ONLINE SUPPLEMENT

Evidence-based practice syllabus content

Outcome: To make the optimal use of current best evidence in making decisions about the care of patients

1. Translation of clinical uncertainty into an answerable question

1.1. Formulates clinical questions using the PECO(t) formula (Patient, Exposure/intervention, Comparison, Outcome, Time)

1.2. Recognises and formulates different types of clinical questions:
- 1.2.1. therapy
- 1.2.2. harm
- 1.2.3. aetiology
- 1.2.4. prognosis
- 1.2.5. diagnosis
- 1.2.6. economic
- 1.2.7. qualitative

2. Systematic retrieval of the best available evidence

2.1. Knows the different sources of evidence

2.2. Describes the 'hierarchy of evidence' as it applies to different types of questions

2.3. Describes what is meant by:
- 2.3.1. publication bias, and
- 2.3.2. language of publication bias

2.4. Describes the difference between the following electronic databases:
- 2.4.1. CINAHL
- 2.4.2. Cochrane Library
- 2.4.3. EMBASE
- 2.4.4. PsycINFO
- 2.4.5. Pubmed
- 2.4.6. Sigle

2.5. Knows how research is catalogued and strategies for efficient retrieval

2.6. Searches efficiently and effectively:
- 2.6.1. PubMed (Medline); and
- 2.6.2. the Cochrane Library.

3. Critical appraisal of the evidence

3.1. Basic epidemiology
- 3.1.1. Describes what is meant by
  - 3.1.1.1. systematic error (selection and measurement bias)
  - 3.1.1.2. random error (chance)
  - 3.1.1.3. internal validity and external validity
- 3.1.2. Describes sources of bias and strategies to overcome them
- 3.1.3. Describes what is meant by reliability, specifically:
  - 3.1.3.1. interrater reliability
  - 3.1.3.2. test–retest reliability
- 3.1.4. Describes what is meant by validity, specifically:
  - 3.1.4.1. construct validity
  - 3.1.4.2. content validity
  - 3.1.4.3. face validity
  - 3.1.4.4. criterion validity (concurrent and predictive validity)
- 3.1.5. Describes different approaches to sampling:
  - 3.1.5.1. simple random
  - 3.1.5.2. stratified random
  - 3.1.5.3. systematic
  - 3.1.5.4. cluster
- 3.1.6. Describes confounding and strategies to reduce the risk of confounding:
  - 3.1.6.1. randomisation
  - 3.1.6.2. restriction
  - 3.1.6.3. matching
  - 3.1.6.4. adjustment using stratification or multivariable regression models.
- 3.1.7. Describes allocation concealment and methods of randomisation:
  - 3.1.7.1. stratification
  - 3.1.7.2. minimisation
  - 3.1.7.3. cluster
  - 3.1.7.4. block
- 3.1.8. Knows how masking can reduce measurement bias
- 3.1.9. Describes approaches for arguing a cause-and-effect relationship (Koch, Hill, Rothman, Susser)
- 3.1.10. Knows the benefits and weaknesses of different quantitative study designs to address different clinical questions:
  - 3.1.10.1. cross-sectional study design
  - 3.1.10.2. cohort studies
  - 3.1.10.3. case–control
  - 3.1.10.4. randomised controlled trials (parallel, equivalence, cluster)
  - 3.1.10.5. systematic reviews
  - 3.1.10.6. ecological survey
  - 3.1.10.7. NOF1 clinical trials

3.2. Basic biostatistics
- 3.2.1. Knows that there are different types of data:
  - 3.2.1.1. categorical (ordinal, nominal, dichotomous)
  - 3.2.1.2. continuous
- 3.2.2. Interprets summary measures
  - 3.2.2.1. proportion
  - 3.2.2.2. mean
  - 3.2.2.3. median
  - 3.2.2.4. mode
  - 3.2.2.5. range
  - 3.2.2.6. interquartile range
  - 3.2.2.7. standard deviation
- 3.2.3. Interprets simple tabular presentations:
  - 3.2.3.1. 2×2 table
  - 3.2.3.2. frequency table
  - 3.2.3.3. frequency distribution
- 3.2.4. Interprets graphical presentations:
  - 3.2.4.1. bar chart
  - 3.2.4.2. histogram
  - 3.2.4.3. pie chart
  - 3.2.4.4. scatter plot
  - 3.2.4.5. box plot
- 3.2.5. For studies evaluating diagnostic accuracy, estimates the characteristics of a test:
  - 3.2.5.1. sensitivity
  - 3.2.5.2. specificity

3.2.5.3. likelihood ratios (positive and negative)
3.2.6. For studies evaluating diagnostic accuracy, estimates the characteristics of a sample
3.2.6.1. prevalence
3.2.6.2. positive predictive value
3.2.6.3. negative predictive value
3.2.7. For studies evaluating diagnostic accuracy, applies the results of a test to another population using likelihood ratios and nomograms
3.2.8. Interprets receiver operating characteristic curves
3.2.9. Describes what is meant by:
3.2.9.1. prevalence
3.2.9.2. cumulative incidence
3.2.9.3. incidence rates
3.2.10. Interprets 'survival' curves
3.2.10.1. median 'survival'
3.2.10.2. relative survival
3.2.10.3. Kaplan–Meier plots
3.2.11. Interprets mortality statistics
3.2.11.1. crude death rate, death rate, mortality rate
3.2.11.2. age-adjusted death rate
3.2.11.3. standardised mortality ratio
3.2.12. Calculates and interprets measures of treatment impact:
3.2.12.1. odds ratios
3.2.12.2. absolute risk reduction
3.2.12.3. absolute benefit increase
3.2.12.4. relative risk reduction
3.2.12.5. relative benefit increase
3.2.12.6. number needed to treat
3.2.12.7. number needed to harm
3.2.13. Knows what is meant by sampling variability and the use of the standard error in statistical inference
3.2.14. Describes what is meant by hypothesis testing (null and alternative hypotheses)
3.2.15. Describes hypothesis testing as applied to parametric and non-parametric data
3.2.16. Describes when to use and is able to interpret (but not calculate) hypothesis tests using:
3.2.16.1. the chi-squared test
3.2.16.2. Fisher's exact test
3.2.16.3. McNemar's test
3.2.16.4. *t*-test (paired and unpaired)
3.2.16.5. ANOVA
3.2.16.6. ANCOVA
3.2.16.7. Wilcoxon matched pairs signed rank test
3.2.16.8. Mann–Whitney *U*-test
3.2.16.9. Kruskal–Wallis test.
3.2.17. Interprets and explains confidence intervals for:
3.2.17.1. means
3.2.17.2. proportions
3.2.17.3. differences between means
3.2.17.4. differences between proportions
3.2.18. Knows what is meant by:
3.2.18.1. Type I error
3.2.18.2. Type II error
3.2.18.3. power
3.2.18.4. sample size
3.2.19. Describes the advantage of confidence intervals over *P* values
3.2.20. Interprets correlation coefficients and their significance:
3.2.20.1. Spearman's
3.2.20.2. Pearson's
3.2.21. Interprets the results from regression analysis:
3.2.21.1. simple linear
3.2.21.2. multiple
3.2.21.3. logistic
3.2.22. Knows what is meant by intention-to-treat analysis and understands different ways of handling missing data:
3.2.22.1. last observation carried forward
3.2.22.2. sensitivity analysis
3.2.22.3. multiple imputation
3.2.22.4. best-case analysis
3.2.22.5. worst-case analysis
3.2.23. Describes the role and limitations of meta-analysis to improve power and robustness of research
3.2.24. Describes the difference between fixed and random effect models
3.2.25. Recognises statistical heterogeneity:
3.2.25.1. visual inspection of forest plots
3.2.25.2. chi-squared test
3.2.25.3. Galbraith plot
3.2.26. Describes the role of sensitivity analysis in meta-analysis

3.3. Basic health economics

3.3.1. Describes the basic differences between direct and indirect costs and the ways in which they can be estimated
3.3.2. Knows what is meant by:
3.3.2.1. cost-effectiveness
3.3.2.2. cost-utility analysis
3.3.2.3. cost–benefit analysis
3.3.2.4. cost minimisation
3.3.3. Knows what is meant by a quality- or disability-adjusted life-year and the rationale for using these measures
3.3.4. Describes opportunity cost
3.3.5. Describes different approaches to discounting
3.3.6. Knows what is meant by the term 'sensitivity analysis' in the context of an economic evaluation

3.4. Qualitative methods

3.4.1. Knows when to apply qualitative research methodologies:
3.4.1.1. grounded theory
3.4.1.2. phenomenological
3.4.1.3. ethnographic
3.4.2. Describes additional approaches to sampling in qualitative studies:
3.4.2.1. purposive
3.4.2.2. convenience
3.4.2.3. snowball

3.4.3. Describes different approaches to data gathering in qualitative studies:
  3.4.3.1. focus groups
  3.4.3.2. interviews
3.4.4. Describes the role of qualitative methodologies in instrument (i.e. screening, diagnostic, outcome measure) development
3.4.5. Describes methods for validating qualitative data:
  3.4.5.1. triangulation
  3.4.5.2. member checking
3.4.6. Describes methods for minimising bias:
  3.4.6.1. reflexivity
  3.4.6.2. bracketing
3.4.7. Describes methods of analysing data
  3.4.7.1. content analysis
  3.4.7.2. constant comparison
3.4.8. Describes data saturation

3.5. Guideline and protocol development

3.5.1. Describes the process for developing NICE and SIGN guidelines
3.5.2. Describes the advantages and limitations of guidelines and protocols

3.6. Critical appraisal

3.6.1. Diagnostic questions
  3.6.1.1. Describes the STARD statement for reporting studies of diagnostic accuracy
  3.6.1.2. Critically appraises cross-sectional studies as used to address questions of prevalence and diagnostic accuracy
3.6.2. Prognosis questions
  3.6.2.1. Critically appraises cohort studies as used to address prognostic questions
3.6.3. Therapy, harm and aetiology questions
  3.6.3.1. Describes the CONSORT statement: recommendations for improving the quality of reports of parallel group randomised trials
  3.6.3.2. Critically appraises randomised controlled trials, cohort and case–control studies as used to address therapy, harm and aetiology questions
3.6.4. Economic evaluations
  3.6.4.1. Critically appraises economic evaluations
3.6.5. Qualitative analysis
  3.6.5.1. Critically appraises qualitative research
  3.6.5.2. Critically appraises mixed-methods research
3.6.6. Systematic reviews and meta-analysis
  3.6.6.1. Describes the QUORUM statement for improving the quality of reports of meta-analyses of randomised controlled trials
  3.6.6.2. Critically appraises a systematic review
3.6.7. Guidelines and protocols
  3.6.7.1. Critically appraises clinical practice guidelines

4. Application of the results in practice

4.1 Describes strategies for enabling the patient to make an informed decision

5. Evaluation of performance

5.1 Describes audit, change planning, feedback, and other elements of PDSA (Plan, Do, Study, Act) cycles, and their implications for clinical governance