

The health costs and benefits of urban planning

Dr. Daniel Fuller
@walkabilly



Thinking like a health person....

1. Populations
2. Co-benefits/co-risks
3. Inequities
4. Costs

Populations

Population health intervention research involves the use of scientific methods to produce knowledge about policy and program interventions that operate within or outside of the health sector and have the potential to impact health at the population level.

Prevention Paradox

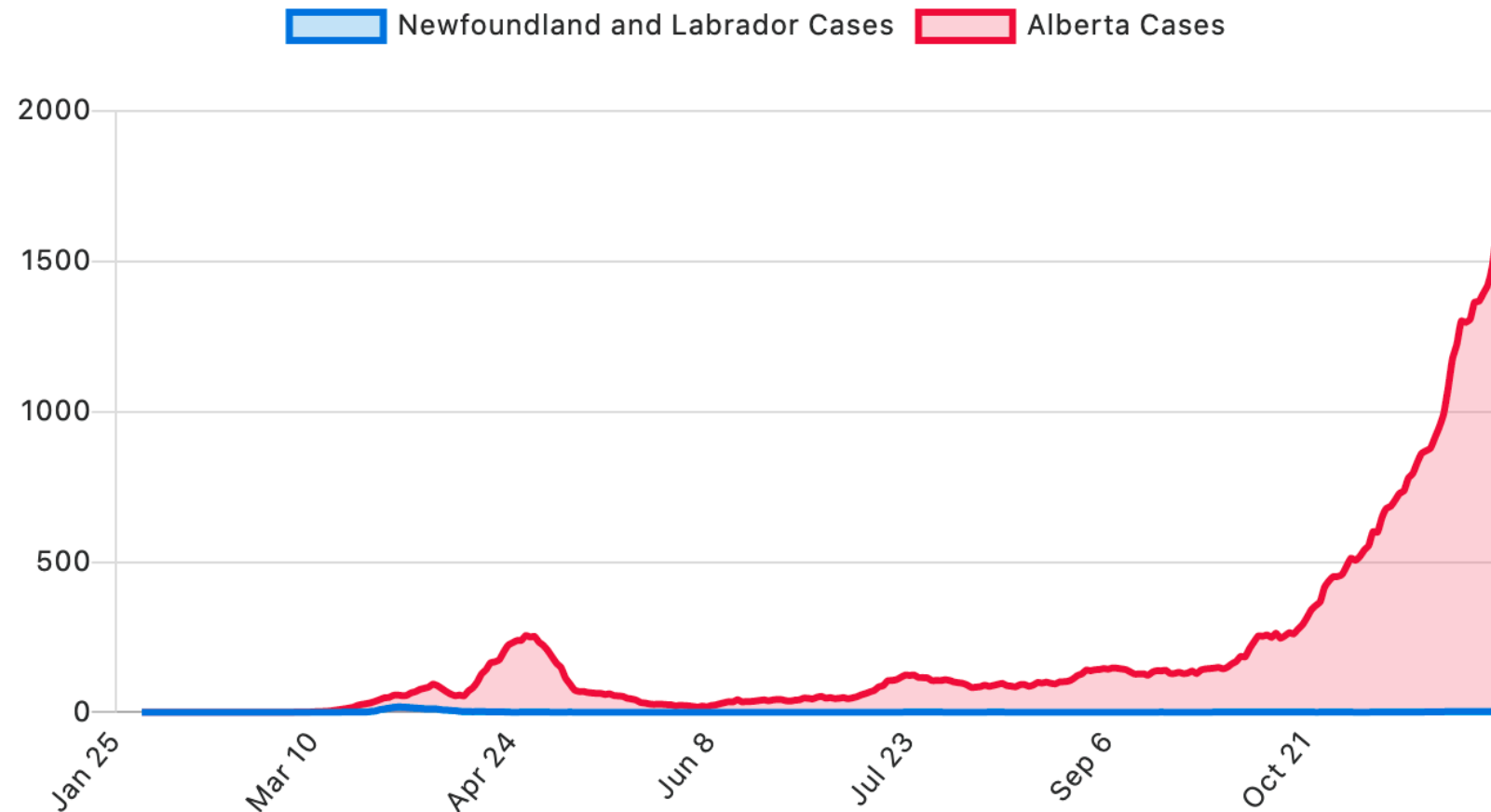
A preventive measure which brings much benefit to the population offers little to each participating individual



<https://www.flickr.com/photos/foilman/>

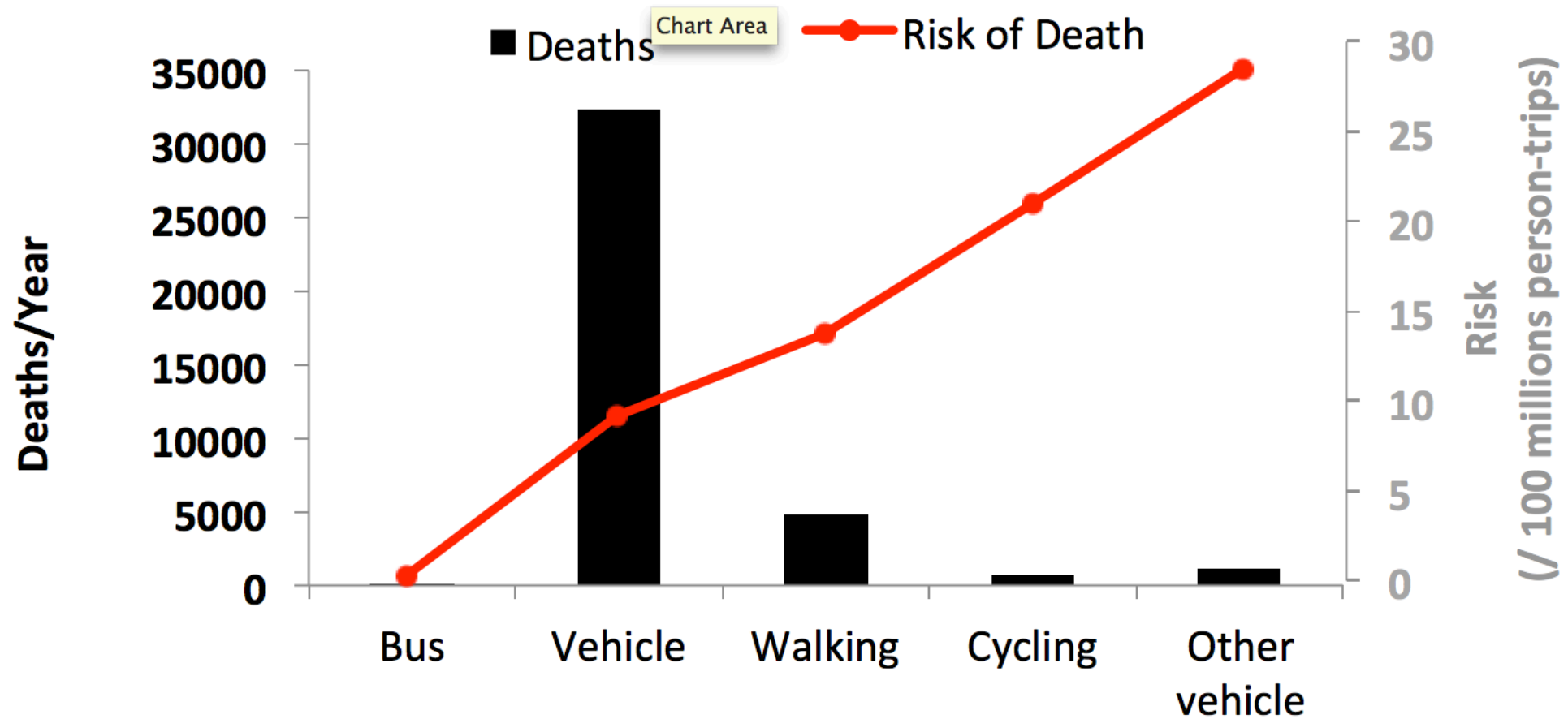
Causes

- Case
 - Episode of disorder, illness, or injury affecting an individual
- Incidence
 - The number of cases of a disease that come into being during a specific time period



<https://covid19tracker.ca/compareprovinces.html>

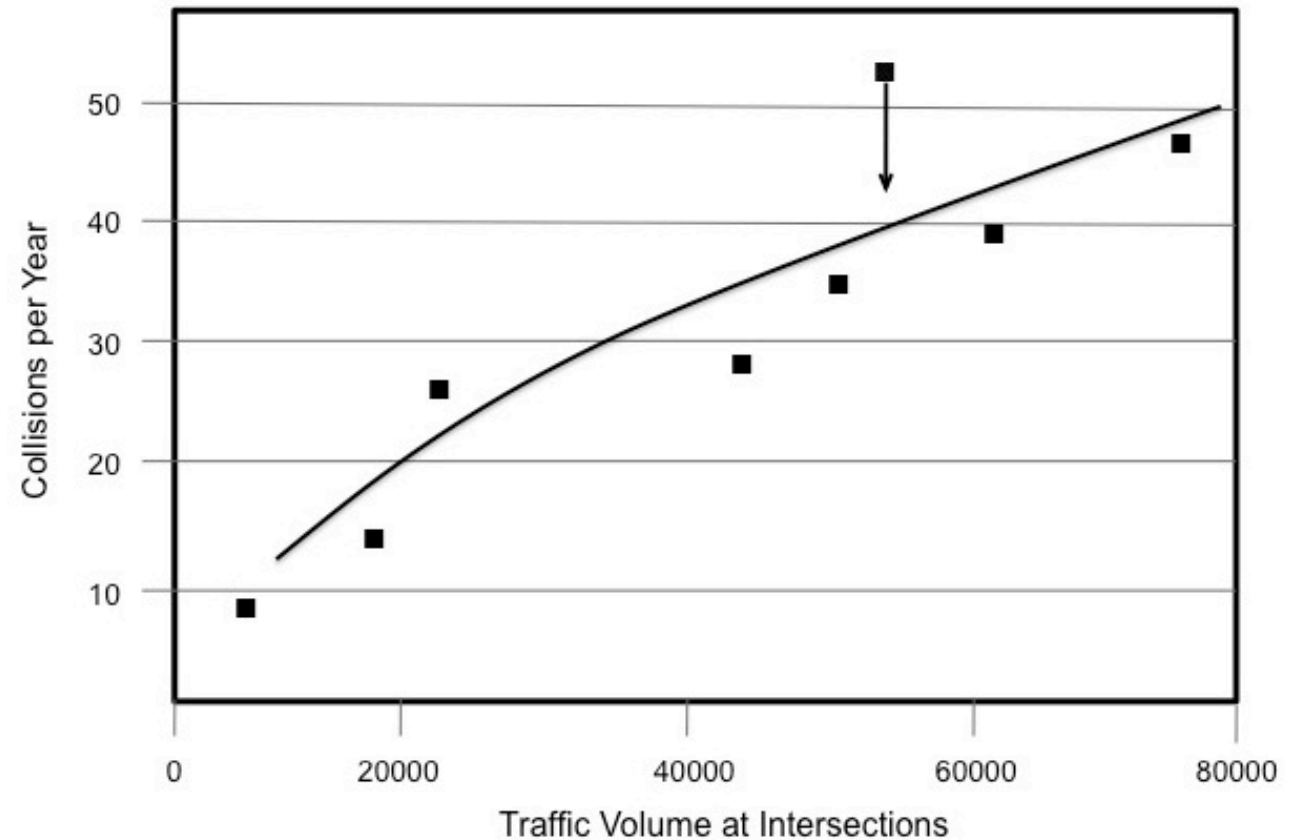
Causes



Typical High Risk Approach

- Return the deviant intersection or building or whatever to some type of norm or trend.

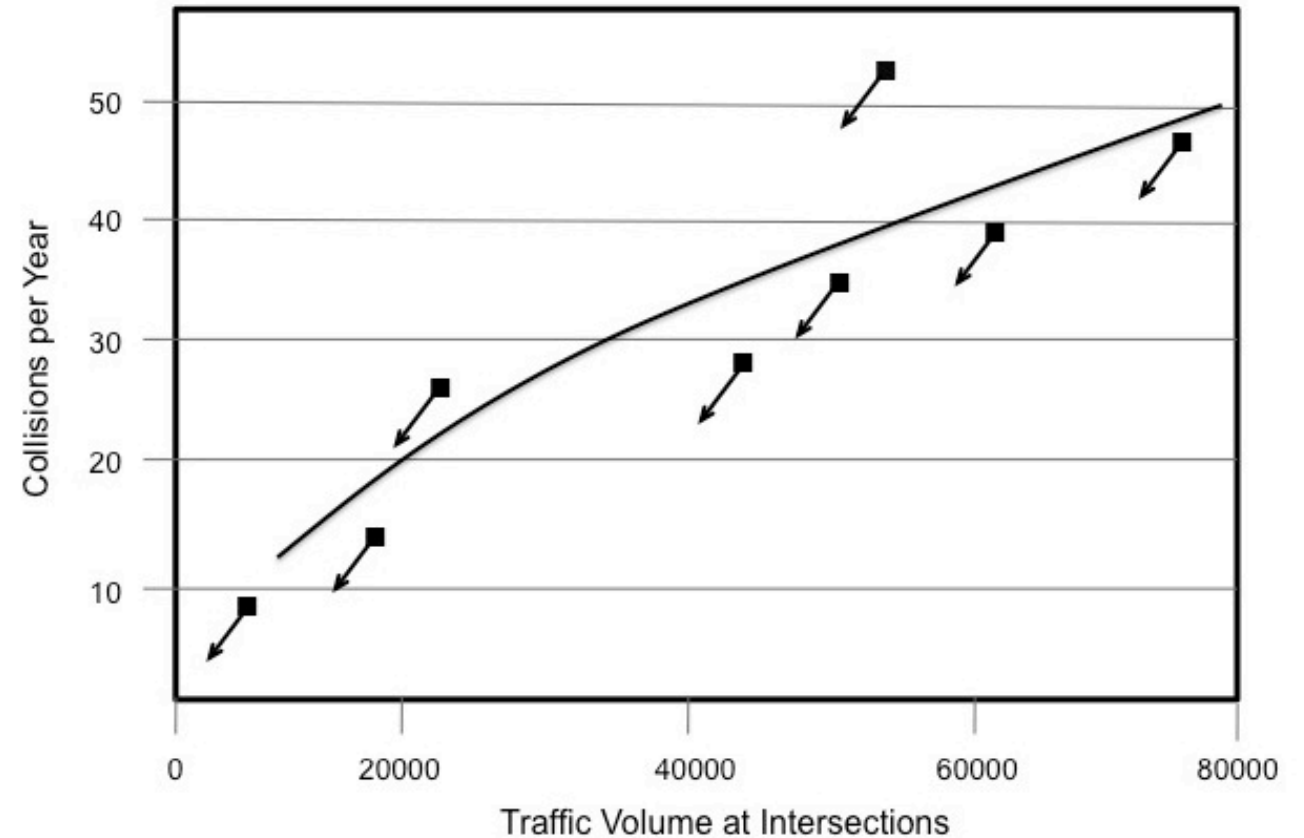
Figure 3a. Potential effect of reducing collisions rate at targeted “deviant” intersections.



Population Approach

- Can all intersection or buildings to change the entire curve.

Figure 3b. Potential effect of a global reduction in exposure to traffic volume at intersections.

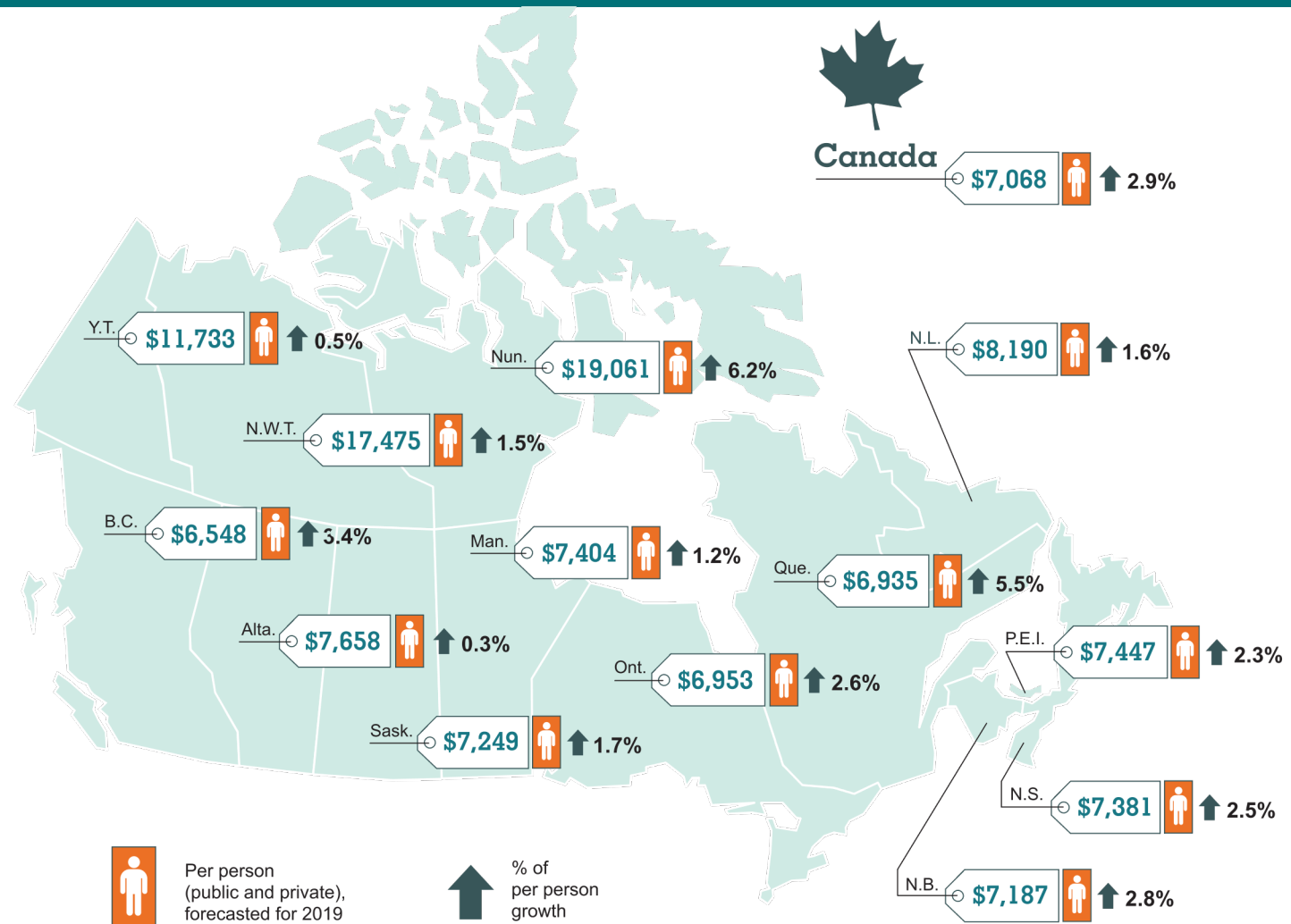


Population Approach

| | Person Trips Million | Fatal Risk/100 million | Status Quo | 4% Risk Reduction |
|------------|-------------------------|------------------------------|---------------|----------------------|
| Vehicle | 349125 | 9.25 | 32283 | -1291 |
| Walking | 35366 | 13.7 | 4846 | -194 |
| Bus | 11458 | 0.35 | 40 | -2 |
| Bicycle | 3314 | 20.97 | 695 | -28 |
| Motorcycle | 580 | 536.55 | 3112 | -124 |

Costs

- Canada health spending as a share of (GDP) = 11.6%.
- NL 38.9% of provincial \$ = 2.9 Billion.



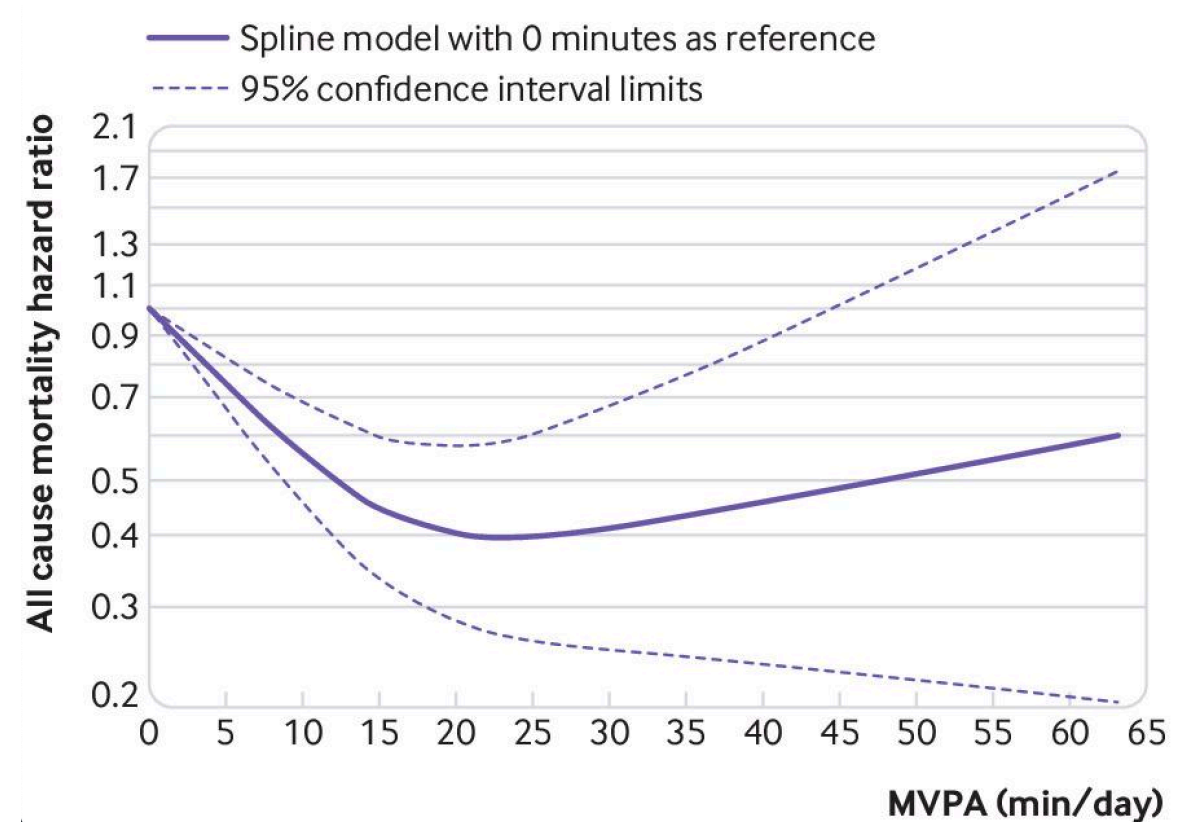
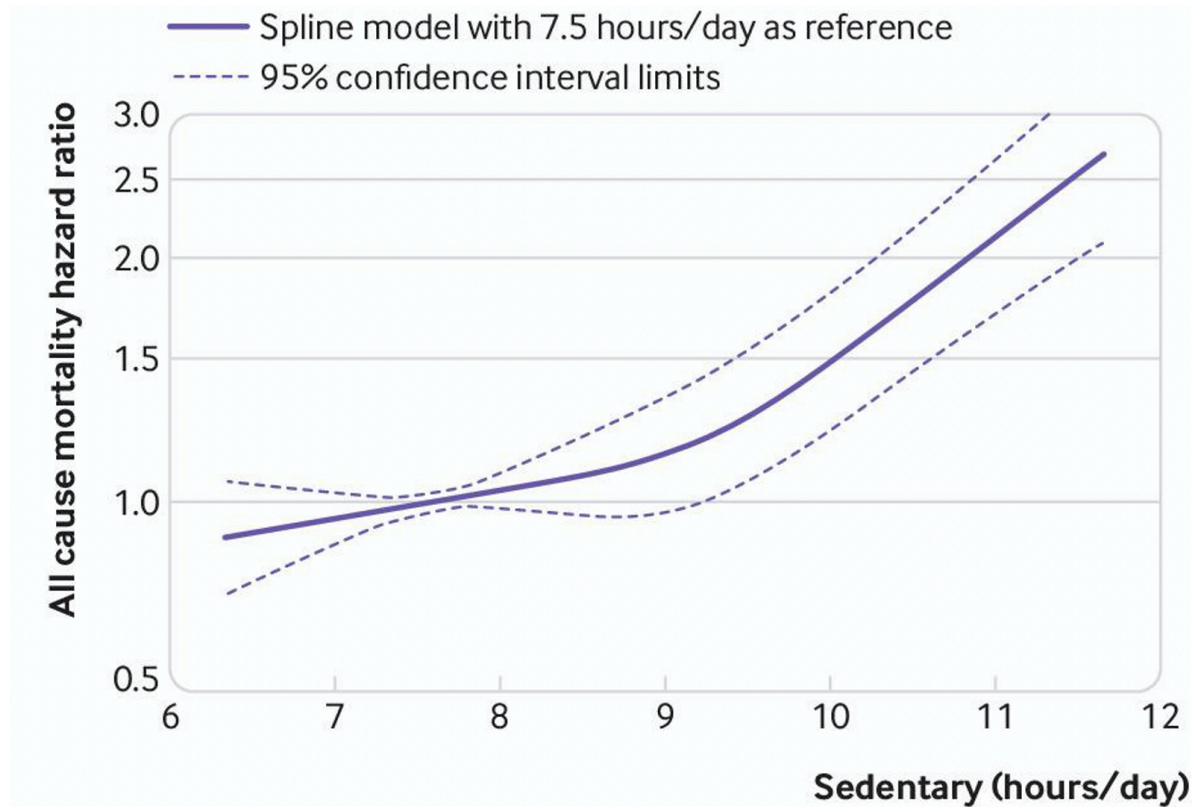
Co-benefits/co-risks

1. Accounting for multiple factors
2. Decisions with uncertainty

What goes up?

- Need to consider how things work together to make people healthier (or not) overall
 - Cycling infrastructure
 - Physical activity
 - Injuries and death due to collisions
 - Air Pollution
 - Noise?
 - Greenspace?

Quality of Evidence



Decision making is political



Ben Spurr ✓ @BenSpurr · Dec 2

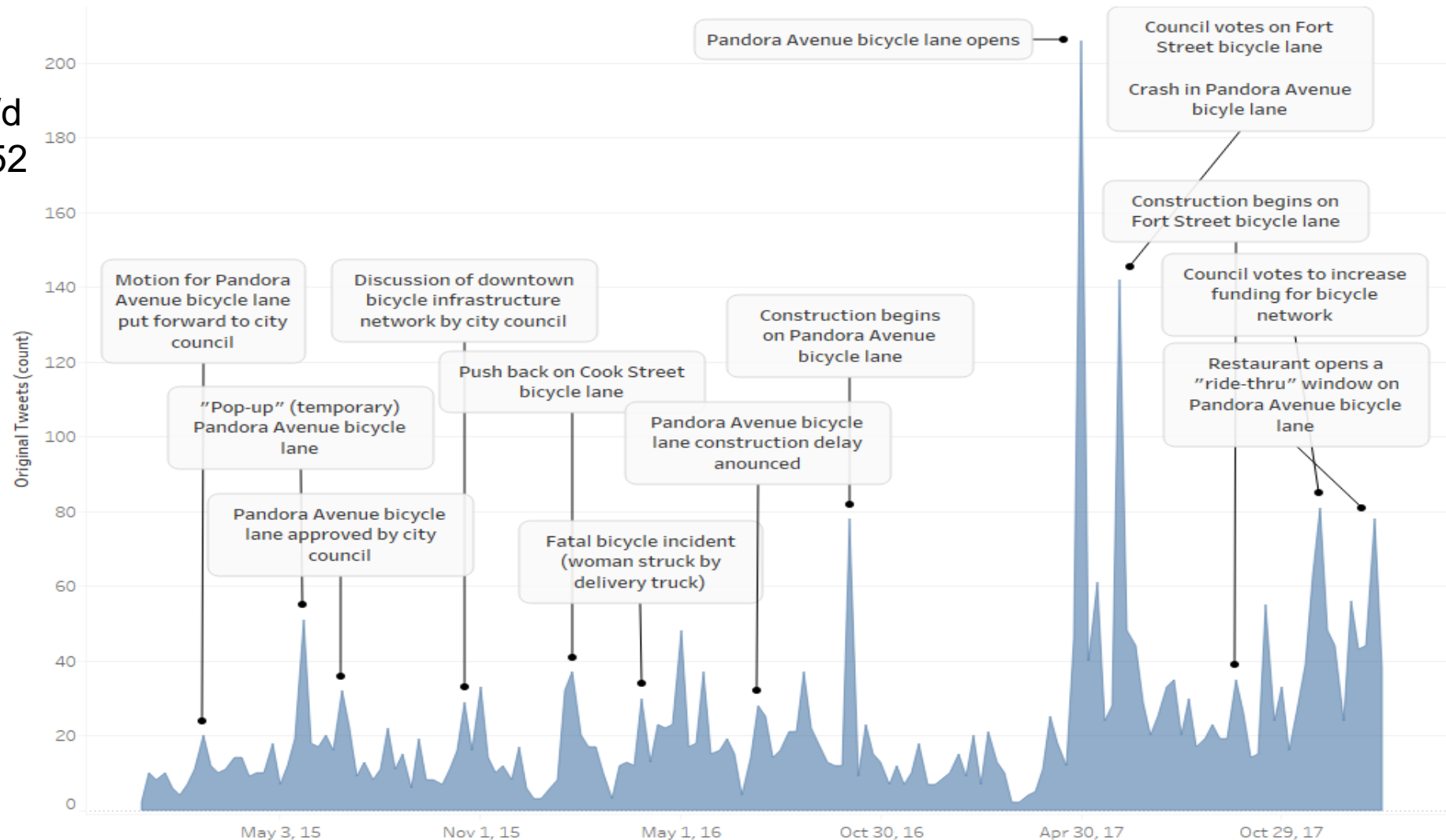
...

Scarborough cycling advocates say they're running out of options to build a safe network in their part of town. City says it will spend \$80,000 to remove the Brimley **bike lane** it spent \$160,000 to install in July



Decision making is political

Ferster et al., 2020 -
<https://journals.sagepub.com/doi/10.1177/0042098020938252>



Inequities

"The notion of vulnerable populations refers to groups who, because of their position in the social strata, are commonly exposed to contextual conditions that distinguish them from the rest of the population"

Inequities

Why We Must Talk About Race When We Talk About Bikes

SYSTEMIC RACISM CAN'T BE FIXED WITHOUT TACKLING IT WITHIN CYCLING.

B BY TAMIKA BUTLER Jun 9, 2020



How do we know what we know?

Two general types of studies

1. Natural Experiments
2. Health Impact Assessment

How do we know what we know?

1

AAA Cycling Network
Victoria, BC

2

Arbutus Greenway
Vancouver, BC

3

Bus Rapid Transit
Saskatoon, SK

4

Community Sustainability Plan
Montreal, QC

INTERACT

INTERVENTIONS, RESEARCH,
AND ACTION IN CITIES TEAM

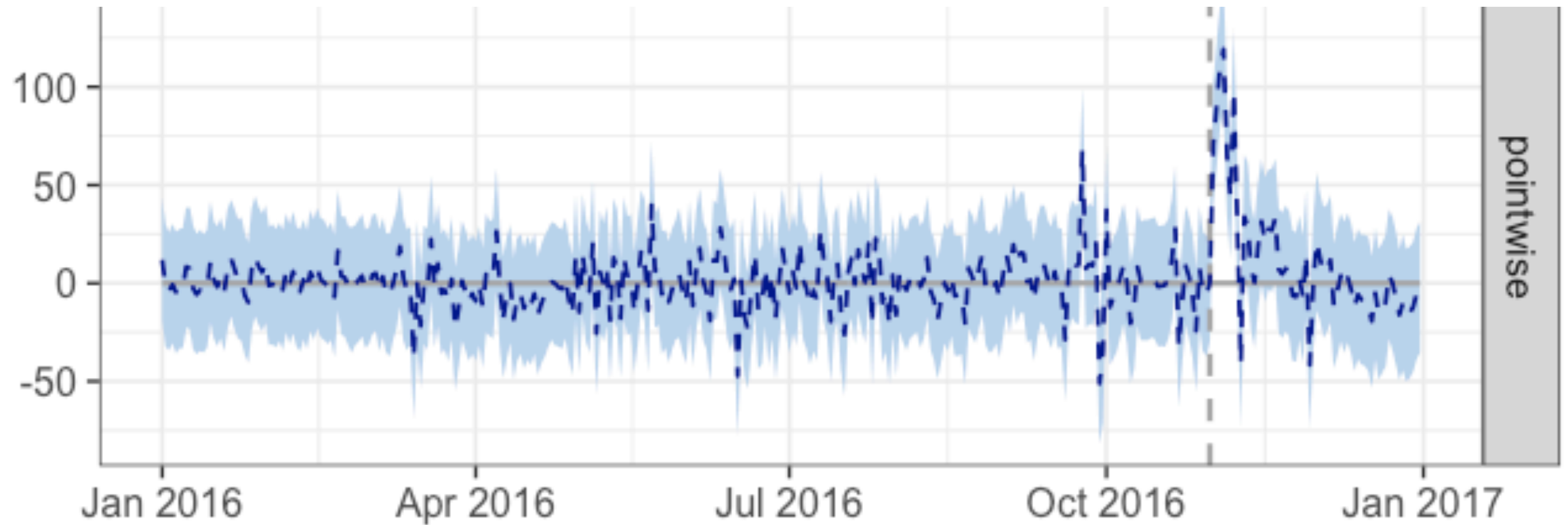
Natural Experiment Studies

- Evaluations of the health impacts of environmental changes
- We evaluate the impact of the changes that you design and create

WATCH: Halifax seeking feedback on proposed downtown bikeway system



Natural Experiment Studies



Health Impact Assessment

A combination of procedures, methods and tools that systematically judges the potential, and sometimes unintended, effects of a policy, plan, program, or project on the health of a population and the distribution of those effects within the population. HIA identifies appropriate actions to manage those effects.

ITHIM

Integrated Transport and Health Impact Model

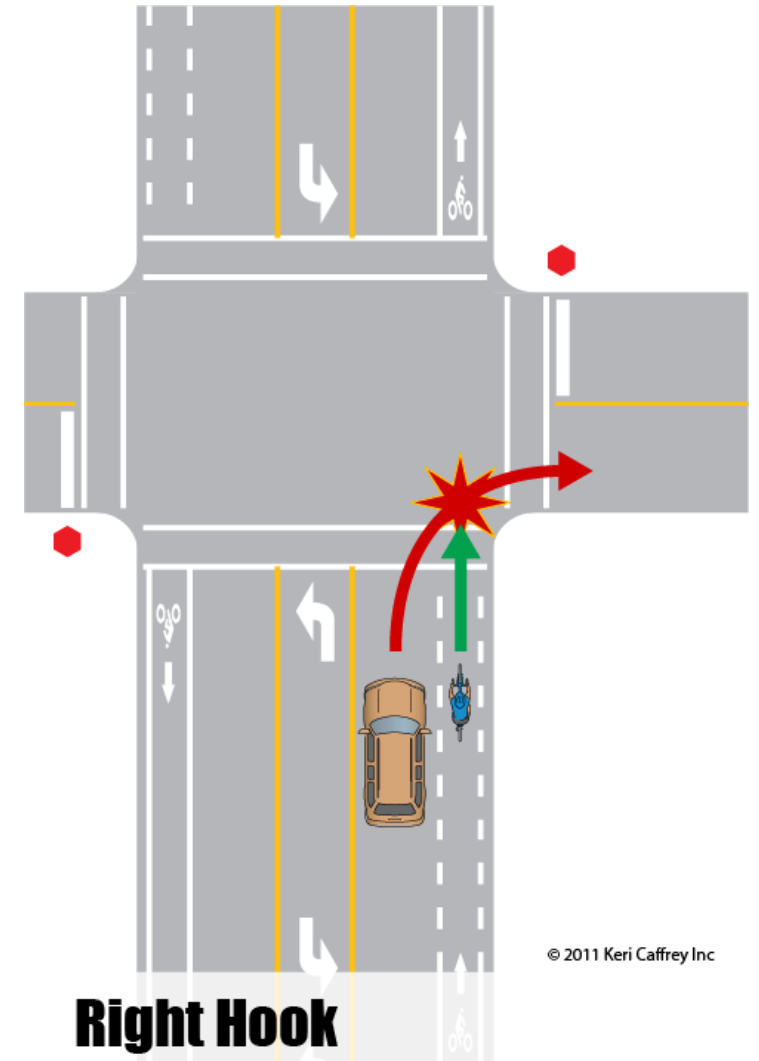
- Estimates overall health impact of transport interventions
 - DALYs
 - All Cause Mortality



ITHIM

London Cycle Hire Scheme

- Men: -72 DALYs (95% CrI -110 to -43)
- Women: -15 (95% CrI -42 to -6)
- Gender differences = Women are killed much more on bikes in London
 - Physical activity is the most important
 - Collision risk



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Transport and Health Impact Modelling

Health Cobenefits and Transportation-Related Reductions in Greenhouse Gas Emissions in the San Francisco Bay Area

Neil Maizlish, PhD, James Woodcock, PhD, Sean Co, MS, Bart Ostro, PhD, Amir Fanai, CEng IMechE, and David Fairley, PhD

Greenhouse gas emissions (GHGE) linked to global warming and climate change are the most significant threat confronting public health in the 21st century.¹ Approximately 7% of US GHGE are generated in California, which is the 12th largest emitter worldwide.^{2,3} California's transportation sector is the single largest source (38%),² and personal passenger vehicles account for 79% of that sector's GHGE. The State of California has enacted legislation to achieve a 2050 goal of reducing GHGE to 80% below its 1990 level. Strategies to reduce GHGE include reducing carbon di-

Objectives. We quantified health benefits of transportation strategies to reduce greenhouse gas emissions (GHGE).

Methods. Statistics on travel patterns and injuries, physical activity, fine particulate matter, and GHGE in the San Francisco Bay Area, California, were input to a model that calculated the health impacts of walking and bicycling short distances usually traveled by car or driving low-emission automobiles. We measured the change in disease burden in disability-adjusted life years (DALYs) based on dose-response relationships and the distributions of physical activity, particulate matter, and traffic injuries.

Results: Increasing median daily walking and bicycling from 4 to 22 minutes reduced the burden of cardiovascular disease and diabetes by 14% (32 466 DALYs), increased the traffic injury burden by 39% (5907 DALYs), and decreased GHGE by 14%. Low-carbon driving reduced GHGE by 33.5% and cardiorespira-

WHO HEAT – St. John's

Making St. John's more walkable worth more than \$100M over 10 years, say MUN researchers



WHO HEAT

- Doubling the mode share of walking in St. John's from 4.6% to 9.2%
- Economic benefit to be \$117,656,000
- Health benefit of 18 premature deaths prevented over a 10-year period.
- If \$3 million were invested annually, the benefit-cost ratio would be 4
 - Benefit would be 4 times greater than the cost.

WHO HEAT

Data Inputs and Assumptions

- Active Modes Data
- Motorized Modes Data
- General Adjustments
 - Take up time
- Contrast Adjustments
 - Proportion of new trips
- Monetization Parameters
- Fixed Parameters

WHO HEAT

Data Inputs and Assumptions

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Building Tools

ITHIM

- Various iterations
 - Excel sheet from hell
 - Analytica Software
 - R Packages - <https://github.com/ITHIM/ITHIM-R> still in progress
- WHO HEAT
 - Website - <https://www.heatwalkingcycling.org/#homepage>

<> Code

! Issues32

🔗 Pull requests0

📁 Projects15

📖 Wiki

📊 Insights

Development of the ITHIM-R, also known as ITHIM version 3.0. Started in January 2018.

🔄 156 commits

🌿 1 branch

🏷️ 0 releases

👥 6 contributors

Branch: master


New pull request

Create new file

Upload files

Find file

Clone or download

| | | |
|--|---|----------------------------------|
|  BelenZapata85 Included age and sex cohort graphs in pdf | | Latest commit 332964b 2 days ago |
| 📁 MSLT | Included age and sex cohort graphs in pdf | 2 days ago |
| 📁 PA | Add gbd data for England for all-cause mortality | 2 months ago |
| 📁 injuries | real Mexico City data | 18 days ago |
| 📄 .gitignore | Add rstudio project related files to git ignore | 2 months ago |
| 📄 ITHIM-R.Rproj | Add rstudio project file | 2 months ago |
| 📄 README.md | Update README.md | 2 months ago |
| 📄 RoadInjuriesMexico.R | Added mortality spline to derive between ages rates | 17 days ago |

Building Tools

- We don't get grants for building tools
- Side of desk projects
- Lots of half baked tools
- Partner with your local researcher!

Thank you

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