Developing an Induced Travel Assessment Framework

Irfan Batur, Arizona State University
Thomas Rossi, Cambridge Systematics, Inc.
Chris Porter, Cambridge Systematics, Inc.
Kate Dannemiller, Cambridge Systematics, Inc.
Robert B. Noland, Rutgers University
Ram M. Pendyala, Arizona State University

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Arizona State University

RUTGERS
THE STATE UNIVERSITY OF NEW JERSEY

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Motivation

- **Growing interest** in induced travel in transportation planning
  - Why it matters: significant implications for project evaluation and investment decisions
  - Ongoing uncertainty and debate about its magnitude
  - Need for clarity on how best to define, measure, and communicate effects
- Motivate development of **a practical, evidence-based framework** to guide consistent assessment of induced travel

Project Introduction

- **NCHRP**-sponsored project (08-184)
  - *"Induced Demand Assessment Framework: A Guide"*
- National research effort to help DOTs **assess, define, and identify sources of induced travel**
- Two-year project (Oct 2024 – Sept 2026)

Project Team

- **Cambridge Systematics, Inc.**
  - Thomas Rossi (PI)
  - Chris Porter
  - Greta Ritzenthaler
  - Karl Reinhardt
  - Kate Dannemiller
- **Arizona State University**
  - Ram Pendyala (Co-PI)
  - Irfan Batur
  - Steven Polzin
- **Rutgers University**
  - Robert Noland (Co-PI)
  - Kelcie Ralph
  - Michael Smart

Project Objectives

- Conducting a comprehensive review of literature
- Defining induced demand
- Gathering and evaluating data for select case studies to develop assessment framework
- Piloting, validating, and testing the assessment framework
- Communicating findings to build consensus

Literature Review

- Conducted a comprehensive review of recent literature and current practices to **define induced travel and its components**
- Examined **different methods and analytical approaches** used to study and estimate induced travel
- Summarized findings to **highlight knowledge gaps and guide framework development** in subsequent tasks

Literature Review - Findings

- **General conclusions**
  - Most studies focused on highway capacity expansions
  - Strong evidence of induced travel associated with capacity improvements
  - Much of the literature focuses on elasticities of VMT w.r.t. lane-miles
  - Most studies over the past 15 years show elasticities of ~1.0
    - However, studies mainly used pre-2010 data, and there was limited investigation about how that might vary for different project types or contexts
  - Some variation in induced travel measures based on definition and context (size of area, highway type, etc.)

Definition of *Induced Travel*

- "**Changes in the amount and nature of travel** resulting from changes in the transportation system"
- Components include route shifts, mode shifts, destination shifts, time of day shifts, new trips, and land use development changes
- So…impacts are not limited to "new trips"

Use of Travel Demand Models to Estimate

- Two main model types to estimate induced demand effects:
  - **Four-step** trip-based models – traditional, sequential modeling approach
  - **Activity-based** models – more detailed, behavior-driven modeling approach

Travel Component	Four-Step Model	Activity-Based Model
Route shifts	✓	✓
Mode shifts	✓	✓
Destination shifts	✓	✓
New trip generation	✗	– *(Some sensitivity)*
Land use / development	✗	✗ *(Needs integrated model or SA)*

✓ Able to estimate – Limited estimation capability ✗ Not able to estimate

Other Tools to Estimate Induced Travel

- There are several tools available to estimate induced travel:
  - California Induced Travel Calculator (**CITC**)
  - The Minnesota Induced Travel Calculator
  - State Highway Induced Frequency of Travel (**SHIFT**) tool
  - FHWA Geospatial Economic Multimodal Systems Modeling (**GEMS**)
- Simpler to apply and rely on elasticity values or lookup tables
- Limited ability to reflect project-specific context or behavioral changes

Research Gaps

How induced travel effects vary for different project contexts

How travel speeds affect travel volumes

How traffic operational improvements affect travel demand

How components of travel change contribute to the overall induced travel

How much induced travel applies to commercial vehicle travel

Whether the underlying drivers of induced travel change over time

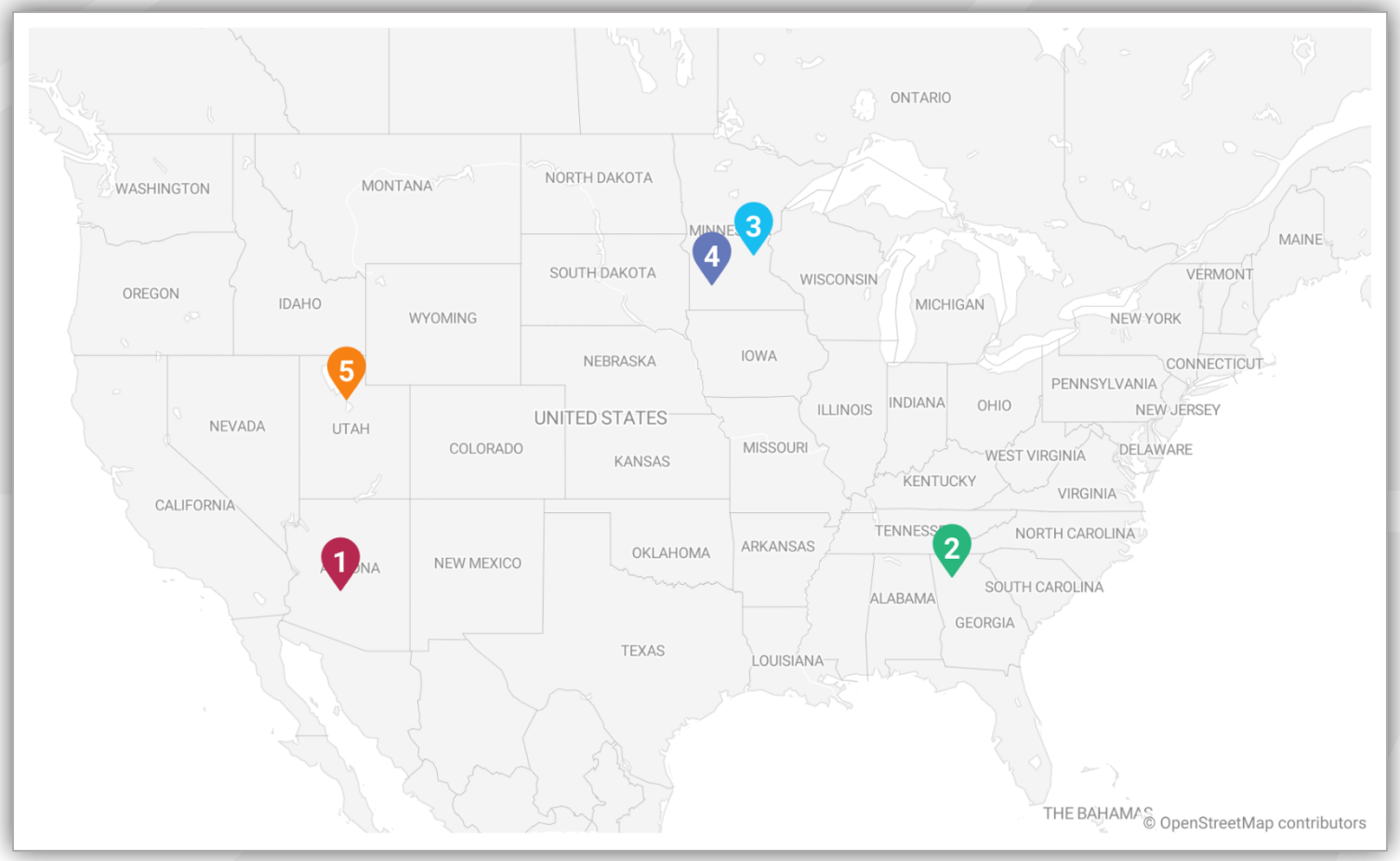
Not all of these questions can be addressed in the NCHRP project…

Case Studies (now underway)

- Five case studies to cover differences in project type, roadway type, area type and size, and geographic location
- Intended to obtain insights on the elements that characterize induced travel in different project contexts
- Identify different approaches, data limitations, and challenges for assessing induced travel

Case Studies (now underway)

1. Arizona Loop 101
2. Georgia I-75 Express Lanes
3. Minnesota I-94 Auxiliary Lanes
4. Minnesota US 14
5. Utah I-15 Lehi Corridor



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Case Study Data Collection

- **Travel demand model outputs** for “no-build” and “build” scenarios
- **Traffic counts** and vehicle miles traveled (**VMT**) data
- **Traffic speed data** from monitoring stations or GPS sources
- Population, employment, and land use data
- Location-based services (**LBS**) data for origins, destinations, and trip patterns
- **Transit ridership** and service data
- Other explanatory variables (e.g., fuel prices, unemployment, special events)

Next Steps

- Develop assessment framework based on case study results
- Pilot assessment framework with a few agencies
- Prepare final guidance document

Project ends October 2026

Guidance Document – Key Elements

- **Define induced travel** and its components for consistent assessment
- **Identify data needs** to support reliable evaluation at the project level
- **Outline alternative induced travel assessment methods** and contexts where each method is most appropriate
- **Provide step-by-step procedure** for applying the guidance in practice
- **Discuss limitations** and considerations for interpretation of results

Acknowledgments

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  - Atlanta Regional Commission
  - Georgia DOT
  - Maricopa Association of Governments (MAG)
  - Metropolitan Council
  - Minnesota DOT
  - Utah DOT
  - Wasatch Front Regional Council