

# Why bother with EBHC?

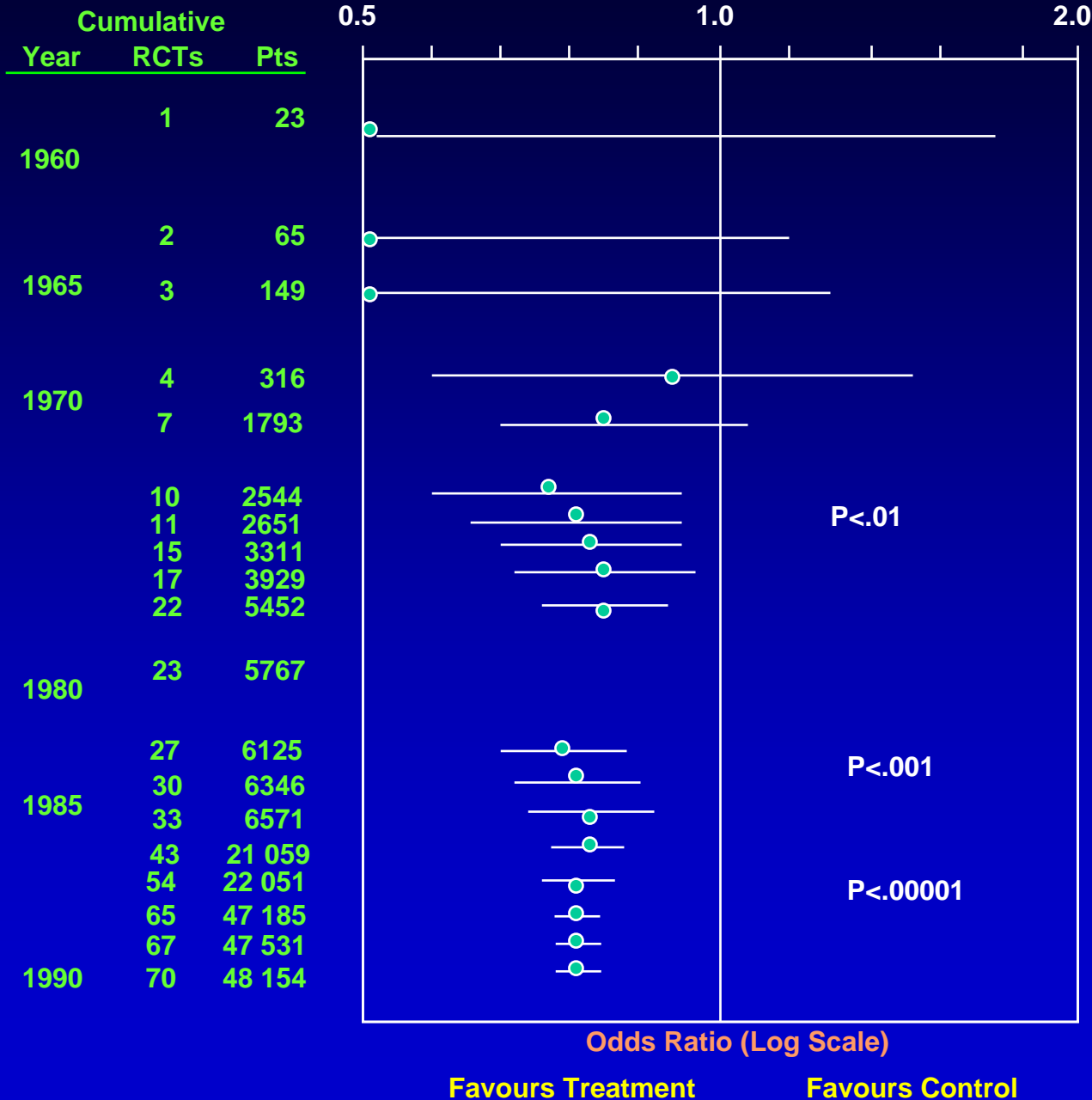
- life before EBHC: what was the problem?
- what is EBHC?
  - three principles
  - how to recognize an EBHC practitioner
- insights from randomized trials
- need for skepticism
- helping the patient decide

# How did we make clinical decisions?

If the basis wasn't evidence,  
what was it?

expert recommendations

# Thrombolytic Therapy



## Textbook/Review Recommendations

	Routine	Specific	Rare/Never	Experimental	Not Mentioned
					21
					5
				1	10
				1	2
				2	8
					7
					8
		1			12
M		1		8	4
M		1		7	3
M	5	2		2	1
M	15	8			1
M	6	1			

# Prophylactic Lidocaine in MI

Outcome = death

Favors treatment

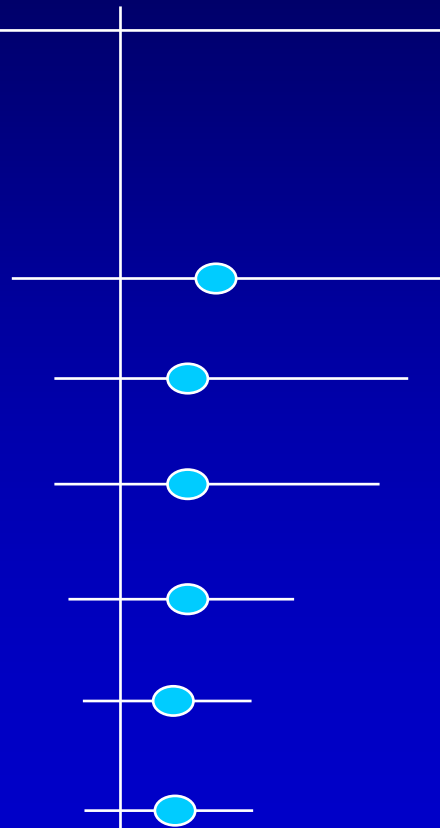
Favors placebo

Relative risk (CI)

0.5      1      1.5      2

Year    # RCTs    Cumulative Subjects

1970	2	304
1974	9	1451
1976	11	1686
1978	12	1986
1985	14	8412
1988	15	8745



	Recommendations		
	Yes	No	Not mentioned
1970	9	1	1
1974	8	0	2
1976	5	0	2
1978	8	0	3
1985	14	4	6
1988	4	2	1

1989 - 1st meta-analysis published

# What was the problem?

- lack of systematic summaries
- first principle of EBHC:  
both individual clinical decisions and guidelines for such decisions should be based on systematic summary of highest quality evidence

# What is highest quality evidence?

- observations in the world
- clinical experience
- open to bias
  - specious causal connections
  - vividness and immediacy
  - small samples
- laboratory and physiological research
  - systematic but generalization dangerous
- observational studies
  - non-comparable groups

# Highest Quality Evidence

- HRT for reducing cardiovascular risk
- educational interventions for reducing teen pregnancy
- antioxidant vitamins for reducing cardiovascular disease and cancer
- single session individual psychological debriefing for prevention of traumatic stress disorder after traumatic incidents

# Second principle,

## Hierarchies of Evidence: intervention

Individual RCT



Observational studies  
patient-important outcomes



Basic research  
test tube, animal, human physiology



Clinical experience

# Clinical decision-making

- third principle of EBHC:  
evidence is never enough  
- values and preferences
- antibiotics and pneumococcal pneumonia
- 95 year-old demented, incontinent,  
contracted

# Comparison of patient and physician values

- to anticoagulate or not to anticoagulate patients with atrial fibrillation: differences between physician and patient perspectives
  - Devereaux PJ et. al., BMJ, 2001
- face to face interview of 63 physicians and 61 patients
- probability trade-off tool to determine and compare physician and patient thresholds for how much stroke reduction is necessary and how much bleeding risk is acceptable for antithrombotic therapy in atrial fibrillation

# The Choice

- without treatment 100 patients will suffer:
  - 12 strokes (6 major, six minor), 3 serious gi bleeds in 2 years
- warfarin would increase bleeds in 100 patients to 5 per 2 years (2 additional bleeds)
- how many strokes must be prevented to make it worth taking warfarin and being subjected to increased risk of bleeding?

# STROKES ☹️ CAN BE MINOR OR MAJOR IN SEVERITY

	MINOR STROKE 😊	MAJOR STROKE ☹️
<b>PHYSICAL SYMPTOMS</b>	<ul style="list-style-type: none"> <li>- You suddenly cannot move or feel one arm and one leg</li> </ul>	<ul style="list-style-type: none"> <li>- You suddenly are dizzy and blackout</li> <li>- You are unable to move one arm and one leg</li> <li>- You cannot swallow or control bladder and bowel</li> </ul>
<b>MENTAL SYMPTOMS</b>	<ul style="list-style-type: none"> <li>- You are unable to fully understand what is being said to you</li> <li>- You have difficulty expressing yourself</li> </ul>	<ul style="list-style-type: none"> <li>- You are unable to understand what is being said</li> <li>- You are unable to talk</li> </ul>
<b>PAIN</b>	<ul style="list-style-type: none"> <li>- You feel no physical pain</li> </ul>	<ul style="list-style-type: none"> <li>- You feel no physical pain</li> </ul>
<b>RECOVERY</b>	<ul style="list-style-type: none"> <li>- You are admitted to hospital</li> <li>- Your weakness, numbness and problem with understanding improve but you still feel slightly weak or numb in one arm and one leg</li> <li>- You are able to do almost all the activities you previously did before the stroke</li> <li>- You can function independently</li> <li>- You leave the hospital after one week</li> </ul>	<ul style="list-style-type: none"> <li>- You are admitted to hospital</li> <li>- You cannot dress</li> <li>- The nurse feeds you</li> <li>- You cannot walk</li> <li>- After 1 month with physiotherapy, you are able to wiggle your toes and lift your arm off the bed</li> <li>- You remain this way for the rest of your life</li> </ul>
<b>FURTHER RISK</b>	<ul style="list-style-type: none"> <li>- You have an increased risk of having more strokes</li> </ul>	<ul style="list-style-type: none"> <li>- Another illness will likely cause your death</li> </ul>

IF YOU HAVE A STROKE, YOUR CHANCE OF HAVING A MINOR OR MAJOR STROKE ARE EQUAL

# SEVERE BLEEDING ☹️

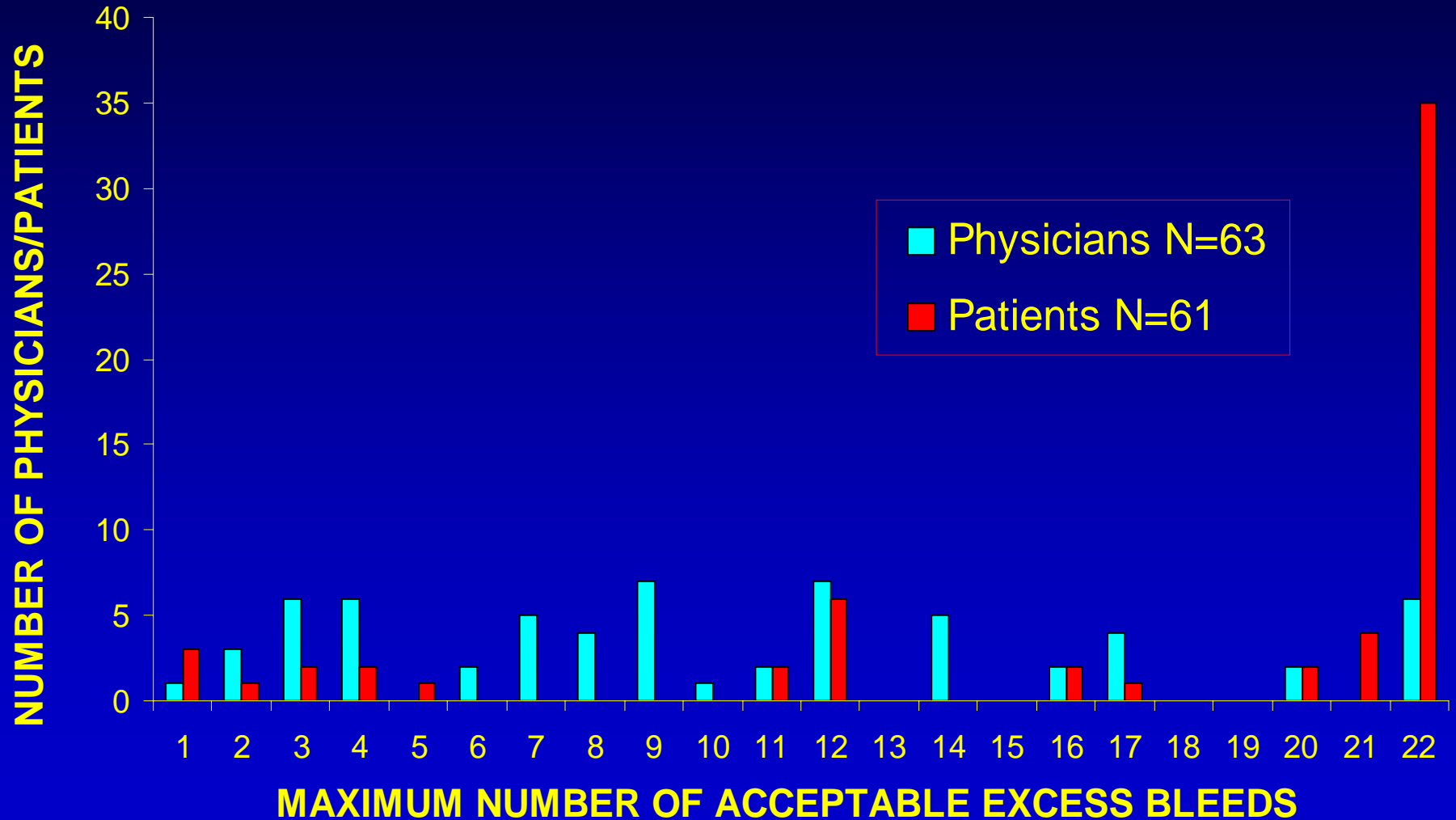
## AN EXAMPLE OF THIS IS A STOMACH BLEED

<b>PHYSICAL</b>	- You feel unwell for two days then suddenly you vomit blood
<b>TREATMENT</b>	-You are admitted to hospital -You stop taking warfarin -A doctor puts a tube down your throat to see where you are bleeding from -You receive sedation to ease the discomfort of the test -You do not need an operation -You receive blood transfusions to replace the blood you lost
<b>RECOVERY</b>	-You stay in hospital one week -You feel well at the end of your hospital stay -You need to take pills for the next six months to prevent further bleeding -You do not take warfarin any more -After that you are back to normal

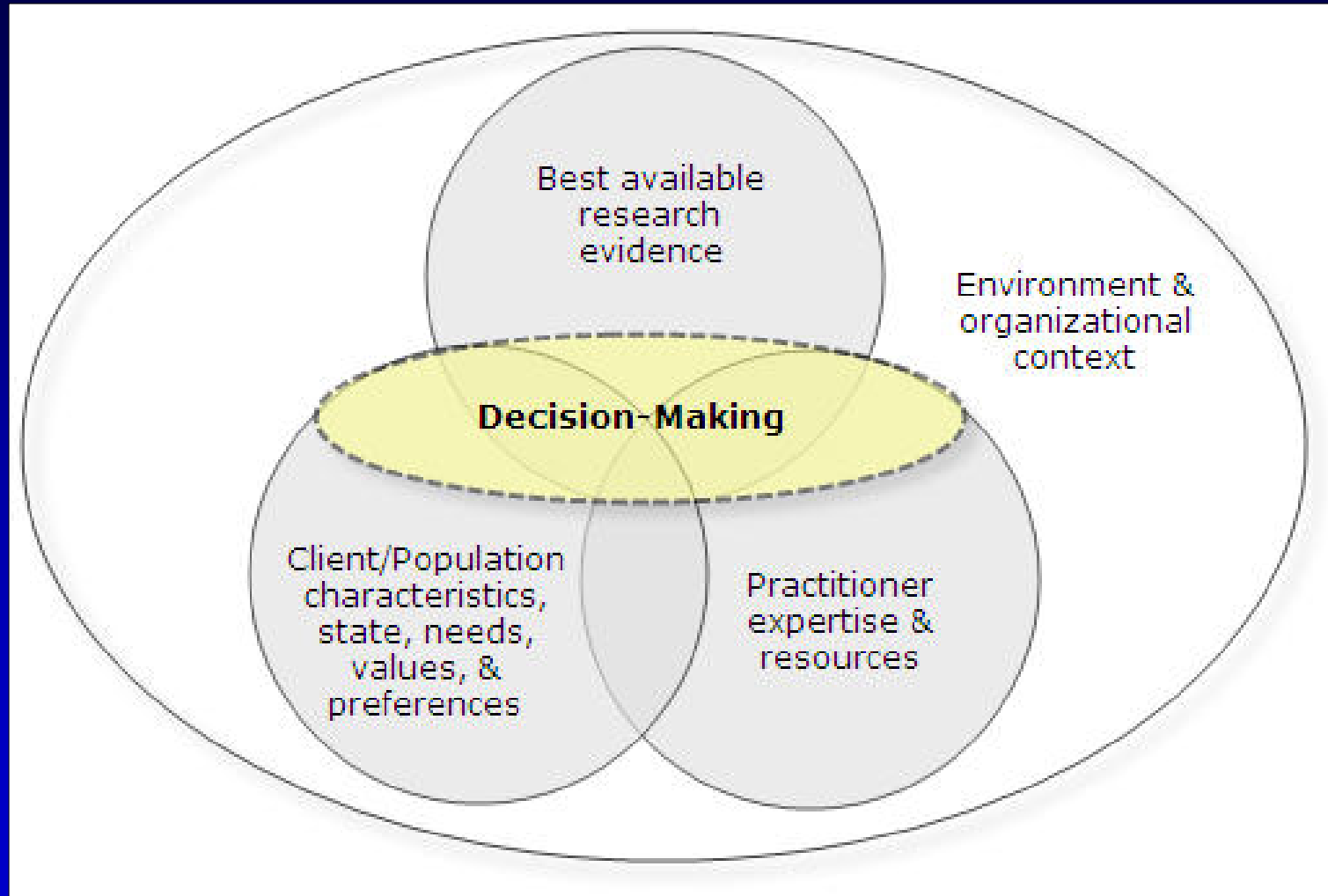
# The Choice

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# PHYSICIAN AND PATIENT BLEEDING THRESHOLDS FOR WARFARIN



# Transdisciplinary Model of Evidence-Based Decisions



Council on Evidence-Based Behavioral Practice, 2008

# Spotting an evidence-based clinician

- should Mr. Jones, a 40-year old man, receive cognitive-behavioral therapy in addition to exercise and dietary counseling for his obesity?
  - let's try it, it might well help
- Should Adrian, a 10 year old obese child, receive behavioral therapy in addition to exercise and dietary counseling for his obesity?
  - let's try it, it might well help

# Mr. Jones

- a meta-analysis of rcts of cognitive-behavioral therapy in addition to diet and exercise suggested a mean additional weight loss of 4.9 kg.
- if Mr. Jones is willing to incur the inconvenience and expense of cognitive-behavioral therapy for an anticipated additional weight loss of approximately 5 kg., he should go for it

# Adrian

- a systematic review of rcts of behavioral therapy in children with obesity with varying control groups found only studies with small sample size and inconsistent results
- if Adrian and his family decide to incur the inconvenience and expense of cognitive-behavioral therapy they should be well aware that only low quality evidence supports its benefits

# How to recognize an EBP is old news



子曰、由、禱女知之乎、知之為知之，不知為不知、是知也。

The Master said, "Yu, shall I tell you what it is to know? To say you know when you know, and to say you do not when you do not, that is knowledge."

Analects of Confucius  
Chapter 2, Verse 17

# Insights from RCTs

*Psychological Medicine*, 2005, 35, 839–854. © 2004 Cambridge University Press  
doi:10.1017/S0033291704003332 Printed in the United Kingdom

## One size fits some: the impact of patient treatment attitudes on the cost-effectiveness of a depression primary-care intervention

JEFFREY M. PYNE<sup>1\*</sup>, KATHRYN M. ROST<sup>2</sup>, FARAH FARAHATI<sup>1</sup>,  
SHANTI P. TRIPATHI<sup>1</sup>, JEFFREY SMITH<sup>3</sup>, D. KEITH WILLIAMS<sup>4</sup>,  
JOHN FORTNEY<sup>1</sup> AND JAMES C. COYNE<sup>2</sup>

# RCT of depression trt

- 12 primary care practices
  - randomized practices
  - 211 pts new episode primary depression
- enhanced intervention or usual care
  - 4 group sessions on phone conference "academic detailing" on depression guidelines
    - drugs and psychotherapy presented as equally effective
  - nurses 8 hours face-to-face training
- monitored patients, reported back to physicians

# Payne et. al.

- measured receptiveness to treatment
  - 53% receptive antidepressants
    - effected response to intervention
  - 69% to counseling
    - didn't effect response to intervention
- receptive to antidepressants
  - 77% versus 37% received antidepressants
  - \$5,864 per QALY gained
  - psychotherapy 22.7 % vs 14.1% (p = 0.21)
- unreceptive: no gain in QALY
- restrict intervention to receptive pts

# Need for skepticism: behavioral interventions to delay diabetes onset

- what is diabetes?
  - type 2, arbitrary threshold
  - take folks just under threshold, prevent cross
  - assumption: reduce neuropathy, retinopathy, nephropathy, vascular events
- recent study rosiglitazone for prevention
  - reduction in risk by over 50%
  - no info on any complications but vascular events
  - trend toward increase in vascular events (RR 1.37)
  - increase in heart failure

# Doctor, what do I gain by taking rosiglitazone?

- Doc: less chance of diabetes
- Pt: what happens if I get diabetes
- Doc: you have to take a drug
- Pt: the same drug I'm taking to prevent diabetes?
- Doc: I could give you a drug with less problems
- Pt: I'll take a drug every day for 3 years to lower my risk of taking the same or a less toxic drug from 25 to 10%???

# Another RCT of diabetes prevention

- 3,234 people with "pre-diabetes"
  - lifestyle modification wt loss, exercise
  - metformin
  - placebo
- reduction in "diabetes"
  - lifestyle 58%, metformin 31%
  - gi symptom events 41/100 greater metformin
  - musculoskeletal events 4/100 higher in lifestyle
  - diabetic complications not measured

# The Cost-Effectiveness of Lifestyle Modification or Metformin in Preventing Type 2 Diabetes in Adults with Impaired Glucose Tolerance

*Ann Intern Med.* 2005;142:323-332.

**Interventions:** Intensive lifestyle, metformin, and placebo interventions as implemented in the DPP.

**Outcome Measures:** Cumulative incidence of diabetes, microvascular and neuropathic complications, cardiovascular complications, survival, direct medical and direct nonmedical costs, quality-adjusted life-years (QALYs), and cost per QALY.

Compared with the placebo intervention, the cost per QALY was approximately \$1100 for the lifestyle intervention and \$31 300 for the metformin intervention.

# Clinical Outcomes and Cost-Effectiveness of Strategies for Managing People at High Risk for Diabetes

David M. Eddy, MD, PhD; Leonard Schlessinger, PhD; and Richard Kahn, PhD

*Ann Intern Med.* 2005;143:251-264

**Design:** Cost-effectiveness analysis using the Archimedes model.

**Data Sources:** Published basic and epidemiologic studies, clinical trials, and Kaiser Permanente administrative data.

Compared with no program, lifestyle modification for high-risk people can be made cost-saving over 30 years if the annual cost of the intervention can be reduced to about \$100.

The program used in the DPP study may be too expensive for health plans or a national program to implement. Less expensive methods are needed to achieve the degree of weight loss seen in the DPP.

# Decreased sugar reduces complications?

- ADVANCE NEJM 2008
  - 11,140 type 2 intensive vs less control
  - only difference proteinuria
- ACCORD
  - 10,521 type 2 diabetes HbA1C > 7.5
  - ↑ death, no ↓ complications
- VADT NEJM 2009
  - 1,791 Veterans poorly controlled diabetes
  - no difference in any complication
- all increase severe hypoglycemia

# Conclusions about cost-effectiveness

- totally speculative
- minimal effect of ↓ glucose with drugs on complications
  - could differ drugs versus behavior
  - no role for drugs until show ↓ complications
- behavioral program to "prevent" diabetes
  - no hypoglycemia
  - weight loss
  - feel better

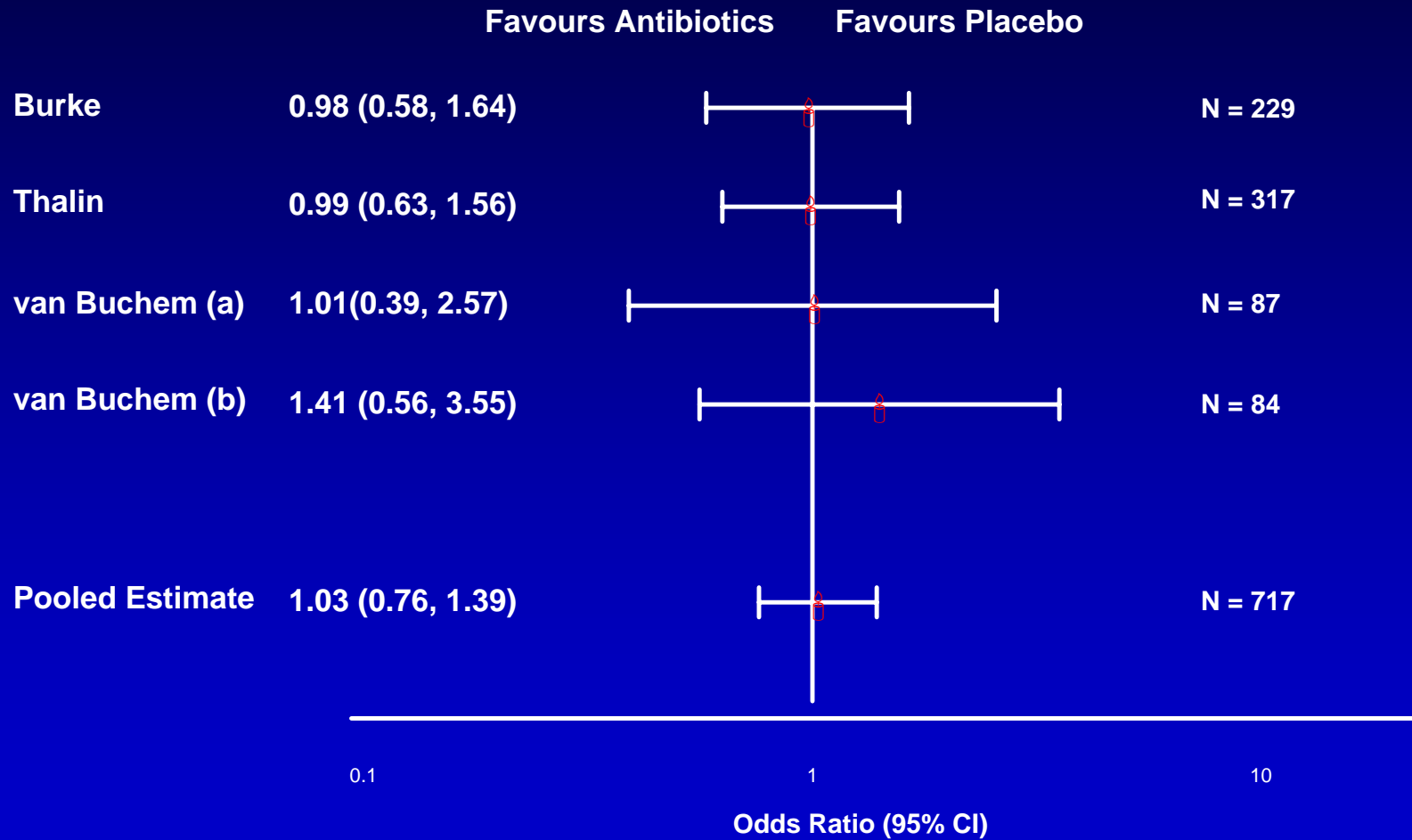
# A patient/parent dilemma

- 3 year old
  - sore ear, low fever, irritable
  - examination shows otitis media
- which of you:
  - have been exposed to kids with sore ears?
- who would expect antibiotics?
- what benefit can I expect?
- what risks are there?

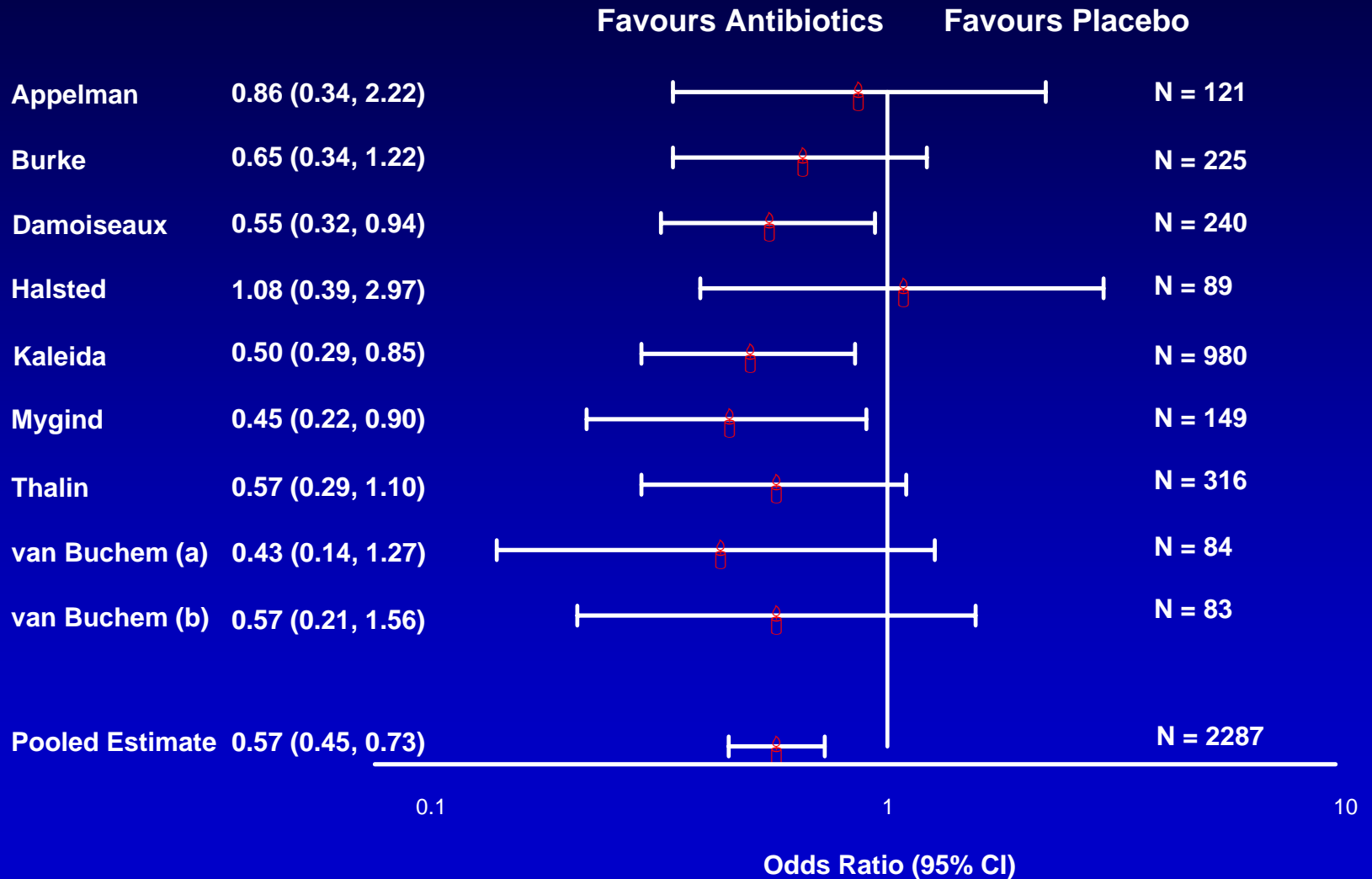
# Glasziou, Cochrane, 2003

- systematic review of RCTs
- question
  - patients: children with otitis media
  - intervention: antibiotics
  - outcome: resolution of symptoms
- comprehensive search
- 8 high quality studies, 2,287 children
  - concealed randomization
  - blinding
  - complete follow-up

# Antibiotics for Acute Otitis Media in Children Pain at 24 hours



# Antibiotics for Acute Otitis Media in Children Pain at 2 – 7 days



# Trade-off

- failure to resolve at 2 to 7 days
  - 20% control
  - 13% antibiotics
- absolute difference 7%
  - NNT 15
- other studies have addressed side effects
  - increase in vomiting, rash, diarrhea 5%
  - NNH 20

# Why bother with EBHC?

- without EBHC we are helpless in the face of
  - misguided experts
  - overenthusiastic experts
- without EBHC our ability limited
  - to differentiate quality evidence from speculation
  - to help our patients understand trade-offs
- with EBHC comes
  - understanding and power
  - greater effectiveness in helping our patients