Understanding the difference between **calculating** and **estimating** PATE and SATE

- **Calculating** PATE or SATE
    - If you have data on everyone in the population including both potential outcomes for each person, you can calculate **PATE**.
    - If you have a *sample* of the population data with both potential outcomes for each person, you can calculate **SATE**.

- **Estimating** PATEs and SATEs (including PATT, PATC, SATT, and SATC)
    - For all cases, you can only see the outcome for each person that corresponds to the treatment they actually received
        - If treatment is randomly assigned and subjects are randomly sampled from the population, you can use your observed outcomes to get an unbiased estimate of **SATE** or **PATE**. (The same estimate is unbiased for both.)
        - If you have randomly assigned treatments, but have not sampled randomly from the population, you can use your observed outcomes to get an unbiased estimate of **SATE,** but not necessarily **PATE.**
        - If you have not randomly assigned treatments, you cannot necessarily use your observed outcomes to get an unbiased estimate of either **SATE** or **PATE** (whether you randomly sampled from the population or not!).