RSG
the science of insight

Using the TRM to answer transportation-health questions

Ted Mansfield

April 28, 2021

Health is influenced by many factors

And transportation plays a key role

Transportation systems provide access

- Employment and educational opportunities
- Healthcare and other social services
- *(can)* support affordable housing

Transportation systems impact users

- Physical activity levels
- Fatal and injury crash risks

And impact the community

- Air pollution
- Noise

Can we re-tool travel models to address health?

Components of a health impact model

- Population
- Transportation-health pathways
- Change in exposure
- Health model type

Health metrics for CAMPO's Commuter Corridors Study

Components of a health impact model

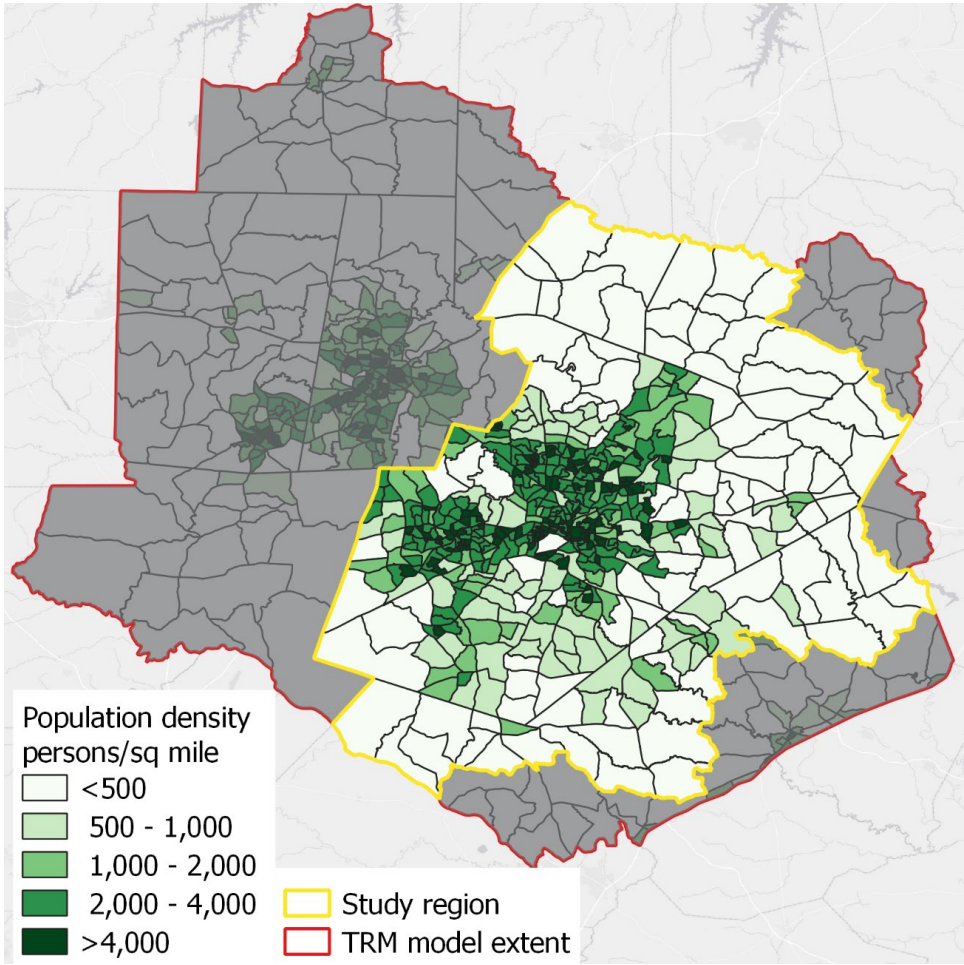
- **Population:** Triangle Regional Model households
  - Health status from Behavioral Risk Factor Surveillance System (BRFSS)
- **Transportation-health pathway:** physical activity
  - Outcome: change in all-cause mortality
- **Change in exposure:** estimated using TRM
  - Non-motorized travel time + walk to/from transit from skims
- **Health model type:** disaggregate, static health impact model
  - Population attributable fraction (PAF) approach:

$$AF_{TPA} = \frac{\left(\int_{TPA=0}^{\infty}\left(1 - RR_m(TPA)\right)f_b(TPA)dTPA - \int_{TPA=0}^{\infty}\left(1 - RR_m(TPA)\right)f_{cf}(TPA)dTPA\right)}{1 + \int_{TPA=0}^{\infty}\left(1 - RR_m(TPA)\right)f_b(TPA)dTPA}$$

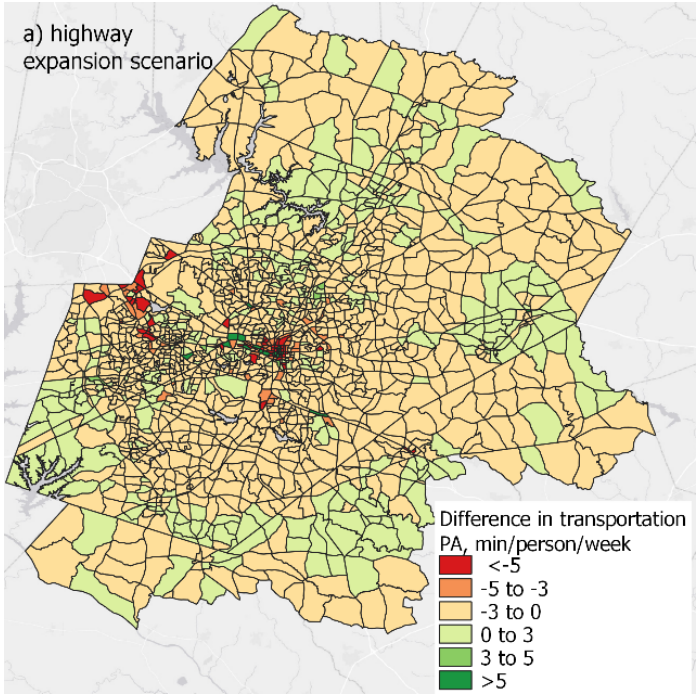
Health metrics for CAMPO's Commuter Corridors Study

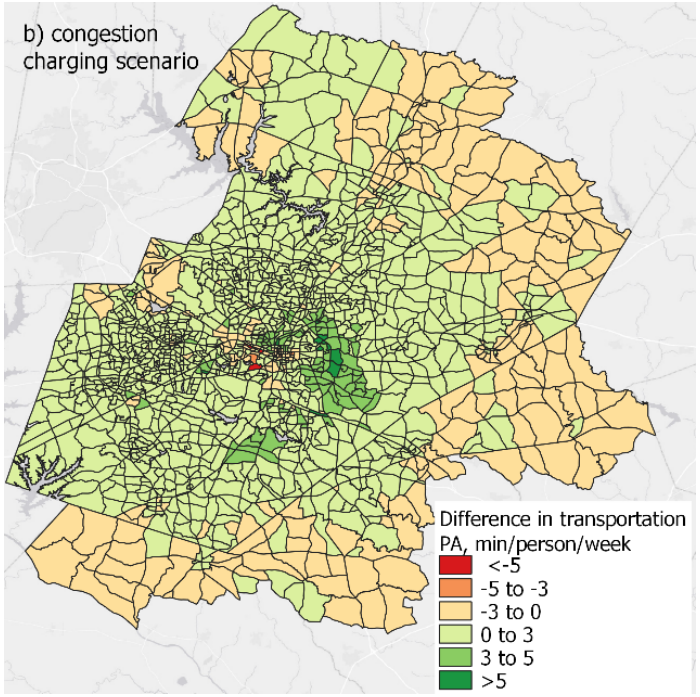
Land use-transportation scenarios:

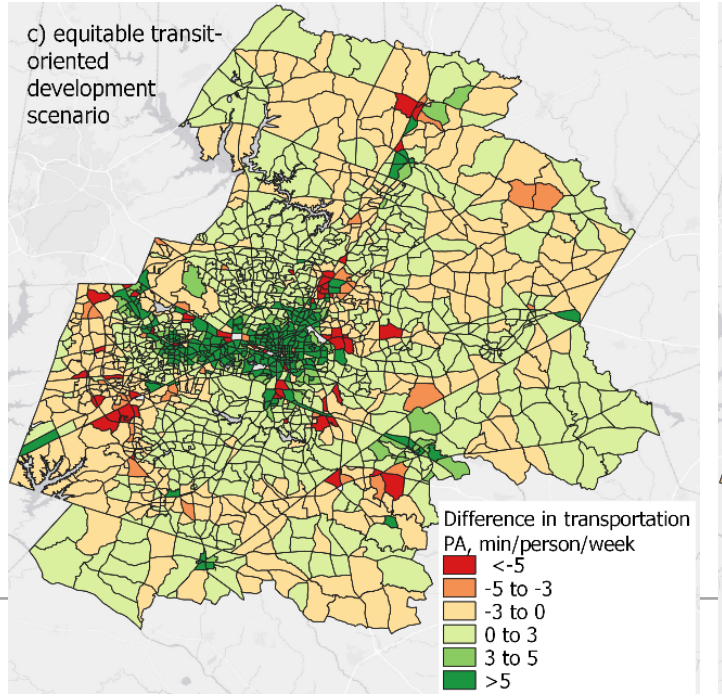
1. **Highway expansion:** freeway capacity doubled
2. **Congestion pricing:** tolls + downtown cordon charge
3. **Equitable transit-oriented development:** more frequent transit, growth near existing routes
4. **Smart mobility hubs:** new transit routes, growth near new routes

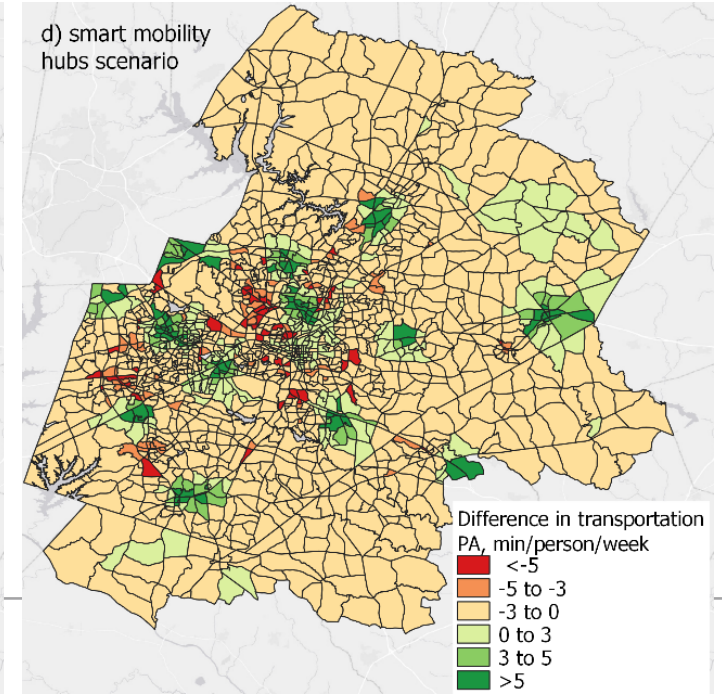


Change, transport walking

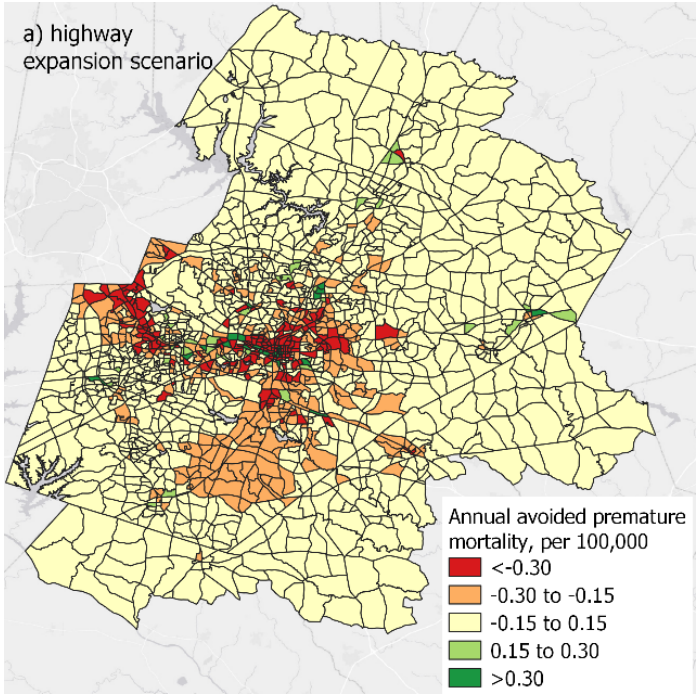


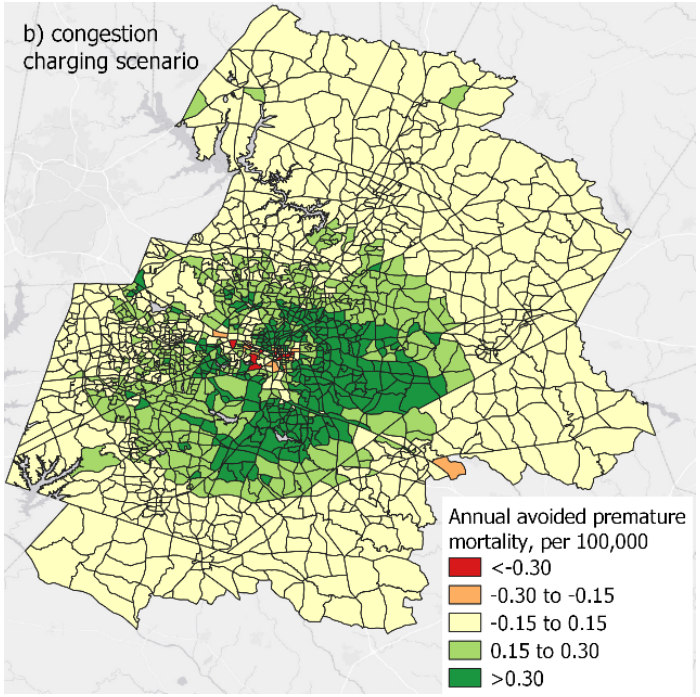


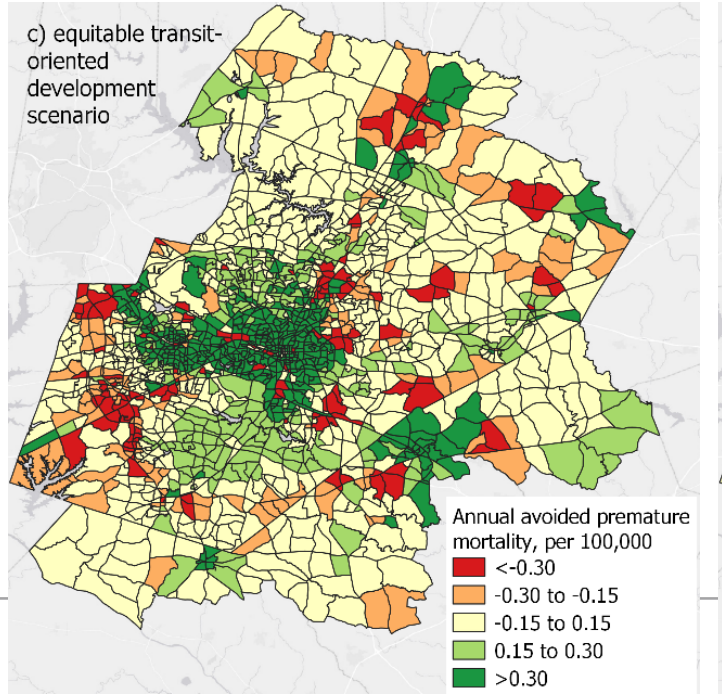


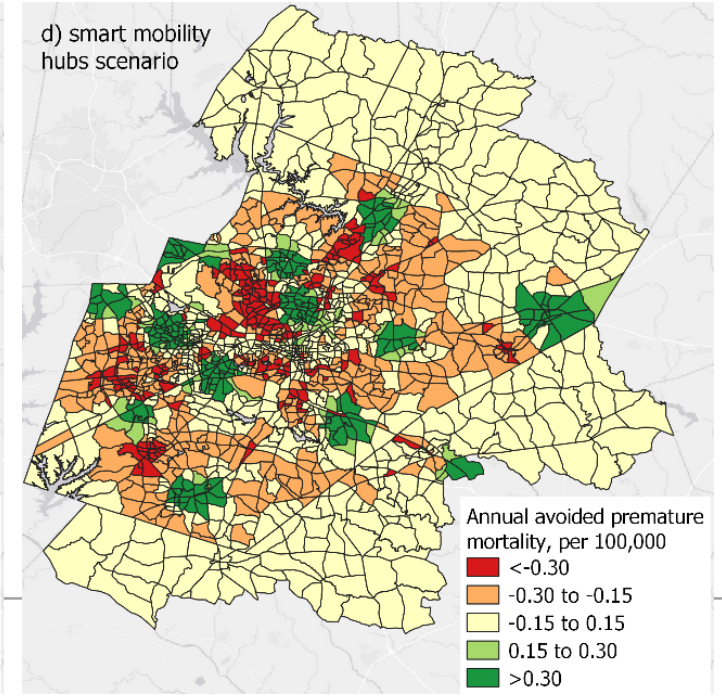


Change, mortality









Can we re-tool travel models to address health?

Integration of health modeling with travel models is useful

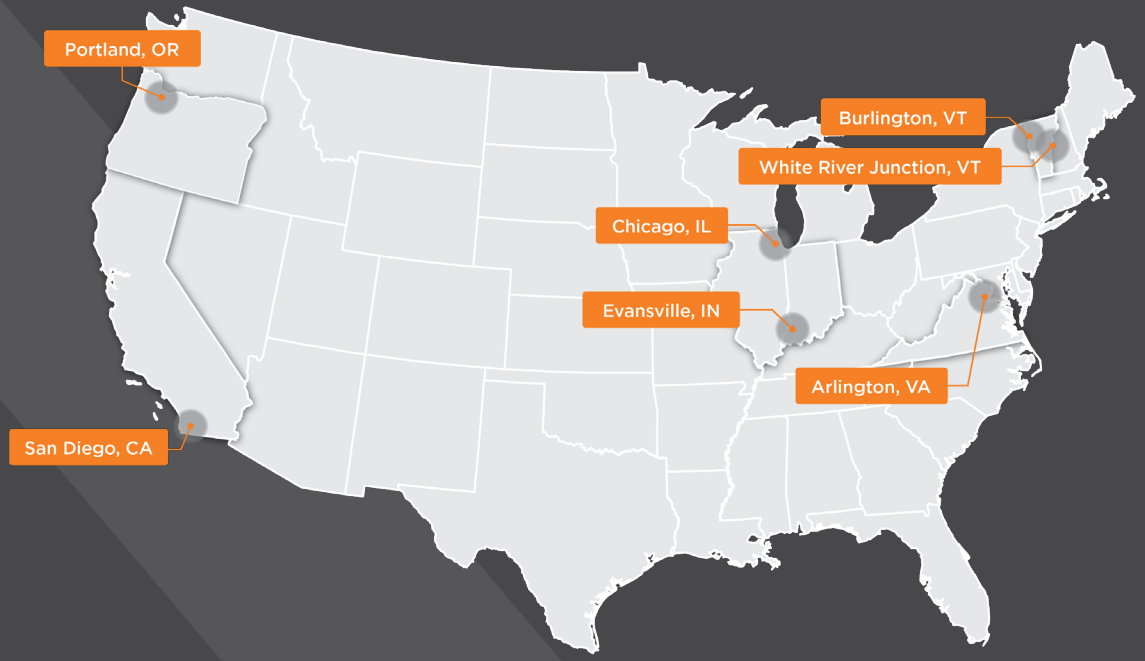
- Direct comparisons with other performance measures
- Can compare wide range of scenarios

Implementation can be tricky

- Pre-built tools exist, but can be difficult to integrate with travel models
- If pre-built tools don't meet you needs, **don't be afraid to try something new**

All models are wrong, but some are useful

- How well do our models estimate active travel?
- Do our models address equity?
- What about activity substitution (e.g., I biked to work, so forget the gym)?



RSG
the science of insight

Ted Mansfield, PhD
Senior Consultant
theodore.mansfield@rsginc.com