Covid Vaccine Randomized Controlled Trial: Codebook

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1 Variable Generation

General strategy:

How to **simulate** randomized trials? Well, let's utilize the random variable generation that is available in Stata and other programming variables. To best simulate the purely random generation, we will utilize the **uniform random variable** pdf.

Recall, the **uniform random variable** when defined on [a,b] is **equally** likely to take on a value c ∈ [a,b]

the **pdf** is as follows: $f_X(x) = \frac{1}{b-a}$, x ∈ [a,b]

(1) Generate a uniform random variable u(0,1)

(2) assign the variable value based on proportionality of the interval. For example, if I want to use race, and I thought that there was a 50% chance that my trial would have a white patient, I would make it so that the patient is assigned white for observations within half of the interval, and so forth. This holds for the other variables, as well as the treatment assignment.

(3) **RACE**

White $\rightarrow u(0,1) \in (0, .616] \rightarrow race == 1$

Hispanic $\rightarrow u(0,1) \in (.616, .804] \rightarrow race == 2$

Black $\rightarrow u(0,1) \in (.804, .925] \rightarrow race == 3$

Asian $\rightarrow u(0,1) \in (.925, .984] \rightarrow race == 4$

American Indian $\rightarrow u(0,1) \in (.984, .991] \rightarrow race == 5$

NHOPI $\rightarrow u(0,1) \in (.991, .993] \rightarrow race == 6$

MultiRacial $\rightarrow u(0,1) \in (.993, 1] \rightarrow race == 7$

(4) **POLITICAL LEANING**

Democrat $\rightarrow u(0,1) \in (0, .45] \rightarrow PoliticalLeaning == 1$

Republican $\rightarrow u(0,1) \in (.45, .91] \rightarrow PoliticalLeaning == 2$

Independent $\rightarrow u(0,1) \in (.91, 1] \rightarrow PoliticalLeaning == 3$

(5) **MOST COMMON NEWS MODALITY**

Television $\rightarrow u(0,1) \in (0, .33] \rightarrow NewsModality == 1$

Online $\rightarrow u(0,1) \in (.33, .59] \rightarrow NewsModality == 2$

SocialMedia $\rightarrow u(0,1) \in (.59, .86] \rightarrow NewsModality == 3$

Radio $\rightarrow u(0,1) \in (.86, .99] \rightarrow NewsModality == 4$

Print $\rightarrow u(0,1) \in (.99, 1] \rightarrow NewsModality == 5$

(6) **EDUCATION LEVEL**

NoHS $\rightarrow u(0,1) \in [0, .089] \rightarrow education == 1$

HSGrad $\rightarrow u(0,1) \in (.089, .316] \rightarrow education == 2$

SomeColl $\rightarrow u(0,1) \in (.316, .538] \rightarrow education == 3$

AA $\rightarrow u(0,1) \in (.538, .643] \rightarrow education == 4$

BA $\rightarrow u(0,1) \in (.643, .820] \rightarrow education == 5$

MA $\rightarrow u(0,1) \in (.820, .916] \rightarrow education == 6$

PhD $\rightarrow u(0,1) \in (.916, 1] \rightarrow education == 7$

(7) **INCOME**

Income $\rightarrow \sim$ N(50000,50000) to allow for some deviation in incomes in the higher and lower range but meaned around 50,000

(8) **AGE**

Age $\rightarrow$ $\sim N(38, 15)$ and then rounded to nearest integer (up if decimal is $\geq .5$, down otherwise)

$\rightarrow$ note that there has been an attempt to make this generation match the likelihood of **real life**: the probability of a patient being white shouldn't be the same as being black due to the population differences in the United States

2 Treatment Assignment

In an RCT, it's important that treatment is randomly assigned, to avoid any potential biases that may result from a non-bias selection of participants to receive the treatment. Thus, we use the following method:

We again generate a uniform random variable u(0,1), which only outputs values on the interval (0,1). Then, we can distribute once again based on these values:

TreatLogic $\rightarrow u(0,1) \in (0, \frac{1}{3}] \rightarrow treatlogic == 1$

TreatEmotion $\rightarrow u(0,1) \in (\frac{1}{3}, \frac{2}{3}] \rightarrow treatemotion == 1$

Control $\rightarrow u(0,1) \in (\frac{2}{3}, 1] \rightarrow control == 1$

3 Treatment

The patients who receive the logic treatment have a change in their vaccine likelihood value where the pre-treatment value is added to a value from a normal random variable $\sim N(5, 2)$

Logic treatment:

$\longrightarrow VaccineLikelihood_{t+1} = VaccineLikelihood_t + R$

where R $\sim N(5, 2)$

Emotional treatment:

$\longrightarrow VaccineLikelihood_{t+1} = VaccineLikelihood_t + R$

where $\mathrm{R} \sim N(10, 2)$