



Integrating evidence-based medicine in clinical practice

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What is the basis for clinical practice?

1. What is there?
2. How do we know?
3. Why should I?



What is the basis for clinical practice?

= A reflection of the three basic questions posed in Philosophy:

1. What is there? (ontology)
2. How do we know? (epistemology)
3. Why should I? (ethical decisions)



What is the basis for clinical practice?

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1. What is there? (ontology)
2. How do we know? (epistemology)
3. Why should I? (ethical treatment decisions)

Why do the theories and practices taught in different school undergraduate & graduate programs vary so much?



The basis for the art and science of medicine and dentistry changes constantly.

Why is this not reflected in practice and in our teaching?



The Teaching and Practice of Medicine and Dentistry reflect changes both in the society as well as in new research.



Philosophy

18th century: Age of enlightenment
(or age of reason)

Philosophers: George Berkeley, Thomas Paine, Voltaire, Jean-Jacques Rousseau, David Hume...



Philosophy/philosophers (very condensed!)

18th century: Age of enlightenment

Wars and misery

19th century: Scepticism

Nietzsche: "*God is dead. The same applies to Christian morality and metaphysics!*"



Philosophy/philosophers (very condensed!)

18th century: Age of enlightenment

Wars and misery

19th century: Scepticism. Nietzsche

More wars, misery and genocides

20th century: Emerging cultural and structural criticism of ontology & epistemology

Modernism (Ihab Hassan / Popper / Kuhn)

Postmodernism (Jean-F Lyotard)

Poststructuralism (Michel Foucault / Jacques Derrida)

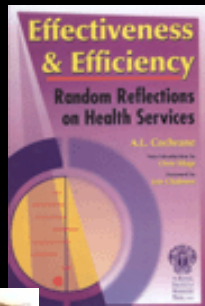


Medicine: Emerging Cultural and Structural criticism of ontology & epistemology



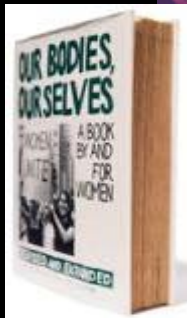
1967

Alvan Feinstein: *Clinical Judgment*. The first book to discuss the basis, as well as process of clinical decision making.



1972

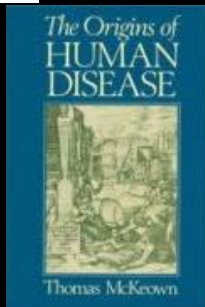
Archie Cochrane: Questioned the knowledge base of medicine, calling for more rigorous evaluation of the effectiveness of medical interventions.



1973

Boston Women's Health Book Collective.

Medical services in the US are male-dominated and women need to empower themselves.



1976

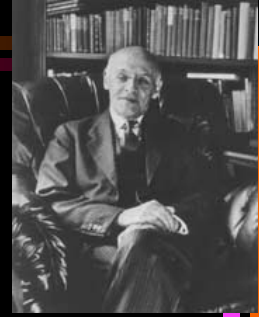
Tom McKeown: What is the role of medicine when improvements in health are due as much if not more to social and environmental changes than to health care?



A strategy for
coping with
continual changes
is mandated!



The Flexner Report, 1910



Abraham Flexner

MEDICAL EDUCATION
IN THE
UNITED STATES AND CANADA

A REPORT TO
THE CARNEGIE FOUNDATION
FOR THE ADVANCEMENT OF TEACHING

BY
ABRAHAM FLEXNER

WITH AN INTRODUCTION BY
HENRY S. PRITCHETT
PRESIDENT OF THE FOUNDATION

BULLETIN NUMBER FOUR

229 FIFTH AVENUE
NEW YORK CITY



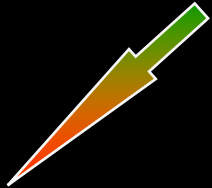
- Accounts of all medical schools throughout Canada and USA
- General plan for curriculum reconstructions
- Curriculums must be based on pathophysiological rationales
- Foundation for all medical and dental curriculums



The new graduate



Advertising
"Pizza evenings"



Head/ Staff/
Demonstrator-
filtered:



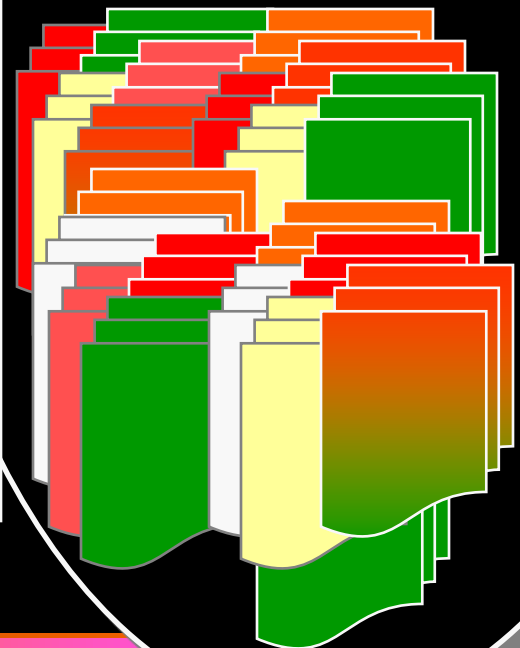
"Curriculum"

" Classic
literature"

"Role models"

Publications in dentistry

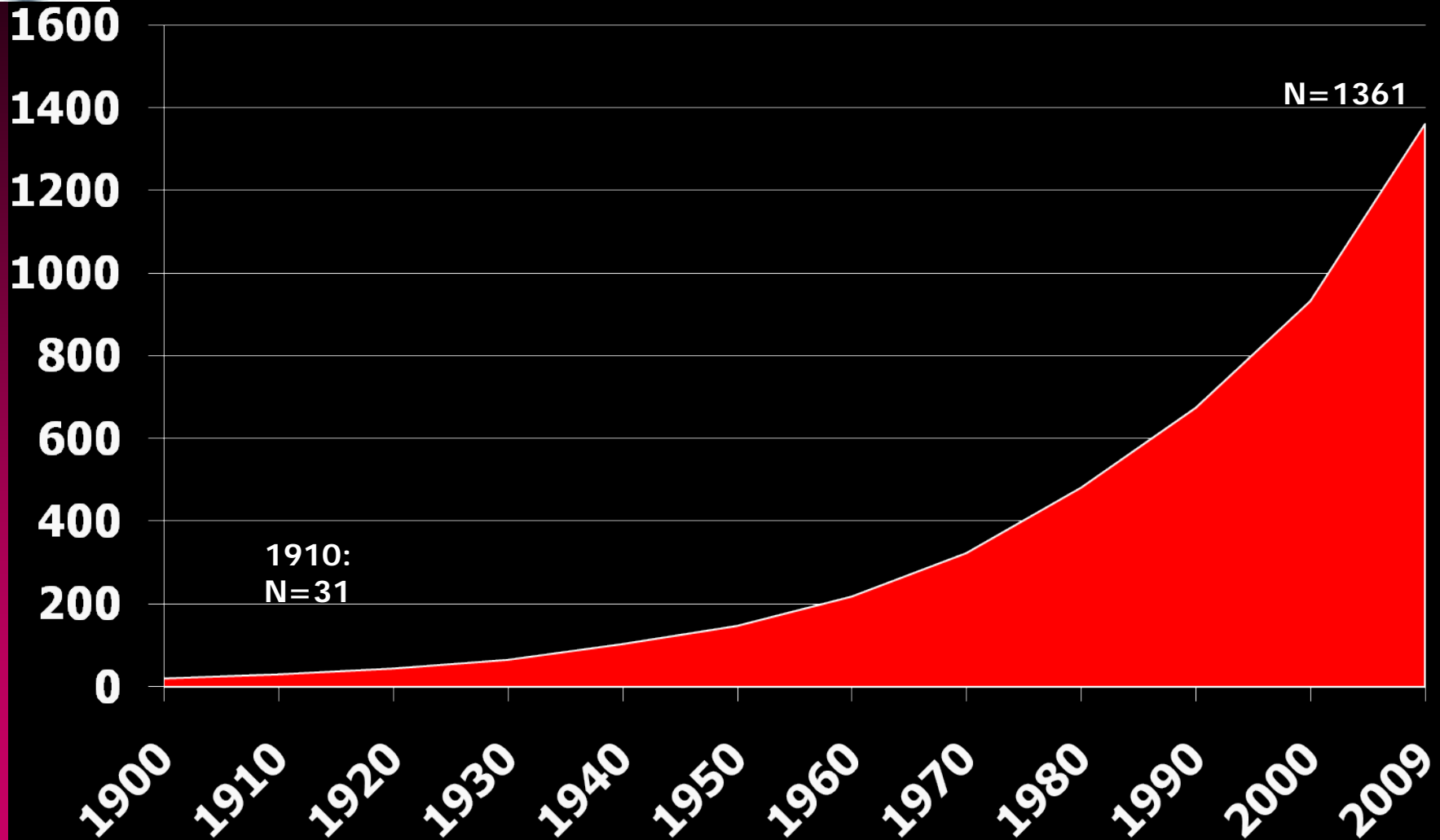
Truths
Relative truths
Damn lies





Publications in Dentistry

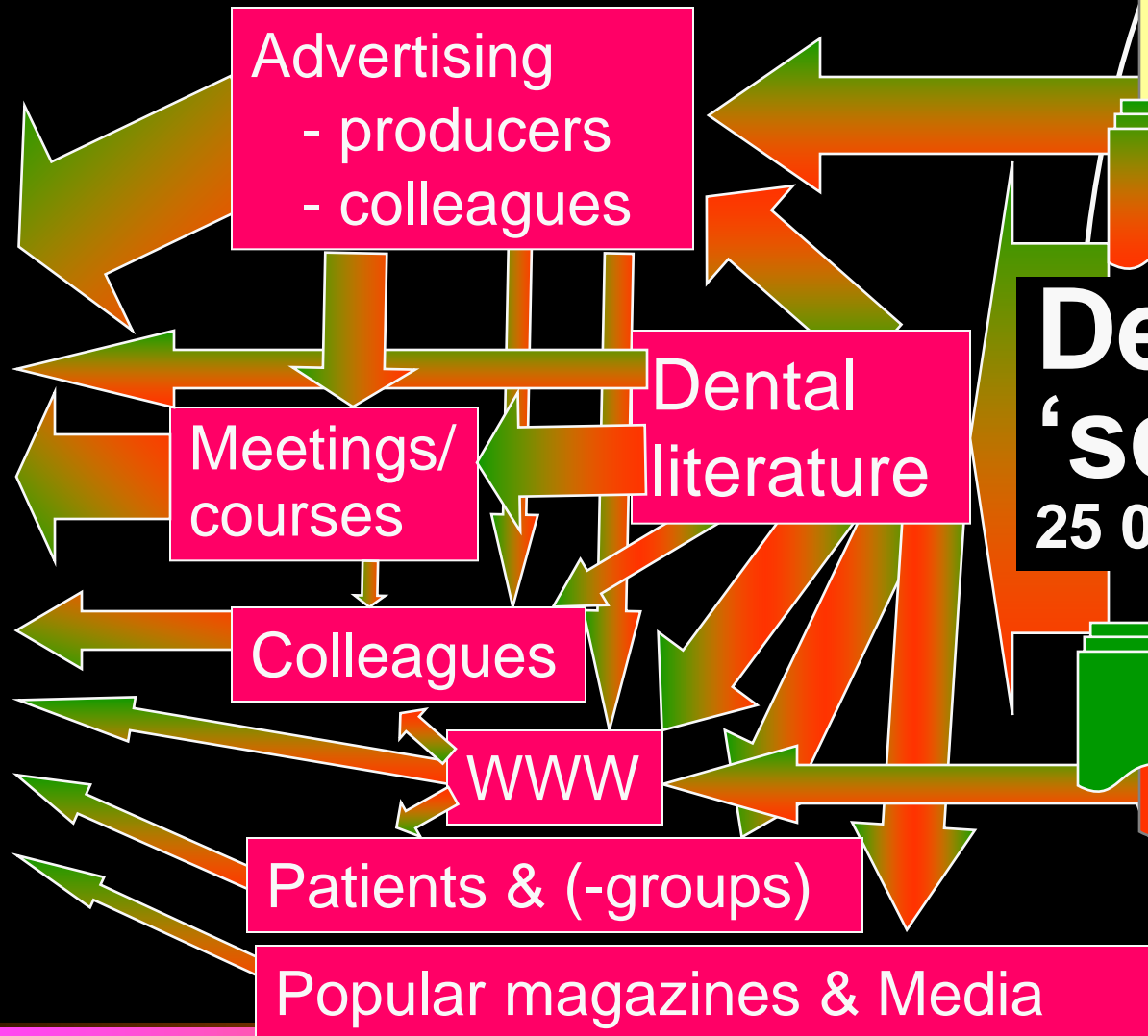
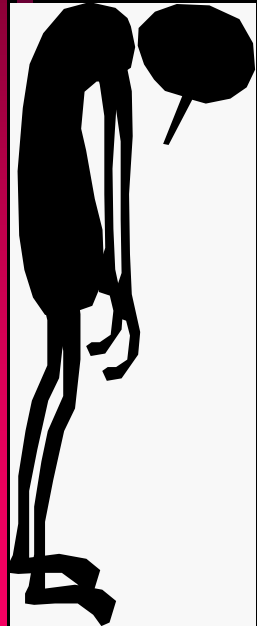
700 active
400 ceased
200 merged



Source: Ulrich's International Periodicals Directory



The Information Overload



Truths
Relative truths
Damn lies

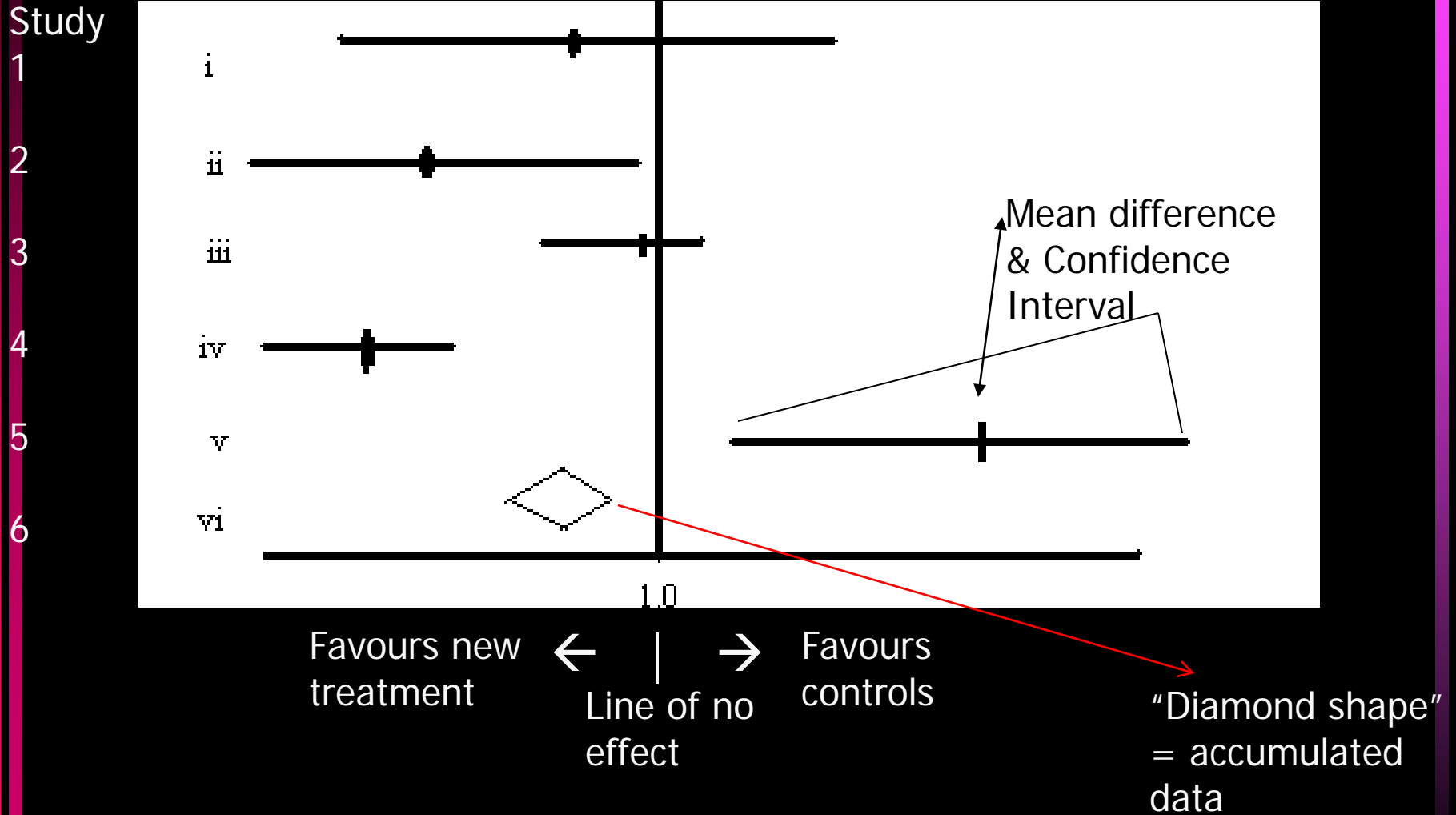
Dental
'science'
25 000 articles/yr



The Cochrane Collaboration – Established 1992



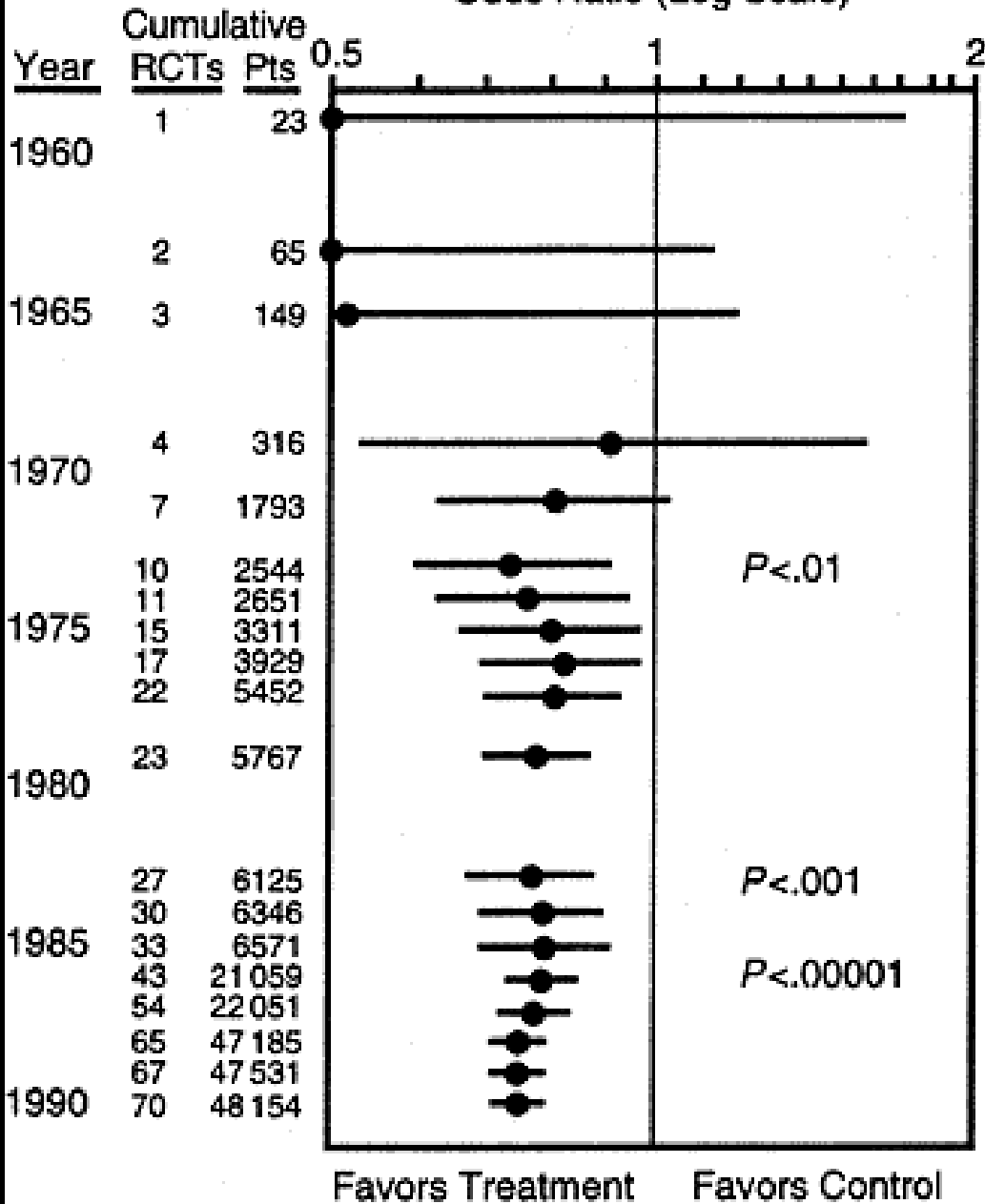
"Forest Plot"





Thrombolytic Therapy

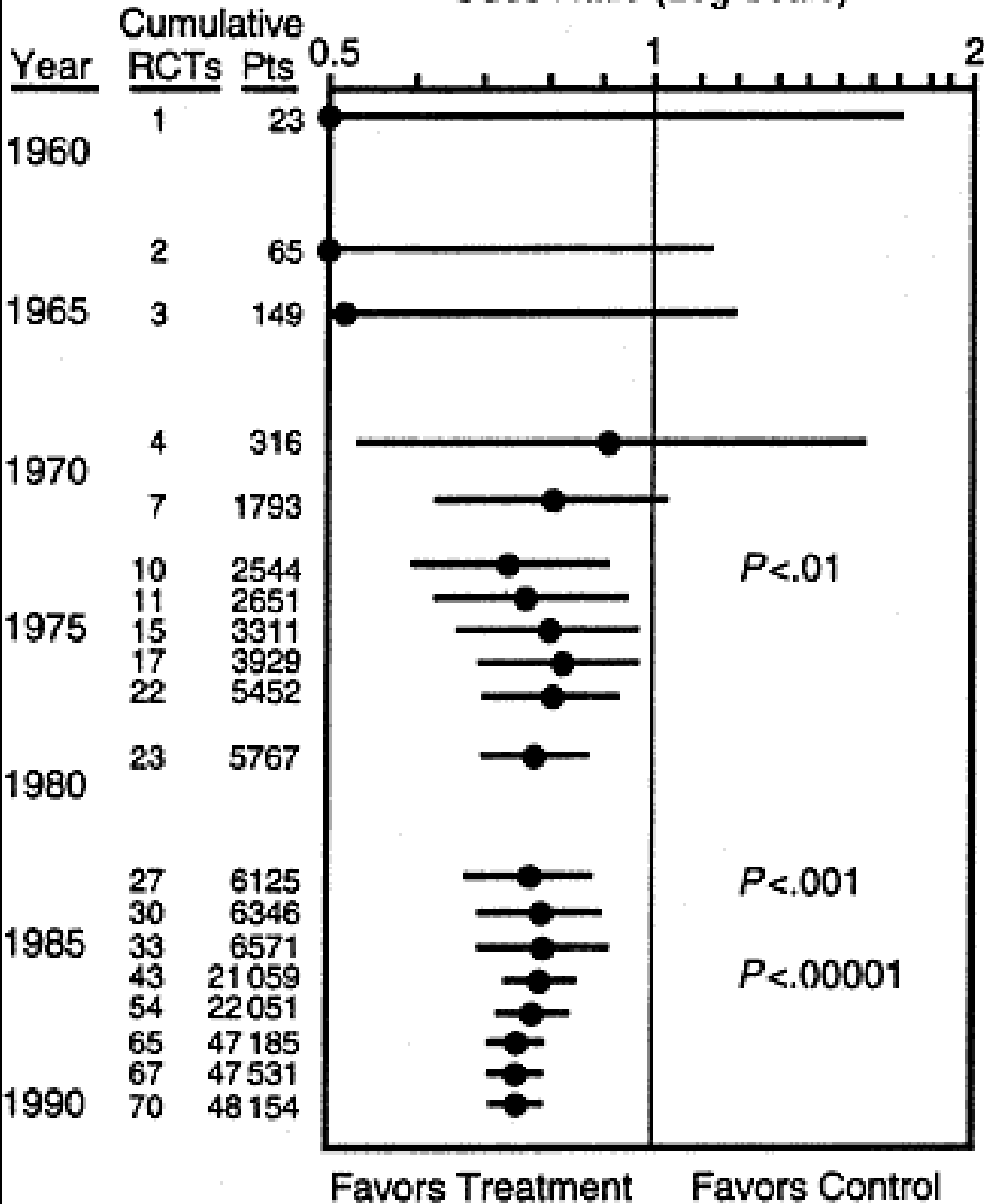
Odds Ratio (Log Scale)





Thrombolytic Therapy

Odds Ratio (Log Scale)



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		1		7	3
M	5	2		2	1
M	15	8			1
M	6	1			

M
M
M
M
M
M



In 1972 a study was published which showed that an inexpensive drug (a corticosteroid) given to women expected to give birth prematurely could help reduce complications in the infant.

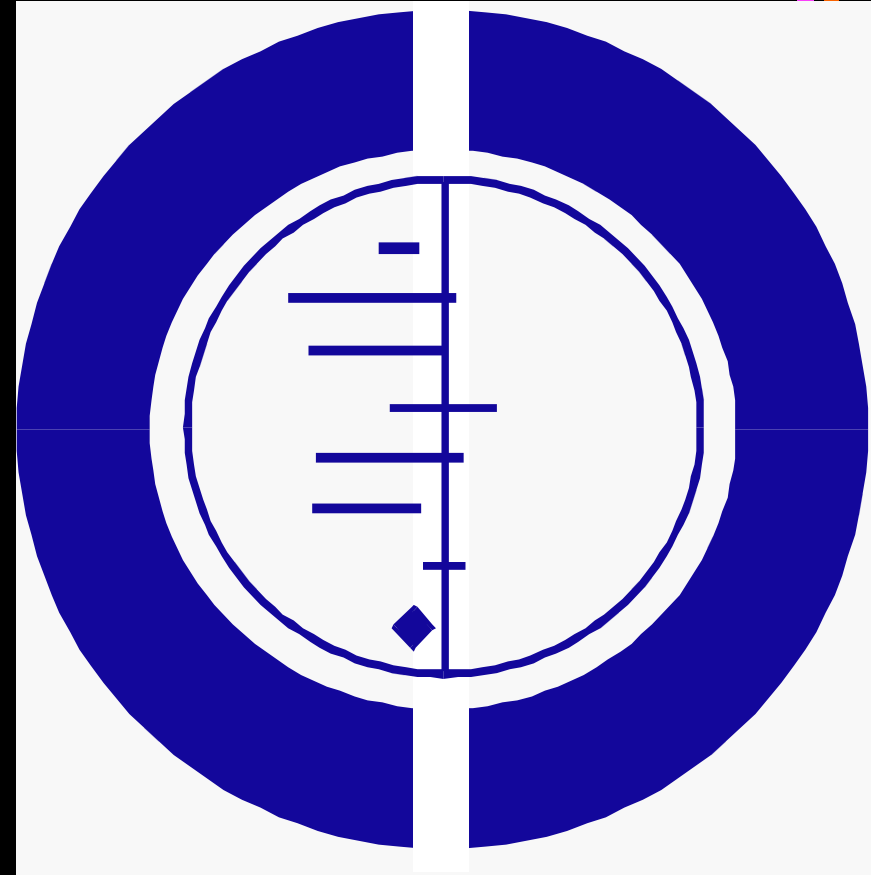
- ❑ Six additional trials were done over the next 15 years, appearing periodically in the medical literature.
- ❑ In 1989 a systematic review summarized these 7 trials to establish beyond a doubt that giving this drug reduced the odds of babies dying from complications by 30-50%.
- ❑ Because the systematic review wasn't published until 1989, most obstetricians did not know that the treatment was so effective, even though evidence had existed since 1972.
- ❑ As a consequence, tens of thousands of premature babies may have suffered and died unnecessarily.



The Cochrane Collaboration Logo

- ❑ 1972: First RCT
- ❑ 1972-1989 + 6 RCTs
- ❑ 1989: First SR
- ❑ Most obstetricians did not know that the treatment was so effective
- ❑ Tens of thousands of premature babies may have suffered and died unnecessarily

1
2
3
4
5
6
7





👉 Can future clinicians be taught a strategy for how to cope with changes ?



Evidence-Based Medicine

JAMA 1992

A New Approach to Teaching the Practice of Medicine

Evidence-Based Medicine Working Group

A NEW paradigm for medical practice is emerging. Evidence-based medicine de-emphasizes intuition, unsystematic clinical experience, and pathophysiologic rationale as sufficient grounds for clinical decision making and stresses the examination of evidence from clinical research. Evidence-based medicine requires new skills of the physician, including efficient literature searching and the application of formal rules of evidence evaluating the clinical literature.

An important goal of our medical residency program is to educate physicians in the practice of evidence-based medicine. Strategies include a weekly, formal academic half-day for residents, devoted to learning the necessary skills; recruitment into teaching roles of physicians who practice evidence-based medicine; sharing among faculty of ap-

dose of phenytoin intravenously and the drug is continued orally. A computed tomographic head scan is completely normal, and an electroencephalogram shows only nonspecific findings. The patient is very concerned about his risk of seizure recurrence. How might the resident proceed?

The Way of the Past

Faced with this situation as a clinical clerk, the resident was told by her senior resident (who was supported in his view by the attending physician) that the risk of seizure recurrence is high (though he could not put an exact number on it) and that was the information that should be conveyed to the patient. She now follows this path, emphasizing to the patient not to drive, to continue his medication, and to see his family

year is between 43% and 51%, and at 3 years the risk is between 51% and 60%. After a seizure-free period of 18 months his risk of recurrence would likely be less than 20%. She conveys this information to the patient, along with a recommendation that he take his medication, see his family doctor regularly, and have a review of his need for medication if he remains seizure-free for 18 months. The patient leaves with a clear idea of his likely prognosis.

A PARADIGM SHIFT

Thomas Kuhn has described scientific paradigms as ways of looking at the world that define both the problems that can legitimately be addressed and the range of admissible evidence that may bear on their solution.⁴ When defects in an existing paradigm accumulate to the



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*"Medicine is
a science of uncertainty
and
an art of probability"*

William Osler (1849-1919)





"Doubt is not a pleasant condition, but certainty is an absurd one"



Voltaire (1694-1778)



Clinical epidemiology:

The application, by a physician who provides direct patient care, of epidemiologic and biostatistical methods to the study of diagnostic and therapeutic processes in order to effect an improvement in health.

David Sackett, 1968

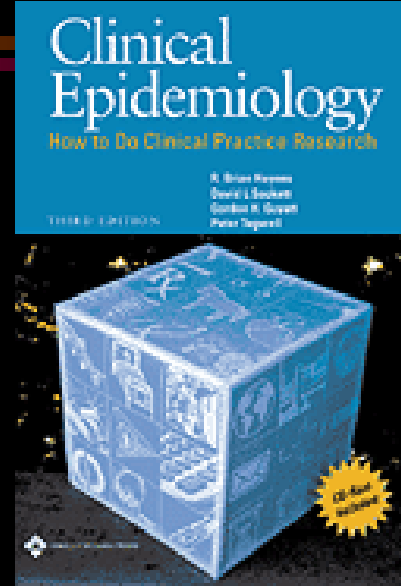
McMaster University, Hamilton, Ontario, Canada



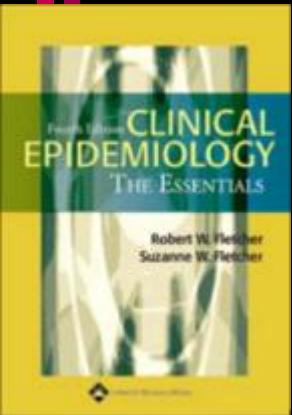
1985:
1st

1991:
2nd

2005:
3rd



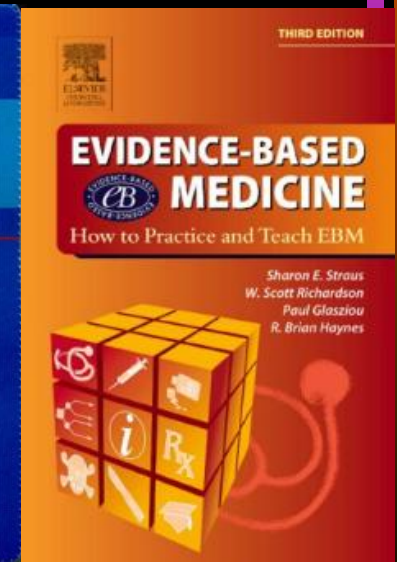
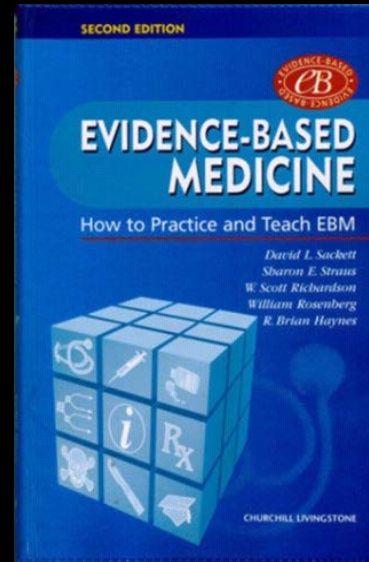
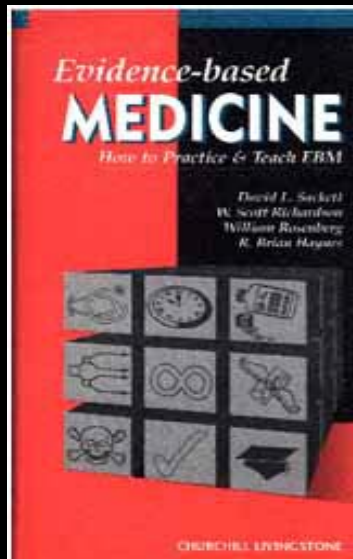
1982:
1st



1997: 1st

2000: 2nd

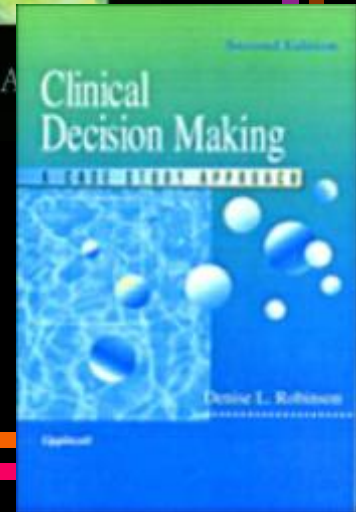
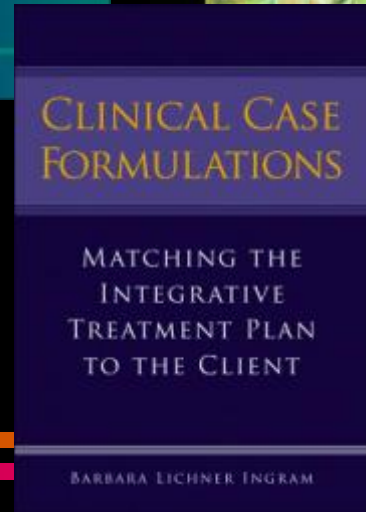
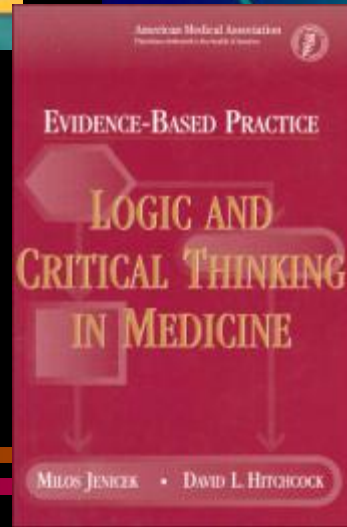
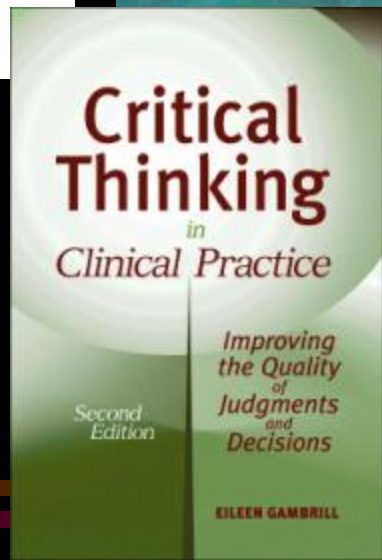
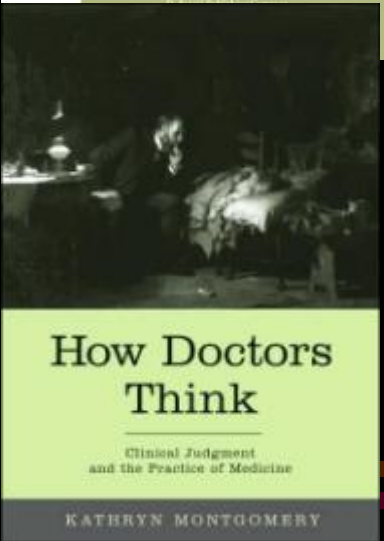
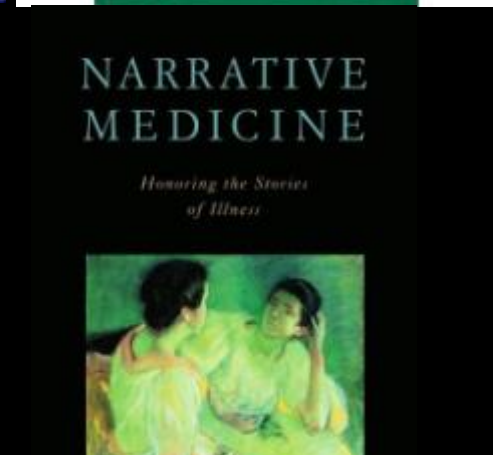
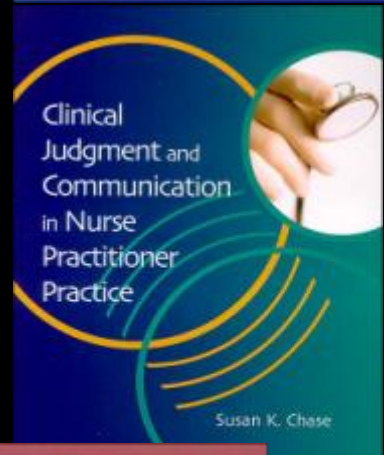
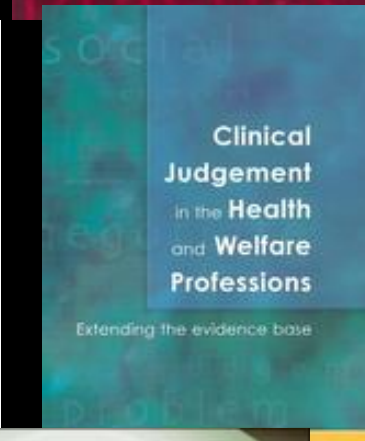
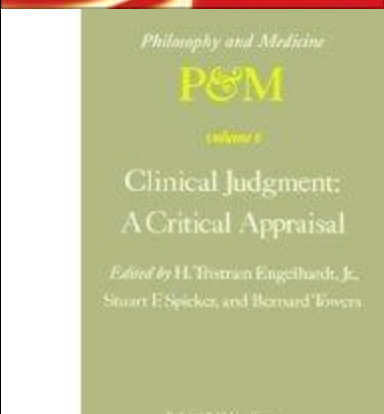
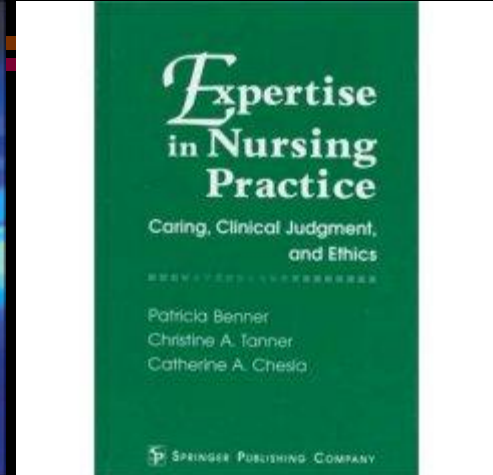
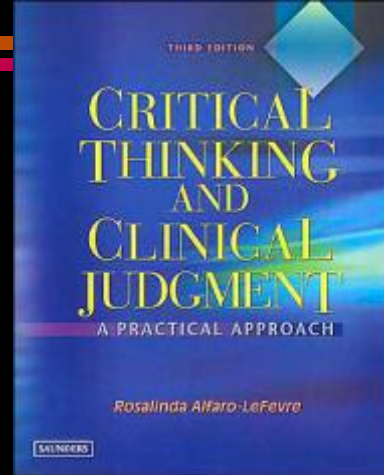
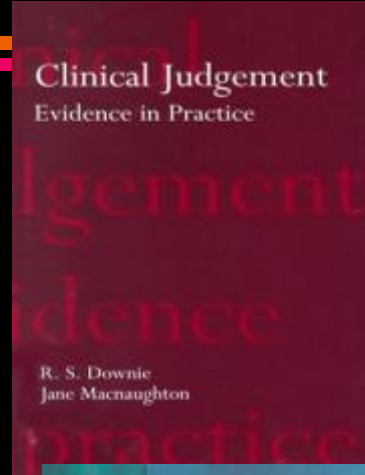
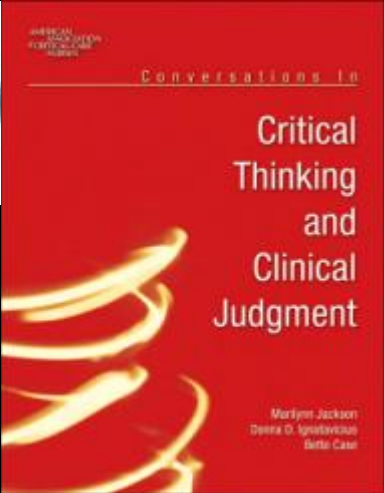
2005: 3rd



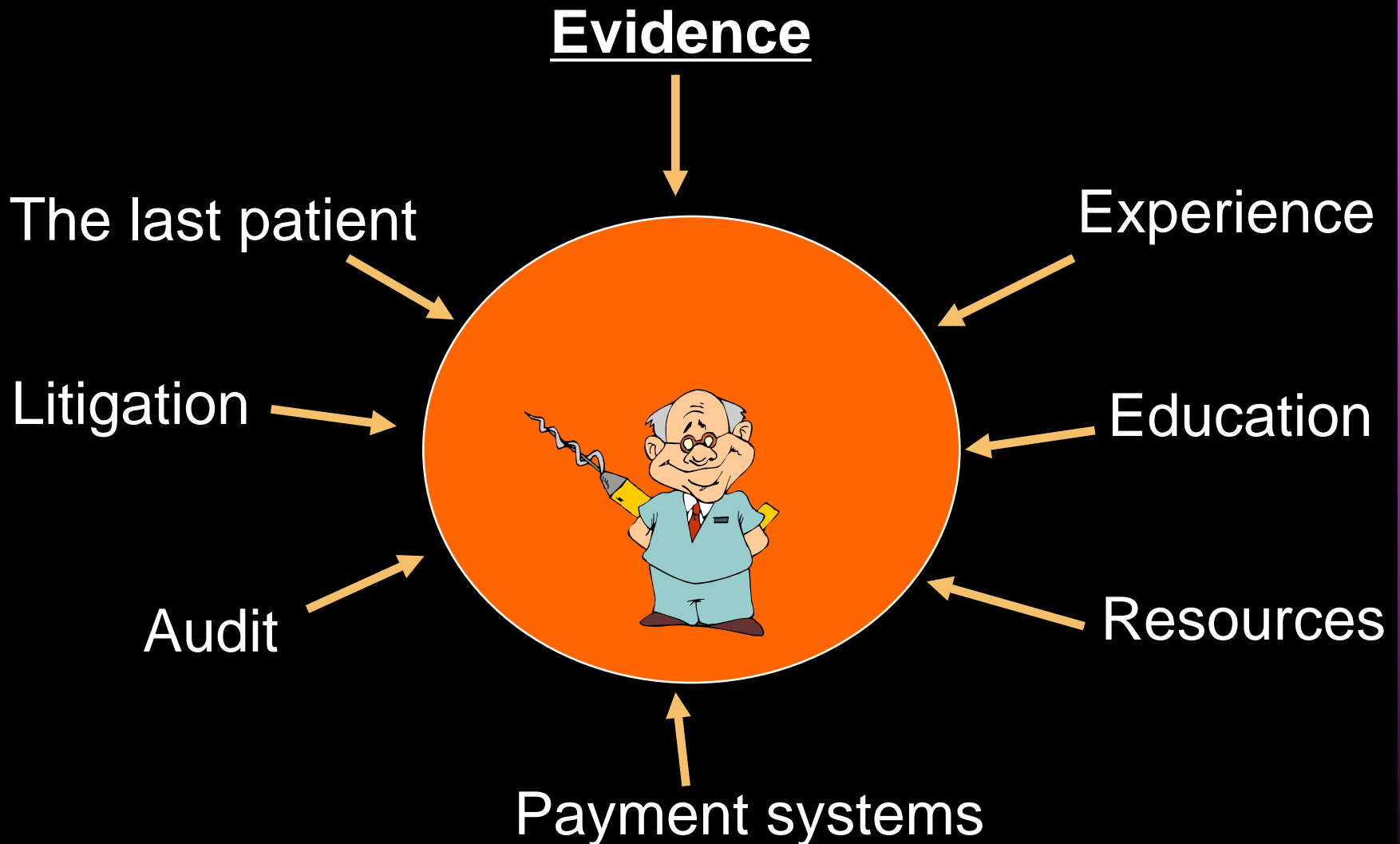


Medicine has changed:

1. Basic Philosophical trends in society
2. Criticism of:
 - Effectiveness – Health equity - Costs
 - Priorities in health and research
3. Implementation of new and effective interventions inadequate
4. Education needs → EBM



Influences on clinical decision making

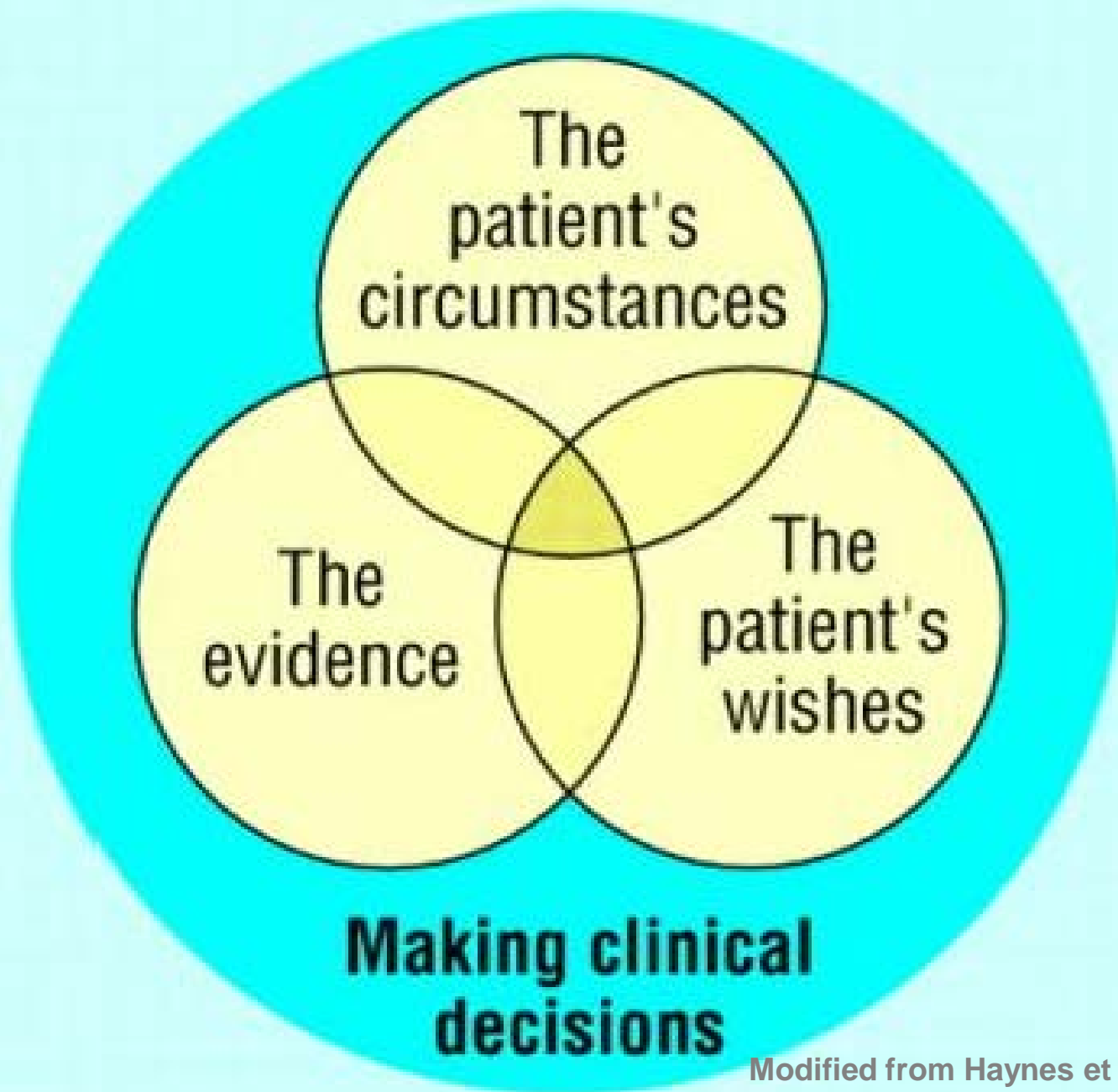




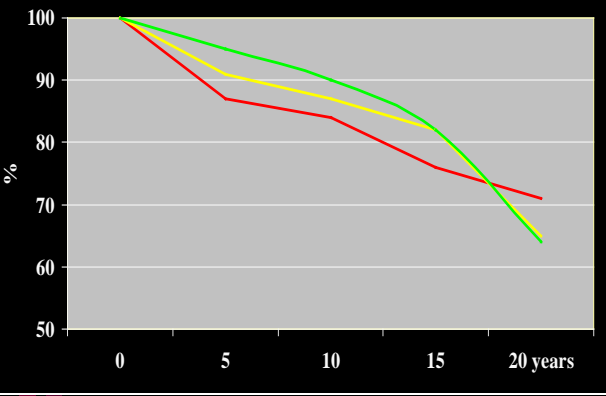
EBM:

The evidence-based practice approach can facilitate clinical decision making

Evidence-Based Practice:



Modified from Haynes et al. *BMJ* 1998;317:273-6



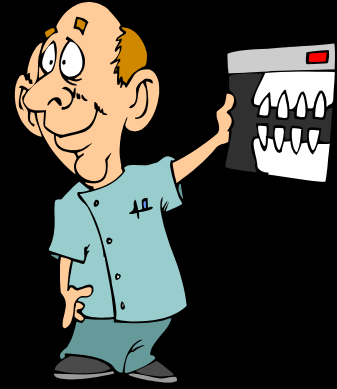
Independent variables	Bi-variate odds ratios	Bivariate significance	95% Confidence intervals bivariate odds ratios	Multi-variate odds ratios	Multivariate significance	95% Confidence intervals for multivariate odds ratios
Age group						
20-30	-	-	-	-	-	-
30-40	2.32	**	1.15 - 3.13	2.52	**	1.35 - 3.33
+40	2.63	***	1.43 - 3.08	2.63	***	1.83 - 3.8
Gender						
Male	-	-	-	-	-	-
Female	2.42	**	1.61 - 2.79	2.12	**	1.91 - 2.9
Material						
Amalgam	-	-	-	-	-	-
Composites	1.12	NS	0.13 - 1.56	1.42	NS	1.13 - 1.96
Glass ionom.	3.12	***	2.52 - 4.34	5.65	**	4.67 - 7.23
Dentists						
#1	-	-	-	-	-	-
#2	1.34	NS	0.35 - 1.61	1.04	NS	1.35 - 2.01
Location						
Mandible	-	-	-	-	-	-
Maxilla	1.55	*	1.17 - 2.04	1.15	*	1.57 - 2.14



Longevity



Risk factors

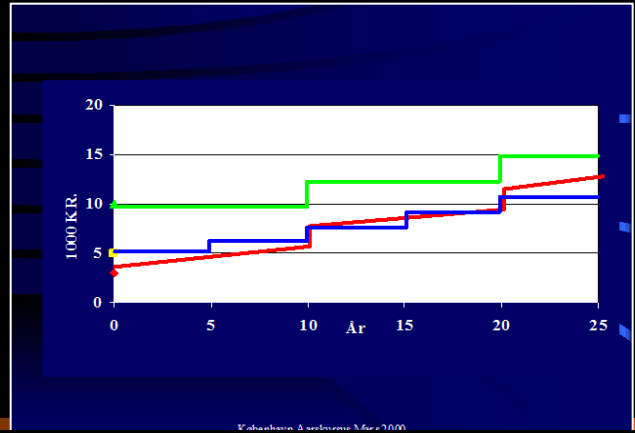


Outcomes probabilities

Arriving at informed clinical decisions



QOL



Incremental Cost



Worst Case Scenario



Scientific studies can be graded according to the theoretical possibility of an incorrect conclusion.

This is reflected by the design of the study.

...we will never know exact answers in science....