

## Step 3 – Critical Appraisal of Research Evidence

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### Critical appraisal of publications

- **Validity** – “proximity to the truth” of the DESIGN
- **Reliability** - RESULTS of the research
- **Applicability** – probability of our being able to make use of the CONCLUSIONS of this study at our own institutions

#### Validity

#### Reliability

#### Are the results important?

- *Refers to consistency or reproducibility of data*
- *Used statistical techniques*
- **Impact** – size of the effect

#### Applicability

- Can we apply it to our patient?
- Can we apply it in our setting?

### Tools for critical appraisal of articles/levels of evidence

- 20 – For evaluation of systematic reviews
- 49 – RCT
- 19 – Observational studies
- 18 – Diagnostic test studies
- 40 – Systems for grading the strength of a body of evidence
- AHRQ Evidence Report #47: Systems to rate the scientific quality of research evidence
- <http://www.ahrq.gov/clinic/epcsyms/strengthsum.htm>
- 29 – For evaluation of qualitative studies

Quality in Qualitative Evaluation: A framework for assessing research evidence – August 2003  
[http://www.strategy.gov.uk/downloads/su/qual/ex\\_summary.htm](http://www.strategy.gov.uk/downloads/su/qual/ex_summary.htm)

### Appraisal Tools

- **CASP**
- <http://www.phru.nhs.uk/Pages/PHD/resources.htm>
- **Users' Guides to Evidence Based Practice** <http://www.cche.net/usersguides/main.asp>
- **Center of EBM, Toronto, Canada**  
<http://www.cebm.utoronto.ca/teach/materials/caworksheets.htm>

**AGREE - clinical practice guidelines**  
<http://www.agreecollaboration.org/>

### **Diagnosis study appraisal (1)**

#### **Is this evidence about diagnosis valid?**

1. Was there blind comparison with gold standard?
2. Was the diagnostic test evaluated in the appropriate spectrum of patients?
3. Was the gold standard applied regardless of the diagnostic test result?
4. Was the cluster of tests validated in a second, independent group of patients?

#### **Is this valid evidence about diagnosis important?**

### **Diagnosis study appraisal (2)**

#### **Can we apply this valid, important evidence about a diagnostic test in caring for our patients?**

1. Is it available, affordable, accurate, and precise in our setting?
2. Can we generate a clinically sensible estimate of our patients pre-test probability? (Are study patients similar to our own?)
3. Will the resulting post-test probabilities affect our management and help our patients?

### **Therapy study appraisal (1)**

#### **Is this evidence about therapy valid?**

1. Was the assignment of patients to treatment randomized?
2. Was the randomization concealed?
3. Were the groups similar at the start of the trial?
4. Was the follow-up of patients sufficiently long and complete?
5. Were all patients analyzed in the groups to which they were randomized?

### **Therapy study appraisal (2)**

#### **Is this valid evidence about therapy important?**

1. What is the magnitude of treatment effect?
2. How precise is the estimate of treatment effect?

#### **Can we apply this valid, important evidence about therapy in caring for our patient?**

1. Is our patient so different from those in the study that its results cannot apply?
2. Is the treatment feasible in our setting?
3. What are our patient's potential harms and benefits from the therapy?
4. What are patient/s values and expectations for both outcome and treatment?

### **Hierarchies of evidence and levels of recommendations**

- **Oxford Centre for Evidence-based Medicine Levels of Evidence**
- <http://www.cebm.net/index.aspx?o=1025>
- **GRADE Working Group**
- <http://www.gradeworkinggroup.org/>

### **Oxford Levels of Evidence**

#### **Journals that indicate articles levels of evidence**

American Journal of Sports Medicine  
Arthroscopy

Clinical Orthopaedics and Related Research  
Knee Surgery, Sports Traumatology, Arthroscopy: Official Journal of the ESSKA  
Journal of Bone and Joint Surgery. American Volume.  
Obstetrics and Gynecology  
Otolaryngology Head and Neck Surgery

### **Oxford Grades of Recommendation**

- A** consistent level 1 studies
- B** consistent level 2 or 3 studies *or* extrapolations from level 1 studies
- C** level 4 studies *or* extrapolations from level 2 or 3 studies
- D** level 5 evidence *or* troublingly inconsistent or inconclusive studies of any level

### **SUNY Downstate Medical Center Evidence Based Medicine Course**

#### **Center for Substance Abuse Prevention**

<http://www.doe.state.in.us/sdfsc/pdf/lvlsofeffectiveness.pdf>

### **References**

- Straus Sh., Scott Richardson W., Glasziou P., Haynes B. Evidence-based Medicine. How to practice and Teach EBM. 2005
- Evidence-based Practice for Information Professionals. A Handbook/ Ed. A.Booth, A.Brice. 2004
- Users' Guides to the Medical Literature. Essentials of Evidence-Based Clinical Practice /Ed. G.Guyatt, D.Rennie
- Critical Appraisal Tools. Health Resources Digest, December 2006  
[http://www.eurasiahealth.org/attaches/99150/digest\\_Dec06\\_eng.pdf](http://www.eurasiahealth.org/attaches/99150/digest_Dec06_eng.pdf)