**Nigeria**

Self-Paced Exercise

**Questions for Students – Answer Key**

**What data are required to create a new setup and run an analysis?**

If the goal of your analysis is to examine only health impacts, you must load grid definitions, pollutants, air quality data (in either monitor or model form), incidence/prevalence rates, a population dataset, and at least one health impact function. If you would also like to examine economic impacts, you must load a variable dataset and a valuation function.

**What is the relationship between the BenMAP data inputs and the grid definitions column/row index?**

All incidence rates and population data must be linked to a grid definition which matches the spatial scale of the data collected. Moreover, the column/row index links the specific input value to the polygon within the grid definition assigned to the incidence or population dataset.

**What is the difference between a pollutant and a metric?**

A pollutant is the air-contaminating substance of interest in your analysis. In this case, the pollutant is PM2.5. A metric expresses the time period over which air quality values are modeled or observed and how the value is calculated (e.g., mean, maximum, minimum). In BenMAP-CE, the Metric field refers specifically to daily values calculated directly from daily observations, or through various mathematical calculations of hourly observations.

**What is the air quality metric for the Nigeria PM2.5 monitor data?**

The air quality metric for Nigeria PM2.5 monitor data is a daily average, here labeled “D24HourMean”.

**What races are included in the Nigeria Population data?**

The 2006 Nigeria population data used in this analysis is not broken down by race. All races are included in the analysis.

**What health endpoints are included in the Nigeria Incidence Rates?**

The dataset includes all mortality rates for five endpoints: lung cancer, ischemic heart disease, cerebrovascular disease, COPD, and all cause.

**What are the health endpoints of the Krewski et al. health impact functions?**

In this analysis, we are using three health impact functions from Krewski et al. (2009) with three different endpoints: ischemic heart disease, lung cancer, and all cause mortality.

**What is the source for the valuation estimate? Why is it necessary to adjust this estimate for use in Nigeria?**

The first valuation function converts the U.S. EPA default mean VSL. The second valuation function converts a VSL estimate from the World Bank. We adjust these estimates for three reasons. First, we convert the VSL to be expressed in local currency rather than U.S. dollars. Second the conversion accounts for inflation, or the general upward trend in prices over time. Finally, the VSL is converted to account for differences in income levels across countries and over time. Income has been shown to affect the value individuals place on mortality risk reductions (i.e., the VSL).

**What is the economic value for the benefits of the new air quality standard the Nigerian government is considering?**

In this case, the point estimate for your pooled valuation results should be 3,555,648,798,720 naira in total. This number can be calculated by exporting your Pooled Valuation Results to a .csv file and then taking the sum of all the point estimates for each state in Nigeria. This sum represents the total economic value across the country of the new standard. Alternatively, you could derive this value by selecting *Nigeria Border* during the Aggregation step under Section 4.3 “Aggregate Incidence Results”.

**Based on the analysis you performed, what would your final policy recommendation be to the Nigeria government as to whether they should implement new air quality standard that will reduce PM2.5 concentrations by 5** **µg/m3? What information makes you support this recommendation?**

The final policy recommendation would be, yes, the Nigerian government should implement a new air quality standard to reduce PM2.5 concentrations by 5 µg/m3. Since the monetary benefits of the rollback, calculated in the previous question, are greater than the cost of the program (300,000,000,000 naira), Nigeria will gain economically from passing this legislation.