

Roseland: An Exercise in Making Sick Populations Health
Graded Group Tutorial
CMED 7310

Background

The provided spreadsheets show a model of a population of 50-year-old female smokers. None of them have diabetes or kidney disease. Cholesterol data is unavailable. They are all roughly 1.75 meters tall. Since they are enrolled in your PHC program you have screened them for blood pressure and weight.

You now must consider efforts to lower their risk of cardiovascular disease using either a population approach or a precision approach. In the population approach you can lower everybody's weight by 10% by changing the built environment so that there is more walking and less use of vehicles as well as taxing ultra-processed foods and making vegetables more accessible. In the precision approach you must only treat the people with high blood pressure (following evidence-based clinical indications for treatment of hypertension). Blood pressure treatment programmes achieve their goals in roughly 50% of patients--this is typical.

In 2019 WHO derived a risk model from 376 177 individuals from 85 cohorts during 10 years of follow-up. PHC planners enter data and receive a prediction of the 10-year risk of CVD.

Instructions

1. **(10 points)** Calculate the CVD risk at baseline using the [PAHO CVD risk calculator](#). Fill out column CVD Risk in tab Baseline by varying the systolic BP, weight in Kgs, and country. Make a bar graph of the CVD 10-year risk for the whole population (rich + middle + poor).
 - a. Assume that nobody has a history of cardiovascular risk, chronic kidney disease, diabetes, or knows their cholesterol level. Assume that everybody is 50 years old, female, smokes, and is 1.75 meters tall. Use the US as the reference country.
2. **(10 points)** Consider the implementation of a population-level approach that lowers everybody's weight by 10%. In tab "Population Approach" re-do your

calculations with this new weight. Make a bar graph of the CVD 10-year risk for the whole population.

3. **(10 points)** Consider the implementation of a precision approach that lowers BP by 15% for 50% of people with high BP (>140) and does nothing for the rest. In tab "Precision Approach", re-do your calculations with this new BP. Make a bar graph of the CVD 10-year risk for the whole population.
4. **(20 points)** How many CVD cases will each scenario have after 10 years?
5. Compute a measure of Social Equity comparing CVD cases in Rich vs. Poor for each population:
 - a. **(5 points)** Devise a "gap" measure that subtracts Poor minus Rich CVD counts.
 - b. **(5 points)** Devise a "ratio" measure that divides Poor CVD count in the numerator and Rich CVD count in the denominator.
 - c. **(10 points)** What are the advantages and disadvantages are of these two equity measures? You may ask AI and use your own words to briefly summarize.
6. **(20 points)** Politicians representing Rich, Middle, and Poor citizens ask about your plans. What will you tell them about gains of each approach for rich, middle, and poor people?
7. **(10 points)** What approach will you recommend and why?

APPENDIX

While many types of bar graph can help you visualize the whole population, one helpful type of graph to try is the histogram. In Excel after selecting data and clicking on <INSERT> look for this icon:

