MEMORANDUM

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Development of Fine Grained Spatial Resolution for an Integrated HIA Tool

for the Sacramento Region

ITHIM-Sac Phase II

R Code Development Document

Date: Aug 25, 2017

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In phase II, the fundamental method applied in Phase II is CRA, which is completely the same as the method used in Phase I. Hence, in this memo, we discuss the new data source and the data preparation for ZCTA level analysis.

## *Population File and Mortality at ZCTA level*

The population file at ZCTA level is taken from Census2010.

Mortality rates are estimated at the ZCTA level by multiplying the population distribution of each ZCTA by Sacramento region-wide rates (as deaths per capita in each age-sex category). The region wide rates are taken from the CDPH death files (08-10).

The R file to extract the population and mortality is “Population+Mortality\_zcta\_level.R.”

The .csv file to store the mortality rates info is “RegionwideMortalityRate\_SACOG.csv.”

## *ZCTA List for the Sacramento Region*

I picked those ZCTAs completely in SACOG’s TAZ map. The total list contains 151 ZCTAs.

The .csv file to store the ZCTA ID and ZCTAs is “zcta\_list\_SACOG.csv.”

## *Allocation of TAZs into ZCTAs*

Since the synthetic population in SACSIM only contains TAZ info, we need allocate those residents into ZCTAs. The area of ZCTA are larger than TAZ. Most of the TAZs are completely fall into one single ZCTA. But for those TAZ overlap more than one ZCTA, we allocate the residents according to the ratio of area. For example, TAZ 1 is 40% in ZCTA 1 and 60% in ZCTA 2. 40% of the residents in TAZ 1 will be picked and labeled with ZCTA 1, and 60% residents will be labeled with ZCTA 2. Then, the population file will have one more column named “ZCTA ID”, and all the following data process will be conducted according to this ID.

The related R file is “Allocation-TAZ2ZIP.R.”

## *Baseline Traffic Injury*

The baseline injury is the annual average number from SWITRS 2006-2016, which is stratified by combination of striking and victim modes, severity (fatal, serious injury) and road type (local, arterial, and highway). Because of the disaggregation process (by ZCTA), baseline injuries in many combinations of victim and striking modes equal zero even though there is a nonzero risk (e.g. areas with a risk of 0.1 injuries over a 10-year period would lead to values of zero in most cases.) For this reason, we use region-wide injury rates for those combinations scaling by the VMT ratio. Since the baseline injury is related to both striking mode VMT and victim mode VMT, we consider both ratios in the scaling process. The equation is listed below.

The parameter m and n are equal to 0.5, which is also used in the traffic injury module in Neil’s ITHIM application.

The .csv file to store the region-wide traffic injury info is “RegionWide\_BaselineInjury.csv”.

The R code to do the scaling is “BaselineInjuryEstimationbyVMT.R.”