Making Recommendations in the Face of Imperfect Evidence

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- Similarities between religious views and approaches to scientific evidence
- Fundamentalist ↔ Liberal
- Trials Only ↔ Variety of evidence
Outline of Talk

- Overview of evidence-based methods
- Implications for policy making
- Illustration of specific issues and examples
Observations

- Policy makers often lack ideal evidence at the time they must make a decision.
- Debates over scientific evidence confusing to clinicians and public.
- Most debates reflect differences in perspective and values rather than disagreement over evidence.
- An explicit and systematic approach to evidence can help separate issue of evidence from those of values.

From Atkins D et al. *Health Affairs*, 2005
A Tale of Three Examples

- Sleep position and sudden infant death
- Drug-eluting stents
- Postmenopausal hormone therapy
“Back to Sleep”

- Launched in 1992 by AAP
- Evidence based on cohort and case-control studies
- Many studies from non-U.S. settings
- Generally consistent
U.S. SIDS Rate vs Prone Prevalence

SIDS Rate (per 1000 live births)


AAP Recommendation

"Back to Sleep"

Prone Prevalence (%)

NCHS Data

NICHD Survey

0

10

20

30

40

50

60

70

80

0.30

0.40

0.50

0.60

0.70

0.80

0.90

1.00

1.10

1.20

1.30

1.40
Drug-Eluting Stents

- RCTs: DES reduce early restenosis
- Little long-term data from trials
- Recent registry studies indicate increased risk of thrombosis after one year
- ? Magnitude of effect, role of antithrombotics
- ? Balance of risks and benefits
Misperceptions about Evidence-based Methods

- Overly reliant on RCTs
  - sets unattainable standard for evidence
- Tool to limit health services, save money
- Ignores realities of practice
- Not appropriate for public health
- Not useful when evidence is poor
Evidence Based Medicine

- Clinical state and circumstances
- Clinical expertise
- Patient preferences and actions
- Research evidence

Haynes, Devereaux, and Guyatt. ACP Journal Club 2002;Mar-Apr 136:A11
Evidence-based Health Policy

Evidence

Values

Resources

From Muir Gray – Evidence-based Health Care
Questions for Setting Policy: A Systematic Process

- What is (are) the outcome(s) I care most about?
- How certain am I that the interventions can improve those outcomes?
- How certain am I that it will work in “real world”?
- How do the potential benefits compare to possible harms and costs?
- How certain do I have to be to make a reasonable decision?
- What other considerations are relevant?
Analytic Framework - 1

1. Early Prostate Cancer
   - Screen: PSA, DRE
   - Treat: radiation, prostatectomy
   - Reduced prostate cancer morbidity, mortality
   - Adverse effects of screening: false pos, false neg, inconvenience, labeling
   - Adverse effects of Rx: Impotence, incontinence, death, overtreatment

2. Asymptomatic Men
2. How good is the evidence that the intervention will improve the outcome?

**Systematic review of the evidence:**
- Explicit methods, avoid bias
- Distinguish intermediate from clinical outcomes
- Systematic search for relevant studies
- Consistent evaluation of quality of individual studies
- Transparent reasoning, reproducible results

**AIM:**
- Distinguish what we know from what we don’t
- Facilitate decision making
Dealing with Imperfect Quality

- What are strengths and weaknesses of available studies?
- How do limitations affect conclusions?
  - Could bias explain all the observed effect?
- Can we improve on the current evidence?
- How can results be placed in context?
  - Understanding of disease process

All studies have flaws – some flaws are “fatal”, some are flesh wounds
Challenges of Non-randomized Studies

- Subject to bias and confounding
- No established criteria for good studies
  - Ongoing debate about discordance between RCTs and observational studies
- Consistency does not protect against error
- Can we completely adjust for known confounders?
  - No way to protect against unknown confounding
- Confounding may vary by setting, population
3. Will it work in the real world?

- Carefully controlled research studies may overstate benefits of intervention in practice – “external validity” or applicability
- Patient selection and intervention may alter balance of benefits and harms
  - Quality of intervention
  - Adherent patients
4. Are benefits sufficient to justify possible harms and costs?

- How big are the benefits?
- How to present tradeoffs:
  - Number needed to screen
  - Number needed to treat
- Are there possible harms? Are they important?
- Opportunity costs, resource implications

*There are no free lunches*
5. What constitutes “good enough” evidence?

What one considers “good enough” depends on:

- **Perspective**
  - Individual vs. public health
  - Advocate vs. payer
  - Researcher vs. policy maker

- **How you value different outcomes**

- **Likelihood of getting better evidence**

- **Judgment of the risks of acting “too soon” or “too late”**
6. What other considerations are relevant?

- Equity
- Costs and resources
- Feasibility
Analytic Framework – Use for clinical decisions

1. Treat

Pregnant Women with Periodontal Disease

2. Reduce Periodontitis

3. Adverse effects of treatment? Costs, opportunity costs

4. Improve birth outcomes
Periodontal Health

What Benefits Are Important?

- Pre-term birth
- Birth outcomes
  - Low birth weight
  - Very low birth weight
- Pregnancy loss
- Periodontal disease
  - Short term
  - Long term
What Other Considerations are Relevant?

- Impact of dental care on other prenatal care
- Implications of screening for periodontal disease
- Resource implications
  - Costs of screening and treatment
  - Limited resources to address varied maternal health issues
- Opportunity costs
  - Are there other pregnancy issues where impact might be bigger (e.g. tobacco and alcohol use)?
What do we still need to know?

Implications for research

- Feasibility in practice
  - Screening for disease in different settings
  - Effectiveness of referral
  - Feasibility of intervention
- Effectiveness of treatment in real world
  - Adherence without incentives
  - Effectiveness of typical treatments
- Effects on birth outcomes
- Costs
Periodontal Health

What evidence is “good enough”?

- Risks of waiting for better evidence
  - Missed opportunities to help affected infants

- Risks of acting too soon
  - Divert resources from more effective programs
  - Harm to pregnancy? – No evidence of risk

- How likely is more research to reduce the uncertainty?

- Will we be able to tell if the program works by implementing it?
Policy Options in Face of Uncertainty

- No implementation until definitive studies
  - Repeat large clinical trials, new meta-analyses
  - Efficacy vs. effectiveness trials

- Phased implementation with evidence development
  - Feasibility in broader practice
  - Will non-randomized studies be able to detect benefits if they exist?

- Full implementation on other grounds
“Other grounds” for Acting in Face of Imperfect Evidence

- Intervention is safe and acceptable
- Intervention is affordable and easy to implement
- Addresses major health problem
- Addresses disparities
- Secondary benefits of intervention
- Likelihood of getting better evidence is low
“Other grounds” for Oral Health Care

- Intervention is safe
- Intrinsic benefits of better oral health
- Limited effective interventions to reduce preterm birth
- Addresses important disparities in oral health
- Potential ancillary benefits of increased clinical contact
Reasons to Get Better Evidence Before Large-scale Implementation

- May miss opportunity to truly establish benefit of intervention
- Significant costs, possible opportunity costs
- Feasibility of widespread implementation unknown
- Other unaddressed issues in maternal health
Conclusions

- Explicit approaches useful even when evidence is imperfect
- Distinguish what we know, what we believe, and what we still need to know.
- Separate issues of evidence from issues of values and resources
- Disputes often reflect legitimate differences in the perspectives of the different parties
- Consider risks of acting “too soon” and acting “too late”