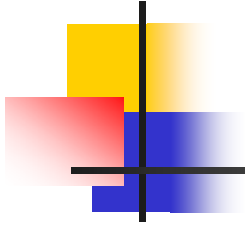


# A Brief Tour of Evidence Based Medicine

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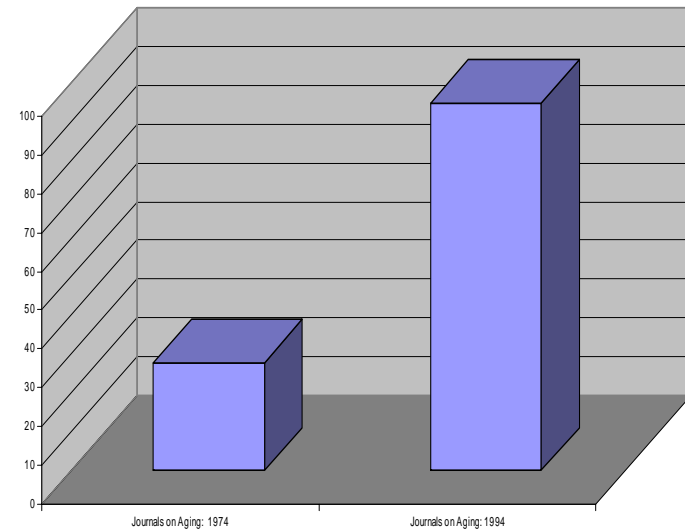
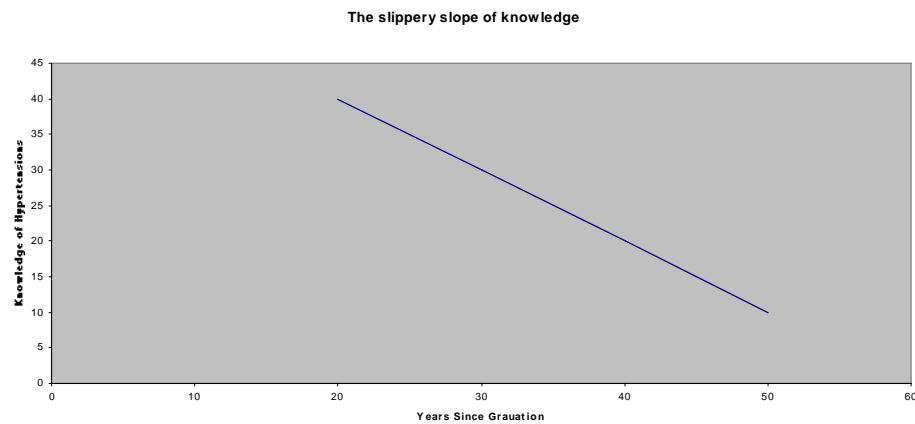


NASSAU HEALTH



“It is astonishing with how little reading a doctor may practice medicine, but it is not astonishing how badly he may do it.” Butler, Equinimitas

# Too Much Evidence?



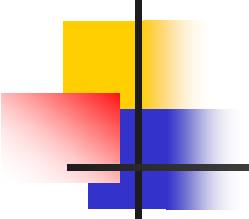
- The slippery slope of knowledge
- Too many journals



# The Elements of EBM

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- Ask - The PICO Approach
- Answer – Online Databases
  - PubMed  
<http://www.ncbi.nlm.nih.gov/entrez/query.fcgi>
  - Ovid, SliverPlatter, ACP, Cochrane Collection
- Appraise – Clinical Epidemiology
  - Diagnosis, Treatment, Prognosis, Harm
- Apply - CAT



# A wise man's question contains half the answer. Ibn Gabirol

<b>P</b> atient population	In what group of patients are you interested? E.g. post-menopausal women.
<b>I</b> ntervention (or exposure)	In what medical event are you interested? E.g. estrogen replacement therapy.
<b>C</b> omparison	Compared to what? Better or worse than no intervention at all? Compared to another intervention? E.g. no estrogen replacement.
<b>O</b> utcome	What is the effect of the intervention in which you are interested? E.g. osteoporosis, endometrial cancer, cardiac event, death.

<http://servers.medlib.hscbklyn.edu/ebm/4200.htm>



# Overview of Study Designs

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- Ceteris Paribus
- Experiments and Quasi-Experiments
- Observational Studies
  - Descriptive – Ecologic, Cross-Sectional
  - Analytic – RCT, Cohort, Case-Control



# Threats to Validity

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- Directionality and Incidence-Prevalence (Survivor) Bias
- The Ecologic Fallacy
- Confounding
- Bias
  - Detection (Surveillance), Loss to Followup, Healthy Worker Effect, Volunteers, Berkson's, Recall, Hawthorne Effect

# Cross-Sectional Studies: Evan's County, GA (OR = 5.4)

	CAD +	CAD -	Total
Active	14	75	89
Not Active	3	87	90
Total	17	162	179



# Confounding

		Myocardial Infarct		
		Yes	No	
<b>Coffee Drinking</b>	Yes	90	60	<b>OR = 2.25</b>
	No	60	90	
<i>Stratify by Smoking Status:</i>				
		Smokers		
		Myocardial Infarct		
		Yes	No	
<b>Coffee Drinking</b>	Yes	80	40	<b>OR = 1</b>
	No	20	10	
		Non-Smokers		
		Myocardial Infarct		
		Yes	No	
<b>Coffee Drinking</b>	Yes	10	20	<b>OR = 1</b>
	No	40	80	



# Relative vs. Absolute Effects

(Mortality Rates per 100,000 person-years from lung cancer and coronary artery disease for smokers vs. non-smokers, Hill and Doll)

	Smokers	Non-Smokers	Odds Ratio	Risk Difference
Lung CA	48.3	4.5	10.8	43.8
CAD	294.7	169.5	1.7	125.13

# Diagnosis: Probability

## Western Blot

ELISA	Pos	Neg	
Pos	498	4	502
Neg	10	488	488
	508	492	1000

NYC, IVDA

US, Random

## Western Blot

ELISA	Pos	Neg	
Pos	1960	7984	9944
Neg	40	990016	990056
	2000	998000	1000000

- Sensitivity=498/408 (98%) vs 1960/2000 (98%)
- Specificity=488/492 (99%) vs 990016/990000 (99%)
- **PPV=498/502 (99%) vs 1960/9944 (19%)**
- NPV=488/498 (97%) vs 990016/990056 (99%)



# Finding and Evaluating Good Therapy Studies: RCTs

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- Gold Standard – Exposure Allocation, Blinding, Placebo, **Randomization**
- Salk- 200K children
- PCN–pneumococcal pneumonia (95%vs15%)
- AZT
- CASS, Lumpectomy, HRT
- Porto-caval Shunts



# Putting It All Together: Critically Appraised Topics

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- Case Presentation
- Clinical Question
- Study / Search Criteria
- Search Results
- Evaluating The Evidence
- The Clinical Bottom Line



# Apply: Beyond Knowledge...

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- “The great end of life is not knowledge, but action.”

Thomas Huxley



# Lesson 1

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- “I have just come from the breast cancer capital of the world, and that is Long Island.” 1991 News Conference, prior to \$30 Million 1993 Congressional authorization to study breast cancer on LI
- 1.1% Percentage above the national average of breast cancer rates in Nassau County, LI. (115.6/100,000 vs. 114.3 cases / 100,000, 1994-1998)
- Don't listen to what they say, go see.

Chinese Proverb



## Lesson 2

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- PA Author: **“Pre-diabetics, once identified, can modify their lifestyle and be treated with Metformin to successfully prevent the incidence of Type II Diabetes.”**
- Study Authors: **“The results of our study extend previous data showing that lifestyle interventions can reduce the incidence of diabetes.”**

Read Your Sources Carefully.





## Lesson 3

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- **“Apneic patients outside of the trauma arena pose few difficulties in the intubation process”**
- **“Earlier operative intervention in trauma patients has clearly been shown to reduce mortality.”**
- **“US has been shown to decrease door to OR time, which in turn saves lives.”**
- **“One study demonstrated 92% diagnostic accuracy with panorex versus 66% with mandibular series.”**

Reference Your Sources.



## Lesson 4

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- PA Author: **The most conclusive epidemiological evaluations of CO toxicity have been completed with regards to ambient CO levels related to air pollution and have clearly demonstrated a rise in daily mortality as ambient CO concentrations increased.**
- Study Authors: **RR=1.10 with an increase of 10ppm CO."**

Present the Evidence. Allow your readers to draw conclusions.



## Lesson 5

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- PA Author: **Standard deviations (SDs) are important. They are measures of dispersion or variation around a central mean. ... *Standard error* (SE) gives the same information as the SD but is derived from sample data rather than an entire population.**
- Irate Letter Writer: **“Regrettably, information in the article is inconsistent, incoherent, and incorrect.”**

Know your statistics...and your audience.



## Lesson 6

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- A Definition of Insanity: **Doing the same thing over and over and expecting to get different results.**
- PA Authors and Students: **“Why do you keep asking me to change.?”**

Be a Life-Long Learner.

