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Operational Programme Research, Development and Education

MINISTRY OF EDUCATION, YOUTH AND SPORTS

Doctoral course

Evidence-Based Medicine

Brief course content

Doctoral study program: Biomedical Engineering

Zdroj: https://predmety.fbmi.cvut.cz/cs/doktorske-bme

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Course structure - lectures

1. Introduction to evidence-based medicine, theory of knowledge, and Key Questions
2. Source of evidence, diagnostic and prognostic studies, harm
3. Evidence search, methods, sources, approaches related to the key questions
4. Risk of bias in clinical studies
5. Critical appraisal of diagnostic and prognostic studies with various design
6. Critical appraisal of efficacy and harm studies; and systematic review and meta-analyses
7. Evidence synthesis and comparative effectiveness: methods and steps for systematic reviews, interpretation
8. Evidence synthesis and comparative effectiveness: meta-analyses, approaches and models, modern tools, interpretation
9. Clinical guidelines, strength of evidence, interpretation, use, implementation, and assessment
10. Use of software to support systematic reviews, conduct meta-analysis, and present clinical guidelines

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Course structure - practices

First practice:

- Key question formulation search for evidence
- data abstraction
- sources for bias
- risk for bias assessment practice
- evidence synthesis

Second practice:

- statistical models for meta-analysis
- meta-analyses in RevMan and R.
- Assess the methodological quality of systematic reviews

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Introduction to evidence-based medicine, theory of knowledge, and Key Questions

- Definition - integration of best research evidence with clinical expertise and patient values
- History and Cochrane Collaboration
- Natural and empirical sciences, knowledge acquisition
- Knowledge by integrating the best research evidence
- Research steps in EBM and key/clinical questions
- Key questions in evidence integration

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Source of evidence, diagnostic and prognostic studies, harm

- Clinical studies as a main evidence source for EBM
- Studies classification: experimental and observational studies
- Study design for RCTs, cohort and case control studies
- Other sources: harm studies, patient experience, clinical expertise etc.
- Reliability/quality of sources of evidence

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Evidence search, methods, sources, approaches related to the key questions

- The key sources of evidence to search: clinical databases, trial registers, resources of professional societies and organizations etc.
- Information sources related to different evidence types
- Systematic review basics
- Search strategy preparation
- PICO/PICOTS and other notations for clinical questions formulation

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Assessing risk of bias in included clinical studies

- Bias: definition and examples
- Types of bias in clinical studies: selection bias, measurement bias, publication bias etc.
- Sequence generation, allocation, blinding, outcome selection and reporting, validity of study results
- Risk of bias assessment tools, Cochrane Collaboration's tool, special tools for various study designs
- Incorporating results of assessment into further analyses

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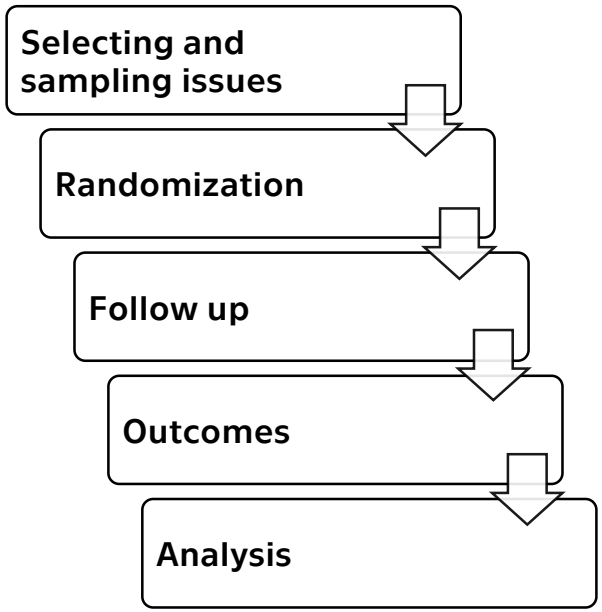
Critical appraisal of diagnostic and prognostic studies with various design and other evidence sources

- Systematic examination of research to judge its trustworthiness
- Internal validity of study
- Process of critical appraisal, recommended steps and developed tools/checklists
- Example of critical appraisal for RCTs
- External validity / generalizability of results



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Evidence synthesis and comparative effectiveness: methods and steps for systematic reviews, interpretation

- Comparative effectiveness research, definition and basics
- Systematic review: definition, approaches, methods, and recommended process
- Software, tools and templates for conducting systematic reviews
- Interpreting results and drawing conclusions
- Presenting results of SR

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Evidence synthesis and comparative effectiveness: meta-analyses, approaches and models, modern tools, interpretation

- Meta-analysis basics
- Data extraction and preparation
- Homogeneity of results in included studies
- Random and fixed effect meta-analysis – differences
- Meta-analysis software
- Interpretation of results: forest and funnel plots

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Clinical guidelines, strength of evidence, interpretation, use, implementation, and assessment

- Systematically developed statements to assist decisions about appropriate health care for clinical circumstances
- Life cycle of clinical guidelines
- GRADE - Grading quality of evidence and strength of recommendations
- Approaches to implementation: clinical groups, seminars, local adaptations, the use of IT
- Evaluation of changes in clinical practice and health outcomes and economic evaluation

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Use of software to support systematic reviews, conduct meta-analysis, and present clinical guidelines

- Citation managers: EndNote, Mendeley
- SR software: RevMan, Abstrackr, SR Toolbox
- MA software: RevMan, meta-analysis in R (Metafor), OpenMeta[Analyst], Excel addons

Doporučená literatura

1. Higgins JPT, Thomas J, Chandler J, Cumpston M, Li T, Page MJ, Welch VA (editors). *Cochrane Handbook for Systematic Reviews of Interventions* version 6.4 (updated August 2023). Cochrane, 2023. Available from www.training.cochrane.org/handbook.
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