register of Drugs or at Medscape Drug Reference (URL: *http://reference.medscape.com/drugs*).

Such a list of recommendations for the proper prescription of drugs, the student forms for all drugs that are purchased by the hospital for budget funds and come to the hospital in accordance with the requirements of the order.

The second part of the individual task is the simulated inpatient prescription paper analysis (the prescription paper is given to the student by the University practical training supervisor). The students analyze the inpatient prescription paper using the unified methodology of pharmacotherapy assessment

that includes stages as follows:

1) Processing the table (see Table 1) in which all the drugs from the simulated inpatient prescription paper are transferred.

Table 1

The list of drugs used for pharmacotherapy of (name of the disorder) **according to the simulated inpatient prescription paper**

№	TN of the drug*	Pharmacotherapeutic group of the drug according to the ATC-classification)*	INN**	Drug dosage*	The real duration of pharmaco-therapy*
Drugs for oral (PO) administration*					
1.					
2. etc					
Drugs for intravenous (IV) drip*					
..					
..					
Drugs for IV bolus etc.*					
..					
..					

Footnotes: * data from simulated inpatient prescription paper; ** according to the data from patient information leaflets (PILs) represented in State Register of Drugs or at Medscape Drug Reference (URL: *http://reference.medscape.com/drugs*).

Table 1 has to reflect the simulated inpatient prescription paper. The difference lies in the fact that the drugs and related information are specifically systematized, first of all, by the route of administration. This will help to assess the correctness of route selection and cases of simultaneous administration of certain drugs in different dosage forms (e.g., tablets and IV solution).

After this, the student identifies the TN of drugs. He gives INN, pharmacotherapeutic group (to estimate cases of simultaneous administration of drugs that belong to the same group or include the same active ingredient) for each drug. Further he indicates dosage and duration of drug administration (in process of treatment duration analysis not only inpatient treatment should be taken into account, but also recommended treatment after discharge from the hospital). In addition, the student assigns a number to each drug to facilitate calculation of the total number of prescribed drugs.

2) Presentation of the results of pharmacotherapy assessment (see Table 2) in order to identify:
   - dosage (according to principles of appropriate clinical practice of drug prescription);
   - route of drug administration (according to patient's condition, age and physical-chemical properties of the drug);
   - duration of drug administration.

The student also estimates expediency of drug prescription (the expedient drug is marked as «+», an inexpedient one – as «–». If the case is controversial – he puts «?»). With the help of «+» and «–» signs the student indicates presence or absence of the drug in the WHO Model Lists of Essential Medicines.

If a student detects caution regarding dosage, route of administration, duration of use and appropriateness of drug prescribing he suggests comments in Table 2.

Table 2

Results of the simulated inpatient prescription paper assessment

№	TN*	Pharmacotherapeutic group of the drug (according to the ATC-classification)**	INN**	Drug dosage (real)*	Drug dosage (appropriate)**	Pharmacotherapy duration (real)*	Pharmacotherapy duration (appropriate)**	Clinical and pharmaceutical assessment of the simulated inpatient prescription paper					
								Dosage correctness ***	Pharmacotherapy duration correctness***	Route of administration correctness***	Comment***	Advisability of the drug prescription***	Availability of the drug in the valid WHO Model Lists of Essential Medicines ****
Drugs for oral (PO) administration*													
1.													
2. etc													
Drugs for IV drip*													
..													
..													
Drugs for IV bolus etc.*													
..													
..													

Footnotes: * data from simulated inpatient prescription paper;

** according to the data from patient information leaflets (PILs) represented in State Register of Drugs or at Medscape Drug Reference (URL: *http://reference.medscape.com/drugs*);

*** result of the clinical and pharmaceutical assessment of the simulated inpatient prescription paper carried out by the student;

**** according to the WHO Model Lists of Essential Medicines.

3) Analysis of potential drug interactions (see Table 3). The student identifies possible drug-drug interactions using information from corresponding paragraphs in the patient information leaflets (PILs) or Medscape Drug Reference. He assesses the potential outcome of the simultaneous use of several drugs and briefly describes the results of interactions (the increased or reduced effect, incompatibility etc.) the student also puts into Table 3 information on advisability of the drug interaction: the useful interaction is marked as «+», useless interaction – as «–», dangerous – as «!».

Table 3

Systematization of detected potential drug interactions in the simulated inpatient prescription paper

TN		**Pharmaco-therapeutic group** (according to the ATC-classification)		**INN**		**Comment on the possible result of drug interaction *****	**Interaction assessment*****
Drug 1*	**Drug 2***	**Drug 1****	**Drug 2****	**Drug 1****	**Drug 2****		

Footnotes: * data from simulated inpatient prescription paper;

** according to the data from patient information leaflets (PILs) represented in State Register of Drugs or at Medscape Drug Reference (URL: *http://reference.medscape.com/drugs*);

*** the result of the clinical and pharmaceutical assessment of the simulated inpatient prescription paper fulfilled by the student.

4) Analysis of cases of contraindicated drugs prescription or non-prescribing the indicated drugs (e.g. the patient who takes a loop diuretic is not prescribed a potassium supplement.

5) Devising a final conclusion about rationality of pharmacotherapy according to the results of simulated inpatient prescription paper analysis and providing pharmaceutical care directed on the patient, physician and the nursing staff for quality band safety of pharmacotherapy improvement.

LIST OF COMPLETED PRACTICAL SKILLS AND EVALUATION IN POINTS

№	List of practical skills or abilities	Score in points				Signature of the immediate supervisor from practice base
1.	Identification of pharmacotherapeutic group of drugs represented in the requirement order	□ 0 points	□ 3.6 points	□ 4.8 points	□ 6 points	
2.	Identification of the main indications of drugs represented in the requirement order	□ 0 points	□ 3.6 points	□ 4.8 points	□ 6 points	
3.	Identification of the main contraindications of drugs represented in the requirement order	□ 0 points	□ 3.6 points	□ 4.8 points	□ 6 points	
4.	Identification of the typical potential adverse reactions of drugs represented in the requirement order	□ 0 points	□ 3.6 points	□ 4.8 points	□ 6 points	
5.	Ability to use Register of Drugs	□ 0 points	□ 3.6 points	□ 4.8 points	□ 6 points	
6.	Ability to use WHO Model Lists of Essential Medicines	□ 0 points	□ 3.6 points	□ 4.8 points	□ 6 points	
7.	Detecting potential drug interactions in the simulated inpatient prescription paper	□ 0 points	□ 3.6 points	□ 4.8 points	□ 6 points	
8.	Assessment of possible outcome of potential drug interactions in the simulated inpatient prescription paper	□ 0 points	□ 3.6 points	□ 4.8 points	□ 6 points	
9.	Determining the correct dosage of drugs in the simulated inpatient prescription paper taking into the account patient's age, main disease and comorbid disorders	□ 0 points	□ 3.6 points	□ 4.8 points	□ 6 points	
10.	Detecting the conformity of drug administration duration in the simulated inpatient prescription paper to the requirements of Good Clinical Practice	□ 0 points	□ 3.6 points	□ 4.8 points	□ 6 points	
11.	Detecting the conformity of drug administration route in the simulated inpatient prescription paper	□ 0 points	□ 3.6 points	□ 4.8 points	□ 6 points	
12.	Detecting the cases of administration of contraindicated drugs in the simulated inpatient prescription paper	□ 0 points	□ 3.6 points	□ 4.8 points	□ 6 points	
13.	Detecting cases of absence of required (indicated) drugs in the simulated inpatient prescription paper	□ 0 points	□ 3.6 points	□ 4.8 points	□ 6 points	
14.	Evaluating of rationality of drug administration in the simulated inpatient prescription paper due to activity of Formulary system	□ 0 points	□ 3.6 points	□ 4.8 points	□ 6 points	

№	List of practical skills or abilities	Score in points				Signature of the immediate supervisor from practice base
15.	expediency in the simulated inpatient prescription paper	□ 0 points	□ 3.6 points	□ 4.8 points	□ 6 points	
16.	Estimating cases of simultaneous administration of drugs that belong to the same pharmacotherapeutic group or include the same active ingredient (in the simulated inpatient prescription paper)	□ 0 points	□ 3.6 points	□ 4.8 points	□ 6 points	
17.	Providing pharmaceutical care directed on a physician	□ 0 points	□ 3.6 points	□ 4.8 points	□ 6 points	
18.	Providing pharmaceutical care directed on a nursing staff	□ 0 points	□ 3.6 points	□ 4.8 points	□ 6 points	
19.	Providing patient-directed pharmaceutical care	□ 0 points	□ 3.6 points	□ 4.8 points	□ 6 points	
20.	Ability to devise a conclusion about rationality of pharmacotherapy according to the results of inpatient prescription paper analysis	□ 0 points	□ 3.6 points	□ 4.8 points	□ 6 points	
Total score for practical skills						

The minimum number of points, which must be scored by the student for the current performance of practice tasks for admission to the final control is 72 points.

The maximum number of points that a student can score for the current performance of practice tasks for admission to the final control is 120 points.

The calculation of the number of points is based on the grades obtained by the student on the traditional scale during the study of the discipline, by calculating the average number (CA), rounded to two decimal places. The resulting value is converted into points on a multi-point scale as follows:

$$x = \frac{CA \times 120}{5}$$

For convenience, the table of recalculation on a 120-point scale is given:

Recalculation of the average score for current activities in a multi-point scale for production practice, ending with a graded credit (with the mark)

4-point scale	200-point scale	4-point scale	200-point scale	4-point scale	200-point scale	4-point scale	200-point scale
5.00	120	4.45	107	3.91	94	3.37	81
4.95	119	4.41	106	3.87	93	3.33	80
4.91	118	4.37	105	3.83	92	3.29	79
4.87	117	4.33	104	3.79	91	3.25	78
4.83	116	4.29	103	3.74	90	3.20	77
4.79	115	4.25	102	3.70	89	3.16	76
4.75	114	4.20	101	3.66	88	3.12	75
4.70	113	4.16	100	3.62	87	3.08	74
4.66	112	4.12	99	3.58	86	3.04	73
4.62	111	4.08	98	3.54	85	3.00	72
4.58	110	4.04	97	3.49	84	Less than 3	Not enough
4.54	109	3.99	96	3.45	83		
4.50	108	3.95	95	3.41	82		

Report

about the production practical training in Clinical pharmacy

on the basis of _____

_____

(name of the hospital department)

5th-year student of specialty 226 “Pharmacy, industrial pharmacy” (full-time form of education) _____

(full first and last name)

List of types of work	Total
Analysis of inpatient prescription papers	
Identification of drug-related problems	
……..	
……..	

Date Signature

Final control of the practical training

The form of final control according to the syllabus is graded credit (with the mark).

Students who received at least 72 points for practical skills, and submitted a report on the practice, are admitted to the final control of industrial practice in clinical pharmacy.

The final control the students are made on the last day of practice in the presence of the commission, which includes supervisors of practice from the University and, if possible, from the hospital.

Assessment criteria for the final control of the practical training

The form of the final control is standardized. It includes inspection of both theoretical and practical training in the form of test Colloquium (80 MCQs that value 1 points each). Each option includes standardized questions, the knowledge of which is necessary to understand the issues of discipline and master the relevant competencies.

The maximum number of points that a student can receive for the final control is 80 points, the minimum number of points – 50.

The grade for practice is defined as the sum of points for current educational activities (not less than 72 points) and points for final control (not less than 50 points). Practice points for students who have successfully completed the program are converted into a traditional 4-point scale according to absolute criteria:

Points for the discipline	Grade according to the 4-point scale
170-200	5
140-169	4
139-122	3
<122	2

ASSESSMENT OF THE PRACTICAL TRAINING

Total score for:		Total score	Traditional mark	Date	Teacher's signature
Practical skills fulfillment	Final test control				

THE LIST OF QUESTIONS SUBMITTED FOR FINAL CONTROL

1. Regulatory documents that correspond to medication administration.
2. Medical deontology principles and codes of conduct.
3. Algorithm of collecting anamnesis (morbi, vitae, medication history).
4. Principles of efficacy and safety of pharmacotherapy enhancement.
5. Criteria for determining OTC and prescription drug categories.
6. Original and generic drugs. Advantages and disadvantages.
7. Drug efficacy criteria. Groups of efficacy criteria.
8. Factors that influence on clinical efficacy of drugs.
9. Clinical and pharmacological characteristics of different routes of drug administration.
10. Informing the patient about the conditions of rational drug administration, combination with food, rules for storage of medicines.
11. Clinical and pharmaceutical aspects of drug interactions with food. Ways of prevention of negative manifestations of drug interactions.
12. Clinical and pharmacological aspects of alcohol application in medicine and peculiarities of its interactions with drugs.
13. Types of adverse drug reactions and complications of pharmacotherapy.
14. Professional activity of pharmacist directed on detecting adverse drug reactions and informing them by means of spontaneous reports.
15. Clinical and pharmacological approach to the drug disease pharmacotherapy.
16. Dermatological representation of adverse effects of drugs, principles of pharmacotherapy.
17. Drug-related problems. Main types.
18. Drug interactions, principles of prevention of objectionable outcomes of pharmacotherapy. Types of drug interactions. Clinical value of drug interactions.
19. Pharmaceutical care as a means of pharmacist's professional activity display.
20. The main pharmacokinetic parameters, their practical value.
21. Disorders of the internal organs that may significantly affect the pharmacokinetic parameters.
22. Pharmacotherapy monitoring. Factors that determine the necessity of conducting the monitoring of pharmacotherapy.
23. Anatomical and physiological features of the human body in different ages (infants, children, adolescents, aged and the elderly) that influence the pharmacokinetics and pharmacodynamics of drugs.

24. Anatomical and physiological features of the female body during pregnancy and lactation that influence the pharmacokinetics and pharmacodynamics of drugs.
25. Characteristics of drug use in pregnant and lactating women. The algorithm of optimal drug, drug formulation, route of administration selection.
26. Pharmaceutical care of children in different periods of development in childhood (infants, teenagers). The algorithm of optimal drug, drug formulation, route of administration selection for the symptomatic treatment.
27. Pharmaceutical care of aged and elderly people. The algorithm of optimal drug, drug formulation, selection of route of administration for the symptomatic treatment.
28. Symptoms and syndromes of the most common cardio-vascular diseases: atherosclerosis, stable angina pectoris, acute myocardial infarction, hypertension, congestive heart failure, heart dysrhythmias.
29. Clinical and pharmacological approach to treatment of atherosclerosis, stable angina pectoris, acute myocardial infarction, hypertension and hypertension crisis, chronic congestive heart failure.
30. Features of use of the following groups of drugs: nitrates, beta-blockers, calcium channel blockers, ACE inhibitors, diuretics, cardiac glycosides.
31. Features of use of anticoagulants, antiplatelet drugs, lipid-lowering agents, and angioprotectors.
32. Efficiency criteria for treatment and safety of pharmacotherapy of the following diseases: atherosclerosis, stable angina pectoris, acute myocardial infarction, hypertension and hypertension crisis, chronic congestive heart failure, heart dysrhythmias.
33. Signs and symptoms of chronic atrophic gastritis (type A), chronic H. pillory-associated gastritis (type B), peptic gastric and duodenal ulcer, chronic pancreatitis, chronic hepatitis, chronic cholecystitis, cholelithiasis.
34. Clinical and pharmacological approach to treatment of chronic atrophic gastritis (type A), chronic H. pillory-associated gastritis (type B), peptic gastric and duodenal ulcer, chronic pancreatitis, chronic hepatitis, chronic cholecystitis, cholelithiasis.
35. Anti-Helicobacter therapy. H. pylori eradication schemes and clinical pharmacological characteristics of drugs for H. pylori eradication
36. Clinical pharmacology of antacids, histamine H2 antagonists and selective M1 choline receptor blockers, PPIs, poly-enzyme preparations, hepatic protectors.
37. The influence of functional state of stomach and liver on clinical efficacy of medications.
38. Safety of pharmacotherapy and treatment efficiency criteria of chronic atrophic gastritis (type A), chronic H. pillory-associated gastritis (type B), peptic gastric and duodenal ulcer, chronic pancreatitis, chronic hepatitis, chronic cholecystitis, cholelithiasis.
39. Clinical and pharmaceutical aspects of gastrointestinal bleeding management.
40. Signs and symptoms of acute and chronic pyelonephritis, acute and chronic glomerulonephritis, cystitis, urethritis, nephrolithiasis, acute and chronic kidney failure.
41. Clinical and pharmaceutical aspects of urinary tract disorders pharmacotherapy.

42. Characteristics of immune-inflammatory kidney disorders treatment with immune suppressants.
43. Signs and symptoms of allergic rhinitis and allergic conjunctivitis (hay fever), urticaria, Quincke's edema, acute anaphylaxis and anaphylactic shock.
44. Clinical and pharmacological approaches to the treatment of allergic rhinitis and allergic conjunctivitis (hay fever), urticaria, Quincke's edema, acute anaphylaxis, and anaphylactic shock.
45. Clinical pharmacology of antihistamines and topical anti-allergic agents.
46. Safety of pharmacotherapy and treatment efficiency criteria of allergic rhinitis and allergic conjunctivitis (hay fever), urticaria, Quincke's edema, acute anaphylaxis and anaphylactic shock.
47. Signs and symptoms of rheumatoid arthritis, arthrosis, osteoporosis.
48. Peculiarities of steroidal and non-steroidal anti-inflammatory drugs administration.
49. Peculiarities of disease-modifying antirheumatic drugs (DMARDs) application including medications that suppress connective tissue proliferation
50. Clinical and pharmaceutical aspects of drug application in surgical practice: local anesthetics, narcotic analgesics, skeletal muscle relaxants, analeptics, infusion solutions.
51. Pain, its causes, mechanisms of development, principles of pharmacotherapy.
52. Clinical and pharmaceutical aspects of antimicrobals application: penicillins, cephalosporins, macrolides, carbapenems, lincosamides, glycopeptides, fluorquinolones, tetracyclines, aminoglycosides etc.
53. Physiological and biochemical peculiarities of pregnancy.
54. Complications of pregnancy, their etiology and signs.
55. Clinical and pharmacological characteristics of drugs that are used for prevention of pregnancy complications.
56. Principles of rational drug application in cases of functional gynecological disorders.
57. Preparations for replacement hormone therapy in gynecology, principles of their application, assessment of efficacy and safety.
58. Clinical and pharmaceutical approach to treatment of inflammatory gynecological disorders.
59. Principles of vitamins rational use in clinical practice. Classification of vitamins, their biochemical, physiological, clinical and pharmacological value.
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RECOMMENDED LITERATURE

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