Today’s Host

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Lippincott Williams & Wilkins / Ovid

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American Journal of Nursing
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  - Fuel new discoveries
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Introductions

Ellen Fineout-Overholt,
PhD, RN, FNAP, FAAN
Dean & Professor,
Groner School of Professional Studies
Chair, Department of Nursing
East Texas Baptist University
Introductions

Shawn Kennedy, MA, RN
Editor-in-Chief
American Journal of Nursing
Lippincott Williams & Wilkins
Objectives

At the end of this session, you will be able to:

• Describe the definition of evidence-based practice and the steps to integrate evidence into practice

• Identify why evidence-based practice is important in healthcare today

• Identify the steps to critically appraise the research evidence
Healthcare Trends: Translating Evidence into Practice
In the beginning...

The Cochrane Model

- Archie Cochrane, epidemiologist from Britain
- Care should not be done just because it’s always been done that way
- Evidence-based care will:
  • Ensure quality care
  • Improve patient outcomes
  • Improve cost efficiencies
Healthcare Trends

Shifting the Practice Paradigm to Evidence-Based Practice

Research

Patient Preference

Clinical Expertise
Evidence-Based Information and Healthcare

- Evidence-based allied health
- Evidence-based medicine
- Evidence-based nursing
Hierarchy of Evidence (Adapted from McMaster’s)

- Clinical Decision Support
- Evidence Summaries, Systematic Reviews, Meta-analyses
- Original Research
Grading the Evidence Recommendations

- **Level A**
  Good evidence that benefits of intervention substantially outweigh risk

- **Level B**
  Fair scientific evidence that benefits of intervention outweigh risk

- **Level C**
  Balance between benefits and risk of intervention; consider individual patient and other factors

- **Level D**
  Risks of intervention far outweigh benefits

(Source: U.S. Preventative Services Task Force)
AJN’s Evidence-Based Practice Series

- Ran from November 2009 - September 2011
- Winner Sigma Theta Tau International Media Award
- Remains among top 3 most popular articles
- Close to ½ million visits to those articles
- Find it at Nursing Center’s Evidence Based Network
7 Steps of Evidence-Based Practice

0: Cultivate a spirit of inquiry
1: Ask the question in the PICOT format
2: Search for and collect the most relevant and best evidence
3: Critically appraise the evidence
4: Integrate the best evidence with the healthcare provider’s experience/ expertise and patient preference
5: Evaluate outcomes of the practice decision
6: Disseminate the outcomes of the EBP decision

Is it possible to really critically appraise the evidence?
Anything is Possible, When You Believe!
Common Beliefs About and Barriers to Critical Appraisal

- It takes too much time
- It is too difficult
- It takes a researcher or expert in EBP to do it well
- You have to be a “whiz” at statistics
Critical Appraisal: The Bottom Line

Being able to determine if findings from a valid study are

● Generalizable to your patient(s)

● Factoring those findings into decision-making with your patient(s)
What are the steps to evidence-based practice and critical appraisal?
EBP Process

Clinical Issue of Interest

Formulate a Searchable, Answerable Question

Streamlined, Focused Search

Rapid Critical Appraisal, Evaluation & Synthesis of Evidence

Apply Valid, Relevant Internal and External Evidence

Generate Evidence Internal: OM, QI
External: Research

Evaluate Outcomes & Disseminate
Critical Appraisal

- **Rapidly Critically Appraise** (determine keeper studies using RCA checklists)

- **Evaluate** (analyze the keeper studies)

- **Synthesize** (determine the best recommendations from what we know, i.e., the Gestalt)
Critical Appraisal Guide for Quantitative Studies

1. Why was the study done?
   Was there a clear explanation of the purpose of the study and, if so, what was it?

2. What is the sample size?
   Were there enough people in the study to establish that the findings did not occur by chance?

3. Are the instruments of the major variables valid and reliable?
   How were variables defined? Were the instruments designed to measure a concept valid (did they measure what the researchers said they measured)? Were they reliable (did they measure a concept the same way every time they were used)?

4. How were the data analyzed?
   What statistics were used to determine if the purpose of the study was achieved?

5. Were there any untoward events during the study?
   Did people leave the study and, if so, was there something special about them?

6. How do the results fit with previous research in the area?
   Did the researchers base their work on a thorough literature review?

7. What does this research mean for clinical practice?
   Is the study purpose an important clinical issue?

Rapid Critical Appraisal for Keeper Studies (e.g. RCT)

1. Are the study findings valid?

1. Were the subjects randomly assigned to the experimental and control groups?  
   Y  N  U

2. Was random assignment concealed from the individuals who were first enrolling participants into the study?  

3. Were the subjects and providers kept blind to study group?  
   Y  N  U

4. Were reasons given for why participants did not complete the study?  
   Y  N  U

5. Were the follow-up assessments conducted long enough to fully study the effects of the intervention?  
   Y  N  U

6. Were the subjects analyzed in the group to which they were randomly assigned?  
   Y  N  U

7. Was the control group appropriate?  
   Y  N  U

8. Were the instruments used to measure the outcomes valid and reliable?  
   Y  N  U

9. Were the subjects in each of the groups similar on demographic and baseline clinical variables?  
   Y  N  U

Used with permission Fineout-Overholt & Melnyk 2005
2. What are the results of the study and are they important?

A. How large is the intervention or treatment effect (NNT, NNH, Effect size, level of significance)?

B. What statistic demonstrates the outcome you have an interest in.

C. How precise is the intervention or treatment (Confidence Interval)?

Used with permission Fineout-Overholt & Melnyk 2005
3. Will the results help me in caring for my patients?

A. Are the results applicable to my patients? Y  N  U
B. Were all clinically important outcomes measured? Y  N  U
C. What are the risks and benefits of the treatment?
D. Is the treatment feasible in my clinical setting? Y  N  U
E. What are my patients/family’s values and expectations for the outcome that is trying to be prevented and the treatment itself?

Used with permission Fineout-Overholt & Melnyk 2005
Box 2 RCA for Hillman et al. 2005 RCT

1. Are the results of the study valid?
   A. Were the subjects randomly assigned to the experimental and control groups?  
      Yes  No  Unknown

      Random assignment of hospitals was made to either have an RRT (experimental/intervention group) or no RRT (control group). Hospitals, not individual patients, were randomly assigned to the intervention as this would protect against introducing further bias into the study.

      Independent statistician randomly assigned hospitals to RRT or no RRT after baseline data were collected; therefore, it was concealed to researchers and participants.

   B. Was random assignment concealed from the individuals who were first enrolling subjects into the study?  
      Yes  No  Unknown

   C. Were the subjects and providers blind to the study group?  
      Yes  No  Unknown

      Hospitals knew to which group they had been assigned, as they had to put into practice the RRT. Non RRT hospitals did not have control placebo interventions to match what was happening in the intervention hospitals (e.g., no education or time spent as in the intervention group to develop and implement RRT - red flag for confounding)- they went on as usual - they had code teams and some already had systems in place to manage unstable floor patients. Hospital management, ethics review boards (IRB), and code committees knew about the intervention in both hospitals. For the control hospitals, unless you were on these groups, theoretically at least, you would not have known your hospital was participating in a study on RRT, which may lessen the chance of confounding variables influencing the outcomes.

How do you know if you have sufficient evidence to make a practice change?
Evaluation

- Critically appraise each article for its worth to practice - validity & reliability
- As you complete the RCA, consider that you will transfer essential information to an evaluation table of those studies you keep
  - Citation - or at least author, year, title (if global include country of study) & funding source
  - Conceptual framework
  - Study question or hypothesis - is this necessary?
  - Design
  - Sample - number, characteristics & how sampled
  - Setting (can help understand relevance to your population of interest)
  - Major variables of interest with study definitions
  - Measurement of variables (scales, equipment used)
Evaluation

• Essential information to an evaluation table (con’t)
  - Describe the findings (not conclusions - can have a separate column for conclusions)
  - Determine the level and quality of the study (comes from RCA)
    • Strengths and limitations
    • Risk or harm if implemented
    • Feasibility of use in your practice (and therefore inclusion in your synthesis table)
## Example of an Evaluation Table

<table>
<thead>
<tr>
<th>Citation</th>
<th>Conceptual Framework</th>
<th>Design/Method</th>
<th>Sample/Setting</th>
<th>Major Variables Studied and Their Definitions</th>
<th>Measurement</th>
<th>Data Analysis</th>
<th>Findings</th>
<th>Level &amp; Quality of Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Author</td>
<td>Theoretical basis for study</td>
<td>Number Characteristics</td>
<td>Exclusion criteria</td>
<td>Attrition</td>
<td>Independent variables IV1 = IV2 = Dependent variables</td>
<td>What scales used - reliability info (alphas)</td>
<td>What stats used</td>
<td>Statistical findings or qualitative findings</td>
</tr>
</tbody>
</table>

*Author Year Title County Funding*
## Table 1. Evaluation Table, Phase I

<table>
<thead>
<tr>
<th>First Author (Year)</th>
<th>Conceptual Framework</th>
<th>Design/Method</th>
<th>Sample/Setting</th>
<th>Major Variables Studied (and Their Definitions)</th>
<th>Measurement</th>
<th>Data Analysis</th>
<th>Findings</th>
<th>Appraisal: Worth to Practice</th>
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</table>
## Table 1. Final Evaluation Table

<table>
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<th>First Author (Year)</th>
<th>Conceptual Framework</th>
<th>Design/Method</th>
<th>Sample/Setting</th>
<th>Major Variables Studied (and Their Definitions)</th>
<th>Measurement</th>
<th>Data Analysis</th>
<th>Findings</th>
<th>Appraisal: Worth to Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chan PS, et al. Arch Intern Med [itals] 2010;170(1): 18-26</td>
<td>None</td>
<td>SR</td>
<td>Purpose: effect of RRT on HMR and CR</td>
<td>N = 18 out of 143 potential studies; Setting: acute care hospitals; 13 adult, 5 peds; Average no. beds: NR; Attrition: NR</td>
<td>IV: RRT DV1: HMR (including DNR, excluding DNR, not treated in ICU, no HMR definition) DV2: CR</td>
<td>RRT: was the MD involved? HMR: overall hospital deaths (see definition) CR: cardio and/or pulmonary arrest; cardiac arrest calls</td>
<td>Frequency Relative risk</td>
<td>13/16 studies reporting team structure 7/11 adult and 4/5 peds studies had significant reduction in CR CR: In adult studies, 21%–48% reduction in CR; RR 0.66 (95% CI, 0.54–0.80) In peds, 38% reduction in CR; RR 0.62 (95% CI, 0.46–0.84) HMR: In adults, HMR RR 0.96 (95% CI, 0.84–1.09) In peds, HMR RR 0.79 (95% CI, 0.63–0.98)</td>
</tr>
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</table>
Legends are Key (AJN EBP Step-by-Step Series)

**ACLS** = advanced cardiac life support; **AP** = attending physician; **APN** = advanced practice nurse; **BLS** = basic life support; **CI** = confidence interval; **CMS** = Centers for Medicare and Medicaid Services; **CPR** = cardiopulmonary resuscitation; **CR** = cardiopulmonary arrest or code rates; **CRO** = code rates outside the ICU; **DC** = discharge; **DNR** = do not resuscitate; **DV** = dependent variable; **ECG** = electrocardiogram; **ED** = emergency department; **FCR** = fatal arrest; **HMR** = hospital-wide mortality rates; **I/C** = Intervention/Control; **ICU** = intensive care unit; **ICUF** = ICU fellow; **IHI** = Institute of Healthcare Improvement; **IV** = independent variable; **LDC** = percent of live discharges after coding; **MD** = medical doctor; **MET** = medical emergency team; **NA** = not applicable; **NR** = not reported; **NS** = not significant; **NSCR** = no survival arrest; **OR** = odds ratio; **PA** = physician assistant; **PD** = patient days; **Peds** = pediatrics; **PRN** = as needed; **RCT** = randomized controlled trial; **RN** = registered nurse; **RR** = relative risk; **RRS** = rapid response system; **RRT** = rapid response team; **RT** = respiratory therapist; **SR** = systematic review; **UICUA** = unplanned ICU admissions
How Do You Think/Talk About Research

Emphasis on practice of research

or

Emphasis on research for practice
Now that we have evaluated the evidence, how can clinicians be confident that the evidence makes sense (i.e., tells them the best intervention to achieve a particular outcome)?
Synthesis
Making it all make Sense
Hmmm...what do I put in my synthesis table?

What studies can be consolidated?
Which cannot?
You want to answer your project question?

There are no pre-set criteria!!
Cluster studies that go together on outcomes
Variables not present
Design
Principles of Synthesis

• Careful decision-making about which studies to include/exclude

• Cluster studies based on one or any of the following:
  - The same design
  - Very similar interventions
  - Same/similar outcomes measured in the same way

• Synthesis reflects thoughtful analysis of the inconsistencies across studies
Principles of Synthesis

• Synthesis reflects consensus on conclusions drawn from each study
  - Consensus on major conclusions for each critical outcome variable
  - Consensus on clinical implications of findings
• Synthesis reflects the gestalt of the strength of the findings across studies
• Synthesis provides confidence about implementation of evidence reviewed
One Example of How to Reduce Bias

- **1. Study Design (0 - 3)**
  - 0 = one group pre-test/post-test
  - 1 = nonrandomized retrospective data
  - 2 = nonrandomized prospective experiment
  - 3 = randomized experiment

- **2. Clarity of Outcome Construct Definition (0 - 1)**
  - 0 = no definition of “falls”
  - 1 = “falls” clearly defined

- **3. Outcome Measure (0 - 1)**
  - 0 = subjective measure of “falls” (i.e., self-report, report via survey, or retrospective review of records)
  - 1 = objective measure of “falls” (i.e., documented by staff during course of study as fall events occurred)

- **4. Indication of Time Until Falls Outcome Measure (0 - 1)**
  - 0 = not specified
  - 1 = clearly indicated

Hill-Westmoreland et al. (2002). *Nursing Research* Vol 51, No 1
# Table 2: The 15 Studies: Levels and Type of Evidence

<table>
<thead>
<tr>
<th>Level I: Systematic review or meta-analysis</th>
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<td>Level V: Systematic review of qualitative or descriptive studies</td>
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CR = cardiopulmonary arrest or code rates; CRO = code rates outside of the ICU; HMR = hospital-wide mortality rates; NE = not evaluated; NR = not reported; UICUA = unplanned ICU admissions

*higher-level evidence; b statistically significant findings; c statistical significance not reported; d non-ICU mortality was reduced.

Consider: Level of Evidence + Quality = Strength = Confidence to Act
(Fineout-Overholt, 2006)

**BEST**

- **Level I:** Systematic reviews or meta-analyses of randomized controlled trials (RCTs)
- **Level II:** Well-designed RCTs
- **Level III:** Well-designed, non-randomized controlled trials
- **Level IV:** Well-designed cohort and case-control studies
- **Level V:** Systematic reviews of descriptive and qualitative studies
- **Level VI:** Descriptive and qualitative studies
- **Level VII:** Expert consensus reports

**Least Valuable**
Confidence Meter

• 17 year gap
• Why don’t we act?
• “We need more research”

Meanwhile, back at the ranch -
- 99,000 people die needlessly each year from preventable errors made by healthcare professionals
Now that you’ve synthesized the evidence, what’s next?
MAKE A DECISION!!!

- Confidence
- Feasibility
- Harm
Confidence to Act **WILL** Change Healthcare

- **NURSING RESEARCH**
- **CLINICAL PRACTICE**
- **HEALTHCARE EDUCATION**

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CRITICAL APPRAISAL: Approach it just like the 2-ton chocolate elephant - one bite at a time!
WE MUST ACT ON WHAT WE KNOW!
Conclusion
Stay tuned for Q&A
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- Recommended CE
- The “Show Me The Evidence” blog
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What’s New

**FREE WEBCAST! Demystifying Research, Streamlining Critical Appraisal**
March 7, 2012 at 12:00PM EST

New guidelines for the management of peripheral artery disease, specifically in women, published online in Circulation

Updated guidelines on managing pediatric patients with traumatic brain injury published in Pediatric Critical Care Medicine

Updated guidelines on neonatal drug withdrawal published online in Pediatrics

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  - Embase, PsycINFO, OvidMD™ and more
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  - Portal model - blends best of breed book, journal and bibliographic resources to answer nurses’ questions
  - Developed out of direct research with nurses about their information needs
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