**DETAIL CALCULATION STEPS FOR ITHIM**

# INPUT

## Population (from US Census): Local and U.S.

## Health Data

* Baseline health outcome (from local database): e.g. Mortality (*User Input*)
* Global Burden of Disease (GBD) (US level): Deaths, DALYs, YLL, YLD.

*Scaling US DALYs by the ratio of deaths in the target region to deaths in the US as a whole in each age-sex category*.

* Baseline health outcome (from local database): e.g. Mortality (*User Input*)
* Relative risk per MET for each disease (Source: Woodcock et al., 2009)

## Physical Activity Data

* Mean walking/cycling time, speed, distance, and coefficient of variation (local) (*User Input*)
* Mean walking/cycling time, distance in each age-sex category from CHTS

*Calculate the ratio to women aged 15-29*

* Distribution of non-travel METs

# CALCULATION

## Baseline Active Travel distribution

* Calculate mean walking/cycling time, speed, and distance in each age-sex category for target region, according to population proportion and relative ratio of mean walking/cycling time, distance from CHTS in each age-sex category
* Calculate MET value based on walking/cycling speed (distance/time)

Walking:

Cycling: 6

* Log-norm distribution is used to describe the physical activity. ITHIM approximates this distribution in quintiles.

where *m, sd* are the mean, standard deviation of the non-logarithmized sample values, respectively.

* Calculate the total active travel time and get the quintiles (log-normal distribution), then use the proportion to calculate the walking and cycling time respectively. Then use the MET value to obtain the distribution of total MET hours of active transport.

## Relative Risk and DALY Calculation

* Calculate the total exposure (MET-hours) by adding travel METs and non-travel METs (if total exposure < 2.5, total exposure = 0.1; else, total exposure)
* Calculate the relative risk considering exposure by using a square root function
* Calculate the ratio of RR relative to quintile 1
* Calculate the New Burden and Attribute Fraction in each age-sex category
* Calculate the baseline deaths, YLL, and YLD
* Calculate the scenario deaths, YLL, and YLD
* Calculate the final