UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Essentials of Medicine for Clinical

2526-1-F8205B009

Learning objectives

The course aims to enable students to interact effectively with physicians in the development of clinical studies, with particular focus on the disciplines of rheumatology, cardiology, and pneumology. The teaching aims to provide an understanding of clinical decision-making processes and methodological choices to answer specific clinical questions.

Students will acquire competencies in the analysis of clinical evidence applied to three fundamental medical areas: rheumatological, cardiovascular, and respiratory pathologies. The course will develop the ability to understand pathophysiology, biological rationale of diseases, clinical presentation modalities, diagnostic criteria, prognostic stratification, and therapeutic approaches for these pathologies.

Particular attention will be dedicated to developing the methodological competencies necessary to critically evaluate scientific literature, design simple research protocols, and understand the practical application of the evidence pyramid in the three reference clinical disciplines. Students will learn to formulate appropriate research questions and propose clinical research projects consistent with the principles of scientific evidence.

The course will also foster the development of transversal competencies such as autonomy of judgment in evaluating clinical studies, communication skills in presenting research projects, and continuous learning capacity in the field of medical sciences.

Contents

The course is structured in three main modules dedicated respectively to rheumatology, pneumology, and cardiology. Each module integrates theoretical learning of pathologies with critical analysis of clinical evidence through discussion of published studies and clinical cases.

In each module, theoretical foundations related to risk factors, pathophysiology, and clinical presentation of the

main pathologies of each discipline will be provided, directly integrated with practical application of clinical and translational research methodology. Teaching delivery will also include interactive group activities for analysis of research protocols and discussion of published studies.

The course maintains a rigorous methodological approach in applying clinical and epidemiological research methodology, focusing on different types of clinical studies functional to generating the best possible evidence, applying these concepts to the specific needs of the three reference clinical disciplines.

Detailed program

Module 1: Rheumatology - Rheumatoid Arthritis as a Study Model
The module uses rheumatoid arthritis as a paradigmatic disease to illustrate the principles of clinical research and scientific evidence in rheumatology.

Part 1: Disease Definition, Diagnosis and Classification Criteria
• Definition and pathophysiology of rheumatoid arthritis
• Diagnostic process and differential diagnosis
• EULAR/ACR methodology for developing classification criteria
• Epidemiological definitions for prevalence and incidence studies

Part 2: Measurement of Disease Activity and Damage
• Relationship between activity, damage and function
• Disease activity scores: development and validation
• Tools for evaluating structural damage and function
• OMERACT Framework

Part 3: Prognostic Factors, Biomarkers and Translational Models
• Prognostic factors
• Stratification biomarkers
• Ex-vivo models and translational research
• Precision medicine

Part 4: Evaluation of Intervention Efficacy
• Application of different study designs to research questions
• Appropriate selection based on research question, ethics, feasibility
• Observational studies and real-world evidence
• Development of recommendations and guidelines

Module 2: Pneumology
The pneumology module will present the main pathologies of the respiratory system in order to enable the acquisition of adequate competencies and vocabulary and to develop the principles of clinical research and scientific evidence.

Part 1: Clinical Approach to Respiratory Pathologies
• Methodology for evaluating pneumological patients
• Risk factors and determinants of respiratory health
• Classification and framework of main respiratory pathologies
• Diagnostic and monitoring tools

Part 2: Chronic Respiratory Pathologies
• Selection and presentation of representative chronic pathologies to use as study models
• Pathophysiology and clinical presentation

• Therapeutic approaches and clinical management
• Discussion of scientific literature examples on chronic pneumological pathologies

Part 3: Acute Respiratory Pathologies
• Selection and presentation of representative acute pathologies to use as study models
• Pathophysiology and clinical presentation
• Therapeutic approaches and clinical management
• Discussion of scientific literature examples on acute pulmonary pathologies

Part 4: Precision Medicine in Pneumology
• Integration between basic research and physiology and clinical practice
• Integrated diagnostic approach
• Patient-targeted treatment with practical examples

Module 3: Cardiology
The cardiology module will provide basic elements for evaluating patients with cardiovascular risk factors and with established cardiovascular disease. The main clinical studies in cardiovascular prevention will also be addressed to provide the necessary tools to interpret clinical research in this field.

Clinical Approach to Cardiovascular Pathologies
• Methodology for evaluating cardiological patients
• Classification and framework of main cardiovascular pathologies
• Cardiovascular risk stratification
• Diagnostic and prognostic tools

Cardiovascular Pathologies of Interest
• Selection of representative pathologies to use as study models
• Pathophysiology and clinical presentation
• Therapeutic approaches and clinical management
• Exemplary clinical cases

Clinical Evidence in Cardiology
• Critical analysis of cardiological scientific literature
• Discussion of relevant clinical studies
• Research methodology in cardiology
• Application of scientific evidence principles to clinical practice

Specific Methodological Aspects
• Appropriate study designs for cardiological research
• Discipline-specific outcome measures
• Methodological challenges in cardiovascular research
• Precision medicine in cardiovascular field

Prerequisites

No specific formal prerequisites are required.

Teaching methods

The course adopts an innovative teaching approach that integrates frontal lessons with interactive group activities. The structure includes:

Erogative Teaching (DE):
• 9 lessons of 4 hours each conducted in erogative mode in presence (3 lessons for each disciplinary module)
• 3 lessons of 2 hours conducted in erogative mode remotely (1 for each module)

Interactive Teaching (DI):
• Group discussion activities on published studies and research protocols
• Analysis of representative clinical cases for each discipline
• In-depth seminars on specific topics

During in-presence lessons, students will be divided into groups to encourage interactive discussion of published scientific works and research protocols related to the pathologies treated. Remote lessons will be dedicated to methodological deepening and preparation of group projects.

Video lessons recorded on the University's e-learning platform will also be available to support individual study and content review.

Assessment methods

The exam is conducted orally with a group work component that values collaborative learning and transversal competencies.

Exam Structure:

Students are organized in groups of 3-4 people and must develop a research project on one of the research questions proposed by the teachers (5-6 proposals for each clinical discipline).

The project must include:

1 Review of existing literature: Critical and systematic analysis of published studies on the chosen topic, with evaluation of methodological quality and obtained results
2 Research protocol proposal: Development of a simple clinical study project that includes:
? Clear definition of objectives and hypotheses
? Identification of target population and inclusion/exclusion criteria
? Description of proposed methodology
? Definition of primary and secondary outcomes
? Ethical and feasibility considerations

Presentation Methods:
• Oral presentation of the project
• Critical discussion with teachers
• Individual evaluation through specific questions on course contents

Evaluation Criteria:
• Quality of literature review
• Methodological appropriateness of proposed protocol
• Presentation and communication skills
• Knowledge of theoretical course contents

Competencies Evaluated:

• Ability for critical analysis of scientific literature
• Competencies in clinical study design
• Communication skills in scientific field
• Autonomy of judgment in evaluating clinical evidence
• Group work and collaborative problem-solving capacity

This exam modality allows effective verification of the acquisition of competencies necessary for professional interaction between biostatistician and physician, valuing both theoretical knowledge and practical skills in applying clinical research methodology.

Textbooks and Reading Materials

Main Teaching Material:
• Specific handouts and materials provided during the course for each disciplinary module
• Selected scientific articles from main rheumatology, pneumology, and cardiology journals
• Research protocols and clinical guidelines from reference scientific societies

Online Resources:
• Specialized bibliographic databases (PubMed, Embase, Cochrane Library)

Specific bibliographic material and articles for group activities will be provided progressively during course development and made available on the University's e-learning platform.

Semester

First semester

Teaching language

Italian.

Specialized medical literature is analyzed and discussed in English to encourage acquisition of international scientific language in the three clinical disciplines.

Sustainable Development Goals

GOOD HEALTH AND WELL-BEING | QUALITY EDUCATION