EBP
STEP 1: Asking the question and Acquiring the evidence

Alison M. Hoens
Clinical Assistant Professor, UBC
Clinical Coordinator, PHC

Charlotte Beck
Librarian, UBC
YEARS SINCE GRADUATION

<table>
<thead>
<tr>
<th>Years since graduation</th>
<th>Series1</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 5</td>
<td>35</td>
</tr>
<tr>
<td>6 to 11</td>
<td>58</td>
</tr>
<tr>
<td>12 to 17</td>
<td>32</td>
</tr>
<tr>
<td>18 to 23</td>
<td>37</td>
</tr>
<tr>
<td>24+</td>
<td>72</td>
</tr>
</tbody>
</table>
HIGHEST QUALIFICATION

<table>
<thead>
<tr>
<th></th>
<th>BSc</th>
<th>MSc</th>
<th>PhD</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>161</td>
<td>32</td>
<td>8</td>
<td>32</td>
</tr>
</tbody>
</table>
The bar chart represents the distribution of primary roles among different categories:

- **Clinical**: 205
- **Academic**: 16
- **Research**: 24
- **Administration**: 40

The chart shows that the majority of individuals have a clinical primary role, significantly more than those in the other categories.
EBP - THE PROCESS

Clinical Problem

Ask

Acquire

Appraise

Apply

Act
EBP - WHAT IS IT?

• Evidence-Based Practice:
  • “The conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual pts”
  
  • “The integration of best research evidence with clinical expertise and patient values”
    ➢ Sackett, 2000 Evidence-Based Medicine. How to Practice and Teach EBM. 2nd Ed. Churchill Livingstone
20,000 biomedical journals worldwide
6 million articles published per year!
OT: >365 articles published per year
  • To keep up - 1 article per day
  • If 1 per week - after 1 year, ~ 6 yrs behind!
PT: >1,400 articles published per year
  • Paul Stratford, 2003
EBP

- What are the barriers to EBP in clinical practice?
BARRIERS TO EBP


- Ranking of importance of factors influencing current practice:
  - Experience
  - Continuing education (practical)
  - Colleague Influence
  - Continuing Education (theory)
  - Professional Literature * secondary sources
  - Entry Level Training
BARRIERS TO EBP

- Mikhail et al, 2005: Physical Therapists’ use of interventions with high evidence of effectiveness in the management of a hypothetical typical patient with acute LBP
  - 68% of PTs used interventions with strong or mod evidence of effectiveness
  - 90% used interventions with limited evidence
  - 96% used interventions with absence of evidence of effectiveness
BARRIERS TO EBP

• Lack of time, computing resources, not enough evidence, lack of access; lack of skills for searching, appraising, and interpreting; lack of incentives (Bennett S. et al, 2003. Australian OT Journal, 50, 13-22.)


• Publication bias, indexing issues, language issues, assessing internal validity, access to electronic databases, access to full text, assessing applicability, drawing conclusions (Maher. C. et al. Phys Ther, 84: 645-654).
BARRIERS TO EBP

- I had considerable freedom of clinical choice of therapy: my trouble was that I did not know which to use and when. I would gladly have sacrificed my freedom for a little knowledge.
  - Sir Archie Cochrane. *Effectiveness and Efficiency: Random Reflections on Health Services*
“Upon this gifted age, in its dark hour, Rains from the sky a meteoric shower of facts. They lie unquestioned, uncombined. Wisdom enough to leech us of our ill is daily spun, but there exists no loom to weave it into fabric”

- Millay’s Sonnets BMJ, 1997
• The Clinical Question
  • - 40% background, 45% foreground, 15% nonmedical
ASK

• BACKGROUND
  • General knowledge
  • What, where, when, why, how
  • Best answered with general reference

• FOREGROUND
  • Very specific re patient care
  • All clinical questions eg. Therapy, harm, prognosis
  • Defines search strategy
ASK

- Foreground Questions
  - PICO
  - P - Patient/Problem
  - I - Intervention
  - C - Comparison
  - O - Outcome
• Why PICO?
  • Improves retrieval
    • Cabell, J Gen Intern Med 16(12), 838-44, 2001: One simple education session markedly increased resident searching activity

<table>
<thead>
<tr>
<th>Pop’n</th>
<th>Interv’n</th>
<th>Compare</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
• Example:
  • Question - Is TENS effective in the management of Chronic Low Back Pain in Adults?
  • P - adults (18-65), chronic (>6 months) LBP
  • I - TENS
  • C - no TENS, sham TENS
  • O - pain, ROM, function, RTW
ASK

- **Group activity**
  - Divide into groups
    - OT
      - Seating, dysphagia etc
    - PT
      - Orthopaedics, neuro etc
  - Each group develop a PICO statement for a clinical issue for which you would like to do a literature search
ACQUIRE

• Best resource depends on type of question
  • Background vs foreground

• Efficiency:
  • Clinicians ideal ~2 minutes
  • Medline: can take ~ 30 minutes
ACQUIRE

- Background Questions:
  - Textbooks
  - Review Articles
  - EBM textbooks: online eg. Clinical Evidence
  - MD Consult
ACQUIRE

• Foreground Questions
  • Pre-appraised
    • PEDro, OT seeker
    • ACP Journal Club
    • Cochrane
    • DARE
    • EBM Reviews - Cochrane, DARE, ACP
    • Databases with filters
ACQUIRE

- Other Databases - not preappraised
  - MEDLINE
  - PubMed
  - EMBASE
  - CINAHL
  - SUMsearch
ACQUIRE

- Search engines
  - Google
  - Google Scholar
  - Dogpile
  - *PABC Physioengine - http://weblogs.elearning.ubc.ca/physio
ACQUIRE

APPRAISAL CRITERIA

• Author
• Scholarly or peer reviewed
• Accuracy
• Currency
• Objectivity
• Coverage
• Purpose
ACQUIRE

DATABASE TOOLS

• Using the computer’s language
• Manipulating the results
• Getting alerts
ACQUIRE

1. PICO - decide on all concepts
2. Build one concept at a time
3. Combine with OR (Boolean operator *gathers)
4. Combine concepts to find relationships with AND (Boolean operator *refining, cutting down)
5. Consider ‘Limits’
Building the search strategy

- Identify concepts from PICO
- Decide on words
  - 2 methods: keywords or classification
ACQUIRE

- **KEYWORDS**
  - Character recognition
  - Not conceptual
  - Computers
  - Get what you put in
  - Need to think!
  - Eg. Stroke
    - Not strokes
    - Not CVA
    - Not CVAs
  - Use truncation / wildcards

- **CLASSIFICATION**
  - Filing system
  - Conceptual
  - Human Beings
  - Preferred term
  - Thesaurus MESH (Medical Subject Headings)
  - Eg. Cerebrovascular accident
Truncation/Wildcards

- Different symbols – often * or $
- Saves on typing e.g. communic$ for communicate, communication, communicative etc.
- Includes plurals e.g. Child* for children
- But use with care – child* also includes childBIRTH!
- Variant spellings included with wildcard e.g. p*ediatrics will include paediatrics
ACQUIRE

Building the search strategy:
1. Search one concept at a time
2. Combine with OR (Boolean operator *gathers like concepts)
3. Combine concepts to find relationships with AND (Boolean operator *refining, cutting down)
• Boolean Operators
  • AND
  • OR
  • NOT
BOOLEAN LOGIC: AND

A ∩ B
BOOLEAN LOGIC: OR
• **Group Activity**
  
  • Meet with your groups that you developed your PICO question
  
  • Add to your PICO question using Boolean operators and keywords/MESH terms
ACQUIRE
HIERARCHY OF EVIDENCE

- Meta-analysis
- Systematic reviews
- Clinical Practice Guidelines
- Randomized Controlled Trials
- Cohort Studies
- Case-controlled Studies
- Case studies

Cormack (2002)
META ANALYSIS
- Locate clinical trials
- Criteria: RCT
- Rank: Methodological Score
- Similar outcome measures
- Variable Rx protocols
- Pool results
- Statistical analysis
- ?Significant effect

- Houghton, 2004 Electrotherapy Update, CPA Teleconference, May 2004

SYSTEMATIC REVIEWS
- Locate clinical trials
- Criteria: RCT
- Rank: Methodological score
- Variable outcomes
- Organized based on Rx protocols
- Blinded reviewers (+/- or ?)
- No statistics (#/+-/-)
ACQUIRE

- Randomized Controlled Trial
- Cohort study
- Case control study
- Case study
Building the search strategy Contd.

• LIMITS
  • Study design *hierarchy
  • Language eg. english
  • Age groupings
  • Year of publication
• **Group Activity**
  • Meet with your groups that you developed your PICO question
  • Add your PICO question using limits
SUMSearch -
• Search for: TENS AND CHRONIC BACK PAIN

• Reviews/Editorials
• Selected journals at PubMed 0 documents.

• Practice Guidelines (some guidelines are systematic reviews)
• National Guideline Clearinghouse™ 3 documents.

• Systematic reviews (what is so good about systematic reviews?)
• DARE (includes Cochrane abstracts) 2 documents.
• PubMed (possible systematic reviews) 15 documents.

• Original research
• PubMed (2 searches) 41 documents.
PEDro: TENS and Chronic Back Pain

Author/Association: Melzack R, Vetere P, Finch L

Title: Transcutaneous electrical nerve stimulation for low back pain. A comparison of TENS and massage for pain and range of motion.

Source: Physical Therapy 1983 Apr;63(4):489-93

Method: clinical trial

Method Score: 7/10 [Eligibility criteria: No; Random allocation: Yes; Concealed allocation: Yes; Baseline comparability: Yes; Blind assessors: Yes; Blind subjects: No; Blind therapists: No; Adequate follow-up: Yes; Intention-to-treat analysis: No; Between-group comparisons: Yes; Point estimates and variability: Yes. Note: Eligibility criteria item does not contribute to total score] *This score has been confirmed*
ACP Journal Club Evidence-Based Medicine: TENS and Chronic Back Pain

Volume 2 Jul-Aug 1997 p 107

Review: Transcutaneous electrical nerve stimulation reduces pain and improves range of movement in chronic low-back pain

Objective: To evaluate the effectiveness of transcutaneous electrical nerve stimulation (TENS) in reducing pain and improving range of movement in patients with chronic low-back pain.

Data sources: English-language studies were identified by searching EMBASE (1985 to September 1995), MEDLINE (1966 to October 1996), CISCOM, and AMED (from the start of the database to January 1995) using the terms TENS, ALTENS, TNS, transcutaneous electrical neurostimulation, electroacupuncture, peripheral conditioning stimulation, percutaneous neural stimulation, microamperage electrical stimulation, cranial electrotherapy stimulation, and transabdominal neurostimulation. Additional studies were identified by scanning the bibliographies of retrieved articles, searching books and abstracts from pain conferences, and contacting experts.
Study selection: Studies were selected if they were randomised controlled trials comparing TENS or acupuncture-like transcutaneous electrical nerve stimulation (ALTENS) with placebo in patients with low-back pain of \( \geq 8 \) weeks of duration.

Data extraction: Data were extracted on pain reduction, range of movement, functional status, return to work, and side effects.

Main results: 68 studies were identified; 6 (4 evaluating TENS and 2 evaluating ALTENS) met the selection criteria and involved 288 patients. More patients receiving TENS or ALTENS had reduced pain than those receiving placebo \( P = 0.005 \) (Table). More patients receiving ALTENS had improvement in range of movement than those receiving placebo \( P = 0.001 \) (Table). Insufficient data were available on TENS treatment alone to evaluate range of movement, functional status, and return to work. Insufficient data were available on ALTENS treatment alone to evaluate functional status and return to work. The use of TENS or ALTENS was relatively free from side effects.

Conclusion: TENS and ALTENS reduce pain, and ALTENS improves range of movement in patients with chronic low-back pain.
Commentary

Given the socioeconomic importance of low-back pain, it is a matter of urgency to find a treatment that really works. TENS or ALTENS is often used for this condition, but their effectiveness remains uncertain. This methodologically rigorous systematic review by Gadsby and Flowerdew suggests that TENS or ALTENS is superior to placebo in relieving pain and restoring function. Although this result looks straightforward at first glance, its practical implications are probably not. One concern is that the effect size is not large and therefore may seem unconvincing to clinicians. This fact is compounded by the paucity of studies included in the final analysis. Even these few studies do not contain homogeneous groups of patients: Many of those included could be classified as having failed back surgery syndromes, and most had nonspecific low-back pain (which in itself is hardly a well-defined disease entity). … may be of limited use to those who routinely treat patients with low-back pain. The authors do not comment on some of the discrepancies between their findings and the results of other systematic reviews on the subject, thus leaving the reader uncertain as to whether this intervention actually works.

Edzard Ernst, MD, PhD University of Exete
• **PUBMED - CHRONIC BACK PAIN AND TENS**

• **Limits**: All Adult: 19+ years, English, Human

• 1: **Yokoyama M, Sun X, Oku S, Taga N, Sato K, Mizobuchi S, Takahashi T, Morita K.** Related Articles, Links
  
  Comparison of percutaneous electrical nerve stimulation with transcutaneous electrical nerve stimulation for long-term pain relief in patients with chronic low back pain.
  

• 4: **Rakel B, Barr JO.** Related Articles, Links
  
  Physical modalities in chronic pain management.
  

• **PMID: 14567204** [PubMed - indexed for MEDLINE]

• 6: **Tsukayama H, Yamashita H, Amagai H, Tanno Y.**
  
  Randomised controlled trial comparing the effectiveness of electroacupuncture and TENS for low back pain: a preliminary study for a pragmatic trial.
  
• **MESH - CHRONIC BACK PAIN**

  • Suggestions: Lower back pains; Lower back pain; Back pain, lower; Back pains, lower; Back pains, low; Low back pains; Back pain, low; Pain, lower back; Pains, lower back; Chromosome painting; more...

• **1: Back Pain**  
  Links  
  Acute or chronic pain located in the posterior regions of the THORAX; LUMBOSACRAL REGION; or the adjacent regions.  
  Year introduced: 1993

• **2: Low Back Pain**  
  Links  
  Acute or chronic pain in the lumbar or sacral regions, which may be associated with musculo-ligamentous SPRAINS AND STRAINS; INTERVERTEBRAL DISK DISPLACEMENT; and other conditions.  
  Year introduced: 1993
• COCHRANE REVIEWS: CHRONIC BACK PAIN AND TENS


ACQUIRE

- Setting up alerts
ACQUIRE

GETTING FULLTEXT

- Pubmed
- Google Scholar
- CINAHL with fulltext
- Hospital Library services
FAMILIARITY/CONFIDENCE WITH USING SEARCH TECHNIQUES

LEVEL OF FAMILIARITY/CONFIDENCE

Not at all
Limited
Average
Above average
Very

Keywords vs MESH Terms
Boolean Operators
Limits
Setting up alerts
FAMILIARITY/CONFIDENCE WITH TERMS

TERM

- Primary vs Secondary sources
- Blinding
- Randomization
- Contamination
- Co-intervention
- Reliability
- Validity
- Power
- Case study
- Cohort study
- Randomized Controlled trial
- Systematic Review
- Meta-analysis
- P-value
- Confidence interval
- Relative Risk Ratio
- Fail-safe number
- Regression Equation
- Use of McMaster Critical Review Checklist
- Systematic Review Checklists
- Use of PEDro scale

Graph showing familiarity/confidence with terms.
THE BOTTOM LINE ...............