Evidence Based Practice: Skills Boot Camp

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Overview

- Asking focused answerable questions
- Conducting efficient searches
- Analyzing study methods
- Determining how to implement evidence

Evidence Based Practice:

- “The conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients”

Evidence Based Practice is:

‘The integration of best research evidence with clinical expertise and patient values.’

Steps in Evidence Based Practice

1. Identify a question (PICO)
2. Find the best evidence to answer the question
3. Critically appraise the evidence for validity, impact and applicability
4. Integrate evidence with clinical expertise and patient values/wishes
5. Evaluate process (prior steps) to improve next time

Asking a Focused Question...

PICO

- P = The Patient or Population
  - "Who will be the focus?"
  - EX: In _ [patient, problem, risk factor] _ does...
- I = Intervention or Clinical Action
  - "What is the Exposure or the Treatment of interest?"
  - EX: does Treatment A compared to...
- C = Comparison
  - EX: Compared to Treatment B Reduce...
- O = Outcome
  - EX: Reduce Outcome of interest
Prioritizing: Deciding on a Question

- Disease/Condition:
  - Patient: Severity, Duration, Cost
  - Societal: Prevalence, Severity, Costs
- Intervention:
  - Potential for meeting unmet needs, Lowering cost
- Practice Change:
  - How would it benefit practice? Preferences? Timing?
  - Motivation to change
- Feasibility:
  - Information/data availability
  - Cost
- Other:
  - Interest
  - Innovation
  - Social or Ethical implications

Refining the Question

- State of the science may dictate
- Too few studies... go up!
- Too many studies... move down!
- Specificity important
  - What age group?
  - What dose?
  - What setting? (inpt, outpt, c)
  - What about outcome?

Does SGA treatment increase risk of metabolic s/e?

- Does age of patient matter? - All patients
- Does diagnosis of pt matter?
- Does setting matter?
- All SGA's or just some?
- Compare to FGA's? What about mood stabilizers? Placebo?
- All metabolic s/e? BMI? Wt gain? Lipids?
  Why will asking these questions help us?

After defining a focused question:

PICO

- P: The Patient or Population
  "Who will be the focus?"
  "Is this all ages?"
  "Does setting matter?"
  "Does diagnosis matter?"
- I: Does SGA treatment
  "Any SGA or all?"
- C: Compared to
  "First generation?"
  "Mood stabilizers?"
  "Placebo?"
- O: Increase risk of metabolic s/e and weight gain?

Searching the Literature

What is the usefulness of an evidence based review if we don’t find all the evidence out there?

Will we ever find ‘ALL’ the evidence?

What if the evidence overwhelms us?
Searching the Literature

- Defining a Search Strategy
  - Database Choices
    - Medline, PubMed, CINAHL, PsychINFO, Social sci, web of sci
    - Vs. TRIP? Cochrane?
    - Vs. Google scholar?
  - References/Bibliographies
  - Hand searching
  - Contacting authors/researchers
  - Conferences/Associations
  - Abstracts
- Dates to search
- When does date matter?
- Savvy searching...
  - Save or print what you did!
- What is the usefulness of an evidence based review if we don't find all the evidence out there?

Thoughts about Searching...

- 'Google it'... key terms...
- Combining terms...
  - Be careful of early 'AND' use
  - Like terms – 'OR'
  - Focus with 'AND'
- Step by step...
- For future...
- How would you study the question...
  - Why that design vs. others...

Kinds of Evidence?

- Empirical research (hierarchy)
- Professional literature
- Effectiveness data
- Clinical intervention & Observation
- Patient response to intervention
- Clinical expertise
  - Judgement
  - Adaptation to needs

Search strategy terms...

<table>
<thead>
<tr>
<th>Topic 1</th>
<th>Topic 2</th>
<th>Topic 3</th>
<th>Topic 4</th>
<th>Topic 5</th>
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Search Results...

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<th>#</th>
<th>Authors</th>
<th>Title</th>
<th>Search Type</th>
<th>Actions</th>
</tr>
</thead>
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<tr>
<td>1</td>
<td>Maes M, Inflammopharmacology</td>
<td>Effectiveness of ketamine: from synapse to behavior</td>
<td>Journal Article</td>
<td>Read, Add to search history, Save to bibliographies</td>
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<tr>
<td>2</td>
<td>Koike H, Iijima M, Chaki S</td>
<td>Blocking NMDA receptor at rest: a possible alleviation of depression</td>
<td>Journal Article</td>
<td>Read, Add to search history, Save to bibliographies</td>
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<td>3</td>
<td>Reus GZ, Stringari RB, Ribeiro KF, Ferraro AK, Vittò MF, Cesconetto P, Souza CT, Quevedo J</td>
<td>Blocking NMDA receptor at rest: a possible alleviation of depression</td>
<td>Letter</td>
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<td>4</td>
<td>Autry AE, Adachi M, Nosyreva E, Na ES, Los MF, Cheng PF, Kavalali ET, Monteggia LM</td>
<td>Blocking NMDA receptor at rest: a possible alleviation of depression</td>
<td>Journal Article</td>
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Comparing Searches...

- Medline
- PubMed
- Google Scholar

Blocking NMDA receptor at rest: a possible alleviation of depression
- PubMed: PubMed: 21397634

Blocking NMDA receptor at rest: a possible alleviation of depression
- Koike H, Iijima M, Chaki S 21397634
- PubMed: PubMed: 21592028

Blocking NMDA receptor at rest: a possible alleviation of depression
- Reus GZ, Stringari RB, Ribeiro KF, Ferraro AK, Vittò MF, Cesconetto P, Souza CT, Quevedo J 21592028

Blocking NMDA receptor at rest: a possible alleviation of depression
- Autry AE, Adachi M, Nosyreva E, Na ES, Los MF, Cheng PF, Kavalali ET, Monteggia LM 21592028

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Comparing...

- Google scholar
- TRIP (3.1.2 of online DB: [x.x=xx])

Assessment & Reporting of Results:

- Cochrane Reviews: Treatment of Inhalant Abuse
- CONSORT statement: Quality of RCT’s
- PRISMA statement: Reporting of systematic reviews and meta-analyses
- STROBE statement: guidelines for reporting observational studies
- TREND statement: reporting quality of nonrandom behavioral and public health interventions
- https://classerv2.yale.edu/portal/site/nurs851_s13/page/a9a2596e-053e-41b3-a5d8-57dbb02188

What results will be used?

- Review by title
  - Exclude those unrelated to your question
- Review by abstract
  - Determine those applicable to your question
- Review parts of article
  - Verify they should be included
- Review full article
  - Extract data to answer your question
  Maintain records of what you have done!

Inclusion criteria

Help you to focus results for review:

- Specific to your question
- Are there specific types of studies you require?
- Is a particular population involved?
- Within a particular time period?

You should have a list of criteria that help you decide when you review results

Exclusion Criteria

Remove articles unrelated to your review

- What articles can be safely excluded?
  - Off topic articles
  - Literature reviews
  - Opinion pieces, editorials
- Use criteria set to determine what to remove
Data Extraction

<table>
<thead>
<tr>
<th>Study</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marienfeld et al. (2012)</td>
<td>68.6% of psychiatrists asked for BZDs for “drug seeking reasons”</td>
</tr>
<tr>
<td>76.6% do not prescribe BZDs to pts with a history of alcoholism</td>
<td></td>
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<tr>
<td>Ciraulo et al. (1997)</td>
<td>ETOH subjects scored higher on subjective drug liking report scales</td>
</tr>
<tr>
<td>than control subjects did for Xanax and Valium</td>
<td></td>
</tr>
<tr>
<td>Shelton et al. (1993)</td>
<td>Pts with drug history are 3X more likely to misuse xanax</td>
</tr>
<tr>
<td>Bruce et al. (2003)</td>
<td>Pts with comorbid panic and depressive disorder are 3.5 times more likely to use an SSRI</td>
</tr>
</tbody>
</table>

Quality Criteria

- Define what studies are best – develop rating system
- By study type
- Sample
- Methods
- Measures
- Analytic method
- Outcome measurement

Allows you to decide which results matter most to your question

Study Designs (the hierarchy)

Cross-Sectional study, RCT, case control study, case series retrospective cohort, case study, prospective cohort

Can you put them in order?

- 'Best' evidence:
  - Prospective
g  - Case Series
  - Case Reports
  - Meta-analysis
- 'Worst' evidence:
  - Cross-sectional (of individuals) : 'snapshot'
  - Ecologic (of group vs. individual)
  - Case-Control (retrospective, id disease/look back at exposure)

What design is even better than the "best" in this list?

Study Designs... & their r/t TIME...

- 1950
- 1970
- 1990
- 2010
- Future follow-up

- Cross-sectional (of individuals) : 'snapshot'
- Ecologic (of group vs. individual)
- Case-Control (retrospective, id disease/look back at exposure)
- Cohort (retrospective or prospective, identify exposure groups follow for disease development (free of disease at start))
- RCT
- Systematic Review
- Meta-analysis

Which way does the hierarchy go here?

Is an Association Causal?

(3 possibilities: random error, bias, or confounding)

- Selection of participants
- Confounding factors
- Bias = systematic error in a study
  - Observer
  - Selection
  - Prevalence
  - Recall
  - Information
Selection of Participants

- Criteria should be **clear** and **objective**
- Relationship of sample selected to population (ability to generalize?)
- State of health/disease or other factors in participants
- Matching (unable to use matched variables in analysis)
- Exposed vs. Unexposed / Treatment vs. Control
- Specific methods based on design...

Confounding...

- A real association
- To be a confounder the factor must be:
  - Associated with the exposure
  - Not intermediate in causal pathway (do not adjust if intermediate mediator / moderator?)
- to deal with confounding:
  - Stratify by confounder
  - Adjust for confounder
  - Restrict to single exposure category (ex: non-smoker)
  - Matching cases = controls on confounder (analysis must account for matching to be done correctly)

Bias...

- Presence of systematic error in a study → provides mistaken estimate of association between exposure and disease
- 2 types of bias:
  - Selection Bias
    - From selecting participants
    - From factors influencing participation
  - Information Bias
    - Recall bias
    - Reporting bias
    - Interviewer bias

Selection Bias...

- Participants aren’t representative of target population (actually r/t generalizability)
- Those following thru/participating different than non-participants
- Cases and controls are similar (no systematic differences, from same source population)
- Randomized allocation to tx and comparison group
- Later problems...
  - Drop outs/loss to follow up (minimize)

Information Bias...

- **Misclassification**...may be:
  - **Non-differential** – amt of misclass independent in groups compared → mask or decrease in size of result/estimate
  - **Differential** – amt of misclass not independent in groups compared → increase/dilution/spurious result/estimate

Misclassification of Exposure:

Recall bias: error in recall of past exposure
Interviewer bias: expos info collected differently in cases and controls

Misclassification of Disease or Outcome:

Observer bias: observer knows exposure status is more thorough in cases vs. controls
Respondent bias: info about outcome is not objective (use obj forms when possible)
Detection bias: those exposed are under greater surveillance so greater likelihood of being diagnosed
Statistical Analysis = Tools

- Descriptive statistics
  - Types of data, summarizing (mean, median)
  - Variability & distributions

- Hypothesis testing & statistical inference
  - Null hypothesis, Type I & II error, p-values

- Estimation
  - Standard errors, Confidence Intervals

- Statistical Tests
  - Type of data & methods

- Correlation & Regression
  - Pearson's r, R square, linear regression, logistic regression

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Study Evaluation Worksheet

- Sample
  - Representation?
  - Chosen in a fair way? (P<0.01 statistically)
  - Likeable group in important ways (other than exposure or treatment, randomized)

- Methods
  - Were measurement of exposure or provision of interventions similarly managed in all groups?
  - Was listing of exposure or intervention appropriate? (that blind used?)
  - Was measurement appropriate?
  - Were conclusions validated?

- Outcome Assessment
  - Were outcome measures validated?
  - Were external validity of exposure or intervention group?
  - Was follow up period appropriate length?

- Analysis
  - Were appropriate tools used to evaluate outcomes? Adequate power? Effect size?
  - Were results significant? (T test)

- Evaluation of Results
  - Is there an evidence supporting/excluding (clear report, exposure prevented outcome, logical explanation, limited sample size)
  - Are conclusions supported by data or evidence?
  - How does this sample compare to what you studied or population of interest?
  - Would your patient or setting be open to this intervention?
  - Are there alternatives available?

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Implementing the Evidence...

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Implementation: An Overview

- Carry out search, identification of literature, evidence
- Describe evidence
- Evaluate/synthesize evidence
- Identify ‘answers’ to the PICO question
- Identify plan for implementation in the setting... specific to:
  - Population Characteristics
  - Patient(s) or Family(s), Community needs & abilities
  - Clinician needs & expertise
  - Organizational resources & limitations; (elicit organz support)
  - Larger system requirements

Real World may re-engage at this point for re-assessment., identification of plan & implementation

Instilling confidence in ability to independently intervene

**Identify evaluation plan... how will we know this worked?**

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Assessment...

- What is the problem or concern?
- Why is it a problem now?
- Who is the problem affecting?
- What are they (patient, families, clinicians) experiencing?
- How are consultants and others affected?
- Involves data collection: from clinicians, patients, family... organization... community
- Systems knowledge; group operating in larger system...
- Involves assessment of knowledge important to problem

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Preplanning

- What are the current practices?
- How do outcomes from best practices compare with outcomes from treatment as usual (TAU)?
- Does the new target practice match client/community needs?
- Could the new target practice be realistically accommodated?
- If so, what elements of the program need to change?
- What data can you collect to establish a baseline?

From p. 7 of
Center for Substance Abuse Treatment.
Implementing Change in Substance Abuse Treatment Programs. Technical Assistance Publication Series 21. HHS
Planning change
• Who should be involved in planning?
  ➢ Stakeholders: staff, leaders, clients, external
• Identify the goal before you identify the plan
  ➢ What outcomes are important?
  ➢ How will they be measured?
• Administrative level? (approval, supervisory change)
• Staff training?
• Roadblocks?
  ➢ Financial, funding
  ➢ Staff concerns?
• Map the Route to change
  ➢ Timeline? Who will carry out change?

Identification of Needs...
• Agree on formulation of problem
  ➢ Joint understanding of PICO question
  ➢ Limits of current review identified/understood
• Approach to understanding problem identified
  ➢ Search strategy
  ➢ Collection of information from system, organization, community
  ➢ Collection of secondary data r/t patient care

Planning for Intervention
• Forum for problem solving
• Elicit support for plan from team involved
• Identification of Assessment/Formulation
  ➢ Seek input and feedback from others
• Engage in problem solving w/participants...
  ➢ What would you like to see happen?
  ➢ What solutions have you tried...
• Provide information already gained r/t problem
  ➢ Identify tools used in study of problem
  ➢ Discuss current evidence
  ➢ How do findings fit with clinical wisdom of participants?
Identify Plan to carry out intervention & evaluate results

Working within multiple organizational levels...
• Alliance with administration
• Alliance with clinicians, staff, other groups of import to problem
• Perceptions of consultant
  ➢ Threatening
  ➢ Extension of administration
  ➢ ‘Take over’ vs... foster independent problem solving
• Giving feedback vs. criticizing
• Working with each level... vs. dictating
• Will not know all the answers...

From ‘best practice’ to practice...
• Diffusion – share information about best practice
• Implementation – put best practice in place
• Fidelity – degree practice adheres to best practice
• Reinvention – how best practice modified to fit setting

Who is involved
• Purveyor –individual or group that initiates or monitors change
• Change agents – individuals promote change, influence colleagues
• Organizational change – altering culture, customs, values, practices
Diffusing Innovation: Rogers

- Knowledge of best practice
- Persuasion of its value
- Decision to adopt innovation
- Implementation of the practice
- Confirmation to continue or reject practice

Roles individuals play:
- Innovators – risk takers
- Early adapters – leaders
- Early majority – deliberate decision makers
- Late majority – traditionalists, skeptics
- Laggards – fearful of change, unaware of trends

NIATx: essential ingredients for process improvement

- Understand and involve the customer
  - Who is customer?
- Fix key problems
  - gain support of leaders
- Pick a powerful change leader
  - need authority, respect, time to devote
- Get fresh ideas from outside system/field
- Rapid-cycle testing to establish effectiveness

NIATx:

Five phases of this model
- Walk through to understand customer needs
- Pick a change goal
- Identify a simple data point to determine if goal reached
- Select and rapidly test changes one at a time
- Sustain the gain

Principles to Implement Change

- No single way to implement change
  - Preconceptions, rigidity about how not useful
  - Vigilance, corrections may be needed
- Individualize to fit culture, readiness of organization
- Change is not linear
  - May need to back track, evaluate and adjust plan
- Change is ongoing
  - Requires planning, coordination, cooperation, evaluation, follow up
- Ultimate goal: create change sustainable over time
  - Institutionalization = part of everyday practice

Implementation

- Realistic Goals
- Celebrate small steps
- Keep your eye on the goal
- Evaluate, re-evaluate
- Monitor progress
- Fidelity?

Responses to change

- Seekers – readily adopt, likely to embrace
- Receptive clinicians – likely to change if from reliable source
- Traditionalists – rely on authoritative sources, focus on experience, skill, authority
  - Respond to rewards, penalties, reinforcement
- Pragmatists – want the bottom line
  - Remove obstacles, need strong incentives to change
### Problems with Models...

- Is change process linear?
- What realities are involved –
  - Financial effects/systems; Regulatory; Cultural
- What is needed to successfully change?
  Ex: evidence based treatment method
  - Education
  - Training
  - Supervision
  - Competency

### Evaluation

- What are outcomes?
  - What should be measured?
  - How should it be measured?
- Fidelity to best practice
- Costs
- Efficiency
- Who will evaluate?
  - Collecting data, analyzing data, reporting data
- Where’s the $$$!

### Sustainability

- Maintenance
  - Reinforcement
  - Fidelity
  - Evaluate/monitor outcome
- Extension
  - May need to make changes; improvements
- Adaptation
  - Vision
  - Support
  - Monitor trends

### CAPs

**Critically Appraised Papers (CAPs)**

Outline for Preparing CAPs

CAPs are a **short, concise** summary of one study. **DO NOT EXCEED** 1½ -2 pages!
- **Clinical Question:** (in PICO format, include patient/population, intervention/exposure, comparison/go, outcome)
- **Search Strategy:** (identify key words/terminology used, databases/sources, number and kind of results)
- **Study Design:** (briefly identify the design of the study reviewed)
- **Sample & Setting:** (include where the study took place (outpatient clinic, hospital, community), and the ‘N’ and particular inclusion/exclusion criteria of import)
- **Study Aims/Objectives:** (identify aims or objectives of study as author states)
- **Strengths/Limitations:** (consider study design, methods/analysis, measurement issues, bias, confusing, sampling/selection, blinding, etc; see individual worksheets or chapters in text for guides to reviewing articles by study type)

### CAPs continued

- **Study Results:** (Report estimates from study related to your clinical question, identify author’s major conclusions, can estimation be drawn based on this evidence?)
- **Conclusions:** (compose by questions below)
  - Identify:
    - Are the results valid? (Why or Why Not?)
  - Are the results important? (Why or Why Not?)
- **Take Home Message:** (The answer to your clinical question based on results from this study [i.e. what will you do now as a practitioner?], is this your overall conclusion based on a synthesis of your review/critical appraisal of major result/estimate. The “Take Home Message” should only be 1 sentence!)
- **Reference:** (provide APA format reference, also turn in a hard copy of the article reviewed)

### A Few Trusted Resources: