From Populations to the Individual Patient

¶ 0.1

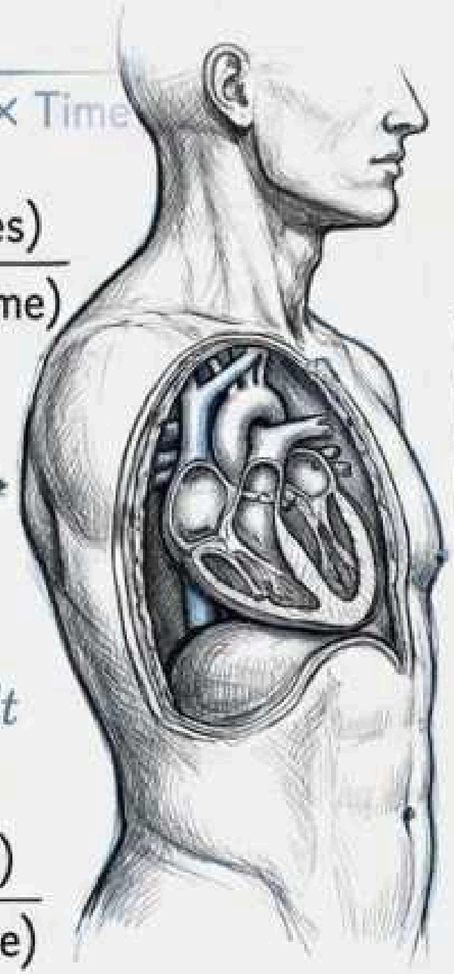
Welcome to Anderson Academy, Medicine 515 B: Clinical Epidemiology.
(First-year spring course, modelled on the Harvard/MIT Health Sciences and Technology curriculum).



$$\text{Incidence Rate (IR)} = \frac{\text{New Cases}}{\text{Population at Risk} \times \text{Time}}$$

$$\text{IR} = \frac{\sum^{n} (\text{new cases})}{\sum_{i} (\text{person-time})}$$

Epidemiology:
The study of how often diseases occur in populations, who gets them, and why.



Clinical Epidemiology:
Applying these population methods directly to the care of individual patients.

$$\int_0^{\infty} f(dt - x)\, dt$$

Incidence Rate (IR)

$$\text{IR} = \frac{\sum^{n} (\text{new cases})}{\sum_{i} (\text{person-time})}$$

¶ 0.2

Maintaining Open Lines of Communication

Questions and feedback about this course are actively welcomed.





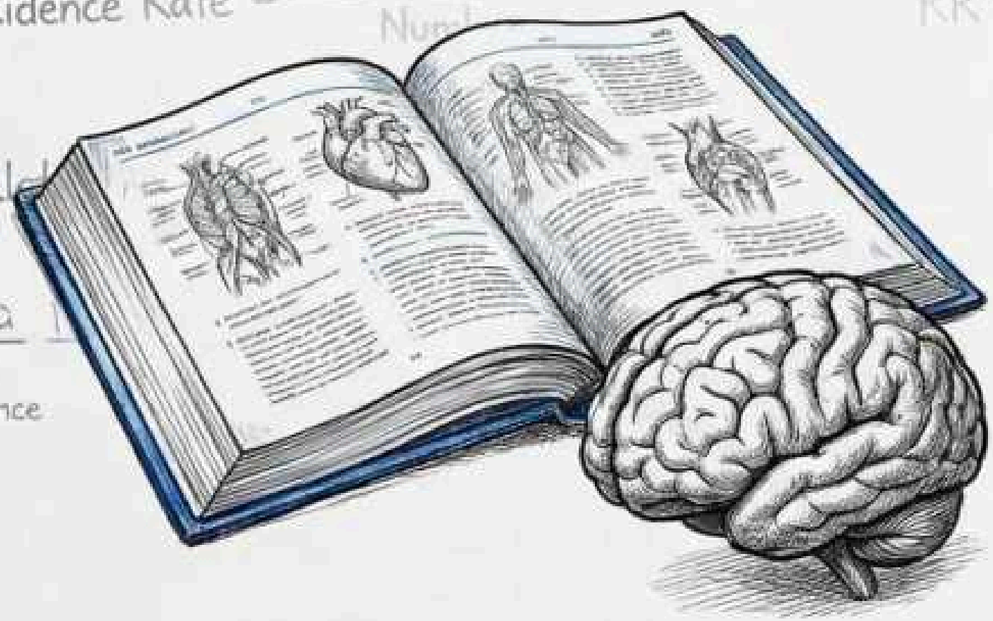
garyanderson @
mail.grokbot.com



@garyanderson

¶0.3

The Boundary of Medical Knowledge versus Clinical Training



Provides:
Medical Knowledge.



Does Not Provide:
Medical training, clinical skills, licensure, or medical advice.

¶0.4

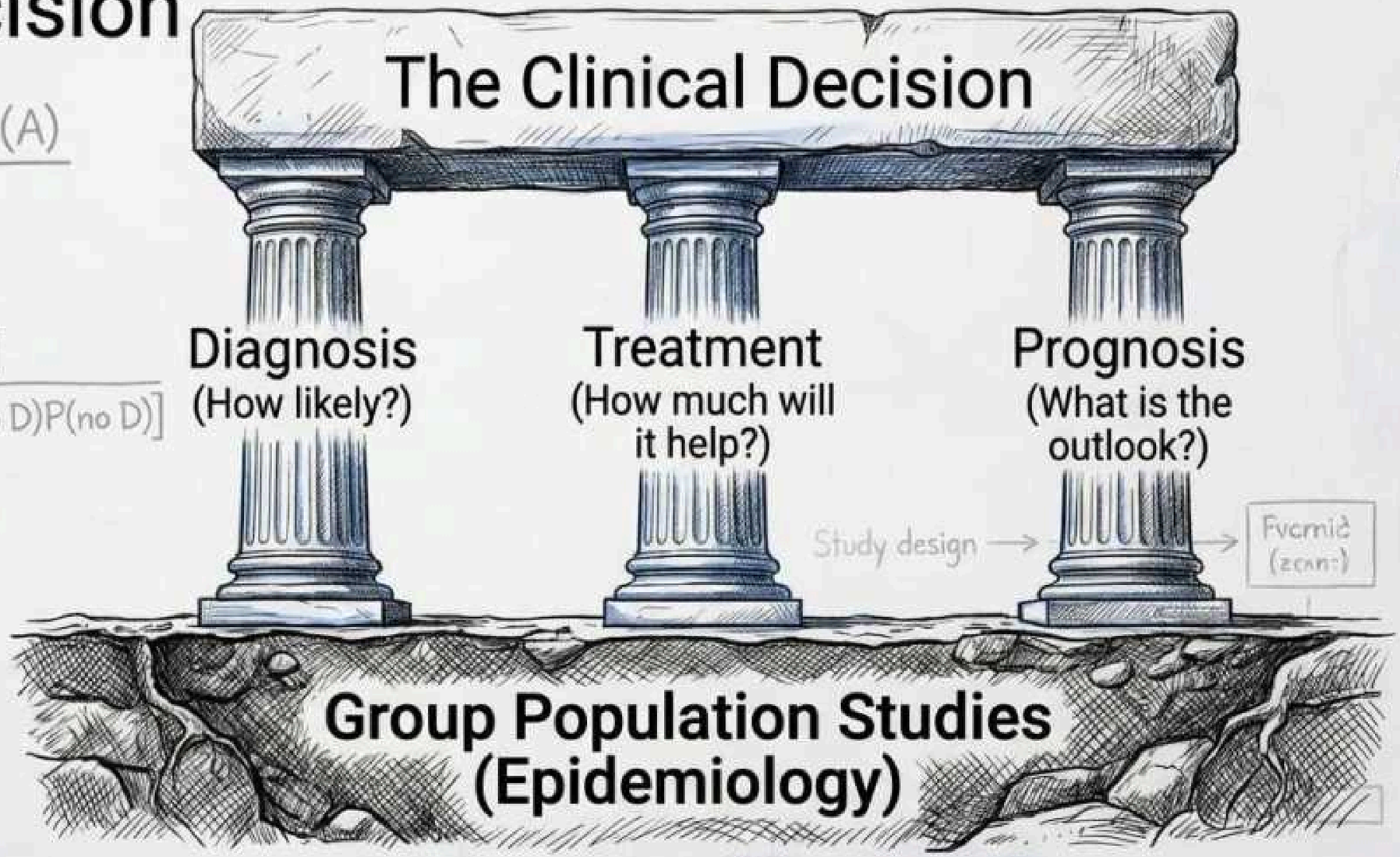
The Invisible Foundation of Every Clinical Decision

$$P(A|B) = \frac{P(B|A)P(A)}{P(B)}$$

$$P(D|+) = \frac{[P(+|D)P(D)]}{[P(+|D)P(D) + P(+|\text{no } D)P(\text{no } D)]}$$

Clinical epidemiology is the discipline of producing this evidence well and using it wisely.

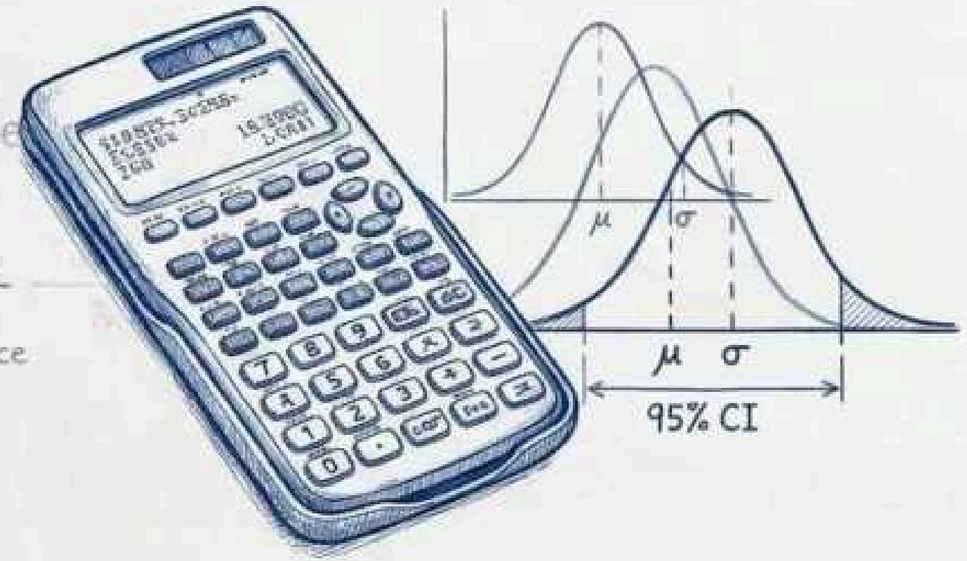
Every **clinical decision** rests, openly or not, on this foundation.



¶0.5

Building on Biostatistics with Epidemiological Design

MED 514 B: Intro to Biostatistics

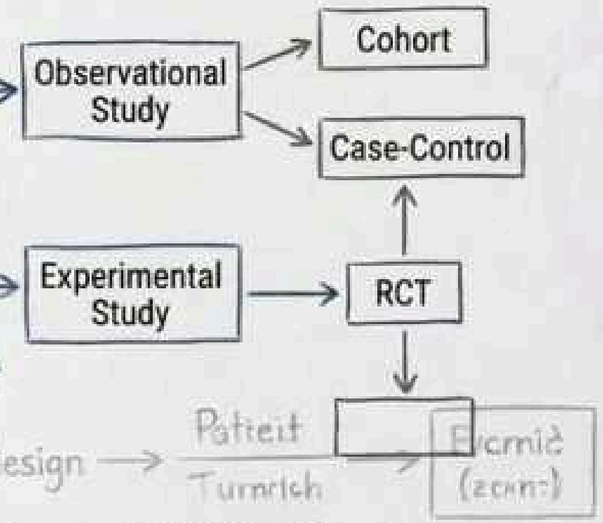


The Tools.

Focuses on the methods for analyzing the numbers.

Clinical Epidemiology



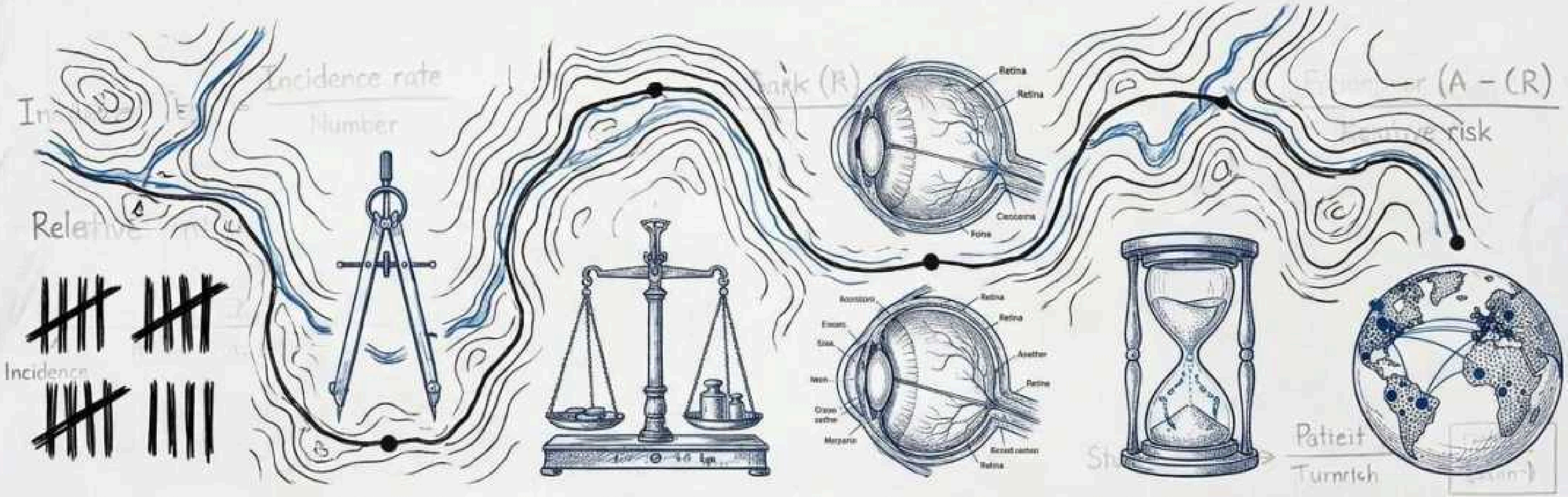


The Architecture & Mindset.

Supplies the designs for gathering the numbers, and the habits of thought needed to judge whether a study's result can be trusted and applied to a particular patient.

¶0.6

The Six-Lecture Journey Ahead



Stop 1
Lecture One:
Measuring Disease (Rates, Prevalence, Incidence).

Stop 2
Lecture Two:
Main Study Designs.

Stop 3
Lecture Three:
Bias, Confounding & Causation.

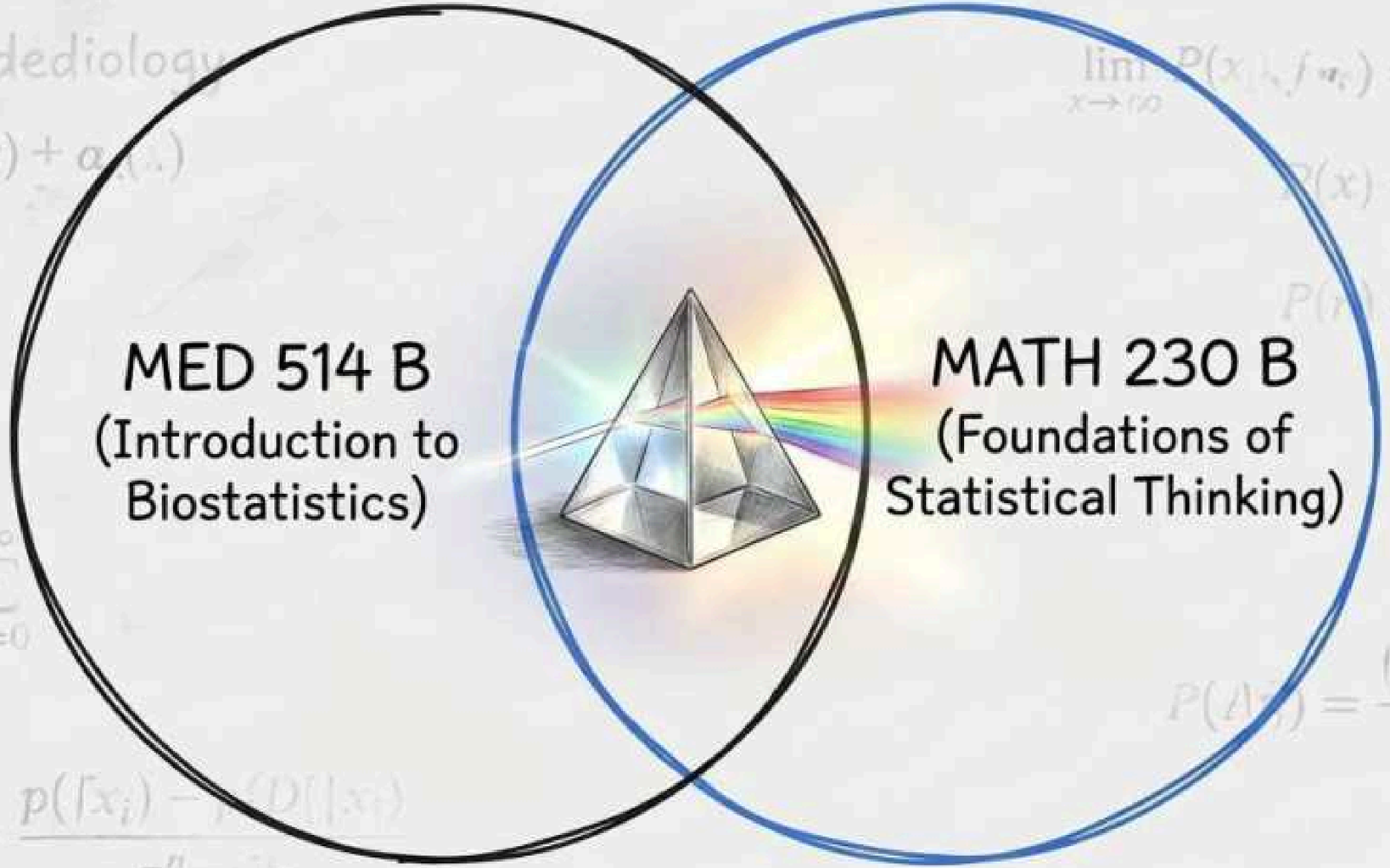
Stop 4
Lecture Four:
Diagnosis & Screening.

Stop 5
Lecture Five:
Prognosis & Treatment Trials.

Stop 6
Lecture Six:
Evidence-Based Medicine & Public Health.

Clarity Over Technicality in Recommended Foundations

¶ 0.7



Every lecture will explain its own terms.
Examples are intentionally chosen to be clear rather than technical.

¶ 0.8

Three Core Questions for Every Clinical Study



Who was studied?
(Population)



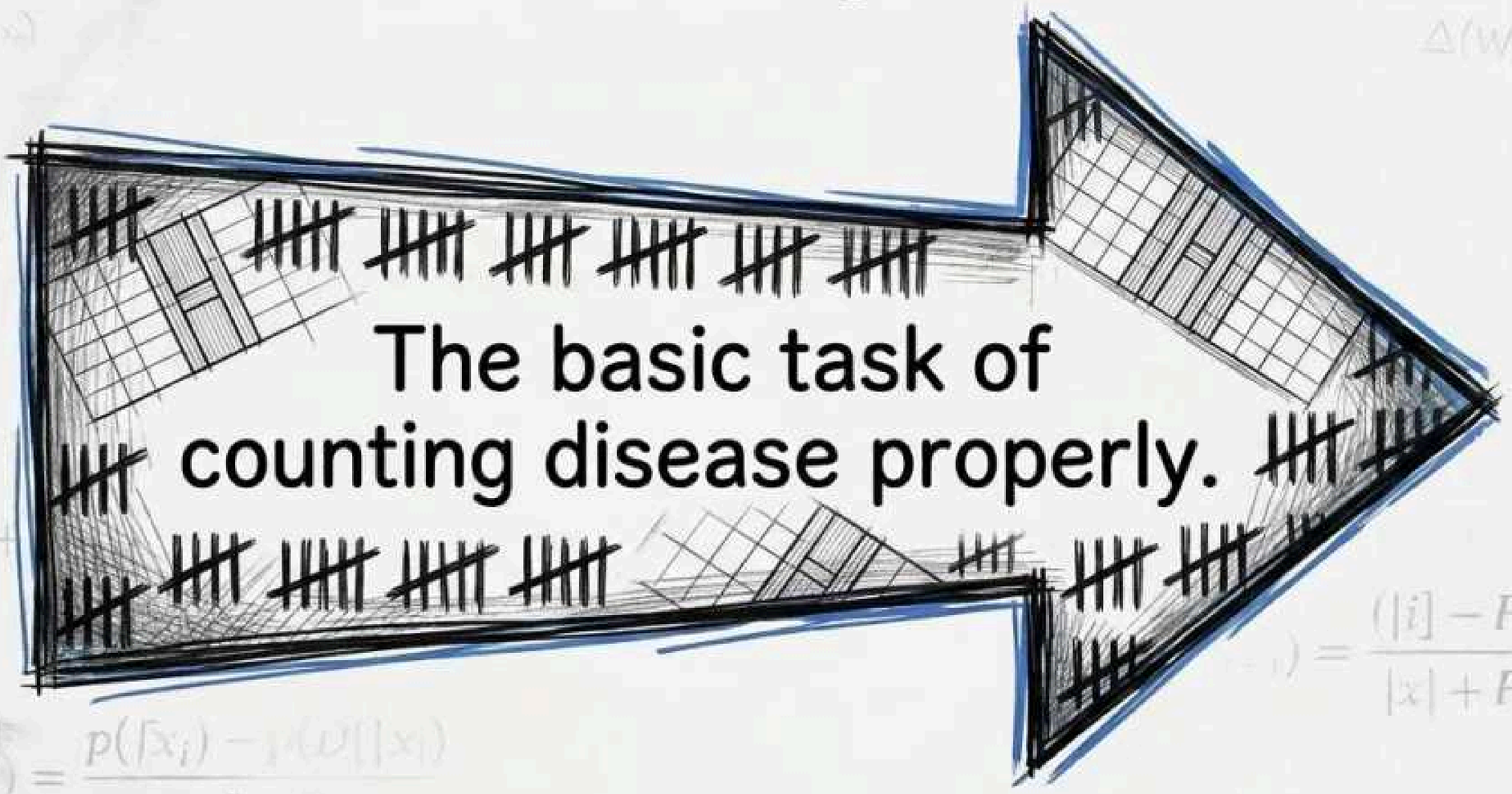
How were they compared?
(Comparison)



What else could explain the result?
(Alternative Explanations)

A practical tip: ask these three questions of every study you meet. They are the absolute core of clinical epidemiology.

Let Us Begin



Proceed to Lecture One.