The Health and Transportation Nexus

A Unified Model Integrating Multiple Mechanisms for Collaborative and Equitable Planning

Yingling Fan, University of Minnesota

Technical Advisory Panel

Abdullahi Abdulle, Transportation Equity Planning Coordinator
MnDOT Office of Transportation System Management

Amber Dallman, Bicycle and Pedestrian Coordinator
MnDOT Office of Transit and Active Transportation

Brent Rusco, Senior Engineer
MnDOT Office of Research and Innovation

Carol Zoff, Environmental Planning and Design Unit Supervisor
MnDOT Office of Environmental Stewardship

Christine Neary, Tribal Transit Coordinator
MnDOT Office of Transit and Active Transportation

David Elvin, Principal Planner
MnDOT Metro District

Kelly Corbin, Planner
MnDOT Bikes Unit

Leif Halverson, Project Coordinator
MnDOT Office of Research and Innovation

Lindsey Bruer, Planning Director
District 8

Nissa Tupper, Sustainability & Public Health Planner
MnDOT Sustainability & Public Health Division

Patrick Hollister, Planner
PartnerSHIP 4 Health

Sara Dunlap, Principal Planner
MnDOT Operations Div Admin

“The street is the river of life of the city, the place where we come together, the pathway to the center.”

–William H. Whyte

Transportation - a unique social determinant of health

- **Social determinants of health (SDoH) are non-medical factors that influence health equity and health outcomes.**
  - Conditions in which people live, learn, work and play;
  - Shaped by the complex and interrelated social structures and economic systems

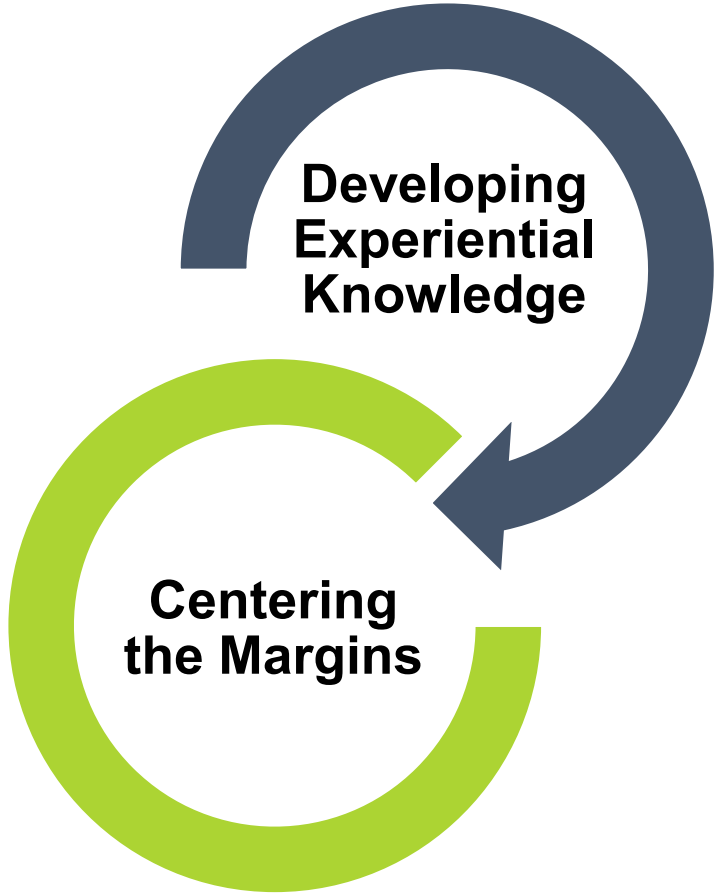
- **Transportation**
  - Its physical presence directly shapes the social and physical environments in myriad ways.
  - Mobility and accessibility determine the types of places where people can live, learn, work, and play in their everyday life

Transportation shapes physical and social environments and determines mobility and accessibility.

Critical Theories in Sociology

Horkheimer, M. (1972). Critical Theory: Selected essays (Vol. 1). A&C Black.

- Critique of society and culture: sexism, racism, and classism are prevalent in everyday life.
- Necessary to study the lived experience of real people to reveal and challenge power structures.
- Necessary to make the perspectives of socially marginalized groups, rather than those of the dominant culture, the central axis around which discourse revolves.
- **Extend to transportation planning: much of our transportation systems are socially constructed by the dominant groups.**



Transportation as an unavoidable everyday life component presents oppression and exclusion in subtle and ordinary ways.

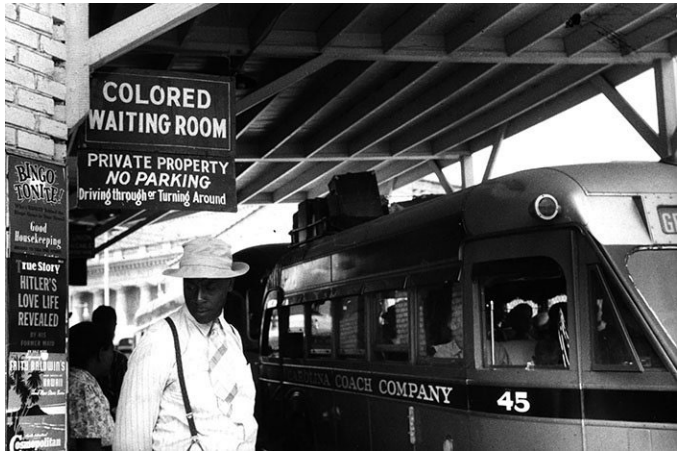
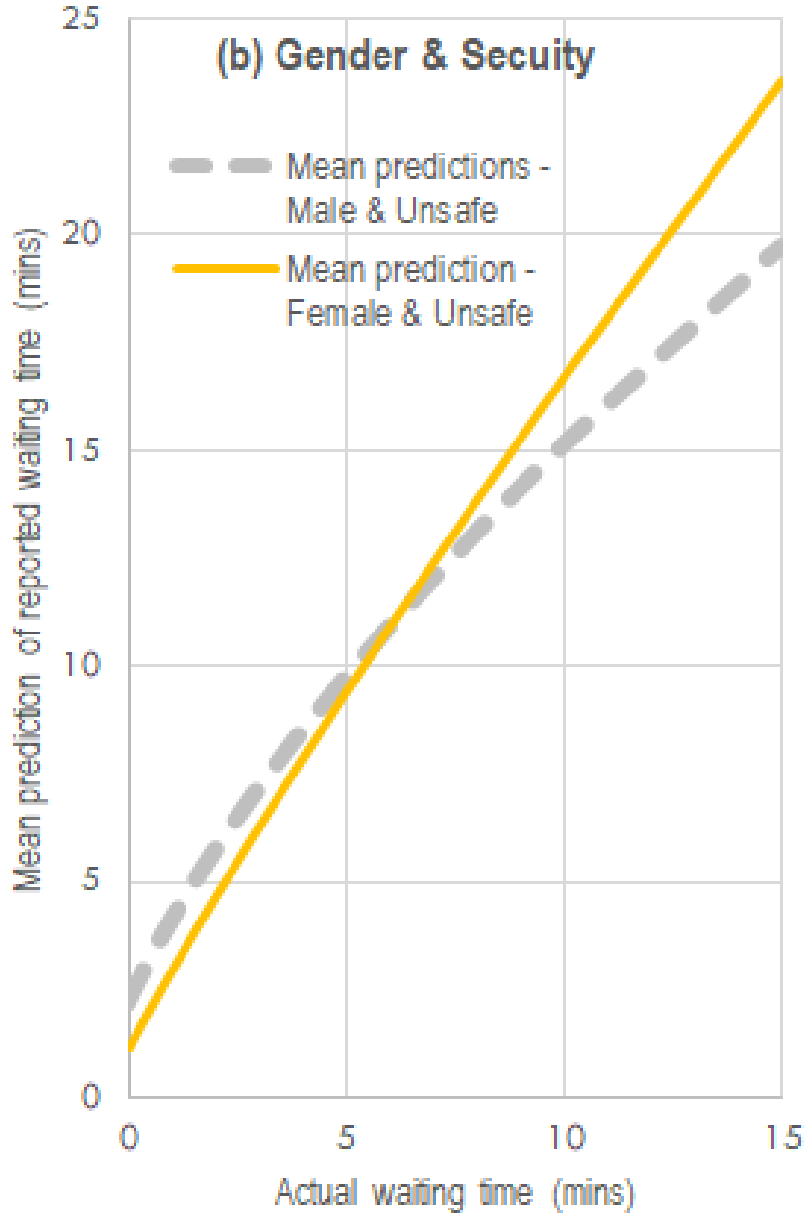
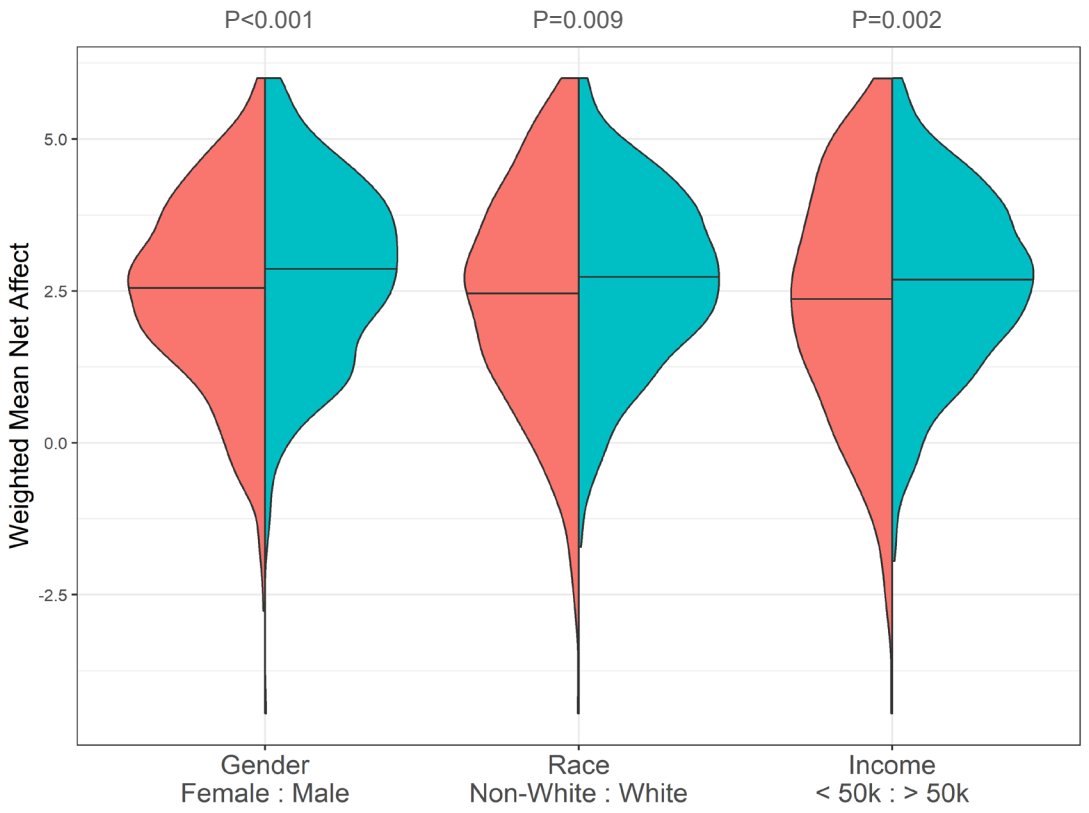


Figure 1. The Tom J. Vandergriff Bronze Statue seen from the front entrance (left) and the Statue seen from the back entrance by the parking lot (right). Photo Credit: Yingling Fan (left) and www.arlington-tx.gov (right)

Lived experience by race, gender, & class



Transportation-Related Well-being gaps by gender, race, & class

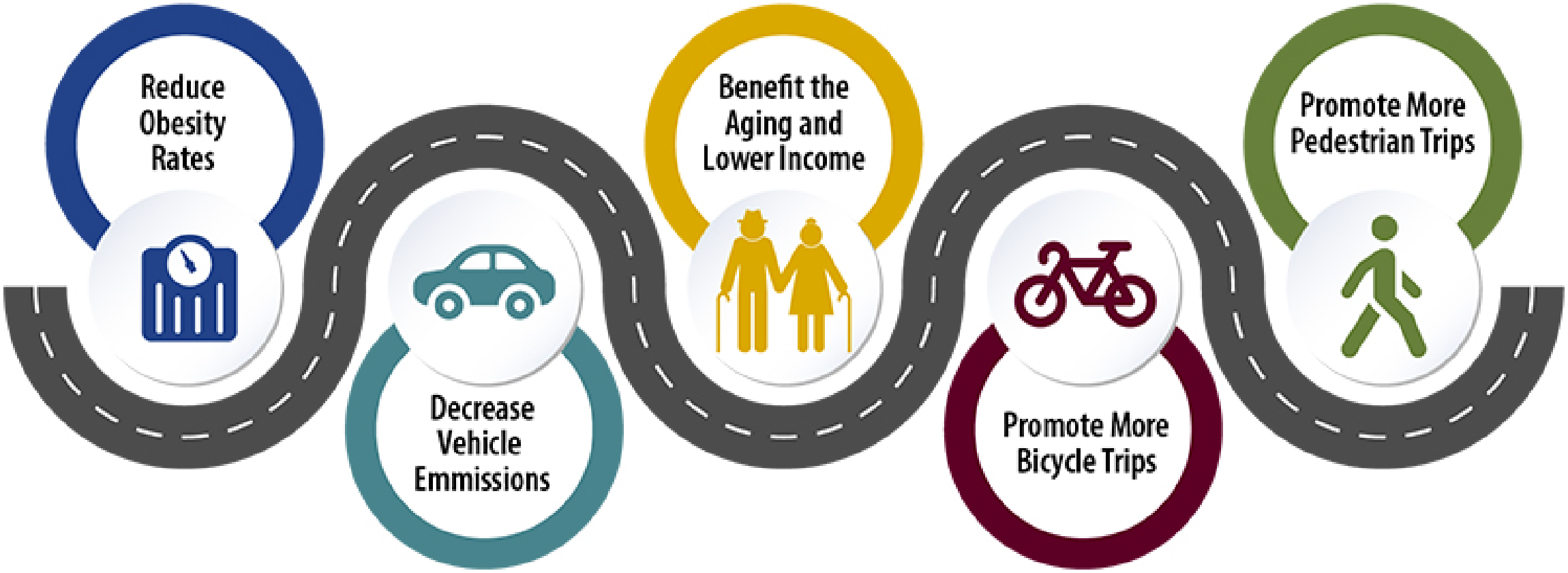


Health and Transportation Nexus – Literature Review

8 Frameworks	
Health in Transportation Corridor Planning Framework	Federal Highways Administration
Metropolitan Area Transportation Planning for Healthy Communities	Federal Highways Administration
A Research Roadmap for Transportation and Public Health	Transportation Research Board
The Transportation Prescription	Prevention Institute & Policy Link
Recommendations for Improving Health through Transportation Policy	Centers for Disease Control and Prevention
Transportation and Health: Policy Intervention for Safer, Healthier People and Communities	SafeTREC at the University of California Berkeley
Transport, Environment and Health	World Health Organization Regional Office for Europe
Health Impact Assessment of Transport Initiatives	Public Health Scotland

3 Tools	
Transportation Health Impact Assessment Toolkit	Centers for Disease Control and Prevention
Transportation and Health Tool (THT)	US Department of Transportation
Integrated Transport Health Impact Model (ITHIM)	CEDAR at the University of Cambridge

Health in Transportation Corridor Planning Framework



Key Domains of Frameworks and Tools

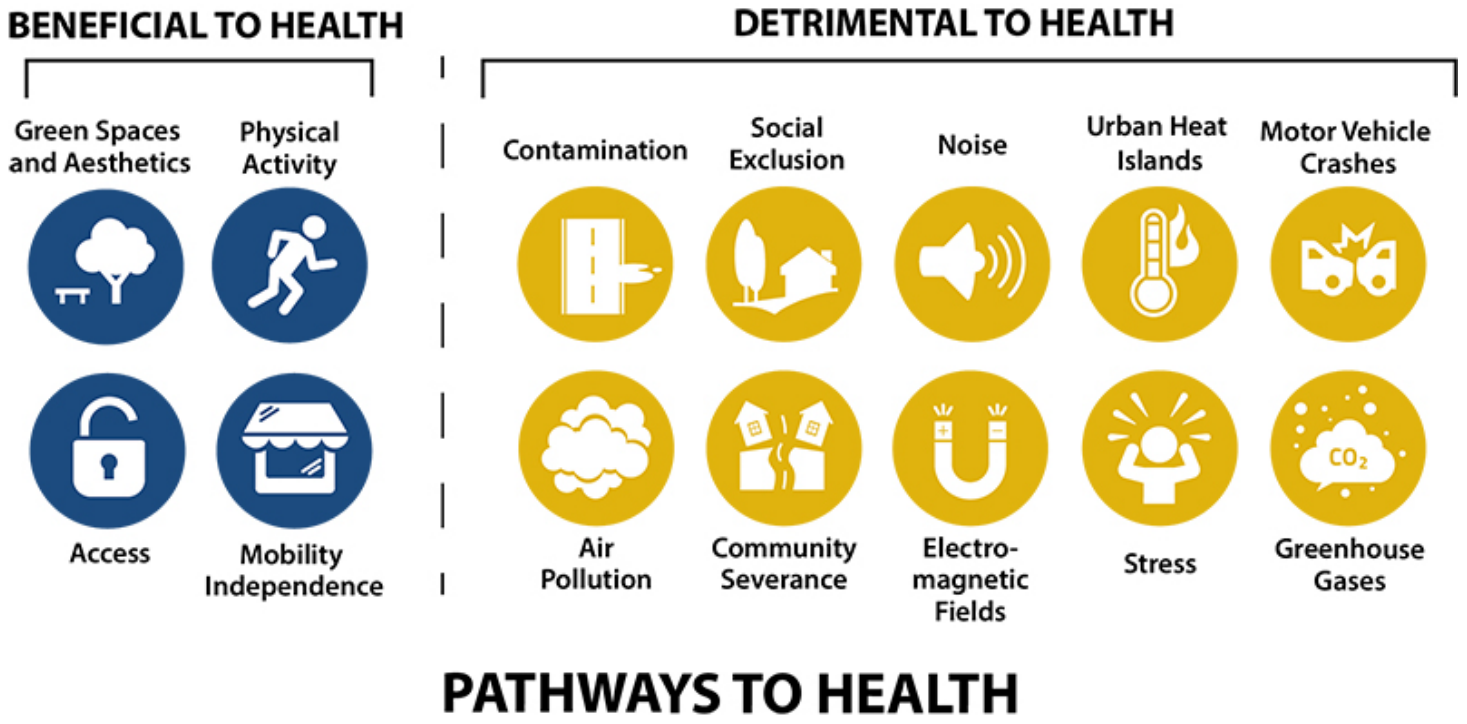
Key Domains/Themes	F1	F2	F3	F4	F5	F6	F7	F8	T1	T2	T3	Total
Active transportation	X	X	X	X	X	X	X	X	X	X	X	11
Environmental pollution	X	X	X	X	X	X	X	X	X	X	X	11
Traffic safety	X	X	X	X	X	X	X	X	X	X	X	11
Access to destinations		X	X		X			X		X		5
Equity	X			X			X	X	X			4
Public transportation	X				X				X			3
Mental health and wellbeing			X	X			X					3
Climate change				X				X				2
Resilience to disasters			X									1

Word Frequency Analysis

Existing frameworks describe the transportation-related domains affecting health and equity, what about the mechanisms through which transportation-related domains affect health and equity?

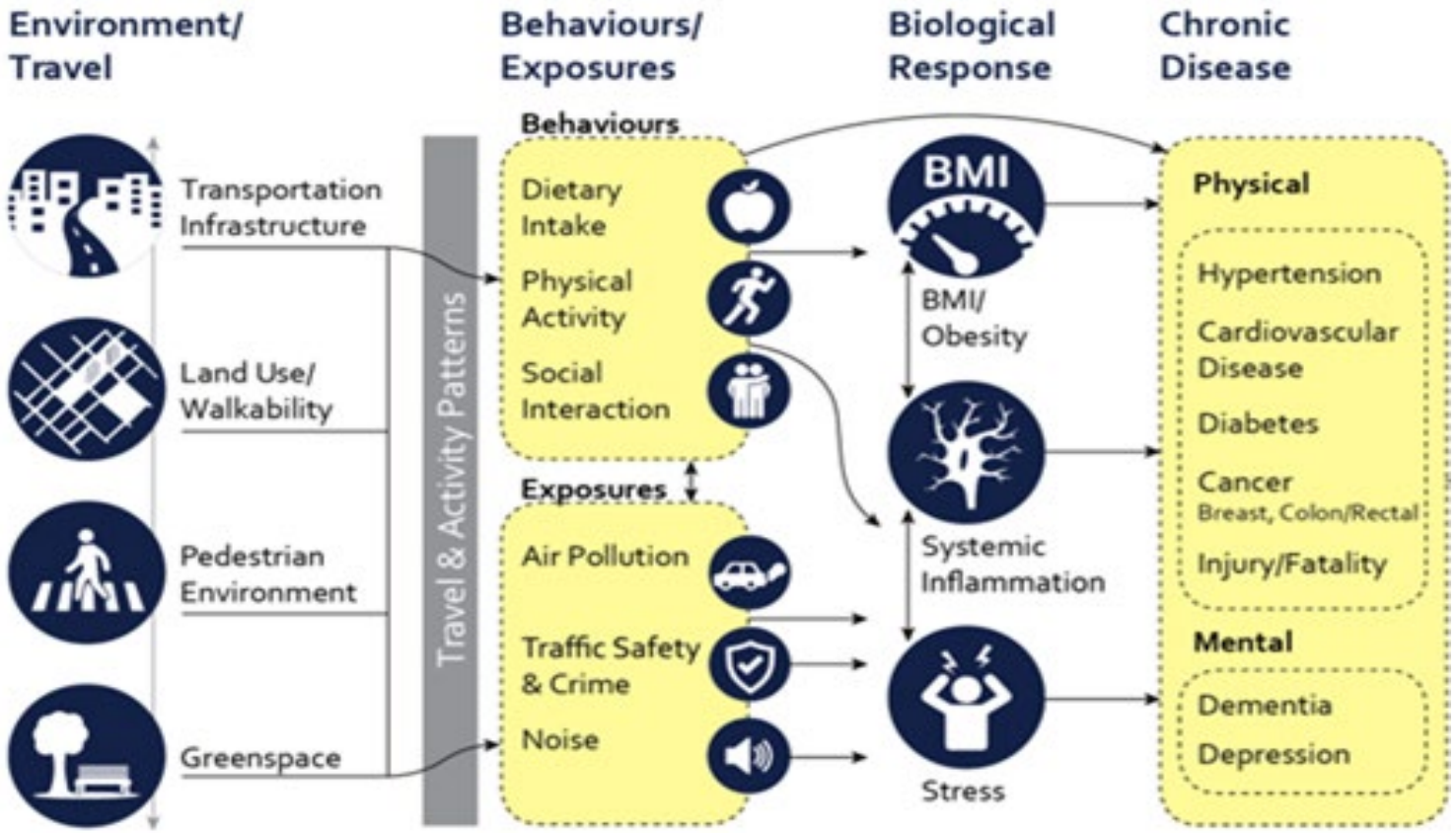
The Environment Health Mechanism

- Emphasizes the protection of people from environmental hazards.
- intrinsically linked to social equity and justice issues--transportation externalities disproportionately affect areas where the most disadvantaged reside.



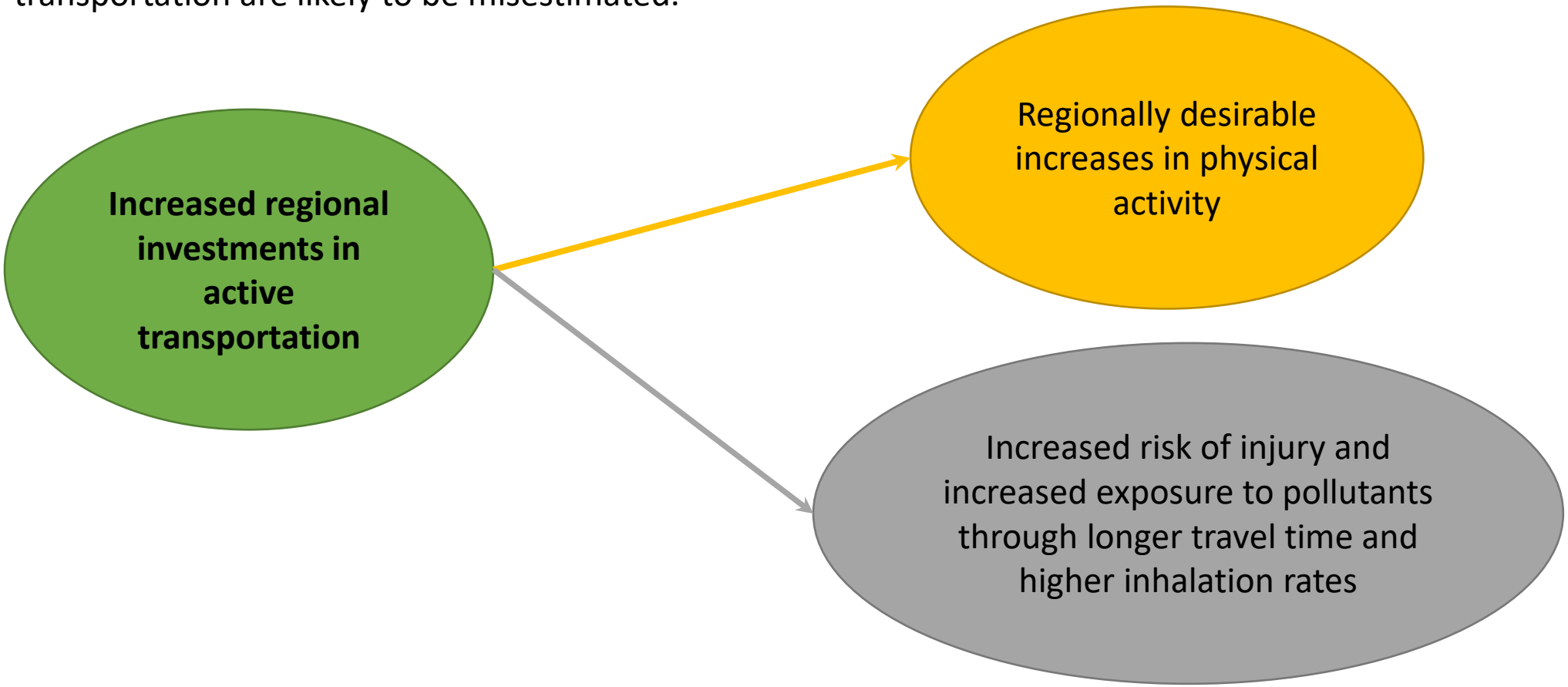
The Behavioral Health Mechanism

- Supported by a growing body of evidence documenting how land use and transportation can support or hinder healthy behaviors such as physical activity and healthy diet.
- A heavy emphasis on obesity and the associated chronic diseases such as cardiovascular disease, respiratory illness, Type 2 diabetes, and poor mental health.



Why integration?

- Without considering both behavior and exposure-based pathways, the overall health impacts of transportation are likely to be misestimated.



The Social Exclusion Mechanism

- The intersection of transport and social disadvantage.
- Inaccessibility affects all domains of life, e.g., services and goods, social networks, and decision making.

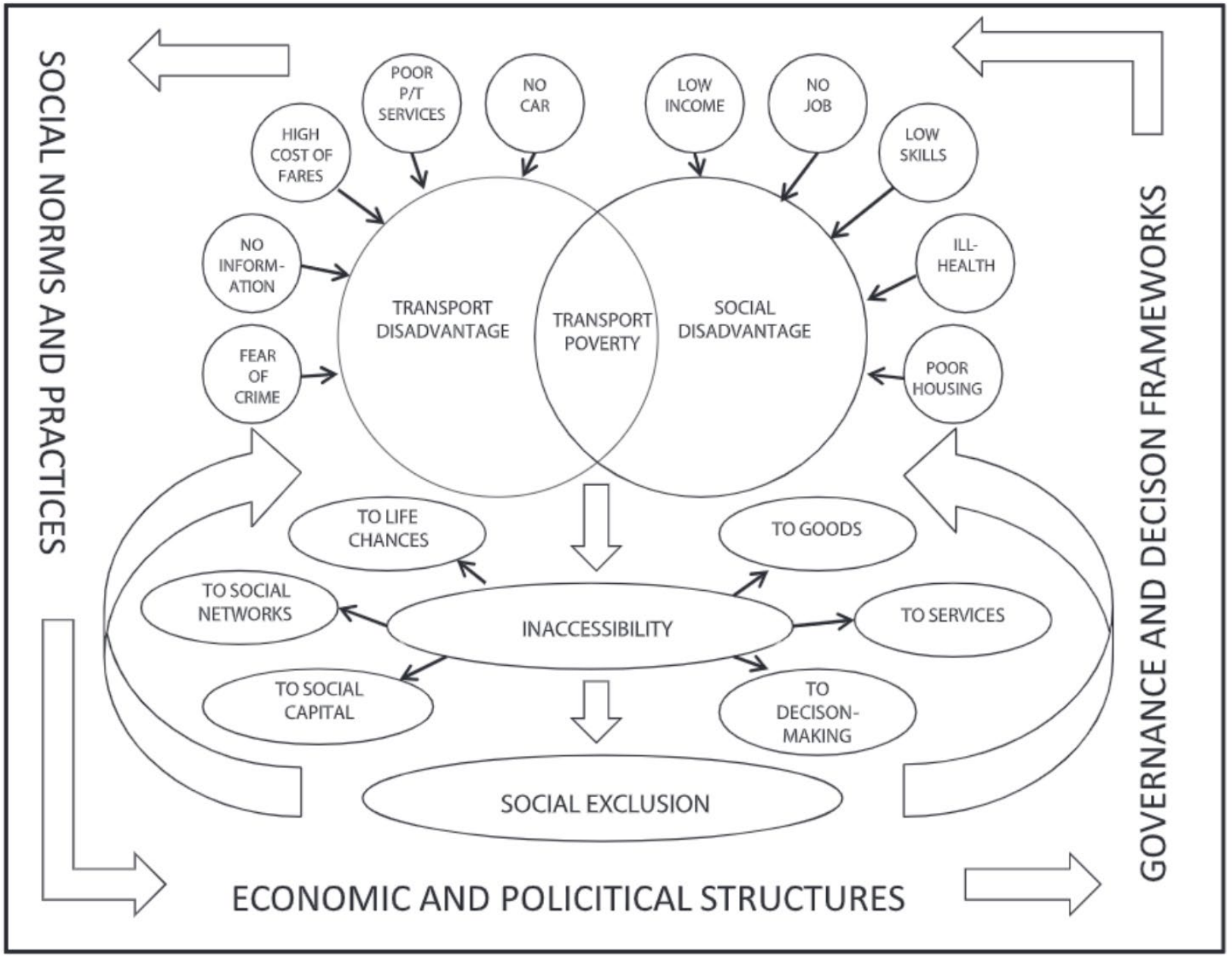


Fig. 1. Diagram to illustrate the relationship between transport disadvantage, social disadvantage and social exclusion.

Innovations in the Social Exclusion Framework

- Recognize that the transportation-health connections operate in multiple life dimensions, including economic opportunities, daily activity participation, and civic and political engagement.
    - Social exclusion involves “the lack or denial of resources, rights, goods and services, and the inability to participate in the normal relationships and activities, available to the majority of people in a society, whether in economic, social, cultural or political arenas.”
- Emphasizes the interactions between transportation disadvantage and social disadvantage, acknowledging multiple, intersecting deprivations.
    - It moves away from the traditional systems-based transportation service provision approach towards a more people-oriented and needs-based social policy approach that focuses on accessing key life-enhancing opportunities.
- Relates the problems back to how the policy decisions and practices of local authorities and agencies may have systematically excluded certain individuals and/or communities from the benefits.
    - It raises questions about systemic inequity in the distribution of transportation and non-transportation resources.

A Unified Model of the Health and Transportation Nexus

Integrating the social determinants of health framework with three pathway frameworks: environmental health, behavioral health, and social exclusion.

Integration

- All five dimensions of social determinants of health are relevant to transportation and health.
  - The **neighborhood and built environment** provide safe, multimodal routes for convenient access to healthy destinations, including **education** and **healthcare**.
  - Transportation not only provides access for one to obtain a good paying job for **economic stability**, but also the means for people to interact with the **community** and stay connected **socially**.

- The social determinants of health interact with transportation and operate on health and equity outcomes via three major mechanisms.

- The three mechanisms can overlap and interact with one another to moderate the effects of social determinants of health on health and equity outcomes.
  - For example, traffic accidents can be studied from both the environmental and behavioral health perspectives.
  - Social inclusion affects the types of environmental exposure to health risks and the environmental contexts for behavior and therefore interacts with environmental and behavioral health mechanisms.

States in which their DOTs are pioneers in linking transportation to health

Strong integration of public health components into long-range transportation plans

- California-Caltrans
- Rhode Island-RIDOT

Dedicated programs to initiate interagency collaboration and promote collaborative health and transportation planning

- Massachusetts-MassDOT
- Minnesota-MnDOT
- Oregon-ODOT
- Washington State-WSDOT

Recommendations

01

Continue to foster partnerships across all agencies and stakeholders outside of Department of Health

02

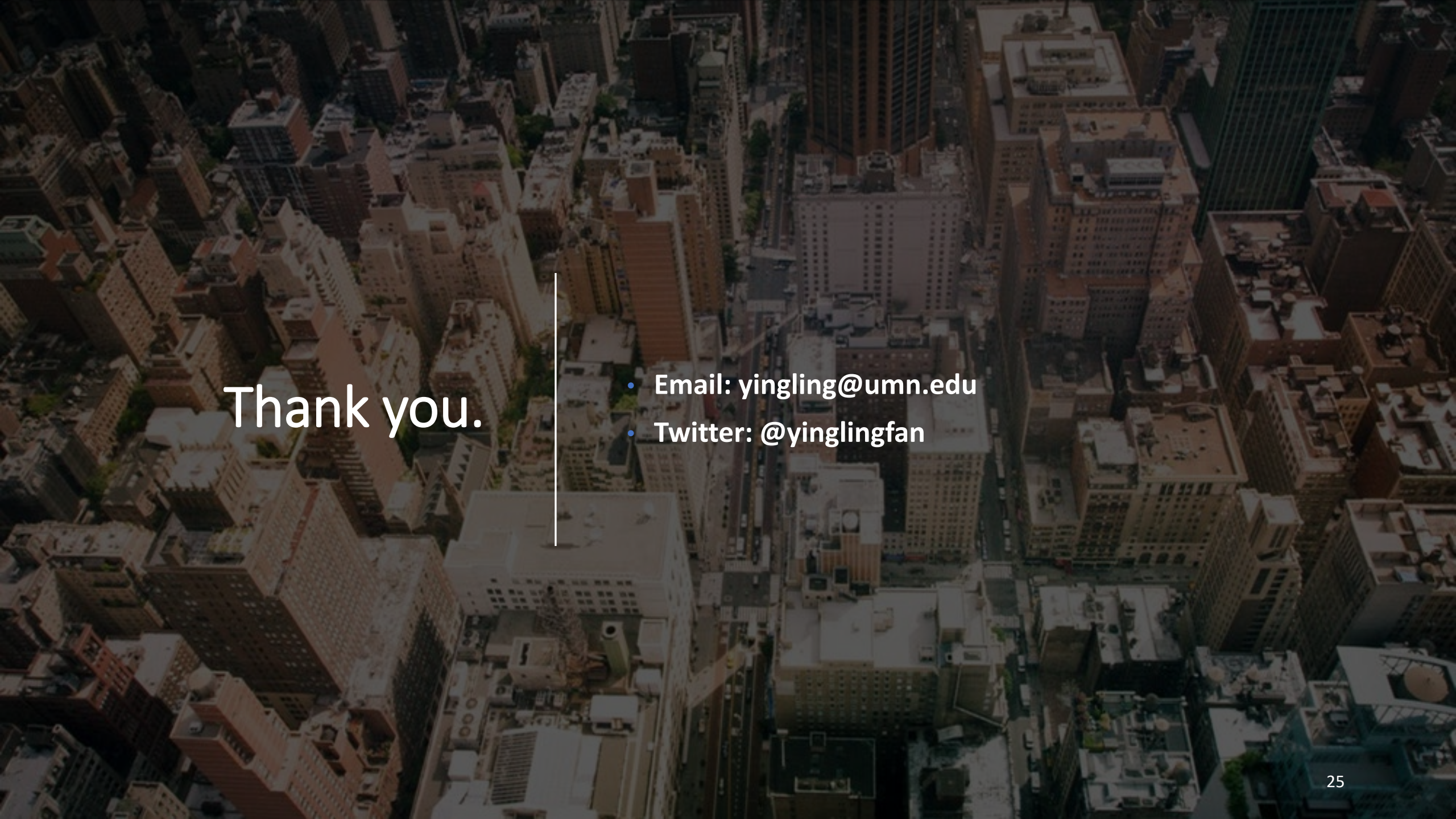
Develop MnDOT's definition of health and how it relates to transportation

03

Develop scoring and evaluation matrix for project selection and project evaluation

04

Ensure MnDOT staff is well-versed and trained in transportation and health concepts



Thank you.

- **Email: yingling@umn.edu**
- **Twitter: @yinglingfan**