

Course Title	Epidemiology and Public Health				
Course Code	MED-403				
Course Type	Required				
Level	Undergraduate				
Year/ Semester	Year 4				
Teacher's Name	<p>Course Lead: Dr Annalisa Quattrocchi</p> <p>Other Contributors: Dr Souzana Achilleos Dr Avgis Hadjipapas Dr Eleni (Lina) Tolma</p>				
ECTS	6	Lectures / week	2/3	Laboratories / week	0
Course Purpose and Objectives	<p>The course aims to provide an overview of concepts and principles of epidemiology and public health. Specifically, the main objectives of the course are to ensure students:</p> <ul style="list-style-type: none"> • Understand the value of epidemiology and public health in the design, delivery and evaluation of effective and evidence-based clinical practice. • Learn about the principles behind the measurement and distribution of disease in the population. • Describe epidemiological study designs used to investigate determinants of health and disease in the population. • Critically appraise research publications to inform clinical practice. • Understand the principles of health promotion, health protection and disease prevention. • Describe the work and organization of health services. • Learn how to evaluate the effect of diagnostic tests and treatment. 				
Learning Outcomes	<p>The following list provides the learning objectives that will be covered in the lectures and tutorials of each week:</p> <p>Week 1</p> <ul style="list-style-type: none"> • Discuss the importance and value of epidemiology and public health in clinical medicine. • Describe the three Pillars of Public Health Practice • Define disease prevalence and incidence and their relationship for quantifying disease frequency in populations. • Define and interpret: life expectancy; quality-adjusted life years (QALYs); and disability-adjusted life years (DALYs) <p>Week 2</p> <ul style="list-style-type: none"> • Define and compare direct and indirect standardisation. 				

- Describe and interpret standardised ratios.
- Define and describe the importance of measuring different types of mortality rates (crude and adjusted rates; maternal / neonatal / infant / under-5 mortality; cause / age-specific and all-cause mortality).
- Tutorials Same Lobs as week 1 and 2

Week 3

- Describe the design and main features, and compare and contrast the use, advantages and disadvantages of descriptive (case report / case series) and observational analytic studies (cross-sectional, ecological, case control, and cohort).
- Identify appropriate study designs to answer specific epidemiological research questions.
- Define, describe the use of, and interpret odds ratios, relative risks, and rate ratios.
- Select the most appropriate regression technique based on the study question and design.
- Interpret regression coefficients.

Week 4

- Tutorials Same Lobs as week 3
- Discuss the potential reasons for study findings (chance, confounding, bias, truth).
- Describe the impact, assessment and control of chance, confounding and bias (including selection and information bias and measurement error).
- Describe and interpret effect modification or interactions.
- Differentiate internal and external study validity.

Week 5

- Outline the concepts of population parameter, sample estimate, sampling variation, sampling error, and sampling distribution, and describe standard error and 95% CI as measures of uncertainty about the population parameter.
- Define and interpret a 95% confidence interval and use it to infer statistical significance. Compare statistical significance to clinical significance.
- Outline the logic of and approach applied to statistical hypothesis testing and formulate the null and alternative hypothesis for given research scenarios.
- Select and interpret basic tests of statistical significance (chi-square, t-test, ANOVA, correlation).
- Interpret a p-value and use it to infer statistical significance, including outlining the concepts of test statistic, sampling distribution under the null hypothesis and critical values.
- Define the terms: Type I and II errors, alpha level, beta, power, precision and degrees of freedom and describe the relationship between sample size, power and precision.
- Outline the concepts of post hoc testing, multiple comparisons and the risks associated with these.

Week 6

- Tutorials Same Lobs as week 5

Week 7

- Define, apply and interpret number needed to treat/harm (NNT/NNH); absolute risk (AR), absolute risk percent (AR%); population attributable risk (PAR), population attributable risk percent (PAR%).
- Describe the difference between efficacy and effectiveness.
- Describe the design and main features of interventional epidemiological studies.
- Describe the reasons for and the methods of randomisation, stratification, blinding, allocation concealment and placebo controls.
- Compare and contrast the parallel and the cross-over design in clinical trials, highlighting the strengths and limitations of each.
- Compare and contrast the statically analysis methods in clinical trials, highlighting the strengths and limitations of each.

Week 8

- Define qualitative research and describe the various qualitative research methodologies
- Describe the process of analysing qualitative data

Week 9

- Describe the principles and practice of the different levels of prevention.

Week 10

- Describe the use and process of health needs assessments
- Identify sources of knowledge and intelligence to inform health needs assessments
- Define health promotion and discuss its importance and limitations
- Describe the action areas and approaches of health promotion, including models of behavioral change, the socio-ecological approach of health, addressing social inequalities, and promoting public policy.
- Demonstrate the application of the above approaches/models in a case study.
- Describe the role of lifestyle medicine in the promotion of health and management of chronic non-communicable disease.

Week 11

*No lectures/tutorials

Week 12

- Tutorials Same Lobs as weeks 9 and 10
- Discuss the importance of evidence-based medicine and list the hierarchy of evidence.
- Outline the main concepts of systematic reviews and meta-analyses and apply the PICO approach to search for evidence.
- Describe the features of systematic reviews and meta-analyses, including the assessment of publication bias, the interpretation of forest plots and the estimation of effect sizes.
- Critically appraise the existing literature and identify and examine gaps in knowledge.

Week 13

- Discuss the aims and objectives of screening.
- Discuss the criteria for selection of a screening test.
- Describe the properties of screening tests (validity, accuracy and reliability)
- Describe different types of screening programmes
- Discuss the screening concepts of confirmatory testing, appropriateness, biases.
- Contrast screening and diagnostic tests.
- Calculate the sensitivity, specificity, positive and negative predictive value of a screening test.
- Describe the interpretation of reference values.
- Describe basic probability theory (multiplication rule / addition rule), prediction / decision rules, decision trees, likelihood ratios (application of Bayes theorem), post-test and pre-test.

Week 14

- Tutorials Same Lobs as week 12 and 13

Week 15

- All previous Lobs
- Describe the global evidence (mortality, prevalence, incidence, risk factors, prevention and costs) of major infectious diseases in the developed and developing world.

Week 16

- List the elements in the chain of infection.
- Describe modes of transmission of infectious disease agents.
- Identify and recommend evidence based control measures based on mode of transmission
- Describe the objectives and types of surveillance systems.
- List the key elements of a surveillance system and its attributes.
- Describe surveillance data in terms of time, place and person.

Week 17

*No lectures/tutorials

Week 18

- Describe the organization of infection control systems, including disease reporting and notifiable diseases.
- Describe the global evidence (mortality, prevalence, incidence, risk factors, prevention and costs) of healthcare associated infections and antimicrobial resistance

Week 19

- Outline the steps involved in outbreak investigations.
- List the types of stakeholders that contribute to outbreak investigations and response.
- Describe and interpret the different epidemiological curves
- Determine the most efficient epidemiological study design to generate and test a hypothesis

Week 20

	<ul style="list-style-type: none"> Tutorials Same Lobs as week's 16-19 <p>Week 21</p> <ul style="list-style-type: none"> Interpret population pyramids. Discuss the impact of demographic change and population ageing on public health. Describe the global evidence (mortality, prevalence, incidence, risk factors, prevention and costs) of cardiometabolic and cerebrovascular conditions. <p>Week 22</p> <ul style="list-style-type: none"> Describe the global evidence (mortality, prevalence, incidence, risk factors, prevention and costs) of neurodegenerative diseases. Describe the global evidence (mortality, prevalence, incidence, risk factors, prevention and costs) of respiratory diseases. <p>Week 23</p> <ul style="list-style-type: none"> Describe the global evidence (mortality, prevalence, incidence, risk factors, prevention and costs) of cancer. <p>Week 24 *No lectures/tutorials</p> <p>Week 25</p> <ul style="list-style-type: none"> Tutorials Same Lobs as week's 21-23 <p>Week 26</p> <ul style="list-style-type: none"> Discuss the theory, evidence and limitations of epidemiological paradigms (adult life risk factors, life-course epidemiology and early life programming). <p>Week 27</p> <ul style="list-style-type: none"> Describe characteristics of health inequalities and strategies to reduce them. Describe the causes of health inequalities Describe the use of health equity audits <p>Week 28 Revision All Lobs</p>		
Prerequisites	None	Required	None
Course Content	<ul style="list-style-type: none"> Introduction to Epidemiology and Public Health Assessing morbidity and mortality in populations: measures of disease frequency & life expectancy (Part 1) Assessing morbidity and mortality in populations: measures of disease frequency & life expectancy (Part 2) Measures of morbidity and mortality in populations TUTORIAL Descriptive and observational analytic epidemiological studies and their role in providing evidence for public health (Part 1) Descriptive and observational analytic epidemiological studies and their role in providing evidence for public health (Part 2) 		

	<ul style="list-style-type: none"> • Assessing associations and identifying disease/mortality determinants • Descriptive and observational epidemiological studies, measures of association TUTORIAL • Interpretation of study findings, Internal and External Validity • Statistical testing of hypotheses (Part 1) • Statistical testing of hypotheses (Part 2) • Validity and Statistical testing TUTORIAL • Assessing impact of determinants in populations • Interventional analytic epidemiological studies and their role in providing evidence for public health (Part 1) Recorded lecture • Interventional analytic epidemiological studies and their role in providing evidence for public health (Part 2) • Introduction to qualitative research methods • Measures of impact and interventional epidemiological studies and qualitative studies TUTORIAL • Measures of impact and interventional epidemiological studies and qualitative studies TUTORIAL • Primary disease prevention Recorded lecture • Secondary and tertiary disease prevention • Health Needs Assessment • Health promotion • Introduction to Critical Appraisal Self-study • Evidence based medicine 1 • Evidence based medicine 2 (Interactive session on critical appraisal) • Levels of prevention, HNA and Health Promotion TUTORIAL • Screening (part 1) Recorded lecture • Screening (part 2) • Statistical aspects of screening • Screening TUTORIAL • Descriptive and analytic epidemiology of major infectious conditions (Part1) • Descriptive and analytic epidemiology of major infectious conditions (Part 2) • Infectious Disease Epidemiology I: disease transmission • Infectious Disease Epidemiology II: disease surveillance and outbreak investigation • Infectious Disease Epidemiology III: organisation of infection control • Interactive case study: Outbreak investigation (Part 1) • Interactive case study: Outbreak investigation (Part 2) • Infectious disease epidemiology TUTORIAL • Demographic change, population ageing and health • Descriptive and analytic epidemiology of major chronic conditions I: cardiometabolic and cerebrovascular conditions • Descriptive and analytic epidemiology of major chronic conditions I: neurodegenerative disease Recorded lecture • Descriptive and analytic epidemiology of major chronic conditions III: respiratory diseases • Descriptive and analytic epidemiology of major chronic conditions II: cancer • Epidemiology of major chronic conditions TUTORIAL • Epidemiological paradigms • Health inequalities • Quizzes on Health inequalities
Teaching Methodology	Lectures, Recorded Lectures/PowerPoint presentations, Tutorials, Flipped classroom

Bibliography	Recommended Textbooks/Reading:																																								
	<table border="1"> <thead> <tr> <th>Authors</th> <th>Title</th> <th>Publisher</th> <th>Year</th> <th>ISBN</th> </tr> </thead> <tbody> <tr> <td>Krentel A, McKee M</td> <td>Issues in public health</td> <td>Open University Press</td> <td>2022 3rd Edition</td> <td>9780335249152</td> </tr> <tr> <td>Timothy L.Lash, Tyler J. VanderWeele, Sebastien Haneuse, Kenneth J.Rothman</td> <td>Modern Epidemiology</td> <td>Wolters Kluwer</td> <td>2021 4th Edition</td> <td>9781451193282</td> </tr> <tr> <td colspan="5">E-book Permalink: https://ebookcentral.proquest.com/lib/nicosia/detail.action?docID=6947080</td> </tr> <tr> <td>Kawachi I, Lang I., Ricciardi W</td> <td>Oxford Handbook of Public Health Practice</td> <td>Oxford University Press</td> <td>2020 4th Edition</td> <td>9780198800125</td> </tr> <tr> <td colspan="5">E-book Permalink: https://search.ebscohost.com/login.aspx?direct=true&AuthType=ip,sso&db=nlebk&AN=2629107&site=eds-live&custid=s1098328&ebv=EB&ppid=pp_Cover</td> </tr> <tr> <td>Chongjian Wang, Fen Liu</td> <td>Textbook of Clinical Epidemiology for Medical Students</td> <td>Springer Nature</td> <td>2023 1st Edition</td> <td>9789819936212</td> </tr> <tr> <td>David L.Katz, Joann G.Elmore, Dorethea Wild, Sean C Lucan</td> <td>Jakel's Epidemiology, Biostatistics and Preventative Medicine</td> <td>Elsevier</td> <td>2014 4th Edition</td> <td>9781455706587</td> </tr> </tbody> </table>	Authors	Title	Publisher	Year	ISBN	Krentel A, McKee M	Issues in public health	Open University Press	2022 3rd Edition	9780335249152	Timothy L.Lash, Tyler J. VanderWeele, Sebastien Haneuse, Kenneth J.Rothman	Modern Epidemiology	Wolters Kluwer	2021 4 th Edition	9781451193282	E-book Permalink: https://ebookcentral.proquest.com/lib/nicosia/detail.action?docID=6947080					Kawachi I, Lang I., Ricciardi W	Oxford Handbook of Public Health Practice	Oxford University Press	2020 4 th Edition	9780198800125	E-book Permalink: https://search.ebscohost.com/login.aspx?direct=true&AuthType=ip,sso&db=nlebk&AN=2629107&site=eds-live&custid=s1098328&ebv=EB&ppid=pp_Cover					Chongjian Wang, Fen Liu	Textbook of Clinical Epidemiology for Medical Students	Springer Nature	2023 1 st Edition	9789819936212	David L.Katz, Joann G.Elmore, Dorethea Wild, Sean C Lucan	Jakel's Epidemiology, Biostatistics and Preventative Medicine	Elsevier	2014 4 th Edition	9781455706587
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Assessment	Formative Midterm Exam and Summative Final Exam. The Summative Final Exam will contribute towards 100% of the course grade. Assessment is by Single Best Answer MCQs (SBAs) and there may also be some Short Answer Questions (SAQs).																																								
Language	English																																								