Using systems thinking to deliver healthier urban mobility

Presenters:

- **Dr Michael Hale (Auckland Regional Public Health Service)**
- **Associate Professor Alex Macmillan (University of Otago)**
- **Claire Pascoe (Waka Kotahi)**

Chair: Professor Simon Kingham (Ministry of Transport)

Transport Knowledge Hub

AVIATION & FORECASTING | DATA | ECONOMICS | ENVIRONMENT | HEALTH | MĀORI | SAFETY | TECHNOLOGY & INNOVATION | URBAN

Systems thinking in Public Health

Michael Hale – Ride

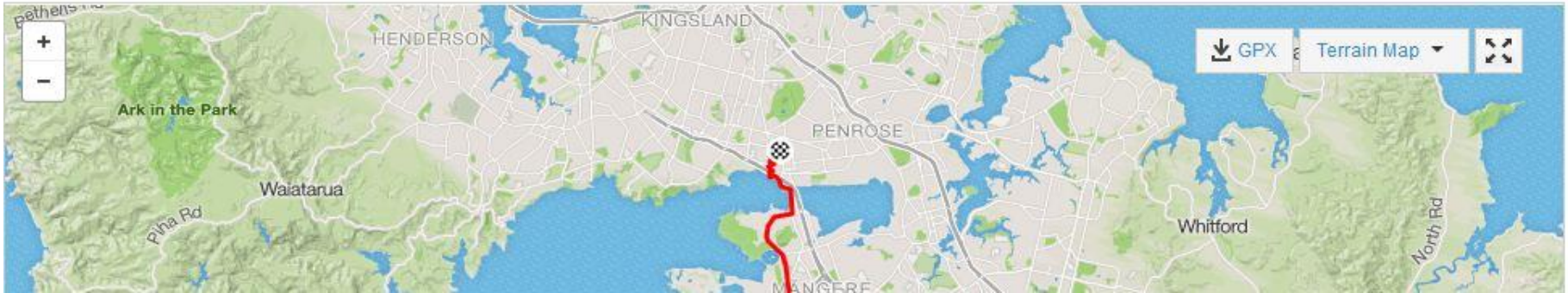
3 1

Transport Knowledge Hub
Michael Hale, Auckland Regional Public Health Service

STRAVA LABS
View Flybys ›

	Avg	Max	Show More
Speed	19.9km/h	40.0km/h	
Elapsed Time	44:58		

Bike: Commuter



What is public health?

"the art and science of

preventing disease, prolonging life** and **promoting health
*through the **organised efforts** of society"*

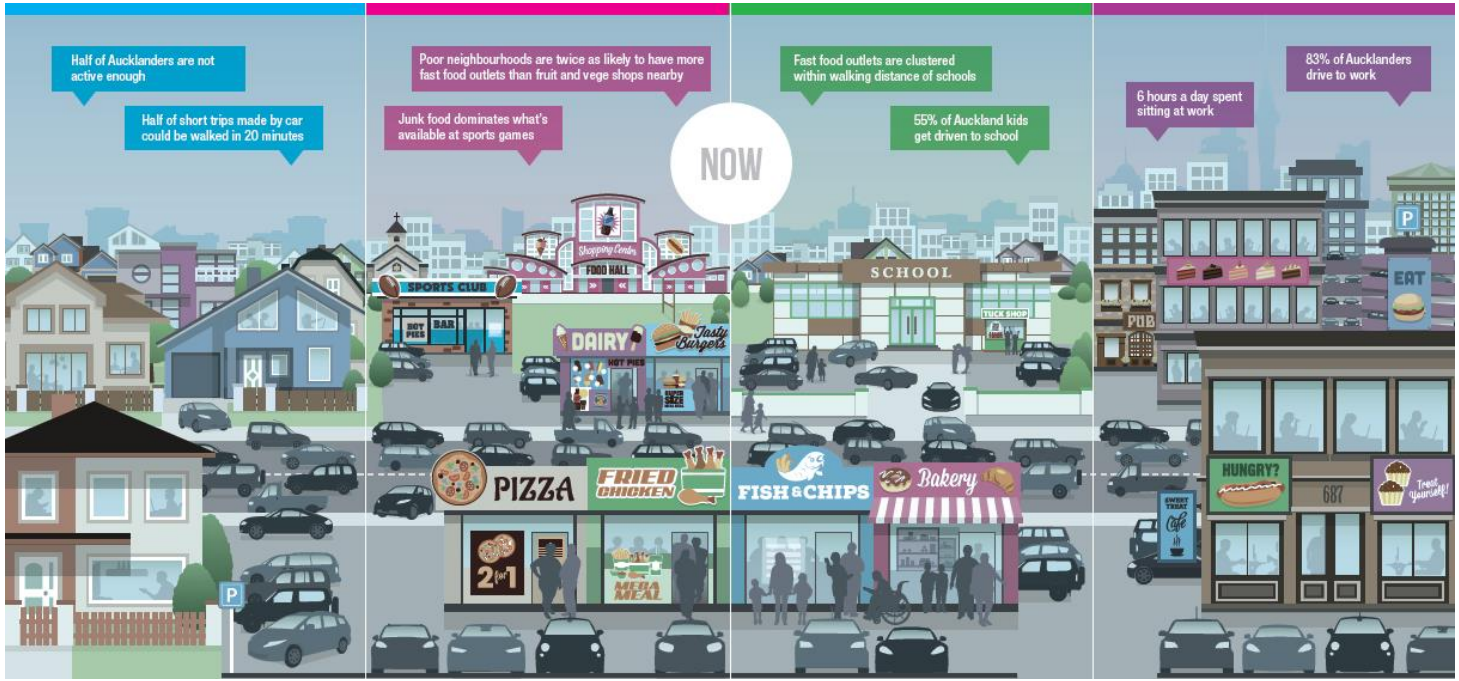
(Acheson, 1988; WHO)

HEALTHY AUCKLAND TOGETHER

Personal Health vs. Public Health

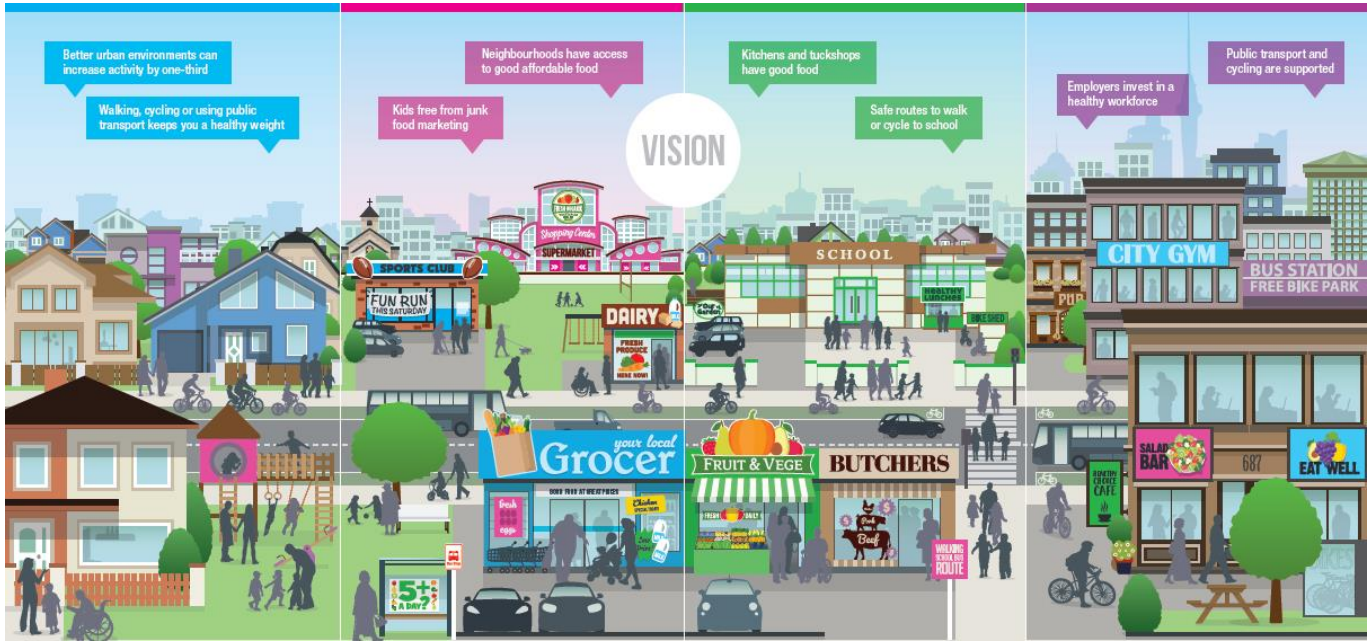
Why is systems thinking important?

- *'How systems work, and how we play a role in them lets us function more effectively and proactively within them. The more we understand systemic behaviour, the more we can anticipate that behaviour and work with systems (rather than being controlled by them)'* Daniel Kim



What is a system?

- A system is a group of interacting, interrelated or interdependent parts that form a complex and unified whole
  - Systems have purpose
  - All parts must be present for the system to function optimally
  - The way in which parts are arranged affects the performance of a system
  - Systems attempt to maintain stability through feedback



What determines well-being and health?

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Ottawa Charter for Health Promotion

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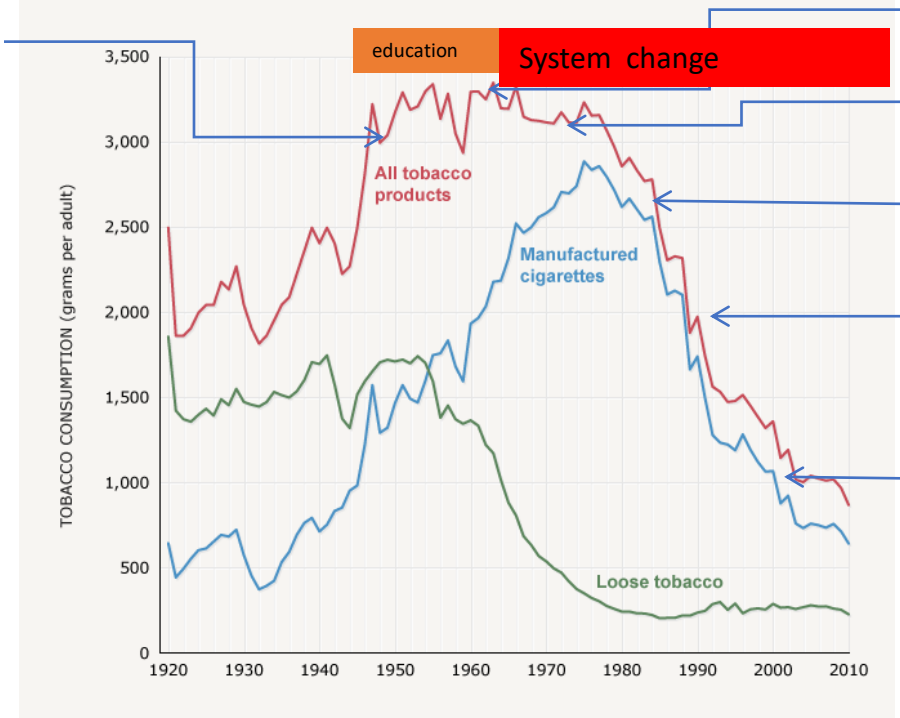
Systems focus for the win: **Tobacco Control in NZ**

Health Dept posters 1948



TV& radio ads banned 1963

Pack warnings 1974

First tax increase 1985

SE Act 1990 & sponsorship bans

SEAA 2005 bars smokefree

Jock Phillips, 'Smoking - Smoking under attack: 1960–2000s', Te Ara - the Encyclopedia of New Zealand, http://www.TeAra.govt.nz/en/graph/38983/tobacco-consumption-per-new-zealand-adult-1920-2010 (accessed 19 June 2017)

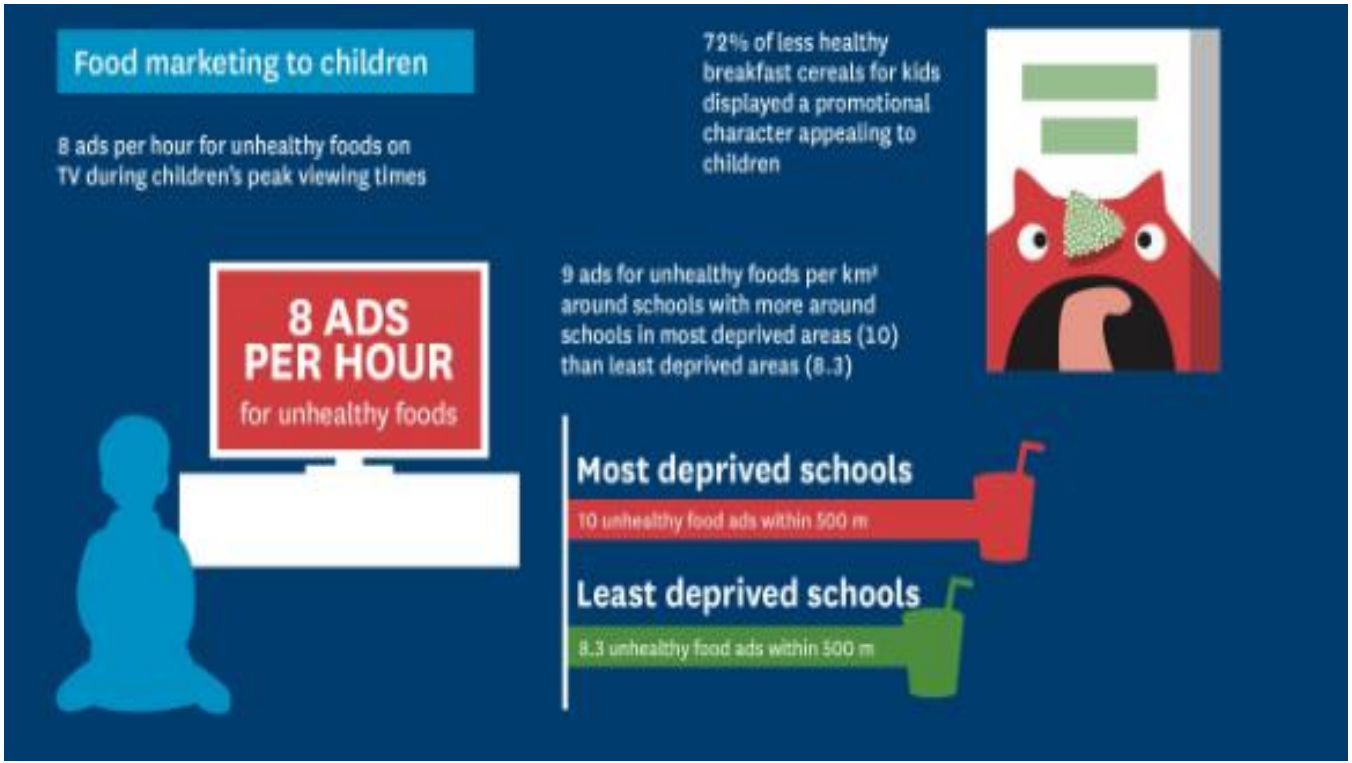
System Actions for a Healthy City

- Marketing to children
- Wai Auckland
- Transport Safety

HEALTHY AUCKLAND TOGETHER

People
are taking the
piss out of you
everyday.
They butt into
your life, take
a cheap shot at
you and then di-
sappear. They leer
at you from tall
buildings and make
you feel **small**. They
make flippant com-
ments from buses that
imply you're not sexy
enough and that all the
fun is happening somewhe-
re else. They are on TV making
your girlfriend feel inadequate.
They have access to the most so-
phisticated technology the world
has ever seen and they
bully you with it. They are
The Advertisers
and they are laughing at you. You, ho-
wever, are forbidden to touch them.
Trademarks, intellectual property
rights and copyright law mean adver-
tisers can say what they like wherever
they like with total impunity.
Fuck That.
Any advert in a public space that gi-
ves you no choice whether you see
it or not is yours. It's yours to take,
re-arrange and re-use. You can do
whatever you like with it.
Asking for permission is like
asking to keep a rock someone
just threw at your head. You
owe the companies nothing.
Less than nothing, you especial-
ly don't owe them any courtesy.
They owe you. They have
re-arranged the world to
put themselves in front
of you. They never asked for
your permission, don't even
start asking for theirs.
Banksy

Saturated: Junk food marketing to kids



INFORMAS Food Environment National Survey: Marketing to Children

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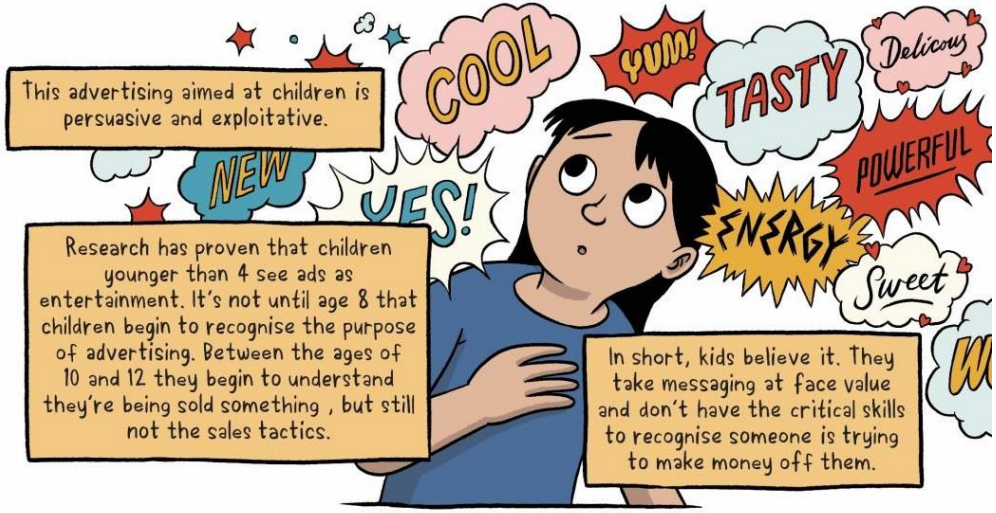
Not marketing to children, apparently

Successful complaints

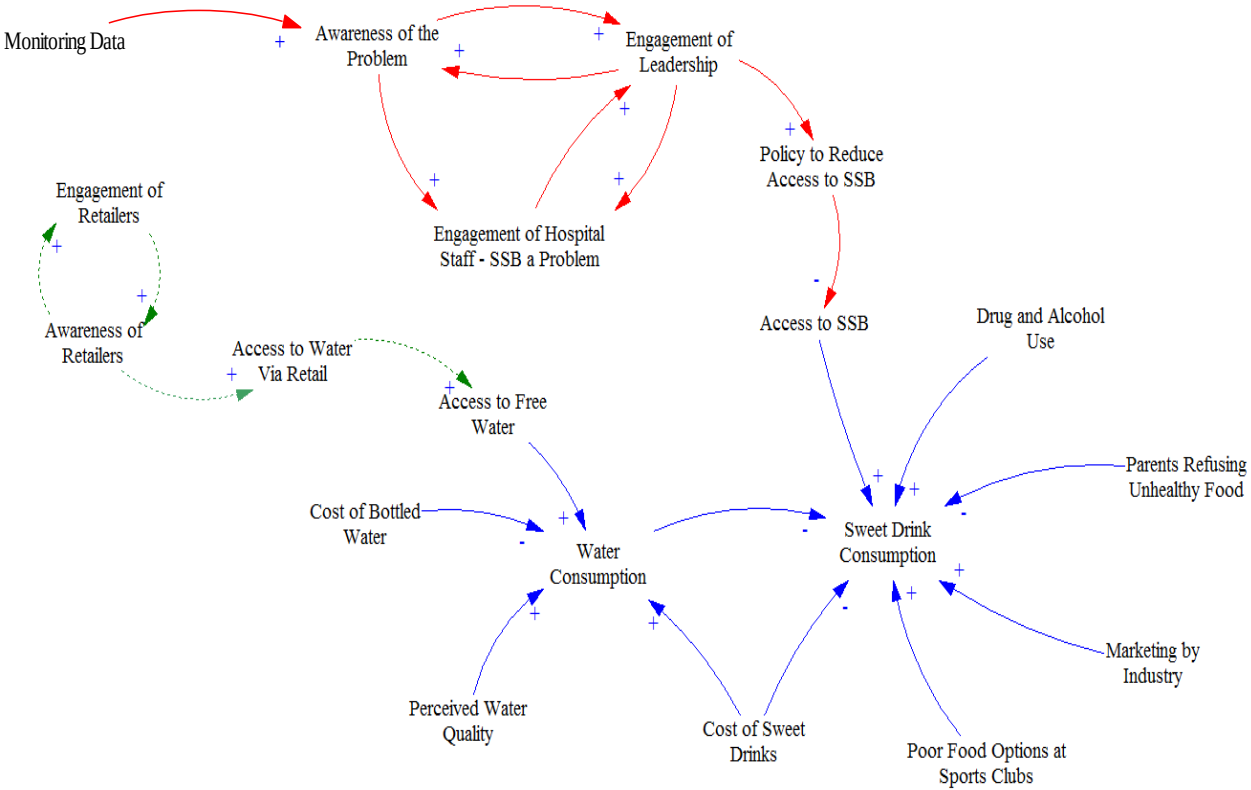


Action on Unhealthy Ads to Kids

1. Influence Healthy Public Policy – ASA review 2016-17
   - Only the nutrient criteria made it in (no monitoring, no independence, no WHO definition of a child)
2. Tested the effectiveness of the code
3. Highlight the issue publicly
4. Push for a better system

HEALTHY AUCKLAND TOGETHER


WAI
AUCKLAND
AUCKLANDERS
CHOOSE WATER
OVER SUGARY
DRINKS
HEALTHY
AUCKLAND
TOGETHER


Monitoring Data
Awareness of the Problem
Engagement of Leadership
Engagement of Hospital Staff - SSB a Problem
Policy to Reduce Access to SSB
Engagement of Retailers
Awareness of Retailers
Access to Water Via Retail
Access to Free Water
Access to SSB
Drug and Alcohol Use
Parents Refusing Unhealthy Food
Cost of Bottled Water
Water Consumption
Sweet Drink Consumption
Marketing by Industry
Perceived Water Quality
Cost of Sweet Drinks
Poor Food Options at Sports Clubs


WAI
AUCKLAND
HEALTHY AUCKLAND TOGETHER
YOU GET ALMOST
7000 GLASSES
OF TAP WATER FOR THE COST OF ONE LITRE OF BOTTLED WATER
1000 X
TAP WATER FOUND HERE
Albert Park
-36.850527
174.767874
FOUR STREAMS
Tap water is easy to find when you're out.
Aucklanders choose water over sugary drinks.
Water is the new normal in schools, facilities and at events.
Communities, parents push for water only.

IN THE **BEGINNING…**

- 346 drinking fountains in Auckland City (1:4000 people)
  - predominantly in parks
  - ?Quality
  - ?Visibility
  - No design standards / guidelines

- Yarra Valley Water - Melbourne (1:1125 people)
  - Population 1.8 m, 1600 drinking fountains, multiple areas, visible on Choose Tap
- Brisbane City Council (1:1600 people)
  - Population 2.4m, 1473 drinking fountains, 845 in central city area

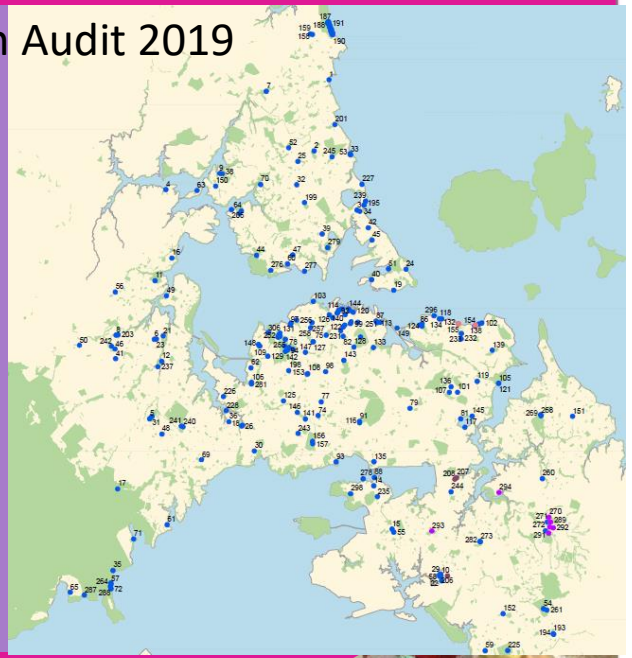
What we know **NOW**

Wai Auckland Drinking Fountain Audit 2019

Characteristic	Yes
Functioning	96.5%
Linear water flow	85.3%
Drinkable	72.8%
Clean	61.7%
Vandalism	1.1%

Sample N = 282/363

(17 not on Council database)



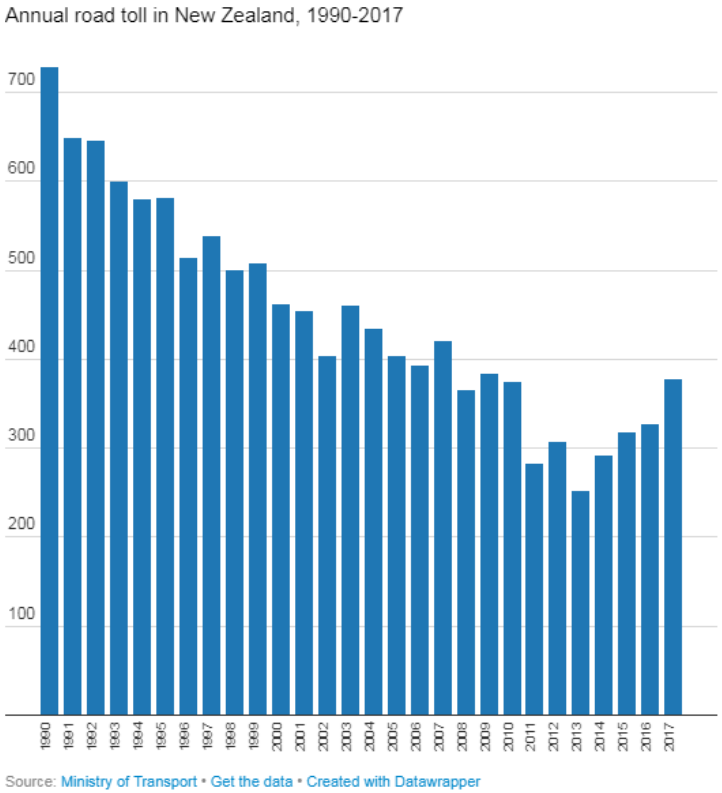
WHAT'S **NEEDED**

- More drinking fountains
  - in the right locations (foot traffic, high density, equity)
  - prioritised GIS targeting required
- Increased visibility/awareness
  - in process through @AklPaths business case
  - RefillNZ
- Design guidance
  - Transport Design Manual, Auckland Design Manual, Regional Public Transport Plan
- Ensuring quality/cleanliness

Transport safety and Vision Zero

HEALTHY AUCKLAND TOGETHER

Transport and trauma



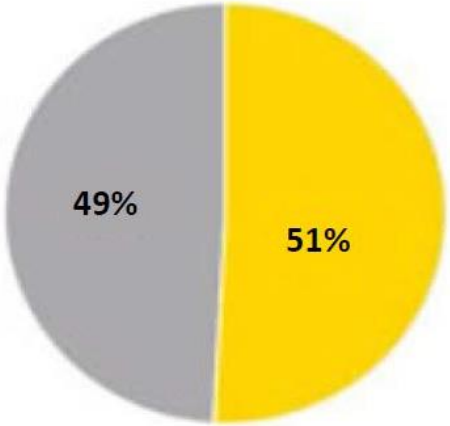
- Road injuries are the 10th leading cause of premature death in NZ
- 3% of all DALYs lost are due to road crashes

Ministry of Health. 2020. *Longer, Healthier Lives: New Zealand's Health 1990–2017*. Wellington: Ministry of Health.

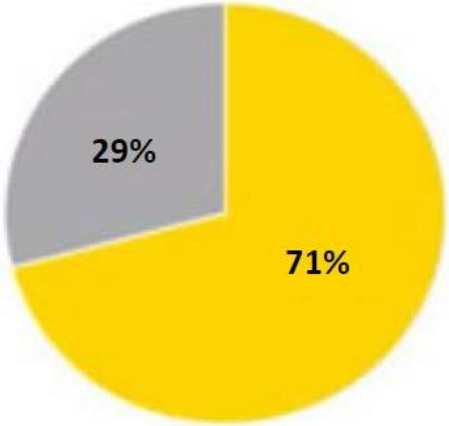
HEALTHY AUCKLAND TOGETHER

People make mistakes

Fatal crashes



Serious injury crashes



- Reckless behaviour
- System failure

Serious, illegal driving behaviour is not the main cause of fatal and serious injury crashes (even though we might hear about them in the media more often).

Source: AA Directions Autumn 2019
https://www.aa.co.nz/membership/aa-directions/driver/crash-causes-what-happened/

Vision Zero principles

System response

We need to look at the whole system, develop combinations of solutions and all work together.

In every situation a person might fail,
the transport system should not.

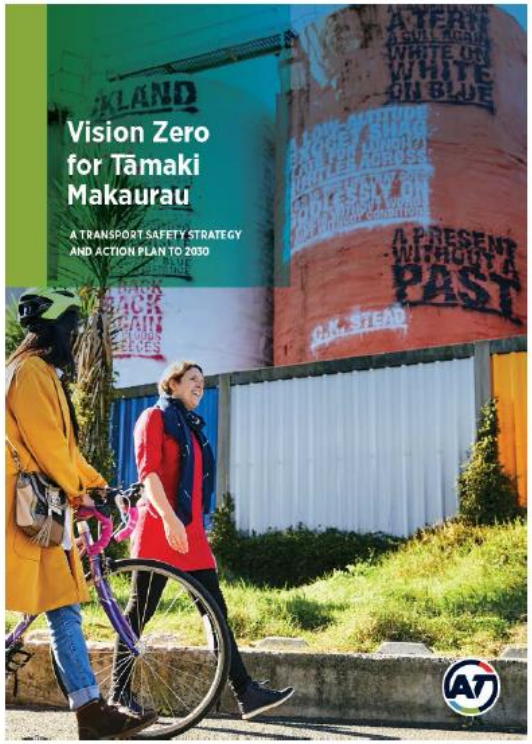
Vision Zero principles

Responsibility

System designers are ultimately responsible for the safety of the system. Everyone needs to show respect, good judgement and follow the rules.

Anyone who works in or influences the transport system are system designers.

Vision Zero Strategy and Action Plan for Auckland



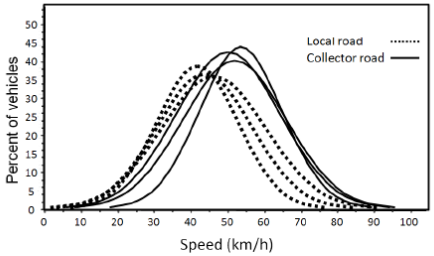
Reducing vehicle speed reduces harm

Lower speeds support a transport mode shift

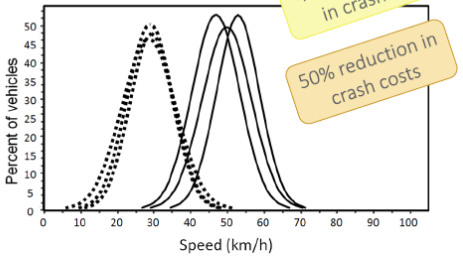
HEALTHY AUCKLAND TOGETHER

Speed is influenced by design

FEWER, AND LESS SEVERE CASUALTIES



Pre-treatment



40% reduction in crashes

50% reduction in crash costs

Post-treatment

Charlton, S. G., H. W. Mackie, P. H. Baas, K. Hay, M. Menezes and C. Dixon (2010). "Reduced Speeds and Improved Safety Resulting From a Self-Explaining Roads Process." Accident Analysis & Prevention 42: 1989-1998.

SELF EXPLAINING ROADS

Social and geographical differences in harm – The system delivers inequity

Figure 2: Road traffic injury deaths and hospitalisations, Auckland region local board areas, 2000-08.

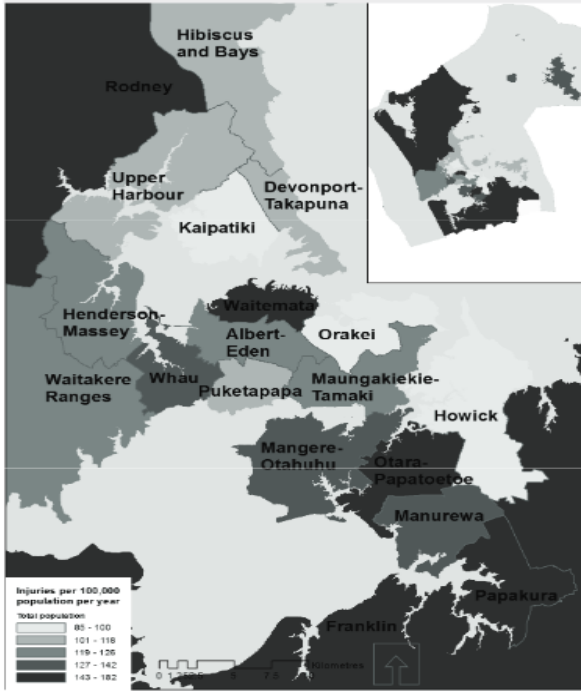


Figure based on unadjusted injury rates

Table 2: Road traffic injury deaths and hospitalisations by ethnicity, age and gender, Auckland region, 2000-08.

	0-14 years	15-24 years	25-64 years	65+ years
Māori	89.7 (81.2 – 99.2)	487.8 (459.6 – 517.8)	169.7 (158.8 – 181.3)	232 (186.1 – 289.6)
Pacific	78.8 (71.1 – 87.2)	309.4 (288 – 332.6)	103.6 (95.7 – 112.1)	125.8 (100 – 158.4)
Asian	29.2 (24.2 – 35.2)	169.3 (156.5 – 183.1)	64.3 (59.4 – 69.7)	130.0 (107.2 – 157.9)
NZE/Other	41.5 (37.9 – 45.4)	352.6 (339.6 – 366.3)	102.0 (98.8 – 105.4)	159.9 (151.8 – 168.5)
Female	43.6 (40.1 – 47.5)	226.2 (216.2 – 236.6)	70.1 (67.2 – 73.1)	156.4 (146.9 – 166.5)
Male	62.8 (58.6 – 67.3)	397.9 (384.7 – 411.7)	130.3 (126.2 – 134.6)	150.0 (139.5 – 161.3)

Rates are unadjusted and expressed per 100,000 population (95% confidence interval). NZE/Other: New Zealand European/Other ethnicity

Jamie Hosking et al. from: https://onlinelibrary.wiley.com/doi/epdf/10.1111/1753-6405.12034

Vision Zero for Tāmaki Makaurau

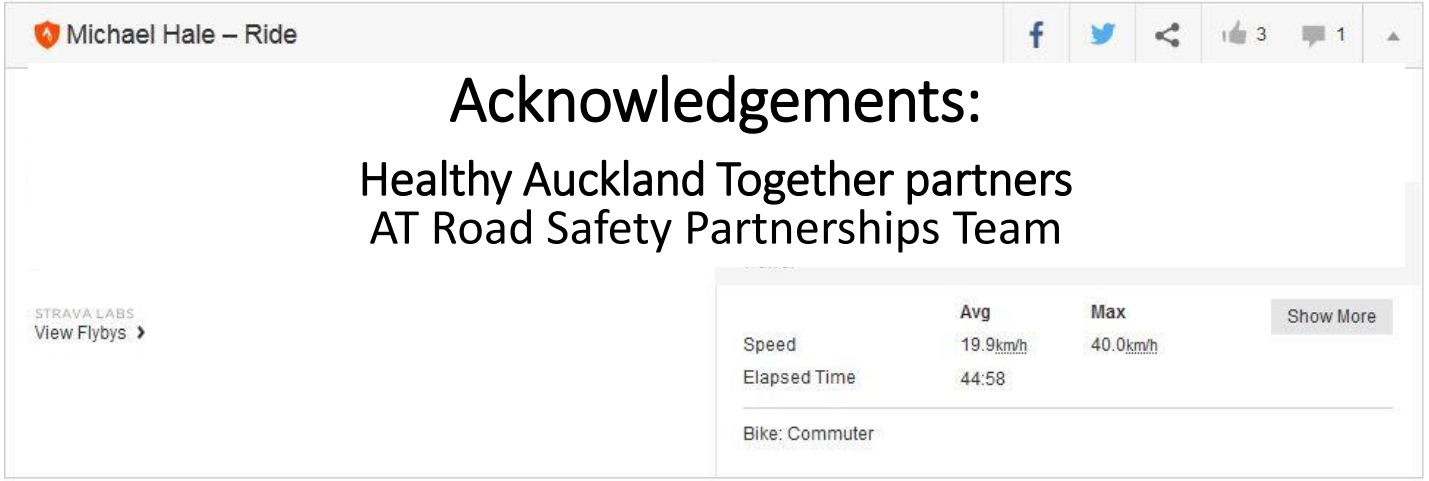
A TRANSPORT SAFETY STRATEGY AND ACTION PLAN TO 2030

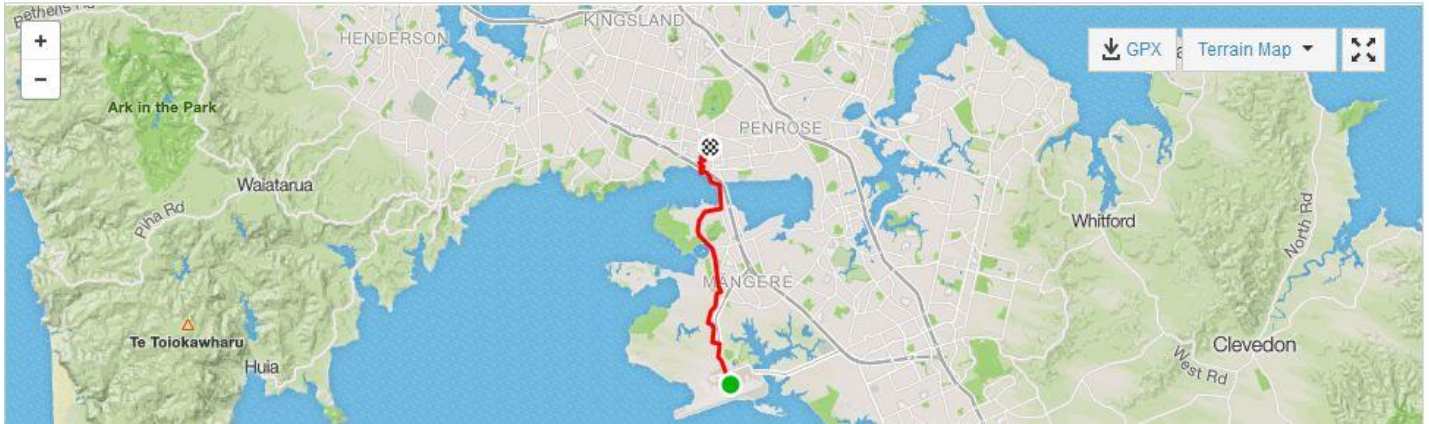
Activity

Is there a need to address commercial determinants in the transport system? What examples can you see?

What changes would you make to your part of the transport system from the health perspective?

Systems thinking in Public Health





“The increasing weight of people worldwide is the result of a normal response, by normal people, to an abnormal environment”

Lancet 2011;378:741

HEALTHY AUCKLAND TOGETHER

Shifting transport system dynamics towards wellbeing and fairness

a.macmillan@otago.ac.nz

@alexkmacmillan

Ernest Zacharevich Little children on a bicycle

Transport and health laundry list

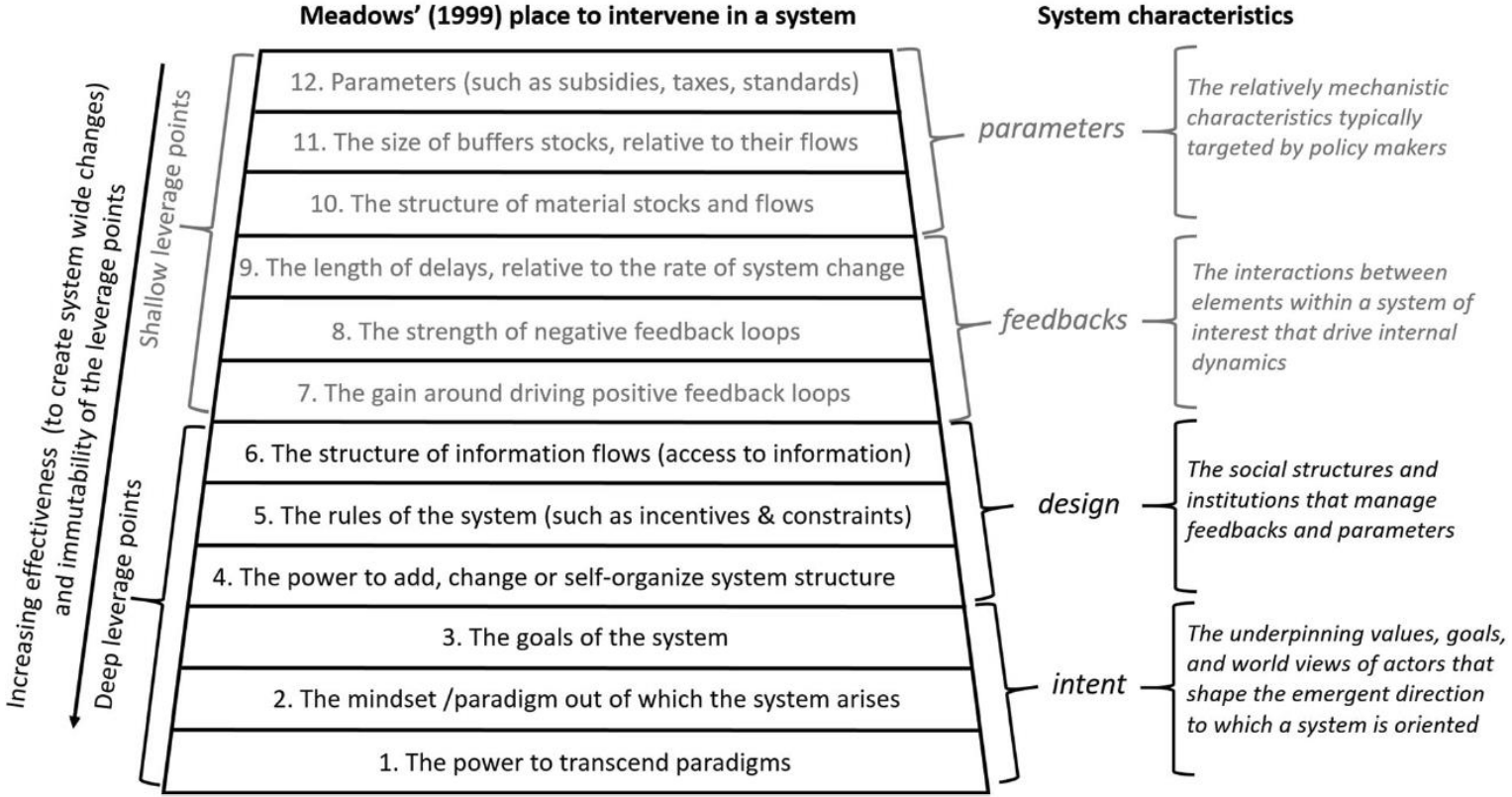
Influences

Sense of safety (crime & injury)
What's "normal" at the moment
Speed and volume of traffic
Space affordance
Cost
Reliability
Attractiveness
Political willingness to invest
Power of different influences on policy
Public and media discourse
Distribution of infrastructure and services
Sprawl and distance between home and destinations
Land and housing ownership patterns and policies

Wellbeing and fairness outcomes

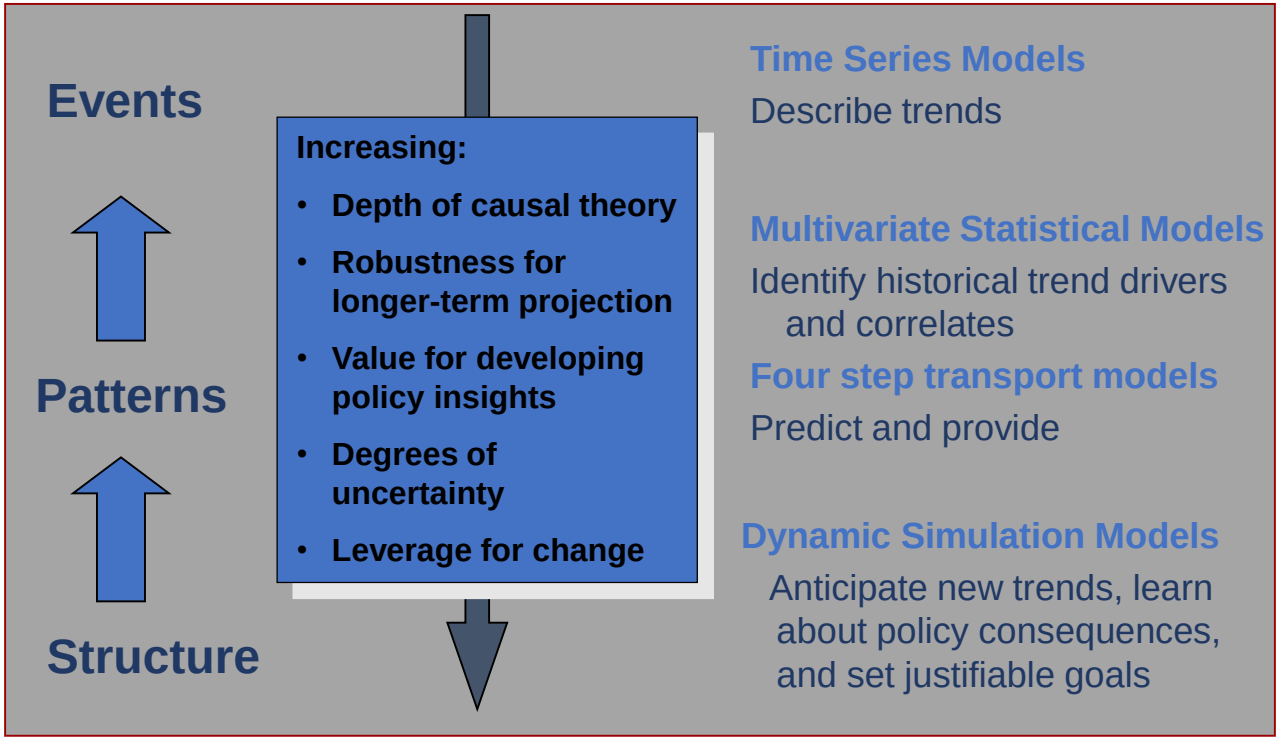
Safe climate
Road traffic injuries
Connection with nature
Air pollution
Social connection
Connection to family and friends
Lost earnings and work
Living costs
Physical activity
Obesity
Time pressure, uncertainty and stress
Fair access to health promoting destinations
Cultural wellbeing
Water quality
Biodiversity

Places to intervene in a system



Adapted from Meadows 1997 by Abson et al 2016

Tools for policy planning and evaluation



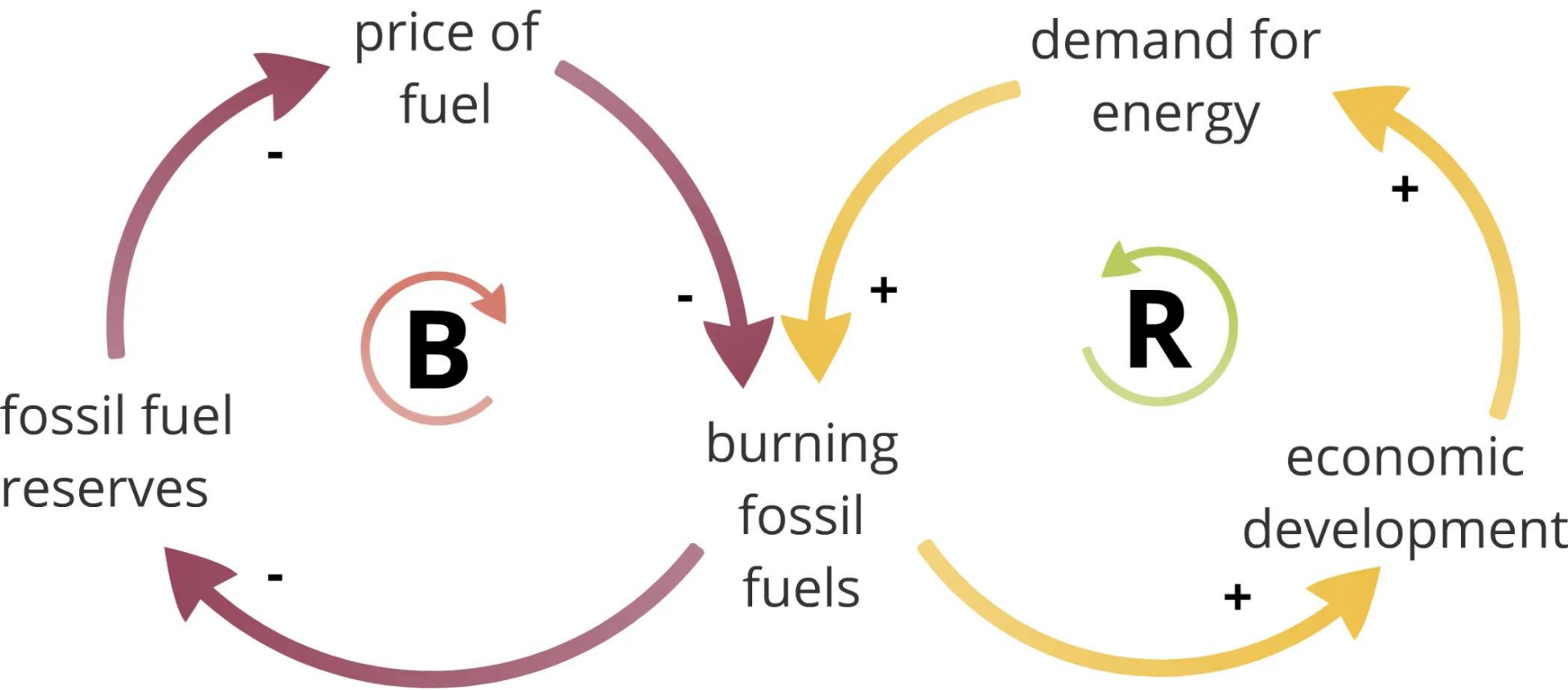
Adapted from Milstein 2007

Transport and health as a **complex social, political, physical and technical system**

Characteristics

1. Complexity
2. Feedback
3. Tipping points/thresholds
4. Delays

=path dependence, unexpected policy consequences, time delays

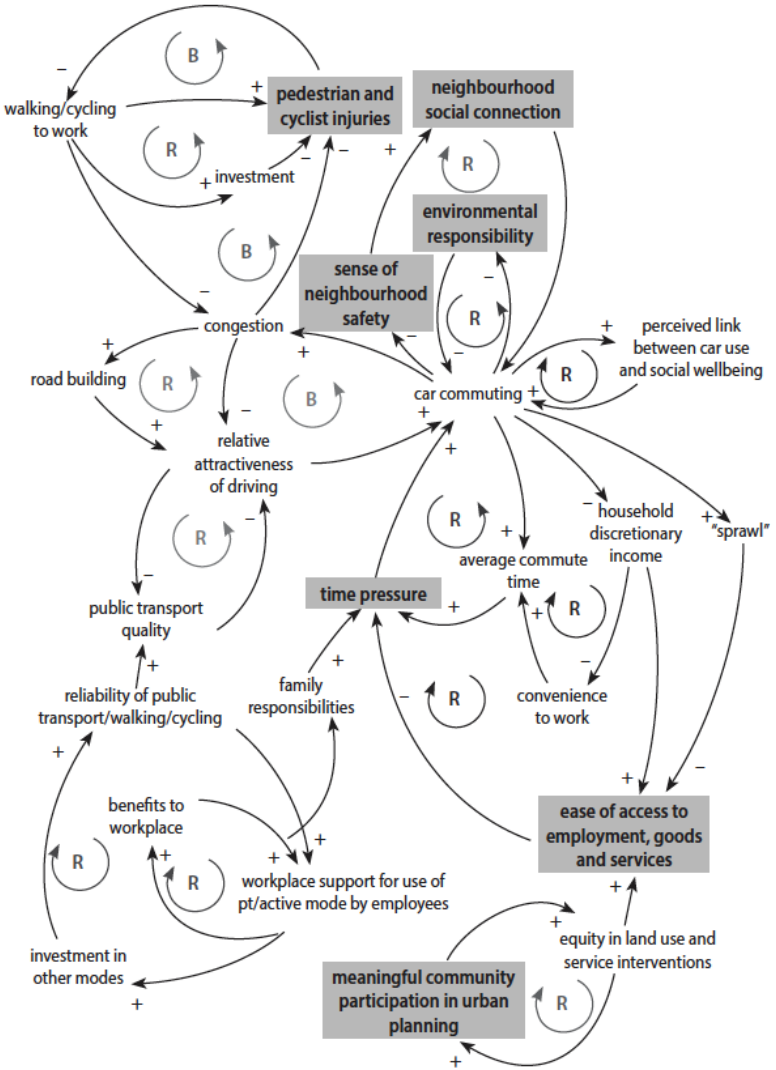


Steve Easterbrook 2013 Serendipity http://www.easterbrook.ca/steve/2013/08/the-climate-as-a-system-part-2-energy-consumption/

Activity: Transport and health feedback loops

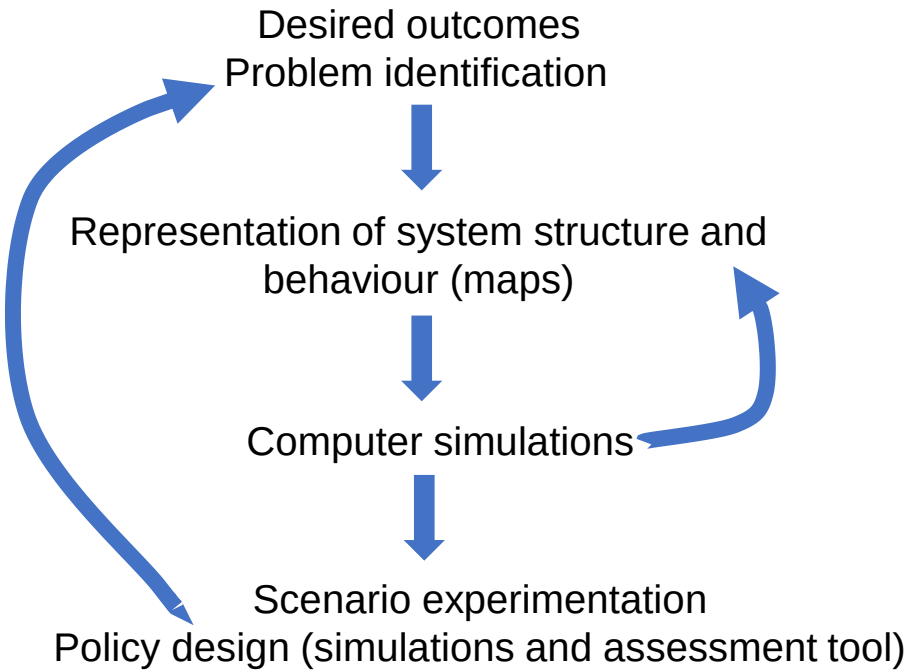
1. Go to **www.menti.com**
2. Type in the code **1892296** to see the transport and laundry list slide during the discussions
3. Accept invitation to a breakout room
4. Make sure someone takes notes of your discussion

Wellbeing & the trip to work – equity focus



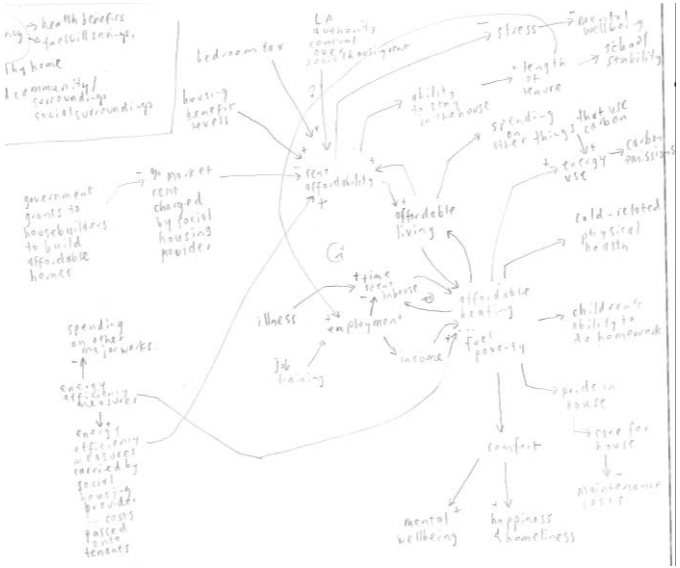
Macmillan & Mackie 2016

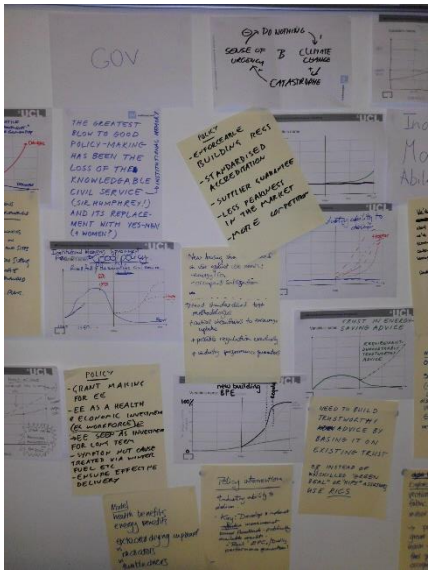
Participatory SD process



Adapted from Saeed 1992

Most effective as participatory co-learning



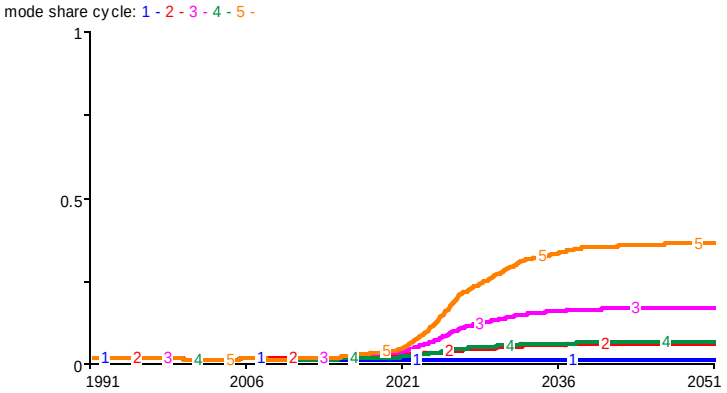


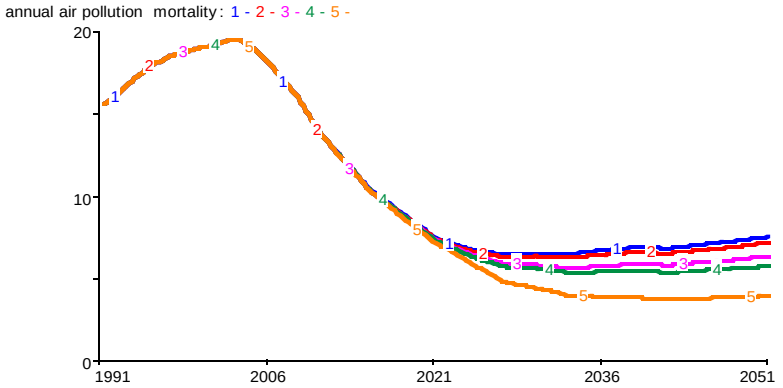
"It's like a bucket's been lifted off my head!"

Macmillan et al 2016

Simulation

theme of causal loop	direction	comments
carbon emissions from housing stock	(iffy) weak impact	what is comparative strength heritage values against positive influences? financing?
housing affordability (regional rental affordability)		
housing affordability (home ownership)		comparative effect of EE and increase rent?
physical and mental wellbeing (household crowding)		timescale important what happens to rents?
community social connection	8/10 3.5/10	could be quite bad especially if EE interventions don't decrease housing costs





Macmillan et al 2014

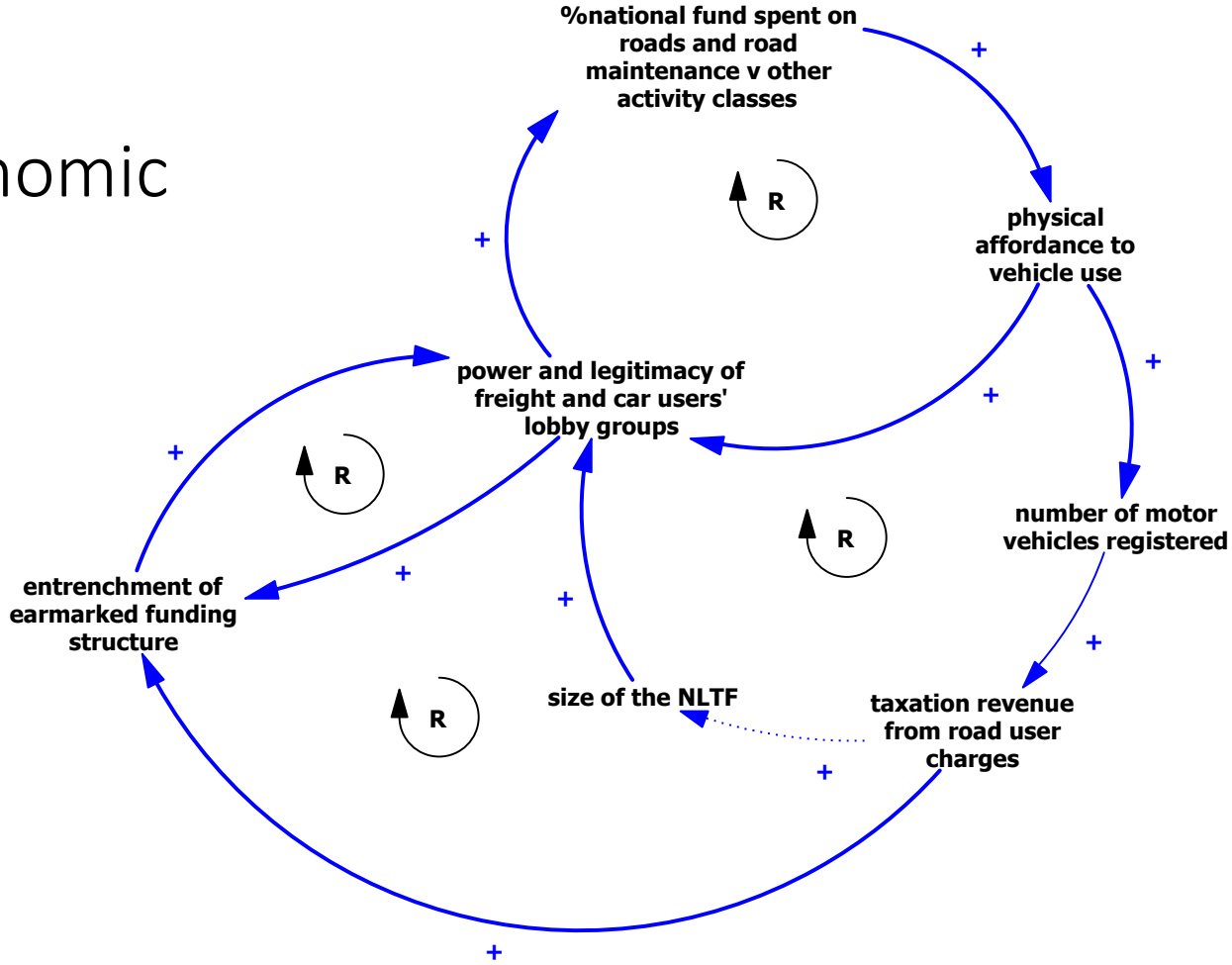
The reality is that… private vehicles will continue to be the method by which most people will travel within the foreseeable future, and our investments need to reflect that reality

2010

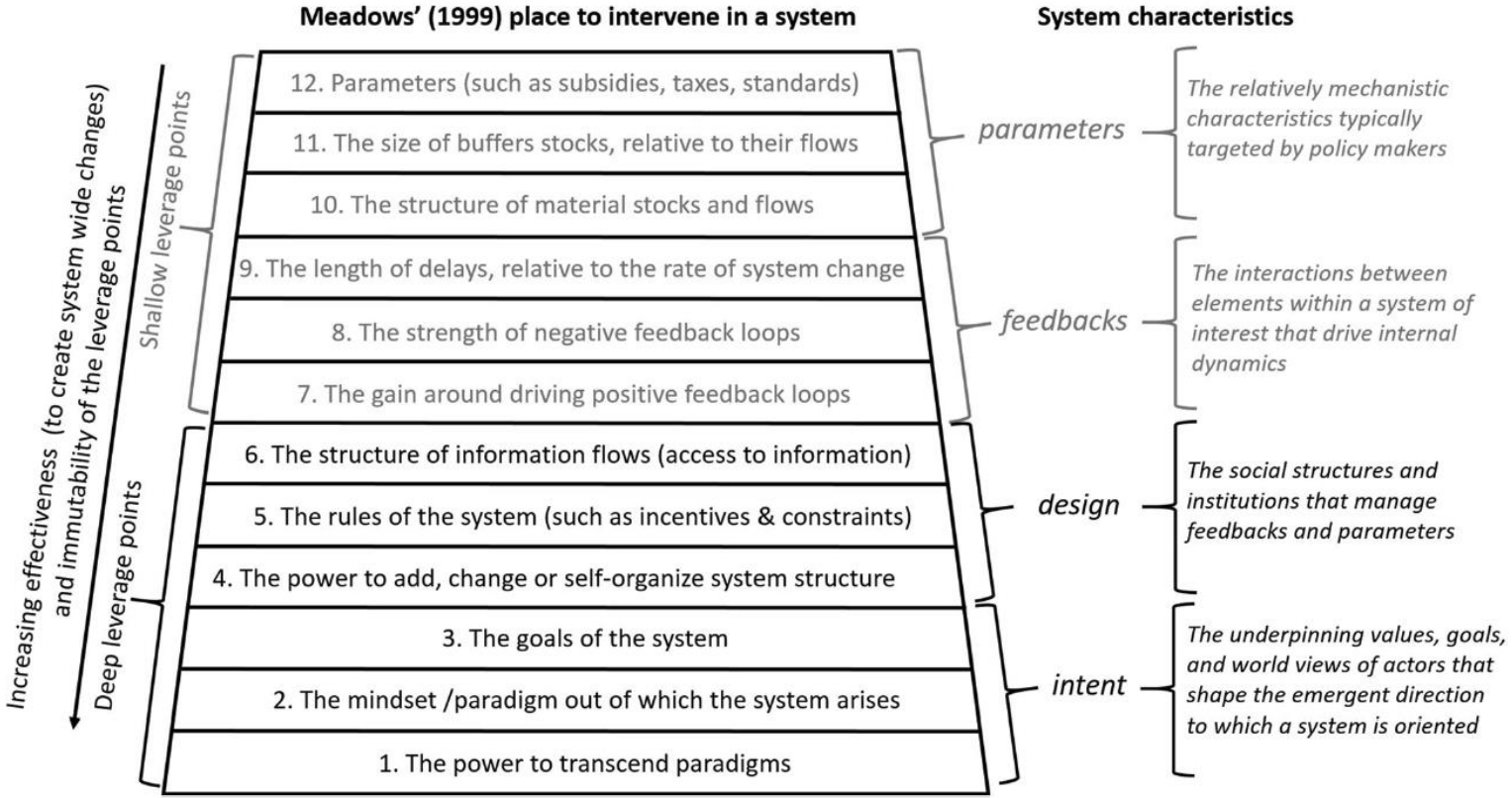
2014

Commuting by bike has health benefits and also helps take pressure off other transport networks… funding will allow cycleway infrastructure to...deliver real incentives for commuters to get on their bikes

Discursive/ political/economic feedbacks?



Places to intervene in a system



Adapted from Meadows 1997 by Abson et al 2016

Sources

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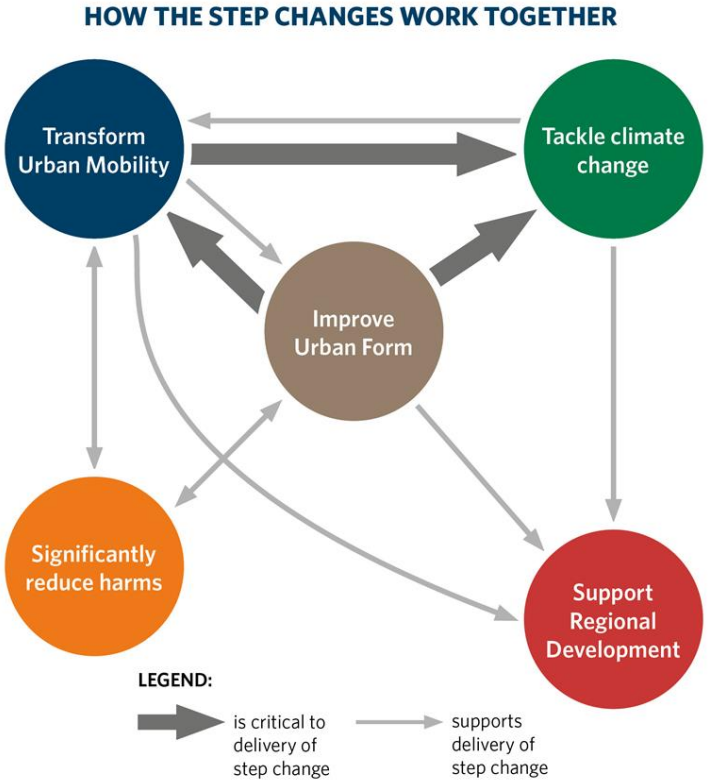
Healthy Urban Mobility

Using system change thinking

WAKA KOTAHI
NZ TRANSPORT AGENCY

New Zealand Government

Transport Outcomes



Arataki step changes

Paradigm shift for our towns and cities

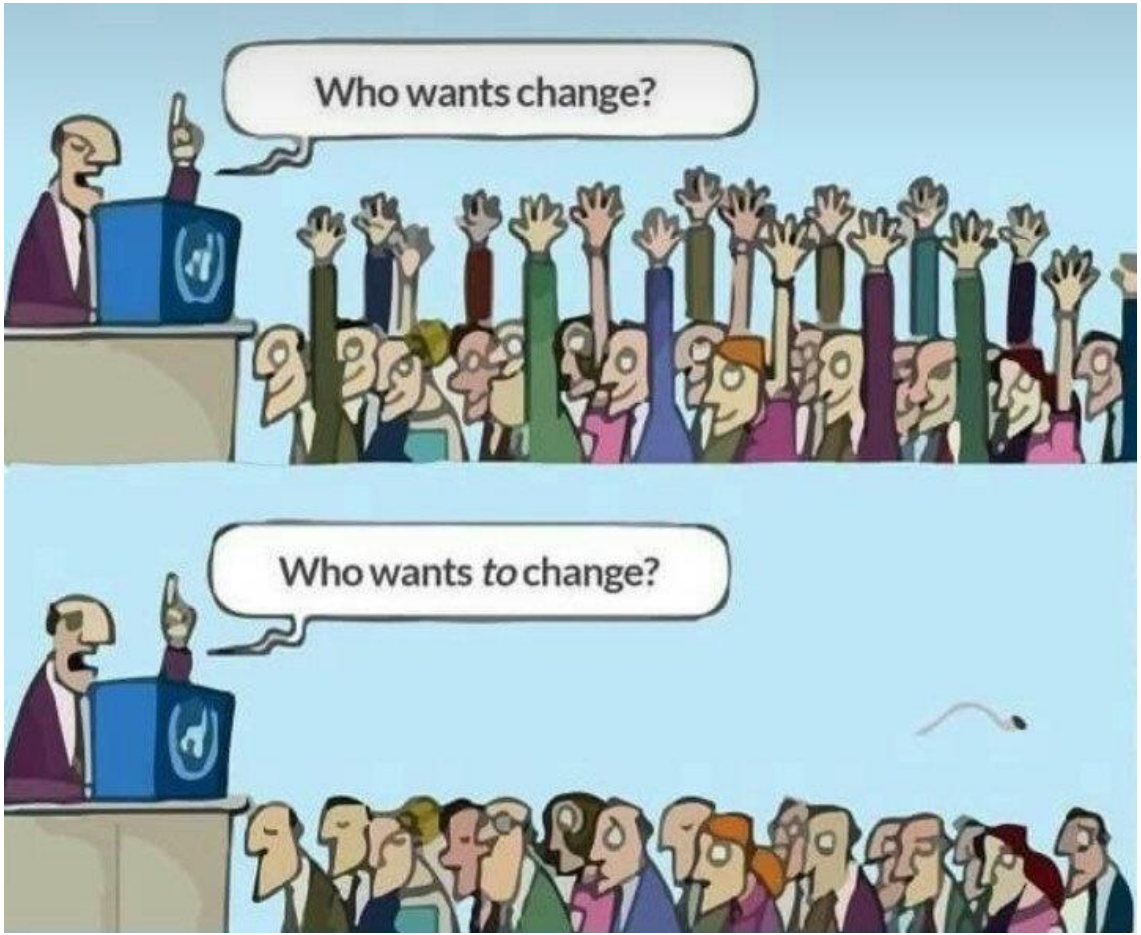
Technical problem or adaptive challenge?

Diagnosing the problem…..

Technical Problems	Adaptive Challenges
Easy to identify and define problems	Difficult to identify or define
Can often be solved by an expert	Can require changes in values, belief, roles, relationships & approached to work
Technical Solutions	Community solutions, consultation, multi-disciplinary
Implementation often quick and easy - clear	Change in numerous places required – across organisational boundaries
Require change in one or a few isolated places	Solutions often experimental, discoveries, can take a long time to implement
Requires expertise	Requires leadership

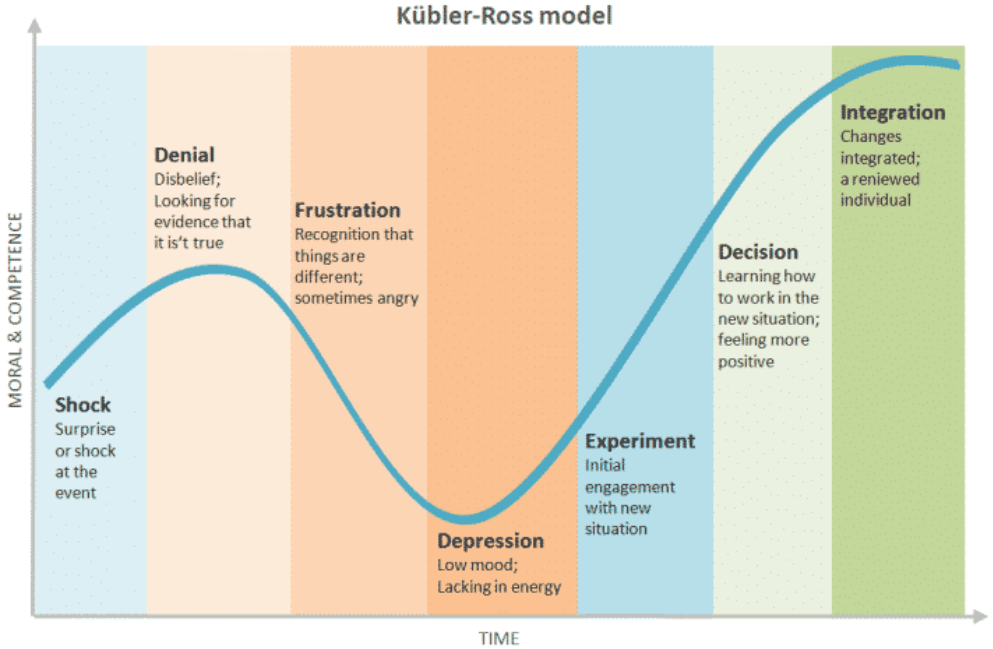
Technical problem or adaptive challenge?

- *"The single most common source of leadership failure is that people….treat adaptive challenges like technical problems" Heifetz and Linsky, 2002*


Who wants change?
Who wants *to* change?

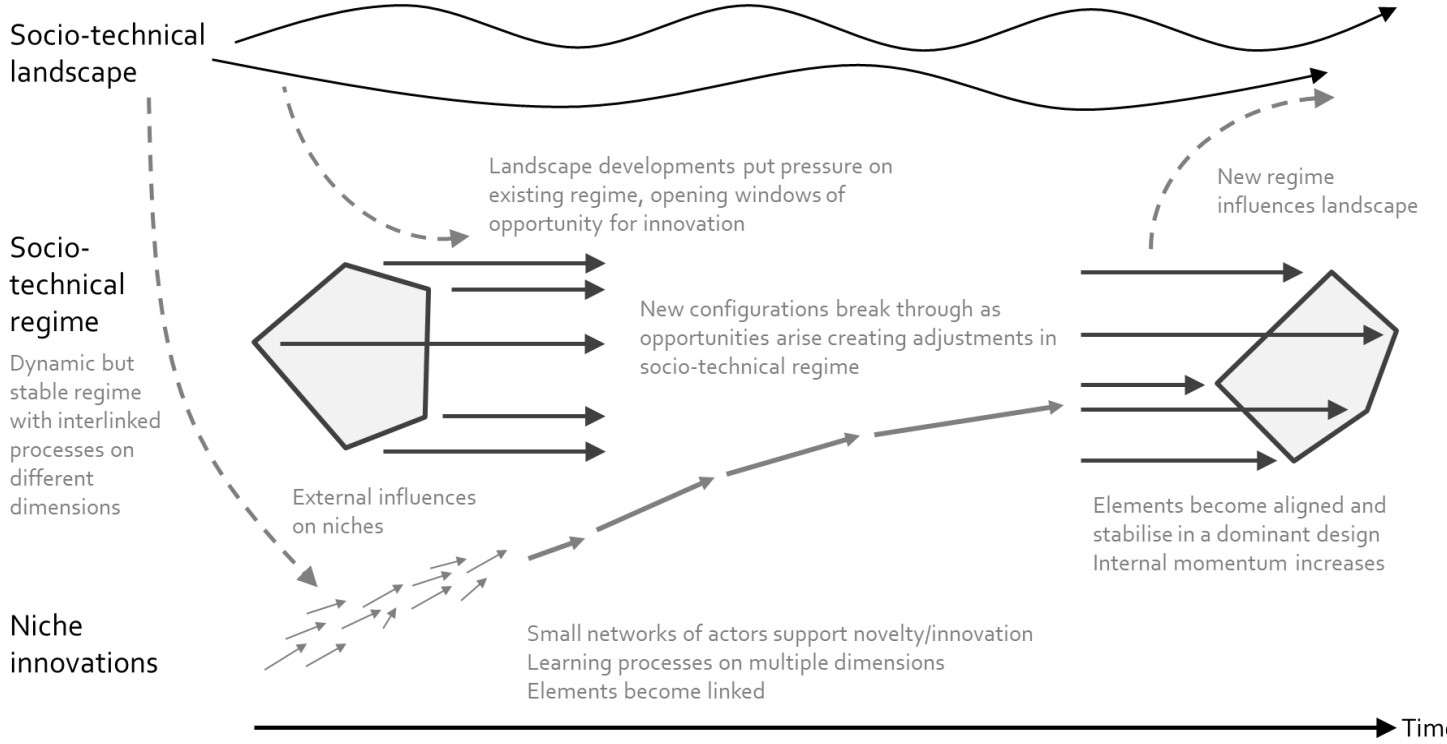
Ways of approaching system change

- Socio-technical systems
- Evolution
- Change management
- A movement
- Disruption
- Transition Management



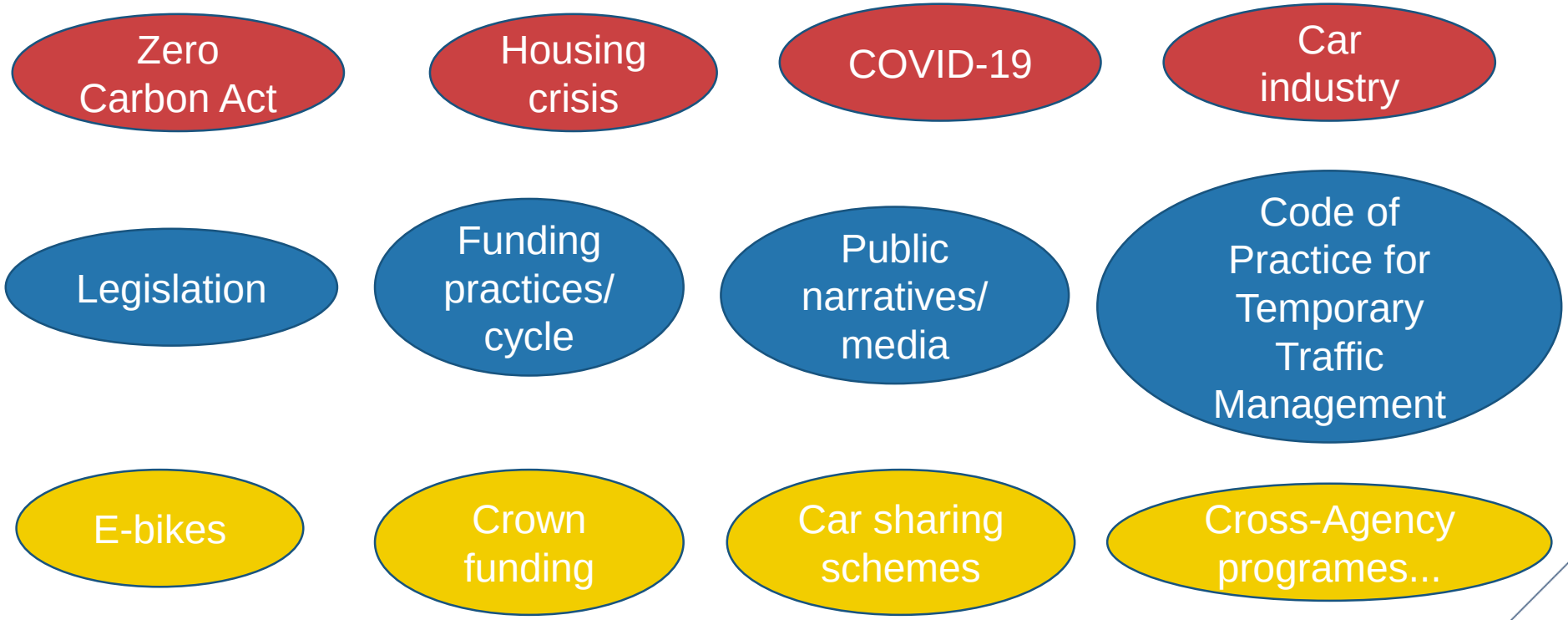
Source: https://www.cleverism.com/understanding-kubler-ross-change-curve/

Sociotechnical systems and niche innovations



Adapted from (Geels, 2011)

Some examples of transport's socio-technical system

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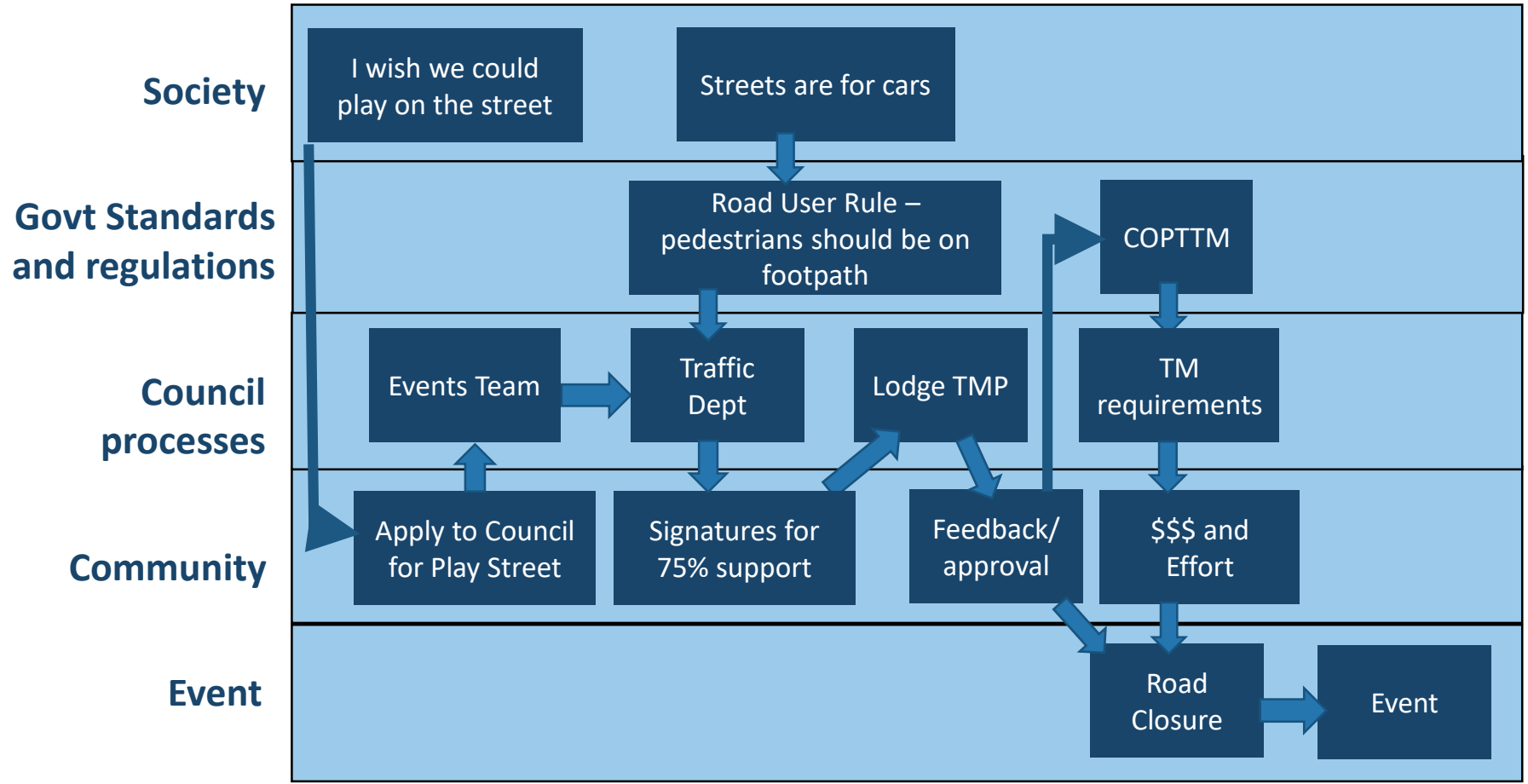
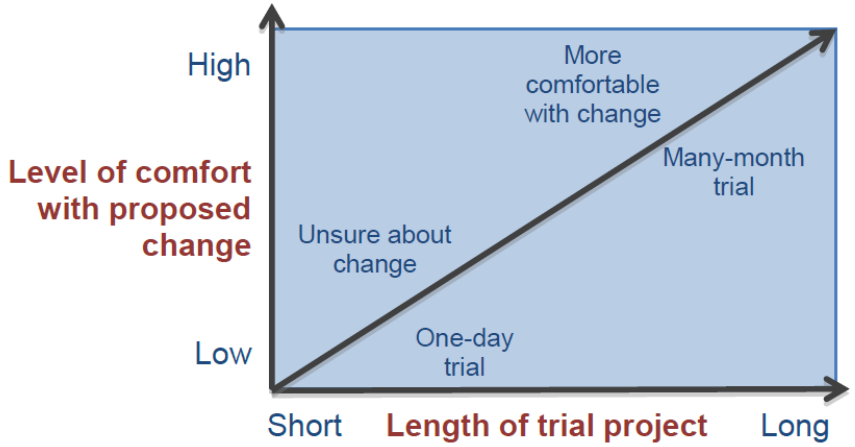

Society
Govt Standards and regulations
Council processes
Community
Event
I wish we could play on the street
Streets are for cars
Road User Rule – pedestrians should be on footpath
COPTTM
Events Team
Traffic Dept
Lodge TMP
TM requirements
Apply to Council for Play Street
Signatures for 75% support
Feedback/ approval
$$$ and Effort
Road Closure
Event

Tactical urbanism as an approach to change

"Smarter Ways to Change: Learning from innovative practice in road space reallocation" Helen Rowe, 2013 https://apo.org.au/node/59916

- Non-threatening way to explore change, reducing risks
- Dialled up or down, based on community attitudes (eg, pop-up to interim)
- Engaging and participatory– 'stimulation,' building trust, capturing local knowledge
- A more positive experience of change
- Slow brain over fast brain



"People cannot reconcile themselves to the loss of familiar attachments in terms of some impersonal utilitarian calculation of the common good. They have to find their own meaning in these changes before they can live with them".

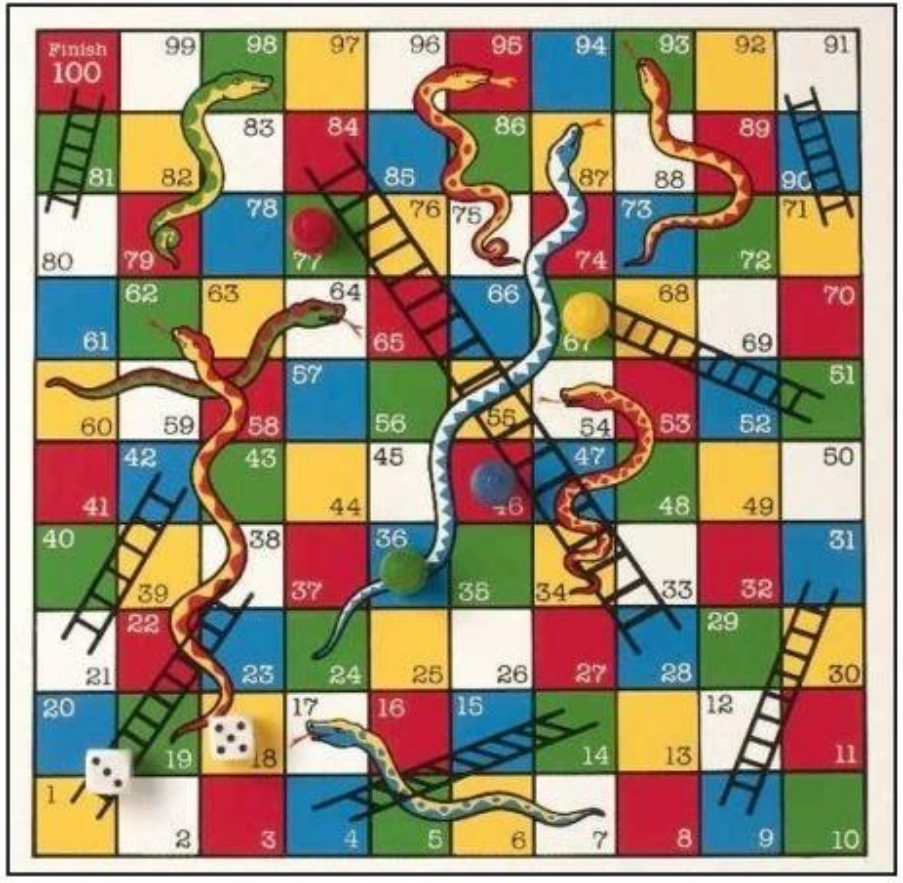
Barriers to tactical urbanism in NZ

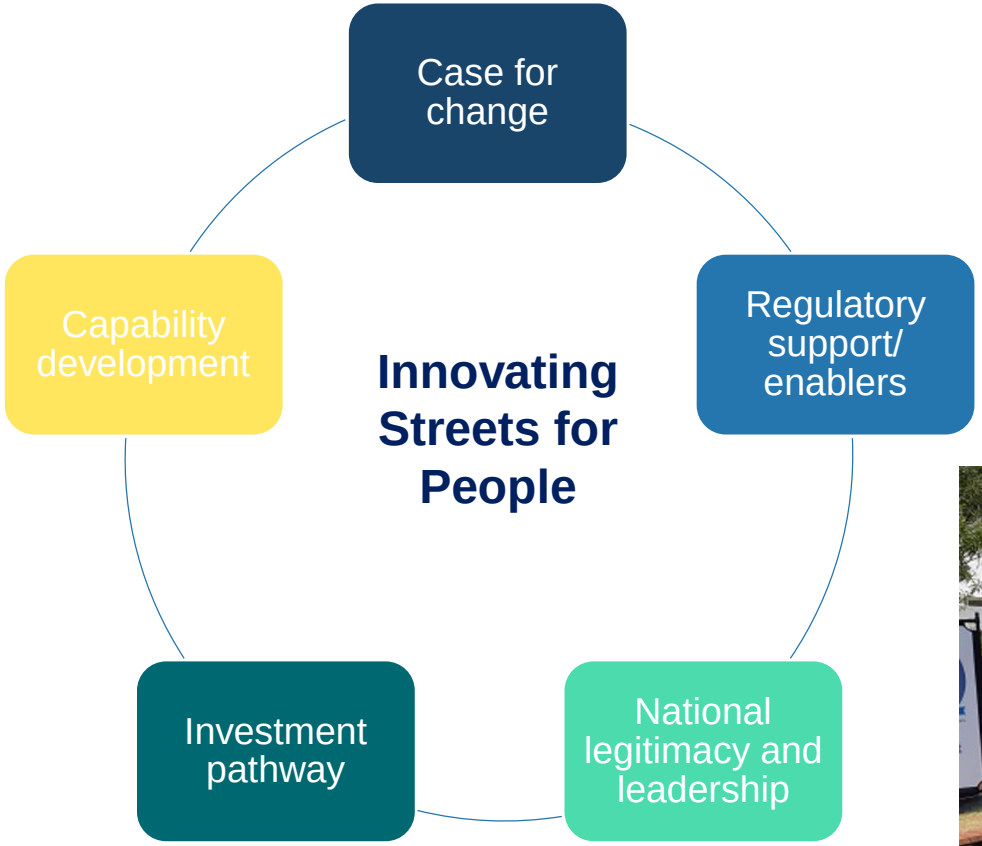
Survey of practitioners identified numerous barriers in NZ system

- Internal decision making process & risk adverse culture
- Public/Business reluctance to change - Fear of loss of parking & vehicle access
- Uncertainty about who to engage with at NZTA about temporary projects
- Onerous traffic management requirements and costs
- Unwillingness from road engineers
- Business case driven by effect on vehicle movements alone, does not include benefits to cycling or walking
- NZTA Traffic Control Device trial process – difficult & slow process and lack of funds
- Lack of strategic knowledge and evidence of previous cases with benefits evaluated and highlighted
- Regulations on Health & Safety

34 out of 45 respondents found it NOT EASY AT ALL to deliver such projects

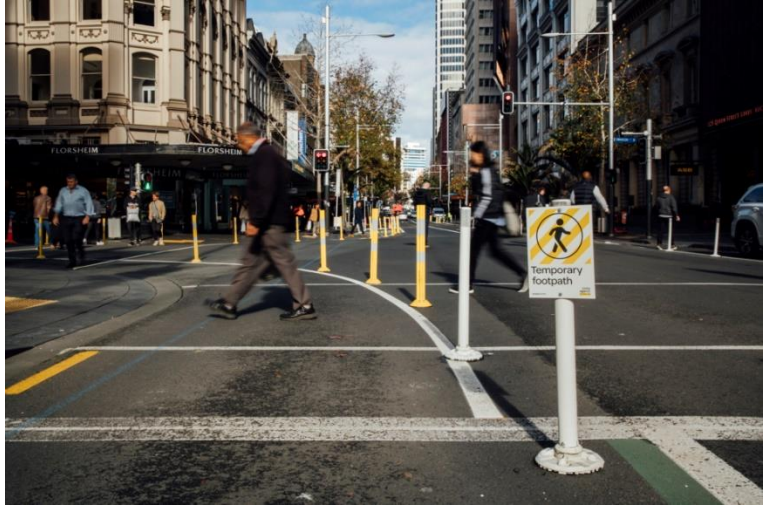
“It’s a bit like snakes and ladders, with no ladders”



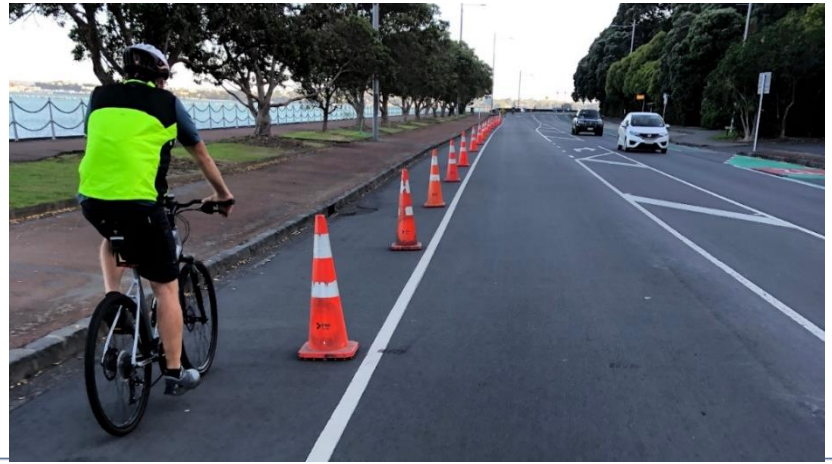

Case for change
Regulatory support/ enablers
National legitimacy and leadership
Investment pathway
Capability development
Innovating Streets for People


COSMIC
High Street, Auckland


OPTOMETRISTS
Andrews Avenue, Lower Hutt


FLORSHEIM
FLORSHEIM
Temporary
footpath


FLEXFITNESS



But the regime came rushing back...

WELLINGTON › BUSINESS

WCC gives up its plans for temporary bike lanes and safer, wider footpaths

June 9, 2020 17 comments

News from WCC
A paper proposing temporary bike lanes and other street changes to encourage social distancing around Wellington has today been withdrawn from Wellington City Council's Strategy and Policy Committee agenda.

The proposals were designed to provide people in Wellington safer transport choices to move around the city during the COVID-19 response. They aligned well with city and regional goals – including the plan to move more people with fewer vehicles, make healthy transport choices an option for more people, and reduce emissions that cause climate change.

Retailer rumbles force council to halt Nelson city footpath widening

Tim O'Connell · 17:31, May 06 2020

BRADEN FASTIER/STUFF

Nelson City Council CEO Pat Dougherty talks to retailers concerned about temporary footpath widening work on Trafalgar St. Work was suspended on the project following the meeting.

Examples of recent system change wins for tactical urbanism

Handbook for Tactical Urbanism in Aotearoa

1 | What is Roadway Art?

Roadway art is a subset of street art that is marked within the roadway, i.e. where vehicles travel. In a nutshell roadway art is any marking on the roadway that is not considered a 'traffic control device'. See Section 2 for further information on traffic control devices. This art usually involves colourful designs, and is used:

- To reinforce a slow and informal street context
- To provide a sense of 'place'
- To highlight pedestrian crossing zones
- Alongside physical changes to the roadway (e.g. narrowing the carriageway) to influence safer motorist behaviour and reinforce slow vehicle speeds
- To show support for the community
- To enhance a streetscape by contributing to liveability and vibrancy

Roadway art, widened footpaths and a barrier-protected multiuse path installed in Asheville, North Carolina, helped to reduce speeds on Coxe Avenue by 28.3%, and reduced incidents of speeding from 66% to 21%. Source: Asphalt Art Guide, Bloomberg Associates

Roadway art installed in Des Moines, Iowa US, has a social or placemaking benefit through connecting public art installations in the city. Used to support wayfinding and enhance walkability. Source: Asphalt Art Guide, Bloomberg Associates

PLAY STREETS

GUIDANCE FOR SAFE PLAY STREETS IN LOW RISK ENVIRONMENTS

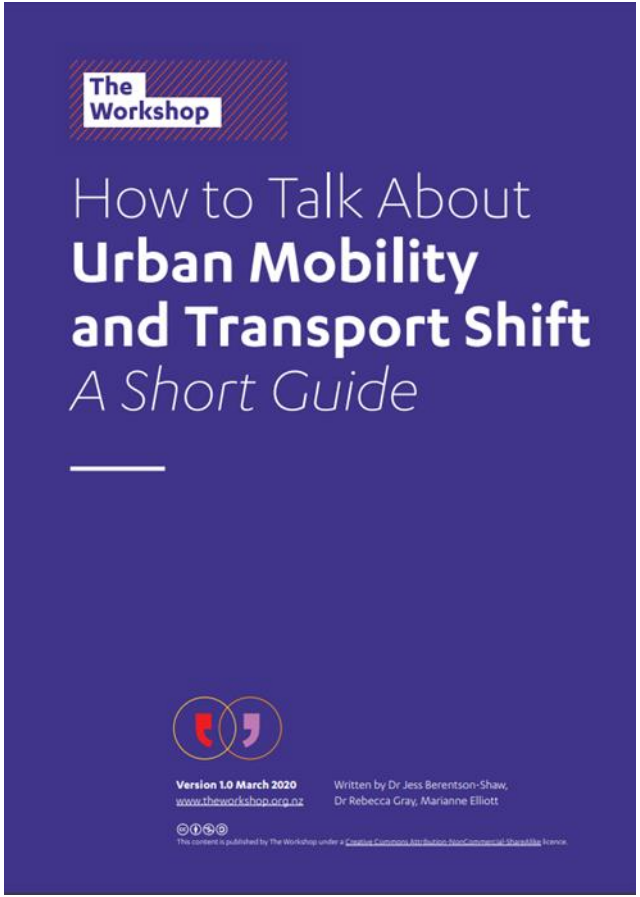
This guidance is aligned to the Waka Kotahi NZ Transport Agency Code of Practice for Temporary Traffic Management and has been issued to support the pilot phase of Play Streets in New Zealand.

DRAFT GUIDANCE DOCUMENT – AUGUST 2020

WAKA KOTAHI NZ TRANSPORT AGENCY

SPORT NEW ZEALAND

New Zealand Government



System change using evidence-based communication

- Shift conversations from individual action to system change based on a shared vision
- Sell the cake (vision), not the ingredients
- Focus on instrinsic community values
- Framing individual action as a stepping stone to system action

https://www.theworkshop.org.nz/publications/how-to-talk-about-urban-mobility-and-transport-shift-a-short-guide

System change and communication

Growing revolt against cycleways, bus lanes in Auckland

5 Mar, 2018 5:00am

8 minutes to read

What do you think is the biggest ‘regime’ barrier to healthier urban mobility in your part of the system?

Leadership is key!

Lemauga Lydia Sosene, Chair
Māngere Otahuhu Local Board

Source: Mackie Research

Questions