



U.S. Department of Transportation
Office of the Under Secretary

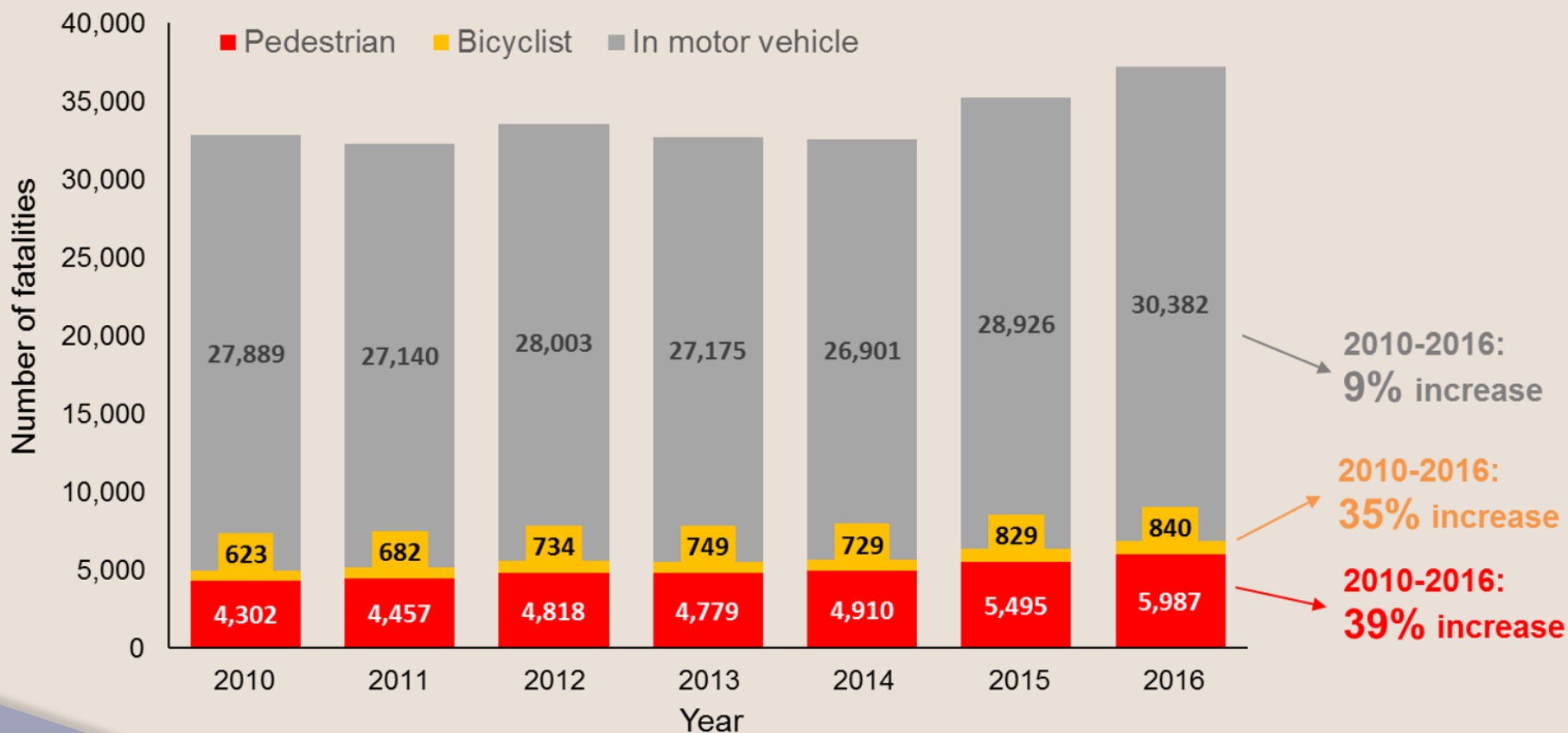
The effects of roadway and built environment characteristics on pedestrian fatality risk: a national assessment at the neighborhood scale

Office of the Assistant Secretary for Policy

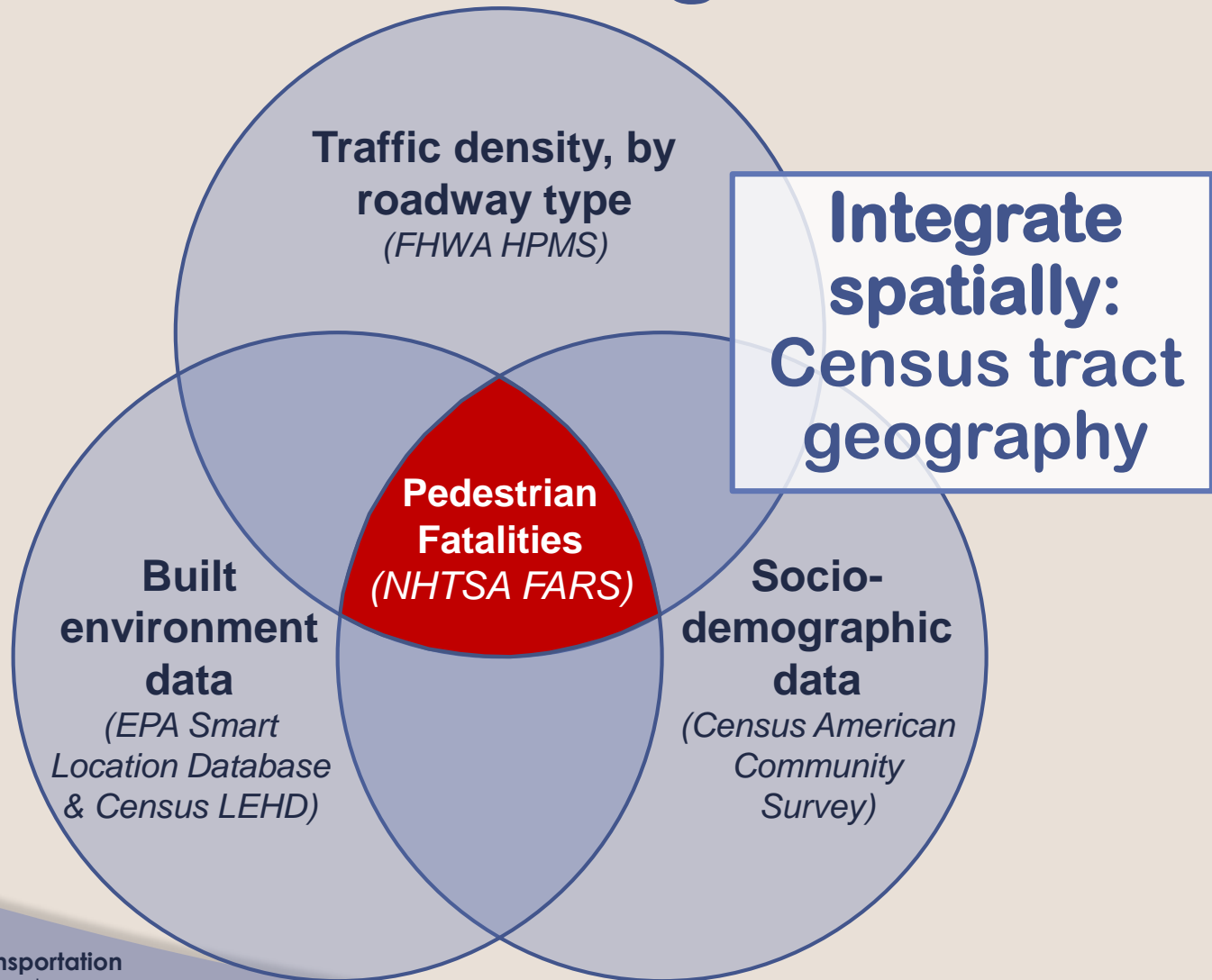
**Office of Policy Development, Strategic Planning,
and Performance**

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Increases in pedestrian fatalities outpace other modes



Leveraging diverse data sources tells us different things about risk

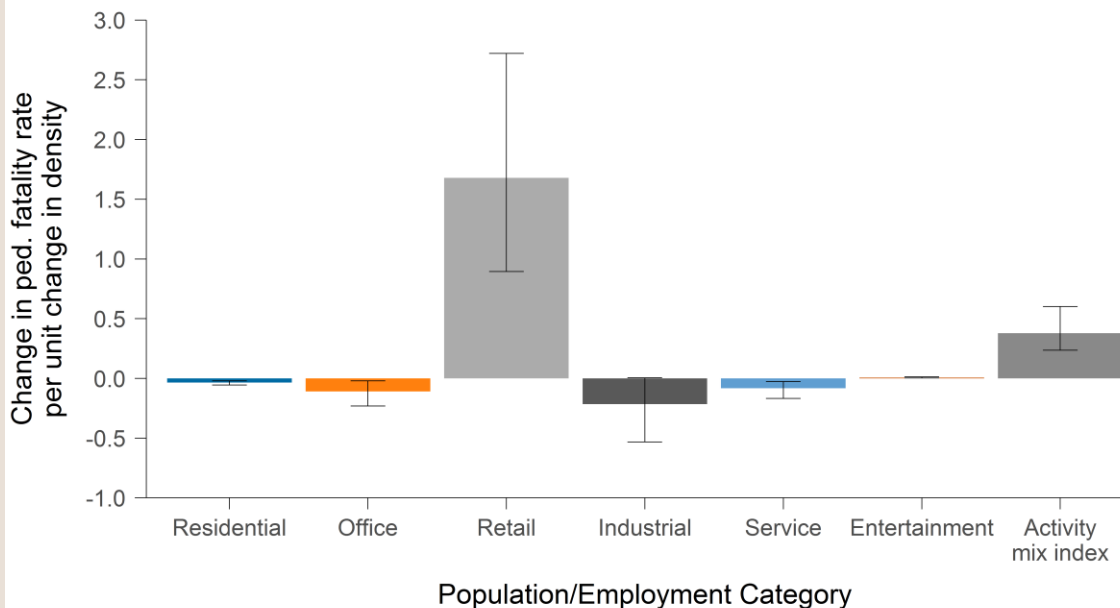


Data integration enables powerful analysis

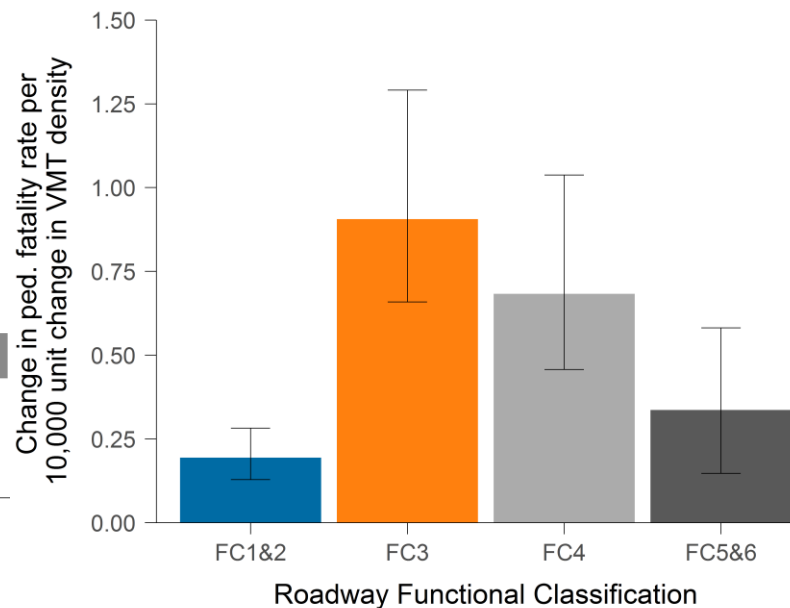
- ◎ **Methods:** Zero-inflated negative binomial mixed effects regression models w/ random parameters
 - Offset: average daily population (exposure proxy)
 - Separate urban & rural models
- ◎ **Outcome:** pedestrian fatality count, 2012-2016
- ◎ **Explanatory variables (averaged, 2012-2016):**
 - Traffic density, by functional class
 - Built environment (density, diversity, and design)
 - Sociodemographic factors

Built environment, traffic density variables have significant effects

Urban Tracts, Population and Employment Density Variables



Urban Tracts, Traffic Density Variables



FC1 & FC2: Interstates, expressways, and other freeways

FC3: Non-access controlled principle arterials

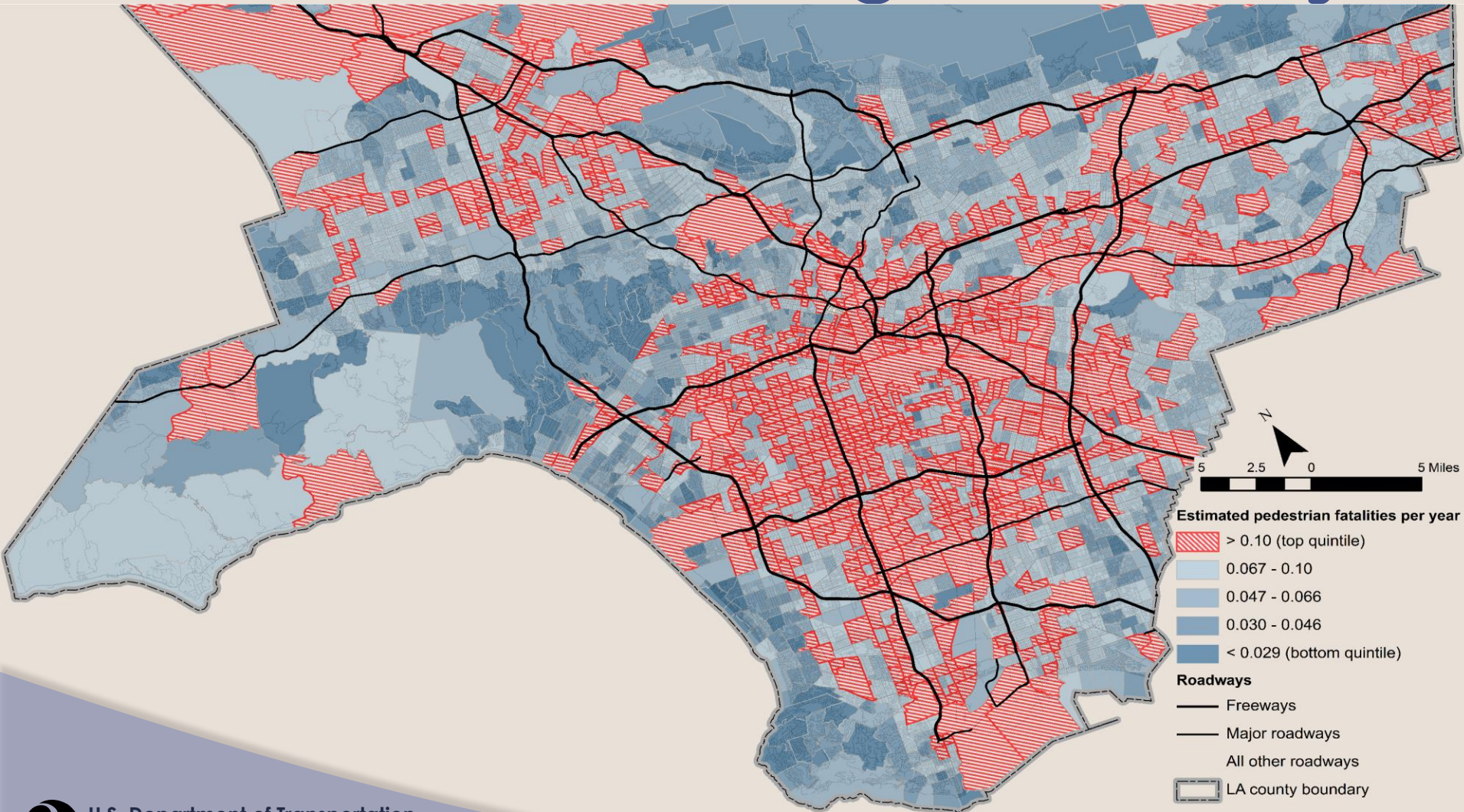
FC4: Minor arterials

FC5: Major collectors

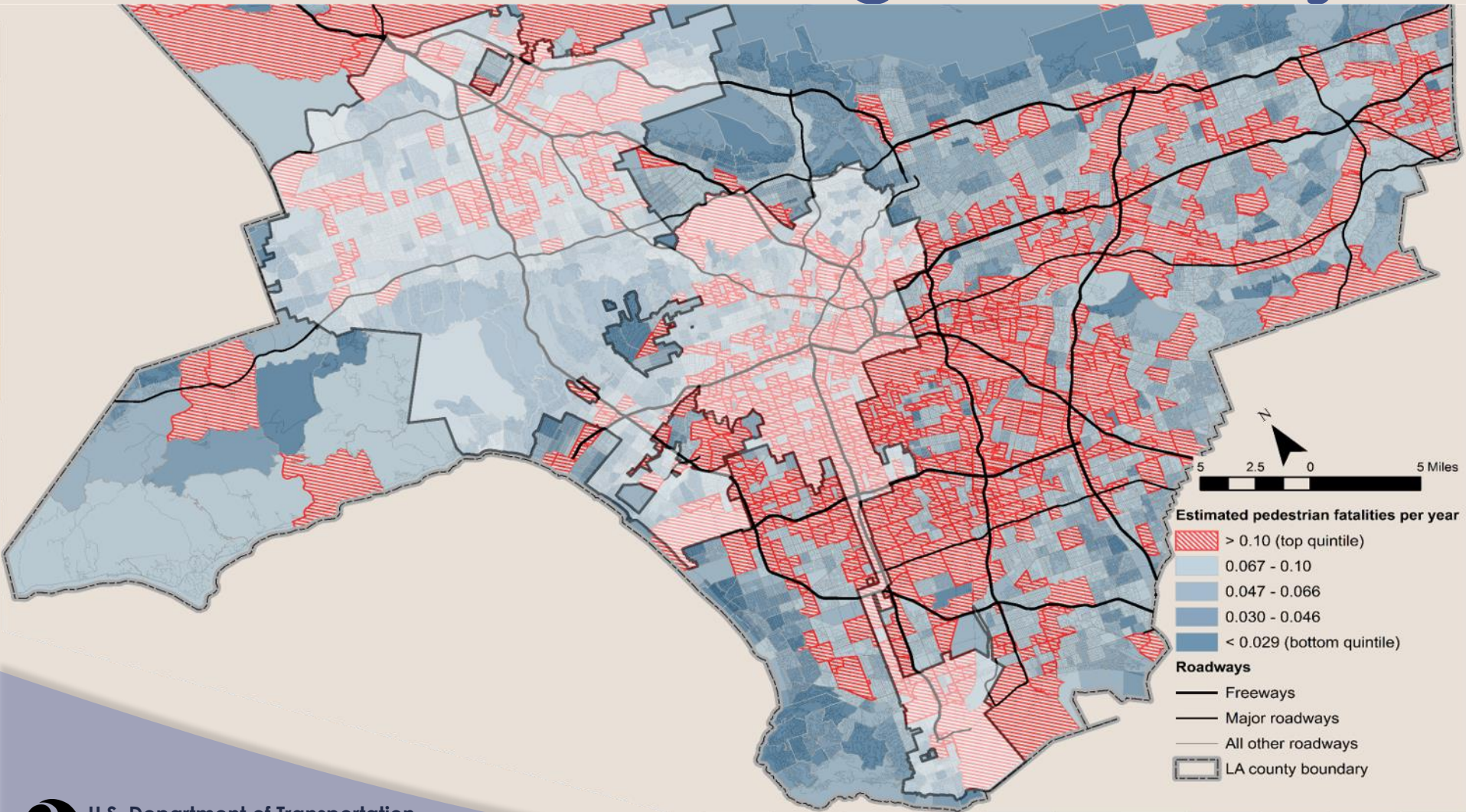
FC6: Minor collectors



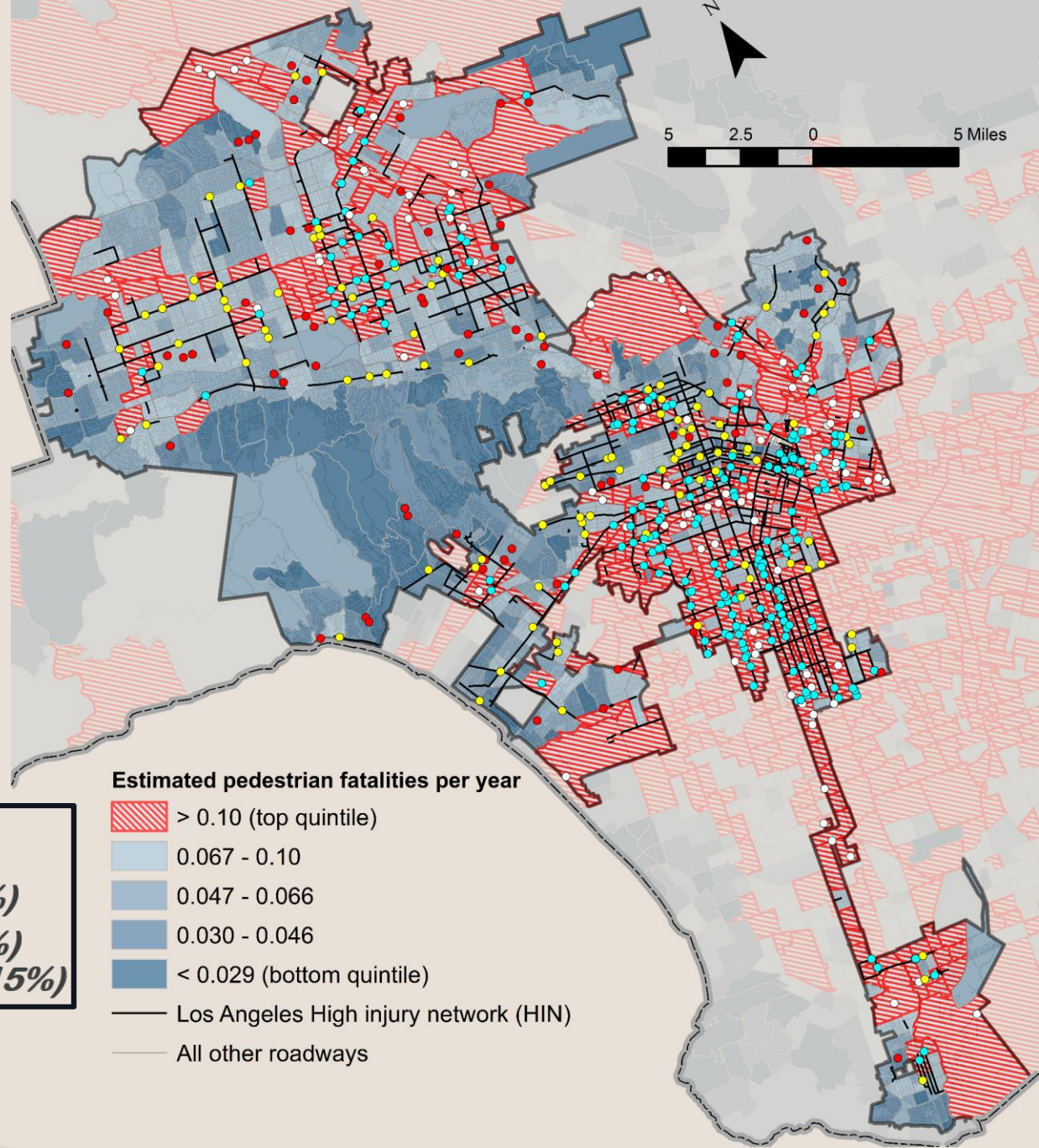
Case study application: model estimates in Los Angeles county



Case study application: model estimates in Los Angeles county



Case study application: comparison to City of Los Angeles high-injury network



Pedestrian fatalities, 2012-2016

- In high-risk tract, identified by HIN **(43%)**
- In high-risk tract, not identified by HIN **(19%)**
- Not in high-risk tract, identified by HIN **(23%)**
- Not in high-risk tract, not identified by HIN **(15%)**



Data integration can inform data-driven policy

- ◎ Prospective, risk-based framework supports systemic safety approaches
- ◎ Supports estimations of how built environment changes may affect risk
- ◎ Identifies high-risk neighborhoods; does not identify appropriate interventions

Data integration can be challenging

- ◎ State-to-state differences can impact scalability of data transformations
- ◎ Some data are unavailable nationally
 - Robust measure of pedestrian exposure
 - Pedestrian injury data
 - Some roadway features (e.g., sidewalks)