THE IMPACT OF OBESITY IN BRAZIL
OVERVIEW

- Project aim
- Burden of disease in Brazil
- Methods
- Next steps and challenges
- Final reflections
- Acknowledgments
To predict the potential impact of a decrease in obesity on CVD burden in Brazil by using a simulation model to compare two groups.
Burden of Disease in Brazil

- Brazil
  - Non-communicable diseases (NCDs) account for 74% of mortality, with 33% due to cardiovascular disease (CVD)
  - CVD mortality: 286 deaths per 100,000 in Brazil compared to 179 deaths per 100,000 in the U.S.
  - 48% overweight and 15% obese

- Global Context
  - NCDs account for 63% of mortality
  - Cardiovascular disease (CVD) represents 48% of the NCD mortality

- WHO Global Health Risks Report, 2010
  - traced high blood pressure, high blood glucose, cholesterol, physical inactivity, overweight and obesity, and low fruit and vegetable intake.
  - 57% of CVD trace to one or more of these
  - 23% of ischemic heart disease is attributable to obesity

- UN General Assembly, 2011 High Level Meeting on the Prevention and Control of NCDs
VIGITEL DATA:
RATE OF OBESITY IN BRAZIL, 2010

* Obesity, BMI $\geq 30$ kg/m$^2$
VIGITEL DATA:
RATE OF OVERWEIGHT IN BRAZIL, 2010

* Overweight, BMI 25 to 30 kg/m²
METHODS

- Estimate Quality-adjusted Life Years (QALYs) for CVD in the Brazilian population
  - Use TreeAge software to create a Markov chain simulation

- Calculate QALYs attributable to obesity by projecting CVD burden given a reduction in BMI
  + Hypothetical cohort of individuals > 30 years old and without CVD
  + Reference (null scenario) versus intervention scenario
    - A reduction in BMI can vary among groups by age and sex

- Timeline
  + Project design, literature review, and collaboration with Brazilian scholars - March & April 2012
  + Implementation of Methods using Framingham Equation and TreeAge software – May & June 2012
**RISK OF CVD INCIDENCE**

- **Framingham Equation**
  - Necessary in the absence of a prospective cohort study to calculate incidence of CVD
  - Gender-specific Cox regression function that predicts the 10-years risk of any and all CVD events (CHD, stroke, heart failure, and CV death):

\[
\hat{p} = 1 - \left[ S_0(t)^{\exp \left( \sum_{i=1}^{p} \beta_i \bar{x}_i - \sum_{i=1}^{p} \beta_i x_i \right)} \right]
\]

- Where:
  - \( S_0(t) \) = baseline survival (function of baseline incidence of CVD).
  - \( x_i \) = the individual value of CV risk factors.
  - \( \bar{x}_i \) = the average value of CV risk factors in the population.

DATA FROM THE LITERATURE

- Relative Risk of CVD associated with obesity
  - Bogers et al, 2007
  - Meta-analysis of 21 studies and > 300,000 individual
  - 1.49 (Confidence Interval: 1.32 to 1.67)
    - adjusted for blood pressure and cholesterol

- Prognosis of an individual with CVD
  - Bautista, Vera et al, 2012
  - Gender and age-specific risks (transition probabilities)
    - Non-CV cause mortality
    - CHD
    - Stroke
    - Recurrent events
**NEXT STEPS AND CHALLENGES**

- Secure a second source of individual level prevalence of CVD risk factors
  - The Collaboration with Iseu Gus provided data to feed the Framingham Equation. However, due to missing HDL cholesterol data, we are pursuing a second collaboration to build on Gus’ data.

- Create the model for TreeAge software simulations with transition probabilities calculated from local data.
  - Identify specific inputs for each node of the model (i.e. probability of developing CVD)
The simulation is repeatable for other risk factors for comparison to help define the most impactful policies (i.e. to target obesity vs. cholesterol).

It is a useful first step

- towards cost-effectiveness analysis of an intervention.
- to compare various interventions to target obesity.
ACKNOWLEDGEMENTS

- Leonelo Bautista
- Mauro Sanchez
- Lori Diprete Brown
- Barb Deurst
- Ajay Sethi
- Iseu Gus and other Brazilian collaborators
- Kate Bersch