Transportation Planning Perspectives Part 1: Transportation and Public Health
Session B2

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Scott Thompson-Graves (WRA)

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Erie, Pennsylvania
October 14-16, 2018
Learning Objectives

• Improve understanding of how to better account for public health outcomes for transportation decision-making
  – Better understand transportation factors that influence public health
  – Explore possibilities for collaboration between health and transportation agencies
  – Discuss tools and approaches that can be used to quantify health impacts
National Health Trends

- Self- Reported Obesity Among U.S. Adults (BRFSS, 2012)

Source: Centers for Disease Control and Prevention
National Health Trends

- Self-Reported Obesity Among U.S. Adults (BRFSS, 2015)
Determinants of Health

- ~60% of premature deaths result from social and environmental factors

Transportation and Public Health

• What are the largest transportation factors that influence public health?
Examples of health outcomes related to transportation:

- Obesity and related chronic disease
  - Access to physical activity
  - Access to healthy food
  - Preventive care
  - Treatment of conditions (Diabetes/Late Stage Kidney Disease)
- Infant mortality
  - Access to preventive and regular care
- Mental health, opioid crisis
  - Access to treatment
  - Access to jobs, basic needs
- Equity and more
  - Air quality
  - Noise exposure
  - Community identity

To create conditions for community wellbeing we must look back – at continuing, historic influences – and forward – to the major forces that shape current and future priorities. The Visualizing Wellbeing series explores the state of wellbeing in the United States through a collection of data visualizations. Each week we will explore one vital condition that comprise our framework for community wellbeing, developed in partnership through the Well Being Legacy Initiative.
Health Impact Pathways

Environment / Policy Change

Initial Outcomes
- Δ in vehicle miles traveled
- Δ in access to resources (recreational and other community resources) for certain populations
- Δ in travel convenience and time (greater impact on certain populations)
- Δ in amount of active travel

Intermediate Outcomes
- Δ in time spent in car
- Δ in physical activity levels
- Δ in crash rates and severity
- Δ in exposure to emissions

Health Outcomes
- Mental Health / Stress
- Overweight / Obesity
- Chronic Disease
- Injuries
Transportation and Public Health

• Two examples of including Public Health in Transportation Planning
  
  – Erie County Long Range Transportation Plan
  
  – Delaware Statewide Planning Toolset and Working Groups
2017 Update to the Erie LRTP

2042 Long Range Transportation Plan

Adopted by the Erie MPO
March 15, 2017
Erie Health Context

- Community Health Needs Assessment (CHNA)
  - Completed in 2015
  - Local health experts and community members
  - Unhealthy diets and obesity listed as key health concerns
Incorporate Health into the Plan

• Added a Health section to the Sustainability Chapter
  – Addresses walking accessibility
    • Transit
    • Fresh Food
    • Hospitals
    • Schools
    • Parks
  – Recommends formation of a Multimodal Transportation and Health Committee
Health Based Performance Measures

- **Enhanced Erie MPO Travel Demand Model**
  - Smaller zones
  - Active transportation forecasts at the individual street level
  - Accounts for multi-use trails and walk access to transit stops

- **HEAT tool**
  - Health Economic Assessment Tool
  - World Health Organization
  - Health-related mortality risk comparisons
Access to Grocery Stores via Sidewalk

City of Erie Inset

Accessibility via Sidewalk
- Supermarkets
- Other Grocery Stores
- Environmental Justice Areas

Walking time to nearest grocery store:
- Less than 15 minutes
- 15 - 30 minutes
- 30 - 45 minutes
- 45 - 60 minutes
- More than 1 hour
- No sidewalk exists

Roadways:
- Interstate Highways
- US Highways
- State Highways
- Secondary Roads
- Municipal Boundaries

Distances in miles:
- 0
- 2
- 4

Map created by WRA
Access to Hospitals via Sidewalk
Access to Schools via Sidewalk
Access to Parks via Sidewalk
Impacts of the Plan

Health Benefit due to Walking (Annually)

<table>
<thead>
<tr>
<th>Year</th>
<th>Trail Scenario</th>
<th>No Build</th>
<th>Preferred</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2040 No Build</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2040 Preferred</td>
<td>0</td>
<td>0</td>
<td>$10,459,989</td>
</tr>
</tbody>
</table>

Baseline:
- 2010: $238,500,000
- 2040 No Build: $247,900,000
- 2040 Preferred: $248,100,000
Delaware: Taking Action in Transportation

- Estimating health impacts of land use/transportation scenarios

  - Existing strategies fall short
    - Health impact assessment not quantitative
    - Standard TDM and travel survey lack detail

  - Model to quantifying land use/transportation decisions, comparative risk assessment
    - DeIDOT leading cross collaborative group
    - TDM, Travel Survey + ITHIM
# Health Impact Estimation

- Cross-Disciplinary Approach

## Partners and Roles

<table>
<thead>
<tr>
<th>PARTNER</th>
<th>ROLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delaware Department of Transportation</td>
<td>DelDOT</td>
</tr>
<tr>
<td>University of Delaware Center for Applied Demography &amp; Survey Research</td>
<td>CADSR</td>
</tr>
<tr>
<td>Whitman, Requardt &amp; Associates, LLP</td>
<td>WRA</td>
</tr>
<tr>
<td>Delaware Division of Public Health</td>
<td>DPH</td>
</tr>
<tr>
<td>Delaware Office of State Planning Coordination</td>
<td>OSPC</td>
</tr>
<tr>
<td>Environment &amp; Policy Committee, Delaware Coalition for Healthy Eating &amp; Active Living</td>
<td>DEHEAL</td>
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<tr>
<td>Delaware Department of Natural Resources and Environmental Control</td>
<td>DNREC</td>
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</tbody>
</table>
Health Impact Estimation

- Steps/Roles
Health Impact Estimation

• Data Inputs
  – Delaware Trip Monitoring Survey (DelDOT)
  – Behavioral Risk Factor Survey (Delaware Division of Public Health)
  – Mortality Data (Delaware Health Statistics Center)
  – Crash Data (Crash Analysis Reporting System, DelDOT)
  – Census 5-year population demographics (American Community Survey)
  – Population Projections (Delaware Population Consortium)
Health Impact Estimation

- Enhancing the model

Delaware Mode Share by Survey Year

Survey Year

2010 2011 2012 2013 2014 2015

Mode Share

Car
Bus
Bike
Walk
Health Impact Estimation

- Enhancing the model
Health Impact Estimation

- Outcomes from ITHIM
  - Integrated Transportation and Health Impact Model

<table>
<thead>
<tr>
<th>Scenario:</th>
<th>Baseline</th>
<th>Alternative</th>
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</thead>
<tbody>
<tr>
<td>Pop.: 917,060</td>
<td></td>
<td>Pop.: 917,060</td>
</tr>
<tr>
<td>10% decrease in VMT over baseline</td>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Time (minutes / day / person)</th>
<th>Baseline</th>
<th>Alternative</th>
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</thead>
<tbody>
<tr>
<td>Walk</td>
<td>2.6</td>
<td>7.6</td>
</tr>
<tr>
<td>Bike</td>
<td>0.15</td>
<td>0.15</td>
</tr>
<tr>
<td>Bus</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>Train</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Car driver</td>
<td>42.4</td>
<td>36.2</td>
</tr>
<tr>
<td>Car passenger</td>
<td>2.0</td>
<td>1.8</td>
</tr>
<tr>
<td>Motorcycle</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Total</td>
<td>47.3</td>
<td>47.3</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Relative Risk (percent difference)</th>
<th>Baseline</th>
<th>Alternative</th>
</tr>
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<tbody>
<tr>
<td>Breast Cancer</td>
<td>-1%</td>
<td></td>
</tr>
<tr>
<td>Colon Cancer</td>
<td>-1%</td>
<td></td>
</tr>
<tr>
<td>Dementia</td>
<td>-4%</td>
<td></td>
</tr>
<tr>
<td>Depression</td>
<td>-1%</td>
<td></td>
</tr>
<tr>
<td>Diabetes</td>
<td>-4%</td>
<td></td>
</tr>
<tr>
<td>Ischemic Heart Disease</td>
<td>-4%</td>
<td></td>
</tr>
<tr>
<td>Road Traffic Injuries</td>
<td>+10%</td>
<td></td>
</tr>
<tr>
<td>Stroke</td>
<td>-4%</td>
<td></td>
</tr>
<tr>
<td>All Cause Mortality</td>
<td>-1%</td>
<td></td>
</tr>
</tbody>
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Livability Collaborative

- Recognition of health and quality of life impacts in fields not traditionally focused on these
- Increasing number of Policy, Partnerships, and Professionals interested

~2009 2011 2013 2015 2017

Brought together professionals in:
- Public health
- Transportation
- Environment
- Land use
- Others
Outcomes

- Opportunity: Jack A. Markell Trail

7 continuous miles of trail with only 2 street crossings!
Outcomes

- Survey of employees at Holloway Campus
  - ~1,000 workers
  - ~160 completed the survey
- Multi-agency collaboration efforts

Gate installed to provide trail access for campus employees
Limitations/Uncertainties

- Unreliable for small geographies (regional OK)
- Physical activity substitution (assumes additive)
- Undersampling
  - demographic sub-group
  - geographic areas
- Crash data
Future Work

- Continue to improve data inputs
- Incorporate quality of bike/ped facilities
- Accessibility and land use impacts
- Fully integrate ITHIM into travel demand model environment

Photo Credit: Delaware Department of Transportation
Next Steps for Erie County

• Use health as a Decision Lens category in the Erie County Parks, Trails & Recreation Plan
• Prioritize projects that address the gaps identified in the LRTP
• Continue data acquisition to input into health equity assessment tools
• Build bridges between the ECDP and the Health Department
Questions and Discussion

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