Evaluating active transportation initiatives using a public health lens

Geoff Noxon
Acknowledgement

Centre for Chronic Disease Prevention

www.phac-aspc.gc.ca
Overview

• The need for a public health lens
• A logic model for active transportation outcomes
• Linking active transportation indicators & health outcomes
• The challenges we face
• What we need to know
• Three approaches being used today
• Where to find data
The need for a public health lens

- AT is a high-profile issue (FINALLY!)
- Real health & safety benefits
- Many groups are interested
- Improves planning & performance measurement
- Canada is lagging

Healthy Canada by Design: BC Project on Municipal Data Needs in Lower Mainland (2013)
#1 need: Metrics linking transportation to health
A logic model for active transportation outcomes

- Logic models show how actions yield results
- Help us choose, sell, plan, design & evaluate initiatives
- Initiatives need unique logic models
- Umbrella logic model
  - Framework for initiative-specific logic models
  - Reduce effort and improve consistency
A logic model for active transportation outcomes

<table>
<thead>
<tr>
<th>INITIATIVES</th>
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<tbody>
<tr>
<td>What actions are being evaluated?</td>
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PATHWAYS
What attributes of active transportation options shape the choices that people make?

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BEHAVIOURAL IMPACTS
How do individuals change their active transportation behaviour?

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How do individual behaviour changes lead to broader outcomes?

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OUTCOMES
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- Initiatives
- Pathways
- Behavioural impacts
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A logic model for active transportation outcomes

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# A logic model for active transportation outcomes

## Initiatives
- Behavioural impacts

## Pathways

## Behavioural impacts
- Pathways

## Outcomes

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Linking AT indicators & health outcomes

**Behavioural impacts:**
Changes in moderate or vigorous activity by individuals
- Volume
- Trip frequency
- Trip length
- Trip duration
- Overall activity levels

**Pathway:**
More physical activity

**Outcomes:**
- Type 2 diabetes
- Heart disease
- Stroke
- Cancer
- Mental health

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**Behavioural impacts:**
Deaths
Injuries
And possibly also:
- Non-injury crashes
- Route selection
- Helmet usage
- Perceived safety levels

**Pathway:**
Exposure to safety risks

**Outcomes:**
- Death
- Injury

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**Behavioural impacts:**
VKT reductions
Possibly also:
- Exposure of AT users
- Outdoor noise levels

**Pathway:**
Exposure to air pollution & noise

**Outcomes:**
- Respiratory illness
- Respiratory attacks
- Depression
- Sleep disorders
The challenges we face

- Range of actors and initiatives
  - *Leadership*: Jurisdictions & sectors
  - *Initiatives*: Policy, plans, infrastructure, land use, operations, services, education, promotion
  - *Audiences*: Users, non-users, children, families, students, commuters, seniors, tourists
  - *Travel choices*: Mode, destination, route, frequency, safety
  - *Scale*: Individual measures & packages
The challenges we face

• Data collection
  – Incremental nature of behavioural changes
  – Crashes are sparse & dispersed
  – Disproportionate cost of measurement
  – Competing priorities
  – Practitioner skills
What we need to know

• Which indicators enable estimates of health outcomes
  – Incremental physical activity (duration, frequency)
  – Typical transportation indicators (volumes, mode shares) are not useful except at high level

• How to estimate outcomes & be confident in causal links
  – Few outcomes are directly observed
  – Instead: {indicators} → {factors/models} → {outcomes}
  – Need to isolate outcomes from:
    • context changes
    • concurrent initiatives
    • substitution effects
Three approaches being used today

1. Integrated assessment tools
   • Model multiple community-wide health benefits
   • Estimate:
     – Reductions in morbidity & mortality
     – Reductions in health care costs
     – Productivity improvements

Use of ITHIM in San Francisco Bay Area
Modelled daily AT usage: 4.5 → 22 minutes

Results:
• Heart disease & stroke ↓ 14%
• Diabetes ↓ 14%
• Dementia & depression ↓ 6-7%
• Breast & colon cancer ↓ 5%
• Overall mortality ↓ 2,300 deaths/year

Integrated Transport and Health Impacts Model (ITHIM)
UK Centre for Diet & Activity Research

Indicators:
Travel demands
Emissions & air quality
Crashes
Demographics
Public health

Pathways:
Physical activity
Crash risk exposure
Air pollution exposure

Outcomes:
Crash death & injury
Cardiovascular disease
Depression
Dementia
Diabetes
Breast & colon cancer
All-causes mortality
Three approaches being used today

2. Economic assessment tools

• Value health benefits in dollars to support benefit-cost analysis

• Best-known tool is Health Economic Assessment Tool (HEAT) for Walking and Cycling (World Health Organization)
  – For planning or performance measurement
  – Conservative approach:
    • Mortality only (death not illness)
    • Excludes crashes & air pollution
    • Average adult populations only (no subgroups)

Use of HEAT by City of Toronto
Estimated that walking & cycling levels in 2006 led to:
• ↓ 120 deaths/year
• Economic benefits of $130-$478M/year
• Medical cost savings of $110-$160M/year

New Zealand Transport
Health benefit of one adult becoming “active” ($NZD):
• $3,112-$4,417/year
Health benefit of one new pedestrian/cyclist ($NZD):
• $3.53-$5.01/km walked
• $1.77-$2.51/km cycled
• 50% less for existing users
Three approaches being used today

3. Health impact assessment

- Forecasts broad health outcomes of plans, policies & projects
- Quantitative & qualitative
- Corridor-scale to community-wide
- Multiple disciplines & stakeholders

Use of health impact assessment in Canada

- Required for all new laws & regulations in QC since 2002
- Metro Vancouver guidebook for planning activities
- Peel Region’s Healthy Development Index
Where to find data

• National population surveys
  – Canadian Census, Canadian Community Health Survey

• Community population surveys
  – Origin-destination surveys
  – Issue-based transportation surveys
  – Standardized physical activity surveys

• Targeted surveys
  – Intercept surveys
  – Workplace, school, program participant surveys

• Transportation user counts
  – Turning movements, automated counters, transit ridership

• Secondary data sources
  – Collision & trauma data
  – Air quality data
Thank you

• Many reasons to consider health benefits in AT planning & performance measurement
• Many stakeholders can benefit & contribute
• Case-specific logic model can guide data collection & analysis
• Diverse measures are a challenge
• Conventional indicators/data are inadequate
• Conventional resources are insufficient
• Useful approaches & tools exist
• Need more awareness, training, demonstration & sharing of results

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