



Course: Epidemiology

Course coordinator: Prof. Branko Kolarić, MD, PhD

Department: Department of Social Medicine and Epidemiology

Study: Integrated undergraduate and graduate university study of Medicine in English

Year of study: 5th year

Academic year: 2021/2022

COURSE SYLLABUS

Course information (basic description, general information, teaching overview, required equipment, preparation, etc.)

Epidemiology is a compulsory course in the 5th year of the Integrated undergraduate and graduate university study of Medicine in English held in the twelfth semester. It comprises 30 hours of lectures, 15 hours of seminars, and 15 hours of practicals, totaling 60 class hours (3.5 ECTS credits).

The **aim** of the course is to prepare the students for professional jobs and tasks based on the acquired knowledge of epidemiology, as they will participate as doctors of medicine in the control and prevention of diseases (primary, secondary and tertiary prevention of communicable and chronic mass diseases). It implies knowledge of the foundations of the epidemiological characteristics of communicable and chronic mass diseases, understanding disease prevention and control measures, and anti-epidemic measures and their role in these affairs.

Course content: students will be introduced to the organization and functioning of the epidemiological service and the ways sanitary-epidemiological unit communicate with other healthcare teams, primarily in the field of early alerting and reporting of diseases and health conditions, on-scene interventions, population screening programs, sampling, and other disease control and prevention measures in the population. Students will be familiarized with the epidemiology of infectious and non-infectious diseases and statistical data processing in epidemiology.

COURSE LEARNING OUTCOMES:

I. COGNITIVE DOMAIN – KNOWLEDGE

Students will:

- be trained for future participation in the epidemiological information system
- be familiarized with their obligations under the Law on the Protection of the Population from Infectious Diseases
- be able to identify unusual groupings or epidemics of diseases and other unexpected events
- be able to identify risk factors for diseases in their patients and apply general measures to prevent mass diseases
- be able to recognize the importance of prevention measures such as vaccination and early detection of chronic mass diseases in the population
- be able to explain preventive and anti-epidemic disinfection, disinsection and deratization
- acquire basic knowledge of interventional epidemiology, epidemiological diagnostics, chemoprophylaxis, and seroprophylaxis
- be able to apply this knowledge in practical work.

II. PSYCHOMOTOR DOMAIN – SKILLS

In classes, students will demonstrate the calculation of measures of association and measures of occurrence in epidemiological data processing, which they will be able to apply and perform later in their practice. Knowledge of basic scientific-analytical epidemiology, epidemiological methods, and epistemology of epidemiology will serve students as a basis for future scientific work (critical analysis of knowledge, interpretation of bias in research, analysis of research limitations).

Teaching: The course is taught at the Faculty of Medicine, University of Rijeka and the Institute of Public Health of the Primorje-Gorski Kotar County. Lectures, seminars, and practicals are conducted using a

PowerPoint presentation. Seminars and practicals require active student participation. Students must prepare in advance for certain practical and seminar classes.

The student is required to prepare the material being discussed concerning attitudes toward vaccination. Students will be divided into two groups, one of which will advocate against vaccination and the other for vaccination. The debate will be mentored by the teacher. Attitudes for/against vaccination will be supported by data from professional and scientific literature.

The teacher evaluates student participation during seminar classes (demonstrated knowledge, comprehension, problem-solving skills, reasoning, etc.).

The teacher assesses student participation during seminar and practical classes, as well as connection and synthesis of prior knowledge adopted in previous lectures. Students should explain and substantiate a particular topic being covered.

Compulsory reading:

1. Gordis L. Epidemiology. 6th edition. Elsevier Saunders. 2018.
2. Heyman DL. Control of Communicable Diseases Manual. American Public Health Association.

Recommended for additional reading:

1. Rothman JK, Greenland S, Lash TL. Modern Epidemiology. Lippincot Williams and Wilkins. 2012.

Course teaching plan:

List of lectures (with titles and learning outcomes):

Lecture 1. Introduction to epidemiology. Historical development of epidemiology.

Learning outcomes:

Familiarizing with the basic terms and concepts from epidemiology: definition of epidemiology, definition of epidemic, endemic and pandemic, the difference between theoretical and interventional epidemiology. Understanding the historical context in the development of modern epidemiology, primarily the vaccine development, health surveillance of human food and drinking water, and aseptic techniques.

Lecture 2. Descriptive epidemiology. Measures of occurrence. Direct and indirect data standardization.

Learning outcomes:

Acquiring basic principles of descriptive epidemiology. Understanding epidemiological variables (person, place, time). Creating an epidemic curve. Seasonal and secular trends. Identifying differences in indicators of morbidity and mortality rate (incidence, prevalence, mortality, lethality). Acquiring knowledge about comparing data on populations of different (age) structures. Choosing the correct method of data standardization by age (direct and indirect data standardization).

Lecture 3. Analytic epidemiology. Measures of association. Epidemiological study design. Sources of bias in population studies.

Learning outcomes:

Acquiring definitions and goals of analytical epidemiology. Ability to calculate and interpret basic measures of association (relative risk, attributable risk, odds ratio). Understanding the level of evidence of epidemiological studies and the cause-and-effect relationship. Understanding the basic principles of analytical studies in epidemiology: cohort, case-control, and cross-sectional studies. Distinguishing the advantages and disadvantages of different epidemiological studies. Selecting the optimal study design depending on the type of epidemiological problem, existing knowledge, and the prevalence of the researched phenomenon. Acquiring knowledge about the basic types of bias in research (random, systemic, confounding) and interpreting personal and literature research work considering potential bias and research limitations.

Lecture 4. Diagnostic tests – sensitivity/specificity, predictive value. Epidemiology of chronic mass diseases – introduction. Cardiovascular diseases. Neoplasms. Diabetes.

Learning outcomes:

Interpreting diagnostic test characteristics (sensitivity, specificity, positive and negative predictive value, determination of the cut-off value in a diagnostic test). Familiarizing with the basic epidemiological principles in the occurrence of chronic mass diseases, risk factors, and measures of primary, secondary, and tertiary prevention of chronic diseases. Acquiring knowledge about epidemiological monitoring of chronic mass diseases, sources of information, morbidity and mortality in Croatia. Understanding cardiovascular diseases: incidence, age distribution and prevention measures. Distinguishing between variable and invariable risk factors for the development of cardiovascular diseases. Distinguishing the effectiveness of

individual preventive activities and understanding the problem of suppressing the most common risk factors for the development of cardiovascular disease. Understanding malignant diseases: incidence, age and gender distribution, prevention measures. Identifying genetic and environmental risk factors for neoplasms. Familiarizing with the Cancer Registry. Interpreting the incidence of diabetes in the world and in the Republic of Croatia, analyzing risk factors, chronic complications, and prevention measures.

Lecture 5. Information systems and interventional epidemiology. Epidemiology of HIV and blood-borne diseases. Post-exposure prophylaxis. Nosocomial infections.

Learning outcomes:

Describing the information flow in the epidemiological service. Understanding how intervention measures in epidemiology are created. Acquiring knowledge about epidemiological principles in the occurrence and spread of sexually transmitted and blood-borne diseases, their morbidity, as well as prevention and anti-epidemic measures on examples of diseases from this group (HIV/AIDS and viral hepatitis). Familiarizing with the procedure in the case of occupational exposure to and prophylaxis for blood-borne diseases. Acquiring knowledge about procedures for control and suppression of nosocomial infections. Detecting the most significant risks for nosocomial infections.

Lecture 6. Screening programs – theoretical basis. National screening programs for malignant diseases.

Learning outcomes:

Specifying conditions for running mass screening programs. Understanding the preparation process for the introduction of mass screening programs. Familiarizing with the criteria for the introduction of mass screening programs. Familiarizing with the procedure in national programs for early detection of breast, colon, and cervical cancers.

Lecture 7. Communicable disease epidemiology – introduction. Vogralik's chain. Epidemiological characteristics of intestinal diseases.

Learning outcomes:

Familiarizing with the epidemiology of diseases transmitted through the digestive system and appropriate anti-epidemic measures (with particular reference to alimentary toxic infections and waterborne epidemics).

Lecture 8. Vaccination and vaccine-preventable diseases. Compulsory vaccination program in the Republic of Croatia. Optional vaccines.

Learning outcomes:

Acquiring knowledge about vaccine types, vaccine antigens, and other vaccine ingredients. Familiarizing with vaccines used in mass vaccination programs in Croatia. Familiarizing with the principles of creating a mass vaccination program, epidemiological goals to be achieved in individual and collective protection, and the results of mass vaccination in the country.

Lecture 9. Epidemiological characteristics of respiratory diseases (influenza, TB). Anthrozoosis. Mosquito-borne diseases.

Learning outcomes:

Acquiring knowledge about the basic principles of the natural course of communicable diseases, epidemiological principles in the occurrence and spread of airborne diseases, their morbidity, as well as prevention measures and anti-epidemic measures on examples of diseases from this group (with particular reference to influenza and TB). Acquiring knowledge about the epidemiological principles in the occurrence and spread of zoonoses and natural-focal diseases, their morbidity, geographical distribution, prevention measures, and anti-epidemic measures on examples of diseases from this group (with particular reference to rabies). Understanding the basic principles of control and prevention of mosquito-borne diseases and emergency anti-epidemic measures (anti-epidemic DDD) in the event of such a disease.

Lecture 10. Death and mortality rate in Croatia. Epidemiology of injuries and accidents.

Learning outcomes:

Familiarizing with the mortality rate in the Republic of Croatia and determination of causes of death. Detecting crucial epidemiological characteristics of injuries and accidents in the Republic of Croatia.

List of seminars (with titles and learning outcomes):

Seminar 1. Prevention of travel-associated diseases.

Learning outcomes:

Familiarizing with vaccines outside the mandatory program (vaccination of travelers, international regulation of vaccination). Advising travelers on the epidemiological characteristics of the travel destination

and taking prevention measures for protection against communicable diseases (intestinal, respiratory, sexually transmitted, and others).

Seminar 2. Debate on vaccination.

Learning outcomes:

Discussing and reflecting on the current social debate about the compulsory vaccination program. Students will be divided into small groups and organize a debate by advocating for and against the mandatory vaccination program.

Seminar 3. Food safety management systems. Disinfection, disinsection, and deratization.

Learning outcomes:

Familiarizing with the activities and obligations in ensuring food safety (health integrity and safety of food, health education of persons working in the production or distribution of food, HACCP). Familiarizing with regulations and obligations in the field of disinfection, disinsection, and deratization. Reviewing anti-epidemic DDD in the 2015 flood.

Seminar 4. Epistemology of epidemiology.

Learning outcomes:

Understanding theoretical concepts of knowledge production in epidemiology. Developing a critical review and continuous questioning of explicit and implicit knowledge in epidemiology and biomedical sciences.

Seminar 5. Construction of knowledge in medicine and epidemiology.

Learning outcomes:

Forming attitudes about the limitations of knowledge and describing bias in inference/knowledge throughout history.

List of practicals (with titles and learning outcomes):

Practical 1. Descriptive epidemiology. Calculation of incidence, prevalence, mortality rate, etc. Calculation of sensitivity, specificity, positive and negative predictive values of a diagnostic test. Epidemiological indicators of health status in the Republic of Croatia.

Learning outcomes:

Through practical examples, students will independently solve problems of descriptive epidemiology and interpret epidemiological health status indicators in the population of the Republic of Croatia.

Practical 2. Direct and indirect age standardization.

Learning outcomes:

Through practical examples, students will independently calculate direct and indirect age standardization.

Practical 3. Law on the Protection of the Population from Infectious Diseases. Introducing the work of the epidemiological service.

Learning outcomes:

Through personal examples of the application of the Law on the Protection of the Population from Infectious Diseases, students will acquire the knowledge necessary for everyday work.

Practical 4. Analytical epidemiology.

Learning outcomes:

Based on examples of analytical epidemiology, students will practice the development of cohort, case-control, and cross-sectional study design.

Practical 5. Alimentary toxic infections.

Learning outcomes:

Based on the example of an outbreak of alimentary toxic infection, students will acquire basic knowledge and skills in interventional epidemiology.

Student obligations:

Students are required to attend regularly and actively participate in all forms of classes. In case the student is prevented from attending classes, they should have proof of a justifiable reason. Students are required to bring a notebook, a pen, and a calculator at seminars and practicals.

Exam (exam taking, detailed exam description of the oral/written/practical part, point distribution, grading criteria):

Evaluation method (ECTS credit system):

In accordance with the Ordinance on Student Assessment and Evaluation at the Faculty of Medicine in Rijeka, students will be assessed and evaluated during classes and on the final exam. Out of a total of 100 grade points (100%), the student can obtain a maximum of 55 points (55%) during classes and a maximum of 45 points (45%) on the final exam.

I. The following is evaluated during classes (maximum 55 points):

- a) acquired knowledge evaluated by a test during classes (45 grade points)
- b) active participation and knowledge demonstrated at classes (10 grade points)

To access the final exam, the student must obtain a minimum of 50% (28 grade points) during classes. If the student doesn't obtain a sufficient number of grade points during classes to access the final exam (less than 28 grade points from the test and class participation together) or isn't satisfied with the grade points obtained on tests during classes, they must take the make-up written exam with the next group of students.

II. Final exam (maximum 45 points)

The final exam is an oral examination. The final exam consists of three questions, each of which is evaluated with a maximum of 15 grade points (maximum 45 grade points). A student who obtains less than half of the grade points on the final exam (less than 23 grade points) cannot receive a final grade higher than F (insufficient). If a student obtains 23 or more grade points on the final exam, these grade points are added to the grade points (percentages) obtained during classes. The final grade is formed according to the table below.

III. Final grade

is the sum of ECTS grade points obtained during classes and on the final exam. It is determined based on the absolute distribution:

Percentage of acquired knowledge, skills and competencies (classes + final exam)	Numerical grade	ECTS grade
90–100%	5 (excellent)	A
75–89.9%	4 (very good)	B
60–74.9%	3 (good)	C
50–59.9%	2 (sufficient)	D
0–49.9% - or less than half of the grade points possible to obtain during class - or less than half of the grade points possible to obtain on the final exam	1 (insufficient)	F

	FINAL EXAM DATES
1.	30 June 2022
2.	14 July 2022
3.	8 September 2022
4.	22 September 2022

Possibility of teaching in another language:

A minor part of the course (20%) can be conducted in English or Italian.

Other important information regarding the course:

Students will choose their representative, who will contact the course coordinator and solve possible problems regarding teaching and course organization. If the student representative cannot resolve an issue with the coordinator, they will contact the course leader. The student representative will take care of the timely exam registration for the whole group and will organize and manage the collection and distribution of the index documents (grade record sheets) after the final exam.

COURSE SCHEDULE for the academic year 2021/2022

Class type	Date	Time	Location	Rotation /group	Lecturer
Lecture 1	May 31 2022	12:00–15:00	Lecture room 9	all	Prof. Branko Kolarić, MD, PhD
Lecture 2	May 31 2022	15:00–18:00	Lecture room 1	all	Assoc. Prof. Vanja Tešić, MD, PhD
Lecture 3	1 June 2022	11:00–14:00	Lecture room 7	all	Prof. Branko Kolarić, MD, PhD
Lecture 4	1 June 2022	14:00–17:00	Lecture room 7	all	Assoc. Prof. Vanja Tešić, MD, PhD
Lecture 5	2 June 2022	11:00–14:00	Lecture room 7	all	Prof. Branko Kolarić, MD, PhD
Lecture 6	2 June 2022	14:00–17:00	Lecture room 7	all	Assoc. Prof. Vanja Tešić, MD, PhD
Lecture 7	3 June 2022	12:00–15:00	Lecture room 9	all	Prof. Tomislav Rukavina, MD, PhD
Lecture 8	7 June 2022	12:00–15:00	Lecture room 9	all	Asst. Prof. Morana Tomljenović, MD, PhD
Lecture 9	8 June 2022	14:00–17:00	Lecture room 9	all	Asst. Prof. Morana Tomljenović, MD, PhD
Lecture 10	9 June 2022	14:00–17:00	Lecture room 9	all	Prof. Branko Kolarić, MD, PhD
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Seminar 1	10 June 2022	14:00-17:00	Lecture room 9	all	Asst. Prof. Morana Tomljenović, MD, PhD Andrea Šuran, MD
Seminar 2	14 June 2022	8:00-11:00	Lecture room 9	all	Prof. Branko Kolarić, MD, PhD Tanja Čorić, MD
Seminar 3	15 June 2022	8:00-11:00	Lecture room 9	all	Prof. Tomislav Rukavina, MD, PhD Tanja Staraj Bajčić, MD
Seminar 4	20 June 2022	8:00-11:00	Lecture room 9	all	Prof. Branko Kolarić, MD, PhD Dinko Štajduhar, MD
Seminar 5	21 June 2022	8:00-11:00	Lecture room 9	all	Prof. Branko Kolarić, MD, PhD Dinko Štajduhar, MD
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Practical 1	13 June 2022	13:00-16:00	Lecture room 9	all	Tanja Staraj Bajčić, MD
Practical 2	14 June 2022	11:30-15:00	Lecture room 9	all	Teaching Assistant Gordana Šimunković, MA

Practical 3	15 June 2022	11:30-15:00	Lecture room 9	all	Andrea Šuran, MD
Practical 4	20 June 2022	11:30-15:00	Lecture room 9	all	Asst. Prof. Morana Tomljenović, MD, PhD
Practical 5	21 June 2022	11:30-15:00	Lecture room 9	all	Tanja Staraj Bajčić, MD

List of lectures, seminars, and practicals:

	LECTURES (topics)	Teaching hours	Location
L1	Introduction to epidemiology Historical development of epidemiology	3	according to the schedule
L2	Descriptive epidemiology Measures of occurrence Direct and indirect data standardization	3	according to the schedule
L3	Analytic epidemiology Measures of association Epidemiological study design Sources of bias in population studies	3	according to the schedule
L4	Diagnostic tests – sensitivity/specificity, predictive value Epidemiology of chronic mass diseases – introduction Cardiovascular diseases Neoplasms Diabetes	3	according to the schedule
L5	Information systems and interventional epidemiology Epidemiology of HIV and blood-borne diseases Post-exposure prophylaxis Nosocomial infections	3	according to the schedule
L6	Screening programs – theoretical basis National screening programs for malignant diseases	3	according to the schedule
L7	Communicable disease epidemiology – introduction Vogralik's chain Epidemiological characteristics of intestinal diseases	3	according to the schedule
L8	Epidemiological characteristics of respiratory diseases (influenza, TB) Anthropozoonosis	3	according to the schedule

	Mosquito-borne diseases		
L9	Vaccination and vaccine-preventable diseases Compulsory vaccination program in the Republic of Croatia Optional vaccines	3	according to the schedule
L10	Death and mortality rate in Croatia Epidemiology of injuries and accidents Evaluation of teaching	3	according to the schedule
Total number of lecture hours		30	

	SEMINARS (topics)	Teaching hours	Location
S1	Prevention of travel-associated diseases	3	according to the schedule
S2	Debate on vaccination	3	according to the schedule
S3	Food safety management systems – HACCP, health education of persons working in the production or distribution of food Disinfection, disinsection, and deratization – implementation obligations and anti-epidemic DDD	3	according to the schedule
S4	Epistemology of epidemiology	3	according to the schedule
S5	Construction of knowledge in medicine and epidemiology	3	according to the schedule
Total number of seminar hours		15	

	PRACTICALS (topics)	Teaching hours	Location
P1	Descriptive epidemiology Calculation of incidence, prevalence, mortality rate, etc. Calculation of sensitivity, specificity, positive and negative predictive values of a diagnostic test Epidemiological indicators of health status in the Republic of Croatia	3	according to the schedule
P2	Direct and indirect age standardization	3	according to the schedule
P3	Law on the Protection of the Population from Infectious Diseases Introducing the work of the epidemiological service	3	according to the schedule
P4	Analytical epidemiology Cohort study Case-control study	3	according to the schedule

	Cross-sectional study		
P5	Outbreak of alimentary toxic infections	3	according to the schedule
	Total number of practical hours	15	

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