Understanding Evidence Based Practice

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Objectives

- Provide an overview Evidence Based Practice (EBP)
- Differentiate EBP and Research
- Describe Iowa Model
- Discuss PICO
- Review Types of Evidence
- Describe of Diffusion of Innovation
- Discuss Translational Research Model
- Provide Examples of Research
- Review a Blueprint for Success
“In God we trust, All others must bring data”
~ W. Edwards Deming
Evidence Based Practice

Integration of research evidence with clinical expertise and patient values ~ DiCenso 2005

Process of using evidence to guides practice & make clinical decisions. Process part of outcomes management ~ Jennings & Loan 2001

The process of shared decision-making between practitioner, patient & others significant to them based on research evidence, the patient’s experiences & preferences, clinical expertise or know-how, and other available sources of information ~ STTI 2008
Use in Practice
What we know from science

- Efforts by federal government & professional organizations - NIH, CDC, AHRQ
  - Synthesis of evidence
  - Formulation of guidelines
  - Dissemination of guidelines

- Can often take up to 17 years before significant research findings are implemented into clinical practice (Balas & Boren, 2000)

- Simply having an evidence based policy/procedure does not make practice change happen
What is the purpose?

- Implications for clinical & administrative decisions/practice support
- Patient safety
- Improved quality
- Cost savings
- Professional work satisfaction
Components of EBP

“Background”
- Questions asked for *general* knowledge about a condition or thing.
- Need for basic information.

“Foreground”
- Questions asked about *specific* knowledge to inform clinical decisions.

*Patient, Problem, Intervention-comparative, outcome*
EBP is NOT:

- Conducting new research - Contributing new knowledge
- “Best Practice” - what other centers are doing
- Quality Assessment/Improvement
- Synthesis of research - Alone
RESEARCH

A systematic scientific process that generates new knowledge or validates existing knowledge.
Research Utilization (RU) differs from evidence-based practice (EBP) in that, although RU also serves to improve the quality of patient care, it utilizes *solely* research findings as a basis of practice to improve patient care.
QUALITY IMPROVEMENT

- The betterment or enhancement of a product or service
- This can be achieved by EBP, but is not limited to it
The aim of evidence-based practice (EBP) is to reduce wide variations in individual clinician’s practices, eliminating worst practices, and enhancing best practices, thereby reducing costs and improving quality.
Iowa Model

- Developed by Marita G. Titler, PhD, RN and colleagues.
- Used to describe knowledge transformation and guide implementation of research into practice.
- Highlights the importance the entire hospital system (provider, patient, and infrastructure).
Iowa Model

- Priority for Organization
- Priority for Department
- **Staff Interest and Commitment**
- Magnitude of the Problem
- Likelihood to contain Costs & Improve Outcomes
- Applicability
- **Multidisciplinary**
- Credibility of Evidence
The Iowa Model Revised: Evidence-Based Practice to Promote Excellence in Health Care

1. Identify Triggering Issues / Opportunities
   - Clinical or patient identified issue
   - Organization, state, or national initiative
   - Data / new evidence
   - Regulatory agency requirements / regulations
   - Philosophy of care

2. State the Question or Purpose

3. Is this topic a priority?
   - No
     - Consider another issue / opportunity
   - Yes
     - Form a Team

4. Assemble, Appraise and Synthesize Body of Evidence
   - Conduct systematic search
   - Weigh quality, quantity, consistency, and risk

5. Is there sufficient evidence?
   - No
     - Conduct research
   - Yes
     - Redesign

6. Design and Pilot the Practice Change
   - Engage patients and verify preferences
   - Consider resources, constraints, and approval
   - Develop localized protocol
   - Create an evaluation plan
   - Collect baseline data
   - Develop an implementation plan
   - Prepare clinicians and materials
   - Promote adoption
   - Collect and report post-pilot data

7. Is change appropriate for adoption in practice?
   - No
     - Consider alternatives
   - Yes
     - Integrate and Sustain the Practice Change

8. Integrate and Sustain the Practice Change
   - Identify and engage key personnel
   - Hardware change into system
   - Monitor key indicators through quality improvement
   - Reiterate as needed

9. Disseminate Results

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PICO

P - patient (individual or group)

I - intervention (cause or prognosis) therapy you wish to consider; diagnostic test, treatment, risk factor, etc.

C - comparison - alternative treatment to compare? absence of risk, placebo, different diagnosis.

O - outcome - should be measurable and include a time horizon.
PICO

- **P** - Population
- **I** - Intervention or Treatment
- **C** - Comparison
- **O** - Expected Outcomes

Ex: In infants with chronic lung disease, does change in position compared to supine position improve pulmonary mechanics and neurodevelopmental outcomes at 1 year of age.
"I just realized something. This study isn't that important."
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Types of Evidence

- Systematic Reviews
- Critically-Appraised Topics & Articles
- Randomized Controlled Trials (RCTs)
- Cohort Studies
- Case-Controlled Studies Case Series / Reports
- Background Information / Expert Opinion

quality of evidence
Observational Studies

- NOT under control of investigator
- Self-selected or are "experiments of nature"
- Weaker empirical evidence
- Prospective/Retrospective
- Provide preliminary evidence that can be used as the basis for hypotheses in stronger experimental studies:
  - Cohort - Longitudinal
  - Case Control
  - Cross-Sectional
  - Case Report/Case Series
Experimental Studies

- Under control of investigator and therefore can be randomized
- Key = investigator controls the assignment of the exposure or of the treatment but otherwise symmetry of potential unknown confounders is maintained through randomization.
- Provide the strongest empirical evidence
- Randomization also provides a better foundation for statistical procedures
  - Randomized Controlled Clinical Trial (RCT)
  - Randomized Cross-Over Clinical Trial
  - Randomized Controlled Laboratory Study
Systematic Review or Meta-analysis?

Systematic Review:
review of a clearly formulated question that uses systematic and explicit methods to identify, select and critically appraise relevant research, and to collect and analyze data from the studies.

Meta-analysis:
often part of a systematic review it differs by using statistical techniques to synthesize the data from several studies into a single quantitative estimate or summary effect size. (Petticrew & Roberts, 2006).
Purpose of Systematic Reviews

- Provide up to date summary of all published research literature
- Allow large amounts of data to be assimilated
- Provide an objective collation of results of research
- Provide reliable recommendations
Benefits of Systematic Reviews

- Up-to-date resource for clinicians
- Starting point for clinical guidelines
- Policy guidance
- Basis for new primary research
  - Important for grant funding bodies
- Management guidance
- Research training tool
Best evidence for different questions

<table>
<thead>
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<th>Prognosis</th>
<th>Particular perspective</th>
</tr>
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<tbody>
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</tr>
<tr>
<td>Randomised trials</td>
<td>Inception Cohorts</td>
<td>Qualitative studies</td>
</tr>
</tbody>
</table>
Useful Resources

- The Cochrane Collaboration
  www.thecochranelibrary.com/
  - Cochrane Handbook for Systematic Reviews of Interventions (version 5 updated March 2011)

- PRISMA
  - Preferred Reporting Items for Systematic Reviews and Meta-Analyses.

- PubMed Health
  - US National Library of Medicine
Finding the Evidence

WHERE'S WALLY?

MARTIN HANDFORD
Formulate a Focused Question

**Patient Population**

**Intervention**

**Comparison**

**Outcome**

Hospitalized Infants with bronchiolitis who receive hypertonic saline via nebulizer will have decreased LOS than infants who do not.
Quick search

- TRIP-Turning Research Into Practice
- PubMed-National Library of Medicine, includes more than 15 million citations
- Ovid-medical, scientific, and academic research
- CINAHL
- Embase-16 million validated biomedical and pharmacological
- Other ways of finding secondary sources:
  - Cochrane Library [www.cochrane.org](http://www.cochrane.org)
Perform a search start on PubMed
Combine Terms with OR

“bronchiolitis” OR “hypertonic saline”
either term can be present
Combine Terms with AND

“bronchioloitis” AND “hypertonic saline” - both terms must be present
Quick tips

- Take a common word stem and look for spelling variations e.g.
  - bronchiolitis - will retrieve papers on bronchiolitis, bronchiolitic, bronchioitis obliterians, etc...

- Phrase searching
  - Use double quote marks if you want words to appear next to each other e.g.
    “Hypertonic Saline”
Bronchiolitis and Hypertonic

CLINICAL PRACTICE GUIDELINE

Clinical Practice Guideline: The Diagnosis, Management, and Prevention of Bronchiolitis

abstract

This guideline is a revision of the clinical practice guideline, “Diagnosis and Management of Bronchiolitis,” published by the American Academy of Pediatrics in 2006. The guideline applies to children from 1 through 23 months of age. Other exclusions are noted. Each key action state-
Evidence-Based Clinical Practice Guideline:  
Inhaled Nitric Oxide for Neonates  
With Acute Hypoxic Respiratory Failure

Robert M DiBlasi RRT-NPS FAARC, Timothy R Myce and Dean R Hess PhD RRT FAARC

Inhaled nitric oxide (INO) is a colorless, odorless gas that is also a potent pulmonary vasodilator. When given via the inhaled route it is a selective pulmonary vasodilator. United States Food and Drug Administration (FDA) for the treatment of respiratory failure is associated with improved outcomes. Accordingly, a systematic review of the literature was conducted with the intention of making recommendations related to the clinical use of INO for its FDA-approved indication. Specifically, we wrote these evidence-based clinical practice guidelines to address the following questions:

1. What is the evidence for labeled use?
2. What are the specific indications for INO for neonates with acute hypoxemic respiratory failure?
3. Does the use of INO impact oxygenation, mortality, or utilization of extracorporeal membrane oxygenation (ECMO)?
4. Does INO affect long-term outcomes?
5. Is INO cost-effective?
6. How is the appropriate dosing regimen and dose response to INO established?
7. How is the dose of INO titrated and weaned?
8. Which INO delivery systems should be used?
9. How should INO be implemented with different respiratory support devices?
10. What adverse effects of INO should be monitored, and at what frequency?
11. What physiologic parameters should be monitored during INO?
12. Is scavenging of gases necessary to protect the caregivers?

To identify the evidence addressing these questions, a PubMed (MEDLINE) search was conducted using the following search terms:

"Inhaled nitric oxide” with limits of English language, human studies, all child (0–18 y)
"Nitric oxide and neonate” with limits of English language, human studies, all child (0–18 y)
"Nitric oxide therapy” with limits of English language, human studies, all child (0–18 y)
"Nitric oxide administration” with limits of English language, human studies, all ages
"Nitric oxide delivery” with limits of English language, human studies, all ages
"Nitric oxide and monitoring” with limits of English language, human studies, all ages

The search timeframe included published papers indexed between January 1, 1990, and December 31, 2009. References and abstracts were retrieved into reference-management software (EndNote, ISI, Berkeley, California) for further analysis.
**Recommendations**

1. A trial of INO is recommended in newborns (≥ 34 wk gestation, < 14 d of age) with $P_{aO_2} < 100$ mm Hg on $F_{IO_2}$ 1.0 and/or an oxygenation index ($OI$) > 25 (Grade 1A).

2. It is recommended that INO therapy be instituted early in the disease course, which potentially reduces the length of mechanical ventilation, oxygen requirement, and stay within the intensive care unit (Grade 1A).

3. It is recommended that INO should not be used routinely in newborns with congenital diaphragmatic hernia (Grade 1A).

4. It is suggested that INO therapy should not be used routinely in newborns with cardiac anomalies dependent on right-to-left shunts, congestive heart failure, and those with lethal congenital anomalies (Grade 2C).

5. It is suggested that there are insufficient data to support the routine use of INO therapy in postoperative management of hypoxic term or near-term infants with congenital heart disease (grade 2C).

6. The recommended starting dose for INO is 20 ppm (Grade 1A).

7. It is recommended that response to a short trial (30 – 60 min) of INO should be judged by an improvement in $P_{aO_2}$ or oxygenation index ($OI$); if there is no response, INO should be discontinued (Grade 1A).

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<td>1A</td>
<td>Benefits clearly outweigh risks, or vice versa; recommendation can apply to most patients in most circumstances.</td>
<td>RCTs with no important limitations, or exceptionally strong evidence from observational studies. Further research is unlikely to change our confidence in the estimate of effect.</td>
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<td>1B</td>
<td>Benefits balanced with risks; best action may differ depending on circumstances or patient/society values.</td>
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Need Help?

- Finding the Evidence
  - EBM web-site - EBM tools - Finding the Evidence
    http://www.cebm.net

- PubMed tutorial

- Cochrane Library tutorials
  http://www.thecochranelibrary.com/view/0/HowtoUse.html
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Symbols:
- ◆ = decision point
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One of the greatest pains to human nature is the pain of a new idea. It ... makes you think that after all, your favorite notions may be wrong, your firmest beliefs ill-founded ... Naturally, therefore, common men hate a new idea, and are disposed more or less to ill-treat the original man who brings it.

-Walter Bagehot *Physics and Politics*
Diffusion of Innovation
four elements

1) innovation - an idea, practices, or objects that is perceived as new

2) communication channels - the means by which messages get from one to another

3) time
   -- innovation-decision process
   -- relative time with which an innovation is adopted by an individual or group.
   -- innovation's rate of adoption.

4) social system - a set of interrelated people who are engaged in joint problem solving to accomplish a common goal.
Diffusion is the process by which (1) an Innovation (2) is communicated through certain channels (3) over time (4) among the members of a social system.
Translational Research Model

- Innovators: 2.5%
- Early Adopters: 13.5%
- Early Majority: 34%
- Late Majority: 34%
- Laggards: 16%

Thought Leadership
Evangelism
Translation
Translational Research Model

Titler, M.G. & Everett, L.Q. (2001)
Adoption of Practice

This all makes GREAT sense….Could there possibly be any problems?
Barriers

- Insufficient Time in clinical setting to implement change.
- Skills and Resources- Healthcare practitioners may value the use of research and scientific evidence to guide practice, but frequently lack resources and skills to achieve and evidence based practice.
- Tradition- Our way or the highway
- Organizational Culture and/or Lack of Administrative Support
- Fear of Change content with Status Quo
Illusions of Implementation

- We just need to tell them what to do
  - “I told them what to do and they don’t change”
- If it works for them it should work for us
- Clinicians will remember the change once they are told
  - Once should be enough
  - Clinicians can be more watchful so they will remember to use the new way
- I just need to find the one right way to implement practice change
Blueprint for Success

Interactive and didactic education

+ Other practice – reinforcing strategies

More positive effect in changing behavior as compared to education alone
Blueprint for Success

- Bottoms-up approach to topic selection
- Keep the topic focused and specific
- Complete a thorough review of evidence
- Compile a multidisciplinary team
- Need a change champion
- Keep the team focused
- Localize the innovation
- Market the innovation
- Develop meaningful practice prompts
- Pilot test the innovation
## Implementation Strategies for Evidence-Based Practice

### Create Awareness & Interest
- Highlight advantages* or anticipated impact*
- Highlight compatibility*
- Continuing education programs*
- Sound bites*
- Journal club*
- Slogans & logos
- Staff meetings
- Unit newsletter
- Unit inservices
- Distribute key evidence
- Posters and postings/fliers
- Mobile “show on the road”
- Announcements & broadcasts

### Build Knowledge & Commitment
- Education (e.g., live, virtual or computer-based)*
- Pocket guides
- Link practice change & power holder/stakeholder priorities*
- Change agents (e.g., change champion*, core group*, opinion leader*, thought leader, etc.)
- Educational outreach or academic detailing*
- Integrate practice change with other EBP protocols*
- Disseminate credible evidence with clear implications for practice*
- Make impact observable*
- Gap assessment/gap analysis*
- Clinician input*
- Local adaptation* & simplify*
- Focus groups for planning change*
- Match practice change with resources & equipment
- Resource manual or materials (i.e., electronic or hard copy)
- Case studies

### Promote Action & Adoption
- Educational outreach/academic detailing*
- Reminders or practice prompts*
- Demonstrate workflow or decision algorithm
- Resource materials and quick reference guides
- Skill competence*
- Give evaluation results to colleagues*
- Incentives*
- Try the practice change*
- Multidisciplinary discussion & troubleshooting
- “Elevator speech”
- Data collection by clinicians
- Report progress & updates
- Change agents (e.g., change champion*, core group*, opinion leader*, thought leader, etc.)
- Role models*
- Troubleshooting at the point of care/bystander
- Provide recognition at the point of care*

### Pursue Integration & Sustained Use
- Celebrate local unit progress*
- Individualize data feedback*
- Public recognition*
- Personalize the messages to staff (e.g., reduces work, reduces infection exposure, etc.) based on actual improvement data
- Share protocol revisions with clinicians that are based on feedback from clinicians, patient or family
- Peer influence
- Update practice reminders

* = Implementation strategy is supported by at least some empirical evidence in healthcare

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DO NOT REPRODUCE WITHOUT PERMISSION
RESPIRATORY THERAPY
PROTOCOL TOOLKIT

Steps to Build and Implement Evidence-Based Respiratory...
### MAKE YOUR CASE: PRESENTING DATA

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tylerl@email.chop.edu