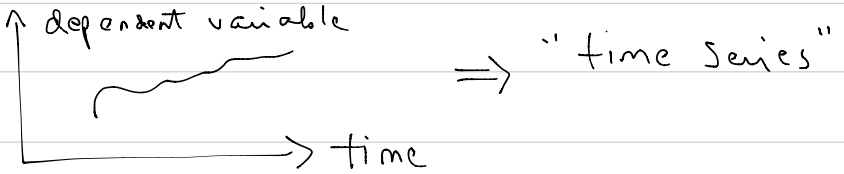
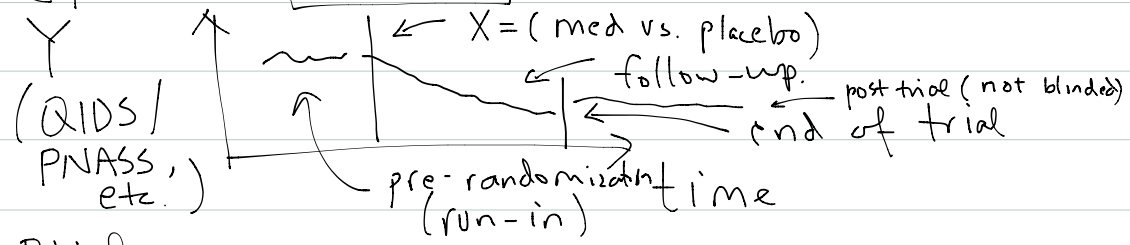
Session – 3 Data evolution in time.



⇒ "time series"

Types of clinical research studies

Experimental: "clinical trial"



Blinding:

Double blind: neither researcher nor subjects know which (med/placebo) given.

(triple blind: safety monitoring committee is blinded)

Single blind: experimenters know, subjects don't know "pepsi challenge"

Non-blind: "open label"

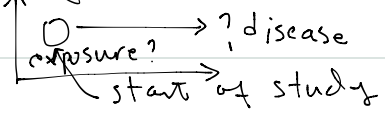
Randomization refers to how control groups are assigned.

"Controlled" refers to the existence of a control group.

Examples: Is this study a DBRCT?

Observational Studies

Cohort study



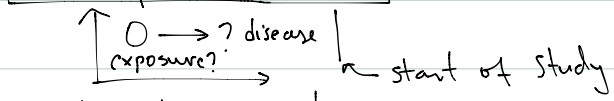
"prospective cohort"

follows a "group" with some shared characteristics i.e. birth/occupation

prospective cohort: start a study ⟶ follow subjects.

famous examples: Women's health initiative. in psych: collaborative study of PD.

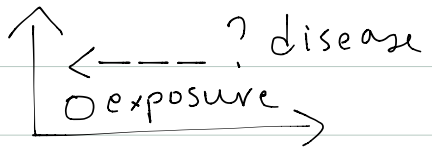
retrospective cohort



Advantages: cheaper

Disadvantageous: recall bias, selection bias

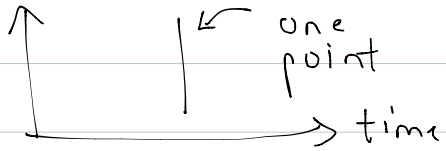
case control study:



Advantages: cheaper still

Disadvantages: lots of confounds.

cross-sectional study:



measure all characteristics of entire population or sample.

Ecological study / multilevel study: unit of analysis is no longer an individual, but also a city / country / county. etc.

Quasiexperimental: those that recieve intervention is NOT randomized. for a variety of reasons.

Example: regression discontinuity. / propensity score matching

meta analysis: collection of studies

Odds Ratio: two groups exposed (p_1) / notexposed (p_2)

p_1 - probability of outcom

$$OR = \frac{P_1/(1-P_1)}{P_2/(1-P_2)} \leftarrow \text{"odds of disease"}$$

Example: from the paper

Usually used most commonly in case-control studies & RCTs

Relative Risk $= \frac{P_1}{P_2}$ for small RR, RR ~ OR.

Commonly used in cohort studies & RCTs.

RR=1 no difference, RR<1 less likely in "exposed group"

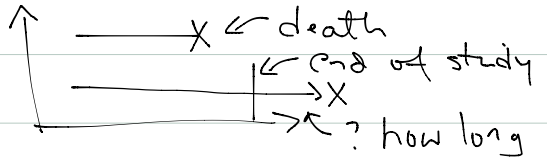
Absolute Risk = p_1

Example: paper.

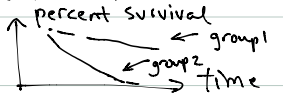
Moral of story: relative risks can be very impressive when absolute risk reduction might not be.

Survival analysis not only care about a dichotomous outcome at the end of the study, but also *when* that outcome occurs.

Censoring: missing data because precise time of event not know



Survival analysis uses censored data to estimate survival time

Kaplan-Meier Curve  test for difference using **log-rank test**

null hypothesis: two groups have identical survival & hazard times → very permissive.

Cox model "proportional hazard model": a method to adjust for risk factors in a survival model details of cox model for the aficionados:

Kaplan-Meier estimates a "survival function" $S(t)$ = proportion surviving to at least time t

hazard function $\lambda(t) = \frac{\partial S(t)/\partial t}{S(t)} = -\partial \log S(t)/\partial t$

Cox model: $\lambda(t|X) = \lambda_0(t)\exp(\beta X)$ ← proportional assumption

↖ "baseline hazard"