Public Health Performance Measures and Their Role in the Regional Metropolitan Transportation Planning Process

Sheida Khademi, Sina Famili, Saeed Reza Ramezanpour Nargesi, Dr. Stephen Mattingly

Department of Civil Engineering, University of Texas at Arlington, Arlington, TX

Introduction

Federal, state, regional, and local governments have begun trying to integrate health objectives into their planning and policymaking process since they have recognized the relationship between health outcomes and transportation, land use, infrastructure and services. Federal government laws require Metropolitan Planning Organizations (MPOs) to consider public health objectives in their programs and policies.

Similarly, the North Central Texas Council of Governments (NCTCOG) has considered the integration of public health elements into their Metropolitan Transportation Plan (MTP) at two levels. At the system level, the plan evaluates transportation infrastructure performance at the overall regional scope. On the other hand, performance measures at the project level refer to those that aim to evaluate transportation infrastructure tied to a specific location.

CONTACT

Sheida Khademi
University of Texas at Arlington
Email:
Sheida.Khademi@mavs.uta.edu

Research Questions

Do environmental justice (EJ) neighborhoods have different infrastructure characteristics in terms of safety and physical activity than non-EJ neighborhoods?

Process

Project-level performance measures were applied in order to evaluate transportation facility elements based on public health objectives such as safety, physical activity and air quality. Fifteen different census blocks are studied based on the Environmental Justice Index (EJI) developed by NCTCOG.

Factors for choosing census blocks: presence of schools (to assess presence of young children, and access to opportunities for physical activity (e.g. through the Safe Routes to School (SRTS program)), and a mixture of EJ and non-EJ locations.

This study conducts a performance measures analysis for the major arterials, minor arterials and collector streets in the selected neighborhoods. Data collection for the project-level analysis is done via a field assessment of street segments and intersections.

Approach

Safety performance measures: "indicators measuring traffic-related injuries and fatalities involving pedestrians and cyclists; and indicators related to perceptions of safety such as fear of crime."

Physical activity performance measures: "indicators that measure infrastructure support for physical activity (e.g. active transportation infrastructure), and environmental conditions that influence the willingness to engage in physical activity (e.g. access to green spaces)."

An expert survey was used for determining the performance standards for both the safety and physical activity measures.

Safety Level	Pedestrian Index		Bicyclist Index	
	Segment	Intersection	Segment	Intersection
Negatively Impact	< 0.16	< 0.14	< 0.25	< 0.14
Negatively - Minimally Impact	≥ 0.16 - < 0.33	≥ 0.14 - < 0.32	≥ 0.25 - < 0.37	≥ 0.14 - < 0.30
Minimally - Positively Impact	≥ 0.33 - ≤ 0.53	≥ 0.32 - ≤ 0.57	≥ 0.37 - ≤ 0.49	≥ 0.30 - ≤ 0.43
Positively Impact	> 0.53	> 0.57	> 0.49	> 0.43

Safety Levels by Index Value at both Segments and Intersections

Physical Activity Level (Walkability and/or bikeability and/or accessibility)	Segment		Intersection
	Walkability Index	Bikeability Index	Walkability / Bikeability Index
Discourages	< 0.10	< 0.08	< 0.12
Discourages - Neutral Effect	≥ 0.10 - 0.24	≥ 0.08 - 0.23	≥ 0.12 - 0.26
Neutral Effect - Definitely Improves	≥ 0.24 - 0.32	≥ 0.23 - 0.37	≥ 0.26 - 0.41
Definitely Improves	≥ 0.32	≥ 0.37	≥ 0.41

Physical Activity Levels by Index Value at both Segments and Intersections
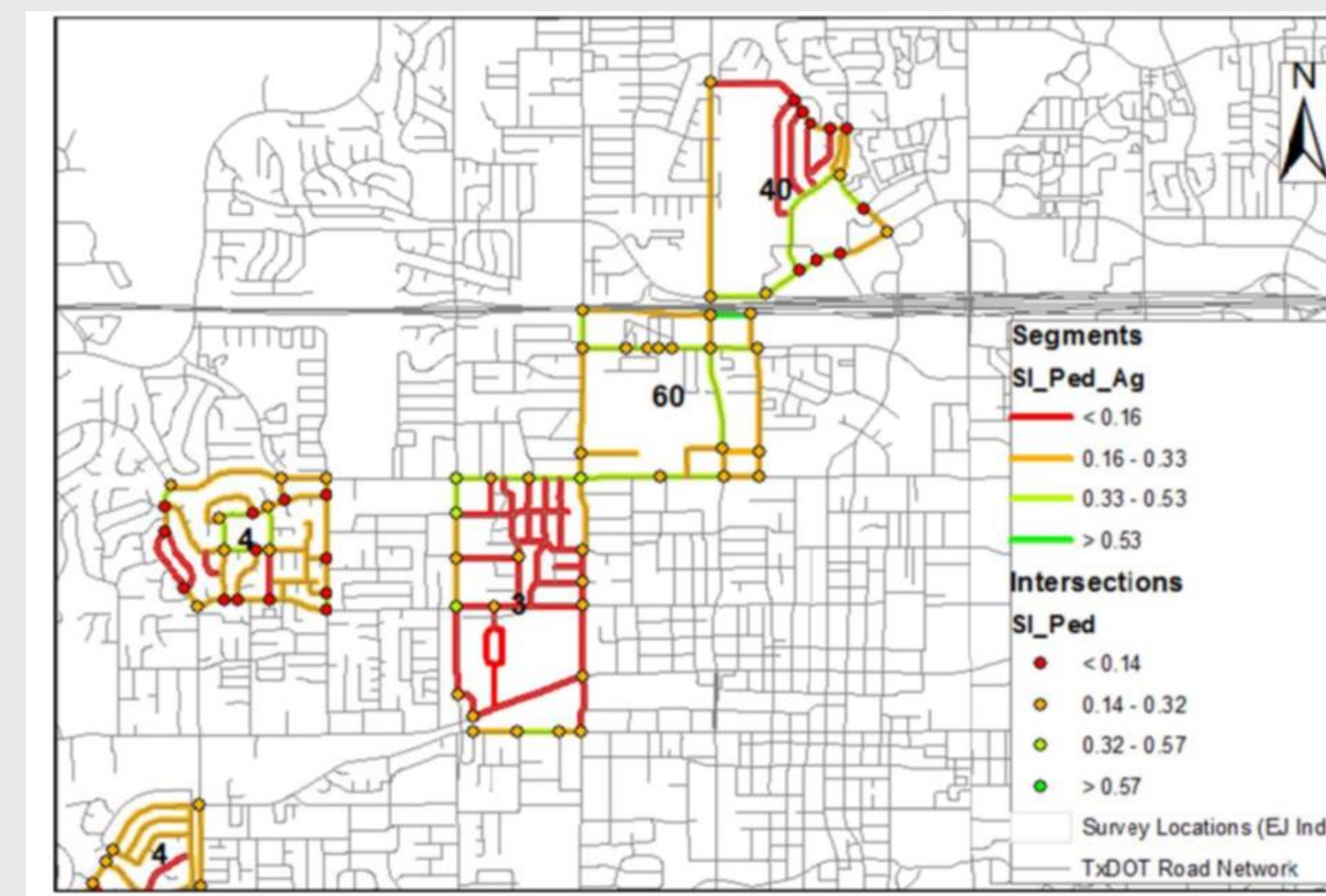
Pedestrian safety Index at selected segments and intersections (EJ≤10 & EJ>10)

Facility	Index	Non-EJ Census Block Group (EJI ≤ 10)		EJ Census Block Group (EJI >10)	
		Collectors/ Local	Arterials	Collectors /Local	Arterials
Segment	Pedestrian - Safety Index	0.22	0.25	0.36	0.40
	Bicyclist - Safety Index	0.25	0.25	0.32	0.30
	Pedestrian - Walkability Index	0.18	0.21	0.20	0.23
	Bicyclist - Bikeability Index	0.22	0.25	0.24	0.22
Intersection	Pedestrian - Safety Index	0.17	0.28	0.18	0.20
	Bicyclist - Safety Index	0.15	0.21	0.20	0.21
	Walkability-Bikeability Index	0.20	0.25	0.23	0.25

Average Index Values by Census Block and Functional Class Type

Findings- Arlington Case Study

-Higher safety for pedestrians on segments of arterial roads rather than minor arterials and collectors. (Not for bikes)

-Slight encouragement of cycling on EJ local and collector streets and non-EJ arterials

-Improved index values for arterial, but still do not positively impact safety or physical activity

-When comparing a road type: Arterial and collector segments provide better safety and physical activity for EJ census blocks, but in non-EJ census blocks arterial intersection provide better safety for pedestrians

Conclusion & Future Direction

• The data sources to use specific performance measures for both types of data (project-level and system-level) are identified.
• The public health performance measures and indicators used in Environmental Justice (EJ) analyses.
• Case study in Arlington, Texas, indicates that the bicycle and pedestrian infrastructure does not appear to improve safety or encourage physical activity; however, the EJ neighborhoods do not appear disadvantaged with lower quality infrastructure.
• Study's outcomes help MPOs evaluate the applicability and transferability of public health performance measures and indicators to their local and regional planning processes.

MPOs can begin one of the early action strategies by identifying the motivation and potential partnerships in integrating health objectives into their planning process. As such, assembling a workgroup or standing committee represents an important step to solidify partnerships between transportation planning agency, public health institutions, and community groups. The standing committee plays a significant role in identifying funding, developing regional visions and goals, prioritizing relevant system and project level performance measures, developing strategies for outreach and implementation of performance measures at various levels of analysis (system or project level).

Acknowledgment