CHEAT SHEET ON STUDY DESIGNS

Intervention study (also known as an experimental study or clinical trial)

- Similar (closest) to traditional laboratory experiment
- Researchers assign participants to the treatment group or control group
    - Treatment group receives the intervention or exposure
        - NB – there can be more than one treatment group. For example, In a study to explore the effect of supplementation on homocysteine levels in the blood, researchers may choose to have four groups:
            - Vitamin E and Vitamin C supplementation
            - Vitamin E supplementation only
            - Vitamin C supplementation only
            - No supplement control
    - Control group does NOT receive the intervention or exposure; sometimes they are provided with a placebo
- The strongest intervention studies are randomized and double-blind
    - Randomized – the participant is assigned to the treatment or control group at random. The assumption is that any unmeasured characteristics that might differ between participants will be evenly distributed across the different groups and therefore not affect the study outcome.
    - Double-blind – both the participant and researcher are blind as to which group the participants are in so that neither group can influence or bias the results
- The two groups should be as similar as possible so that the intervention is the only difference
- The researchers watch the groups over time and compare outcomes

Cohort study (also known as a longitudinal study)

- For situations when doing an intervention study would be unethical, too difficult, or when researchers are particularly interested in measuring the relationship between an exposure and outcome in a real world setting, cohort studies are considered the most accurate of the observational study designs (no active intervention is undertaken).
- Can be retrospective or prospective
    - Prospective – start in the present and monitor groups of people into the future, or may start at point in past and look forward from there
    - Retrospective – look into past for causes of diseases from which people currently suffer
- Researchers choose a large number of healthy people, collect data on their exposures, and track outcomes over time
- Major difference from an intervention study is that people choose their own exposures
- This study design is not ideal for diseases that are rare like Creutzfeldt–Jakob disease, estimated to affect only 300 people in the United States per year. You would need a very large initial study sample to ultimately end up with enough cases to have a robust study.

Case-control study

- Unlike in a cohort study, case-control studies start with identifying people with the disease (the cases). People who are similar to the cases in all identifiable ways except they do not have the disease are recruited into the study as controls. Cases and controls are questioned about past exposures and those exposures are compared.
- The control group consists of healthy individuals chosen to match the cases as much as possible. Similar in e.g. age, sex, and other relevant factors.
- More cost-efficient than cohort studies because they focus on a smaller number of people and can be completed relatively quickly
- Findings may not be generalizable to the larger region or country context since the study participants may not be a representative sample of the larger population.
- Also may not be appropriate if the exposure of interest is rare, such as people who follow vegan diets in rural Texas.