

Evidence-Based Infection Control

A Webber Training Teleclass with Dr. Mark Loeb

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**Evidence-Based
Infection Control**

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Hosted by Paul Webber paul@webbertraining.com
A Webber Training Teleclass www.webbertraining.com

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Definition

Evidence-based infection control is...
...the explicit, judicious and
conscientious use of current best
evidence from infection control research
in making decisions about the prevention
and control of infection of individuals and
populations.

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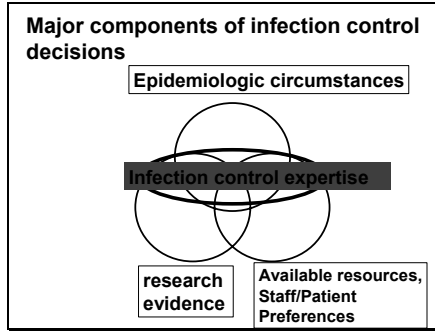
**Evidence-based infection
control...**

*...is an attempt to build a bridge
between evidence from research
and infection control practice.*

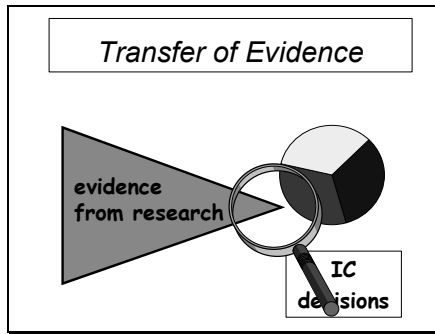
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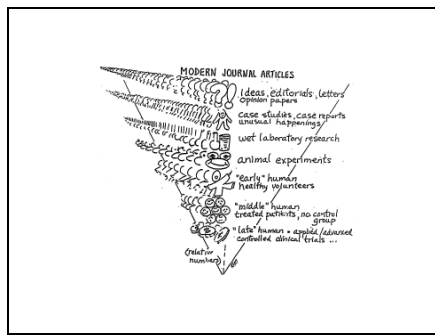
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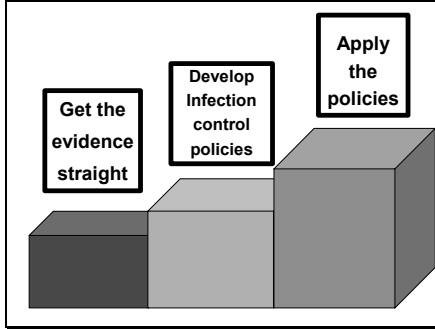
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- 5 Steps of Evidence-Based Infection Control**
- Framing the question appropriate to the circumstances
 - Finding the evidence
 - Evaluating the evidence
 - Making and doing the decision
 - Evaluating the process

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Framing the question

PICO

- Patient or Population
- Intervention
- Comparison
- Outcome

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Framing the Question

In nurses providing care to SARS patients in the ICU, does use of an N95 mask reduce SARS transmission ?

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5 Steps of EBIC

- framing the question
- finding the evidence
- evaluation of the evidence
- making and doing the decision
- evaluation of the whole process

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**Approach to Research Evidence:
What question am I asking ?**

- Therapy
- Prognosis
- Diagnosis
- Etiology

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**Common features of
Infection Control Research**

1.Comparative

Soap 1 vs Soap 2
MRSA culture vs PCR
N95 vs No N95

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Common features (con't)

2. Preplanned

- Objective, rationale, background
- Inclusion and exclusion criteria
- Methodology for all interventions
- Outcomes and how&when measured

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Severe Acute Respiratory Syndrome (SARS)



March 25, 2003 March 29, 2003 April 2, 2003

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Question

In patients with SARS, does interferon reduce mortality ?


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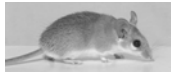
Levels of Evidence

- Animal study
- Case Report
- Case-control
- Cohort
- RCT
- Systematic review



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Animal Studies



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Case Report

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE
Volume 348:1995-2005 May 15, 2003 Number 20

Identification of Severe Acute Respiratory Syndrome in Canada

Susan M. Prodanon, M.D., M.P.H., Donald E. Low, M.D., Bonnie Henry, M.D., Sandy Potholeros, M.D., David Ryan, M.D., Karen Choon, R.N., Raymond Pillay, M.D., Owen Dudley, F.D.C., Denis Akachi, M.Sc., Melissa Ayers, R.Sc., Adrienne E. Chan, M.D., Daniela M. Stawinski, M.D., M.H.Sc., Pring Saito, M.D., Andrew E. Simor, M.D., Arthur C. Shadyk, M.D., Patrick W. Doyle, M.D., M.H.Sc., MEd Englem, M.D., Martin Patria, Ph.D., Robert C. Stronken, M.D., Allison J. McQueen, M.D., for the National Microbiology Laboratory, Canada, and the Canadian Severe Acute Respiratory Syndrome Study Team

ABSTRACT
Background Severe acute respiratory syndrome (SARS) is a condition of unknown cause that has recently been recognized in patients in Asia, North America, and Europe. This report summarizes the initial epidemiologic findings, clinical description, and diagnostic findings that followed the identification of SARS in Canada.

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Case-Control Study

- Begin with Case
- Compare to controls
- Pros: quick, inexpensive
- Cons: bias in selection of cases, selection of controls, recall bias, measurement
- Use: determine risk

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Cohort Study

- Begin with patients who do NOT have the outcome
- Follow forward in time
- Pros: less bias since outcome unknown, better to design data collection
- Con: expensive, lengthy
- Use: best to assess risk, outcome

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Randomized Controlled Trials

- Randomly allocate patients to an intervention, follow up and measure outcomes
- Pro: reduce selection, assessment bias, confounding
- Con: expensive, not always possible

- Bottom line: gold standard for prevention, treatment

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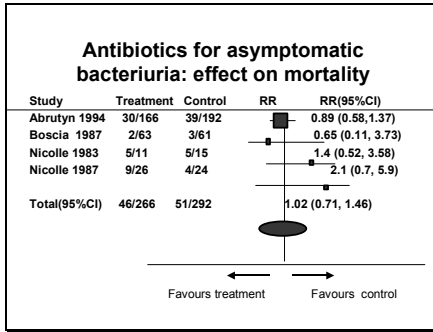
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Systematic review

- Highest form of evidence
- Evidence-based review article
- Has purpose, search strategy, inclusion and exclusion criteria
- May or may not include meta-analysis

• Bottom line: summary of the best evidence

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JASPA
(Journal Associated Score of Personal Angst)

J: Are you ambivalent about renewing your JOURNAL subscriptions?

A: Do you feel ANGER towards prolific authors?

S: Do you ever use journals to help you SLEEP?

P: Are you surrounded by PILES of PERIODICALS?

A: Do you feel ANXIOUS when journals arrive?

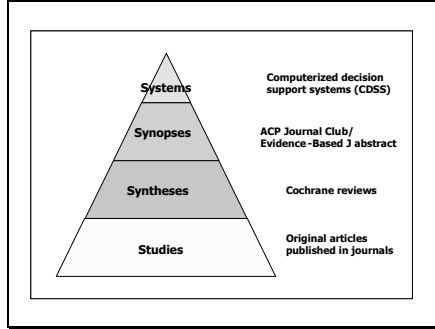
0 - liar?
1-3 - normal range
>3 - sick

* Modified from: BMJ 1995;311:1666-1668

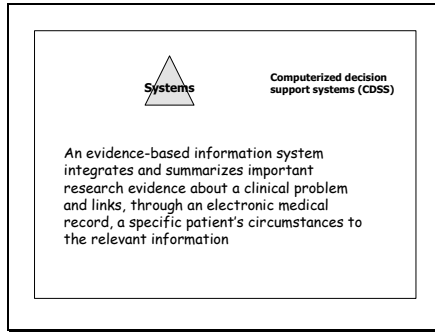
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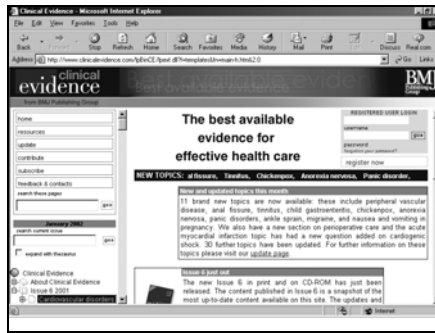
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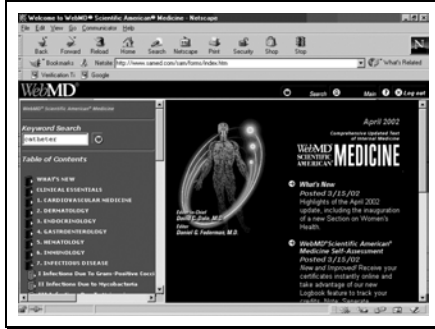
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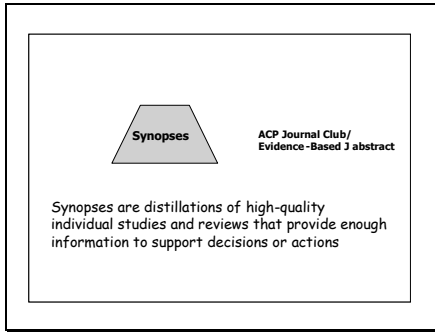
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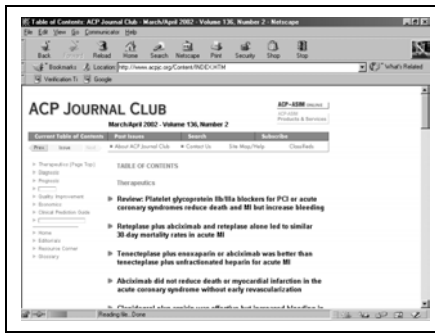
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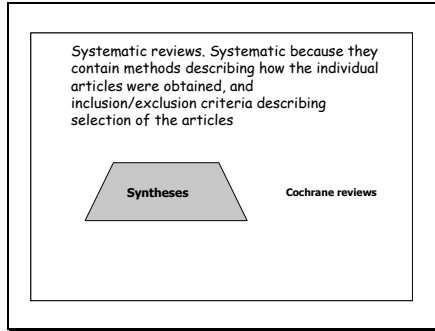
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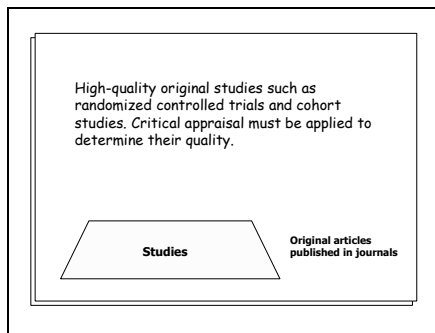
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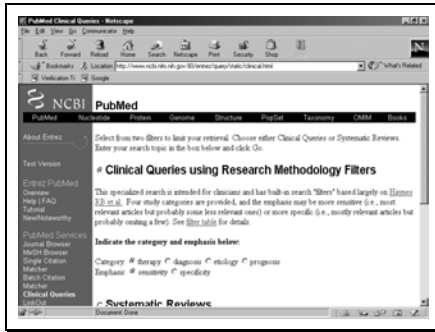
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5 Steps of EBIC

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Preventive or Therapeutic Trial: Are the results valid?

- Was assignment of treatment randomized ?
- Was the randomization list concealed ?
- Were all patients who entered the trial accounted for at the end?
- Were they analyzed in the groups to which they were randomized?

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Preventive or Therapeutic Trial: Are the results valid?

- Was there "blinding" ? If so who was blinded ?
- Were the groups treated equally (aside from experimental intervention) ?
- Were the groups similar at the start of the trial ?

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Preventive or Therapeutic Trial: What are the results?

- How large is the treatment effect?
- How precise is the treatment effect?

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Risk Reduction

Absolute risk reduction =
control rate - experimental rate

Relative risk reduction =
control rate - experimental rate
control rate

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Drug A: 2% die of pneumonia
Placebo: 4% die of pneumonia

Absolute difference: 4% - 2% = 2%
Relative difference: $\frac{4\% - 2\%}{4\%} = 50\%$

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Number Needed to Treat (NNT)

Number of patients who need to be treated to prevent 1 or more adverse events

NNT = 1/ARR e.g. 1/0.02 = 50

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Confidence Intervals

- A way of quantifying the uncertainty in measurement
- 95% CI = range of values within which we can be 95% sure that the true value for the whole population lies

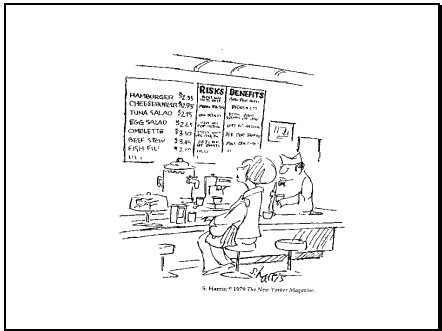
RR = 1.3 (95% CI, 1.02 - 1.74)

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Preventive or Therapeutic Trial: Will the results help me provide healthcare?

- Can the results be applied to my patient population?
- Were all important outcomes considered?

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Prognosis Study: Are the results valid?

- Was a representative and well-designed sample of patients collected at a similar point in the course of their disease (condition)?
- Was follow up sufficiently long and complete?
- Were objective and unbiased outcome criteria used?
- Was adjustment for important prognostic factors done?

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Systematic review: Are the results valid?

- Does the stated objective of the review address your question?
- Does the methods section describe finding and including all relevant studies?
- Is study validity assessed?
- Are the results consistent from study to study?

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Systematic Reviews: What are the results?

- How large is the treatment effect?
- How precise is the treatment effect?

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Systematic Reviews: Will the results help me provide healthcare?

- Can the results be applied to my patient population?
- Were all important outcomes considered?
- Are the likely benefits worth the potential harms and benefits?

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