NEXT-GENERATION TRANSPORTATION: A FOCUS ON PEDESTRIANS AND CYCLISTS

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CARSP

Why focus on active modes of safety?

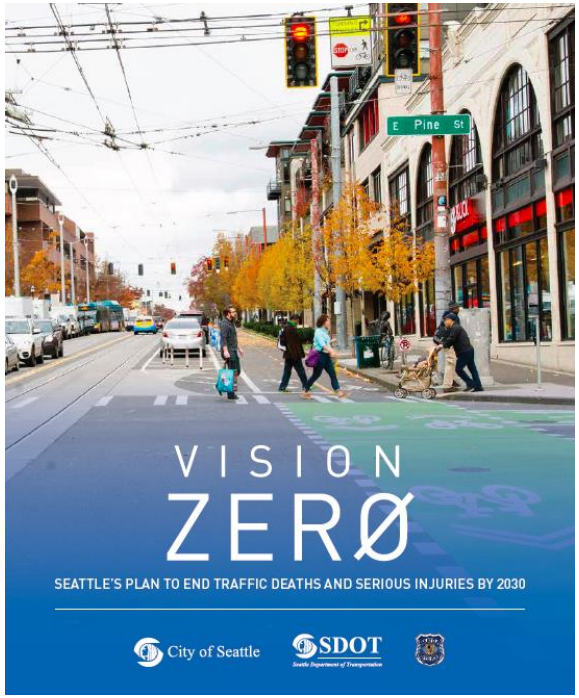
- In the last 15 years, in Canada:
  - 5,755 pedestrians killed, and 205,000 injured;
  - 926 cyclists killed and 122,000 injured

How Canada Compares

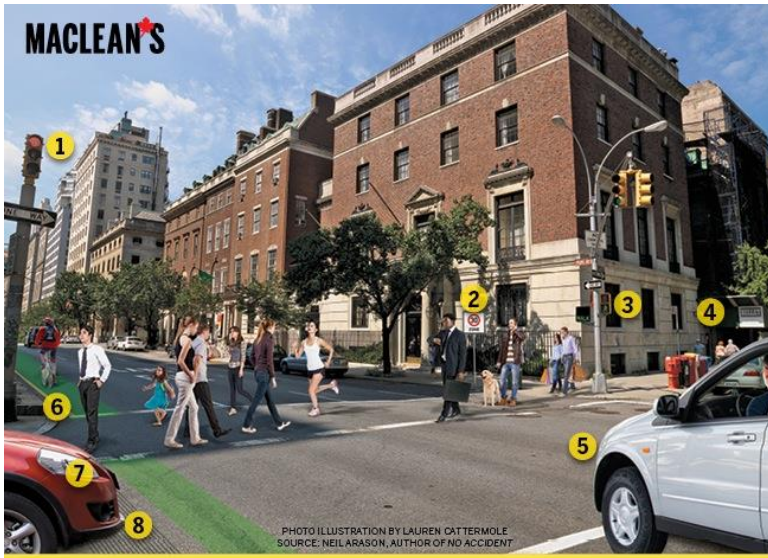
- Canada's road crash fatality rate is double that of the world's best performers

- We are no longer making any progress for pedestrians and cyclists

VISION ZERO



VISION ZERO INITIATIVE
TRAFFIC SAFETY BY SWEDEN



FAST FIXES ON THE PATH TO ZERO TRAFFIC FATALITIES

Steps to reduce injuries where cars and people meet

1. Automated enforcement through speed cameras placed at red lights

2. Reduce speed in residential areas to 30km/h

3. At other corners provide six-second advance walk signals to make people more visible. Pedestrian traffic islands reduce the number of lanes a person must cross at any one time.

4. Use the pedestrian scramble at busy corners: signals stop all traffic or all pedestrians. Cars and people never move at the same time.

5. A mere 10 cm of space between the hood edge and the rock-hard engine block can absorb the energy of a collision and save lives

6. Bright lime-yellow markings, including bike lanes, catch drivers' attention better than black and white

7. Redesign car hoods so that a struck pedestrian falls onto the car rather than the road.

8. Other low-cost measures include channelized traffic flow, better lane markings, rumble strips and anti-skid surfacing on roads

“In every situation a person might fail, the road system should not.”

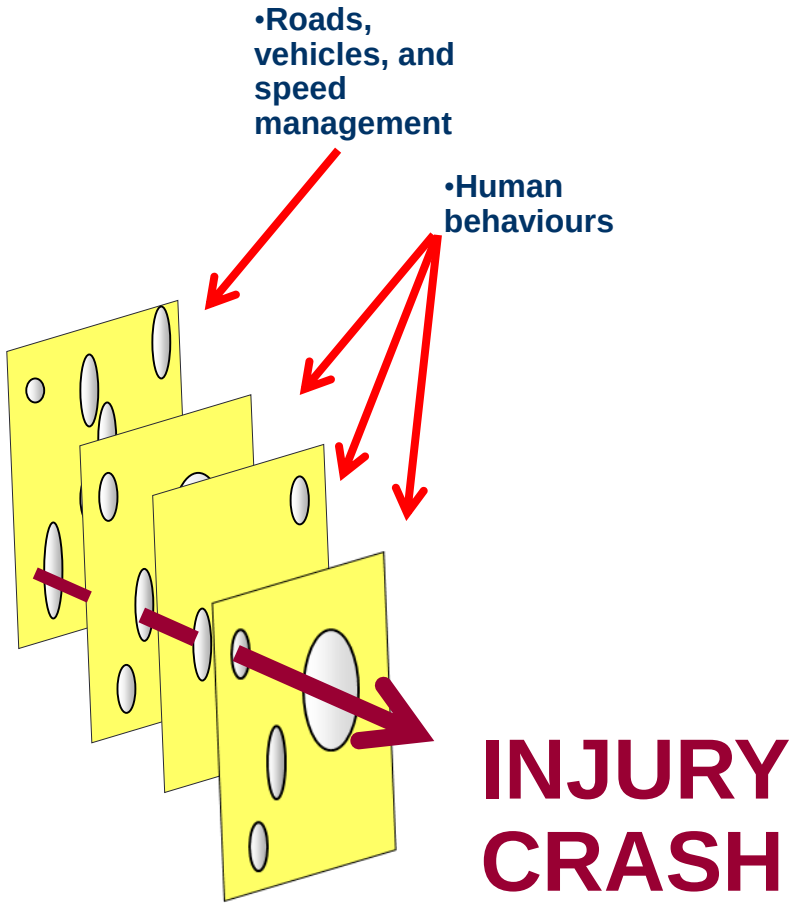
Countless Human Factor Problems Impact Road Safety

Inexperience
Underdeveloped orbitofrontal cortex
Presence of peer passengers
Carelessness
High predisposition for risk
Disregard for others
Pressure to maintain schedules
Cardiovascular conditions
Pulmonary conditions
Diabetes
Hypertension
Psychiatric conditions
Seizures
Visual acuity issues
Compromised visual fields
Visual blind spots
Contrast sensitivity issues
Dementias
Musculoskeletal conditions
Weak Motor skills

Muscle strength & flexibility limitations
Decision errors
Confusion
Turning and pulling-out errors
Left-turn corner cutting
Poor judgement
Overconfidence
Failure to scan the road ahead
Feeling rushed
States of agitation
Following too closely
Sense of entitlement to the roadway
Alcohol
Drugs
Distraction
Fatigue
Not using seat belt
Not wearing helmet
Mechanically unsafe vehicles
Speeding

Current Situation

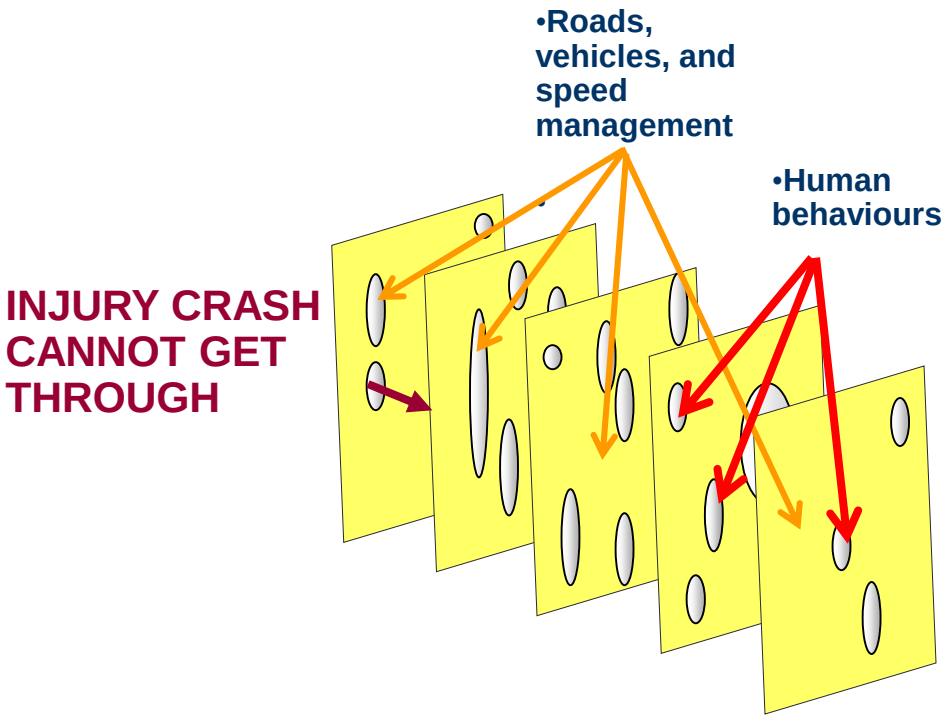
- **Too few levels of protection**
- **Safety overly dependent on human behaviours**



Concept adapted from James Reason and Fred Wegman

The Safe System Approach

- **Builds in more levels of protection**
- **Safety becomes less dependent on human behaviours**



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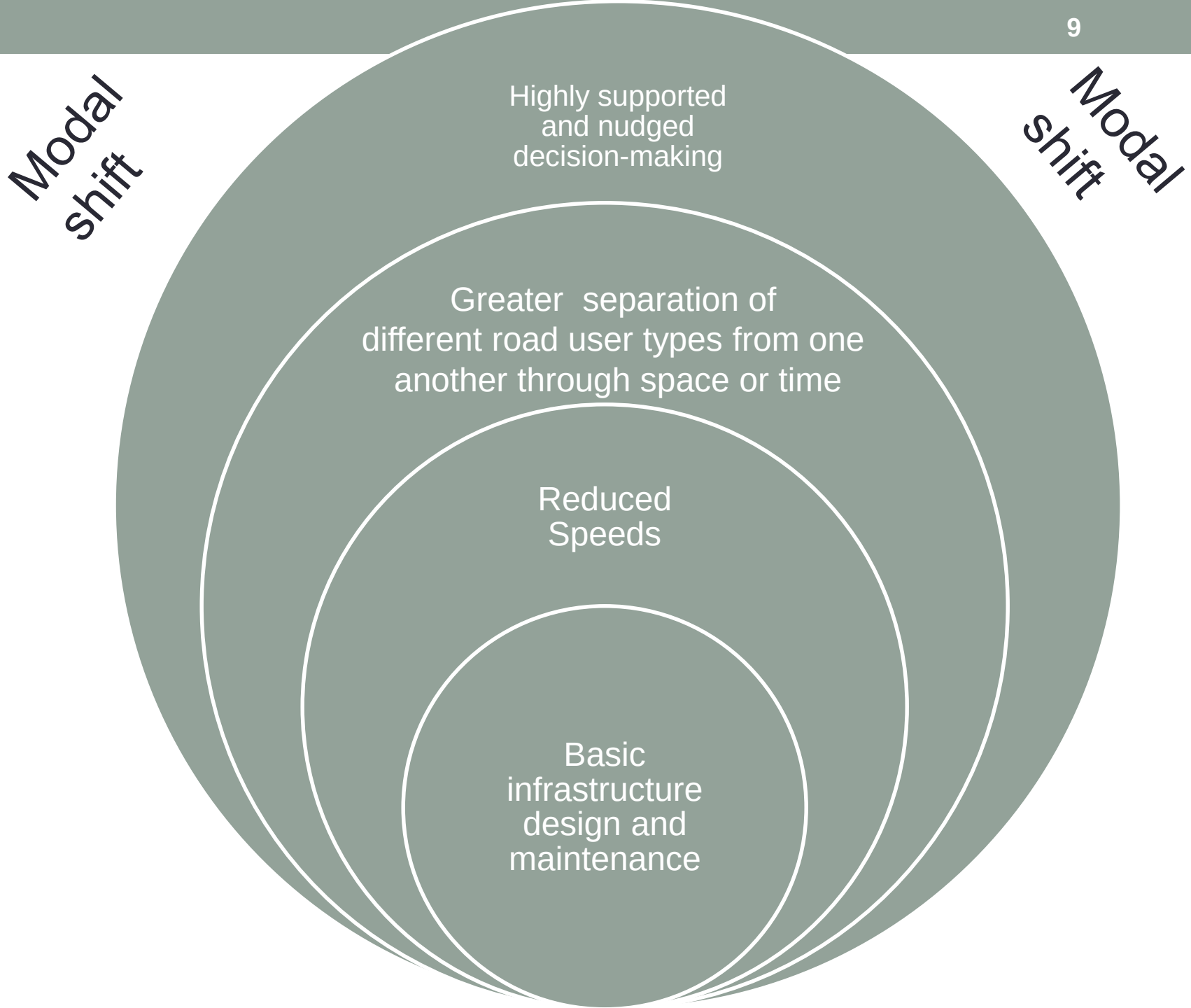
Modal shift
Modal shift
Highly supported and nudged decision-making
Greater separation of different road user types from one another through space or time
Reduced Speeds
Basic infrastructure design and maintenance

Principle #1: Basic infrastructure design and maintenance

Examples:

- Sufficiently wide and connected sidewalks and cycle paths
- Adequate pavement friction of surfaces and adequate drainage
- Cycle times, at signalized locations, long enough for pedestrians
- Curb cuts/ramps to provide sidewalk/cycle path access
- Adherence to access management principles
- Even surfaces that are not too steep
- Maintained sidewalks and cycle paths, e.g., road markings and signs
- Bicycle compatible drainage gates
- Parking that does not create hazards to cyclists (e.g., dooring)
- Clear zones for cyclists, e.g., removal, or relocation, of hard objects that can cause injury (e.g., rock, sharp or hard rail, etc.)
- The provision of good temporary facilities during construction and maintenance periods


Photo: www.pedbikeimages.org/ Laura Sandt

Bicycle wheel hazard


Photo: Neil Arason

Photo: www.pedbikeimages.org/ Justin Pryzby

Principle #2: Reduced speeds

- Speed reduction = shorter stopping distances, and less kinetic energy released in a crash
- Driver effective field of vision widened at slower speeds
- Drivers more likely to stop for other road users when travelling at lowered speeds
- When speeds go up so do deaths and injuries

Examples:

- 30 km/h speed zones
- Traffic calming, chicanes, speed humps, etc.
- Well designed roundabouts with tight cross diameters
- Narrower lanes and streets
- Shorter curb radii to reduce speeds at turns
- Conversion of two-way stop to four-way stop intersections


20
30
I'm seven times more likely to die if you hit me at 30mph.
You could save a life.
It's slower for a reason.
Lancashire County Council
Photo: Lancashire County Council
www.lancashire.gov.uk/20mph

Photo: Neil Arason

Photo: David Coburn

Photo: www.pedbikeimages.org/ Dan Burden

Narrow street

Photo: www.pedbikeimages.org/ Dan Burden

Principle #3: Greater separation of different road user types from one another through space or time

Examples of spatial/physical separation

- Spatially separated sidewalks and bicycle lanes
- Protected sidewalks and cycle paths (with some kind of barrier)
- Pedestrian and cyclist underpasses or overpasses
- Pedestrian medians and sidewalk bulges
- Delineated pedestrian and cyclist zones at intersections
- Provisions for jug-handle left for cyclists
- Floating bus stop (bicycle lane diverted around bus stop zone)

Examples of temporal separation:

- Leading Pedestrian Intervals (LPIs)
- Pedestrian scrambles (exclusive WALK phase for pedestrians in all directions)
- Dedicated signal phases for cyclists
- Prohibition on right-turn-on-red for vehicles
- Elimination of permissive left turn for vehicles, and elimination of concurrent traffic movements

Photo: David Coburn

Photo: Charlotte Arason


Photo: Charlotte Arason

Photo: www.pedbikeimages.org/ Dan Burden


We're building protected bike lanes along this street!
We appreciate your patience during construction.
Fall 2016 – Spring 2017
CITY OF VICTORIA
victoria.ca/cycling

Photo: City of Vancouver Archives/Jack Lindsay

Photo: Bruce McDougall

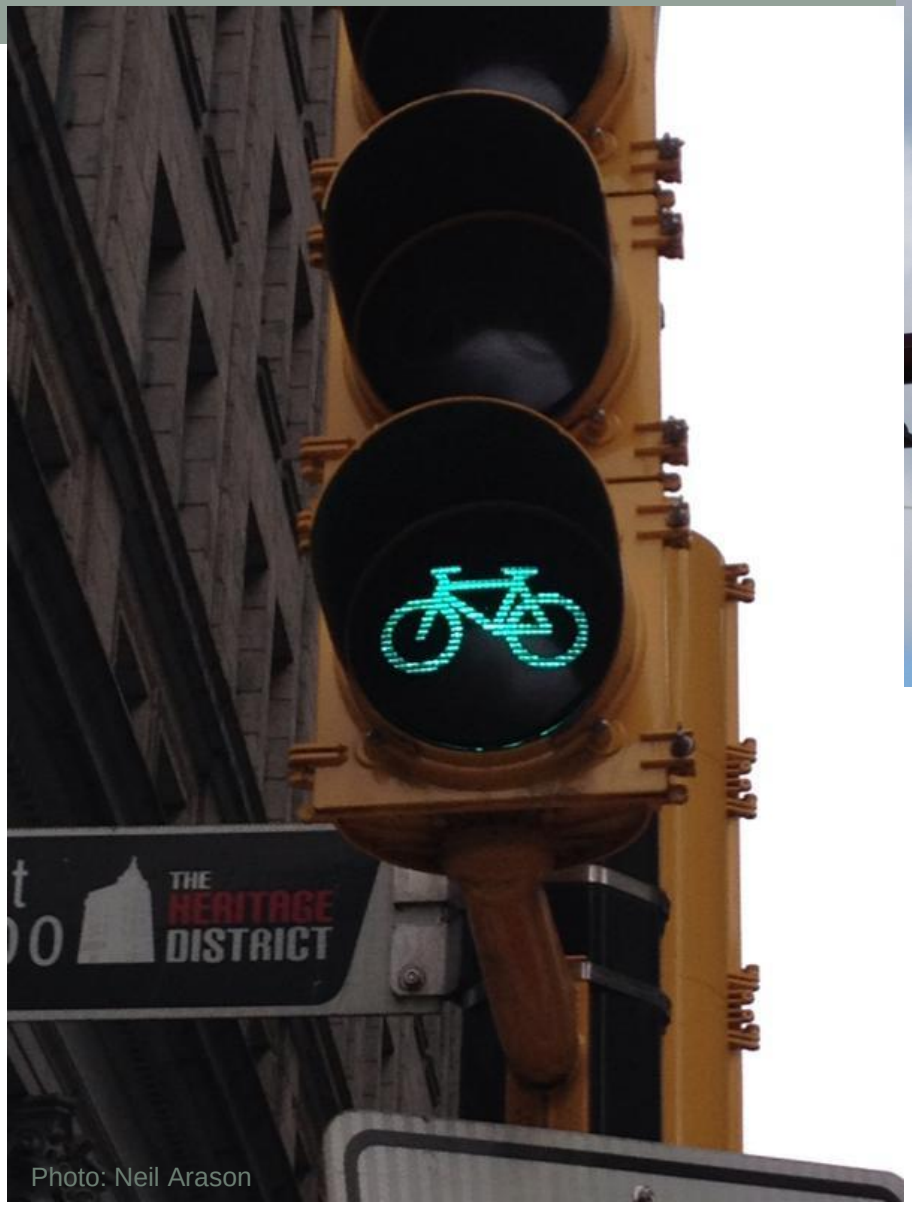

Photo: Neil Arason


Photo: David Coburn


Photo: Neil Arason

Principle #4: Highly supported and ‘nudged’ decision-making

Examples of highly supported decision-making:

- More vivid crosswalk treatments, e.g., RRFB, HAWK, etc.
- Good lighting
- Road and intersection designs that enable enhanced visibility
- Good and wide sight lines
- Advanced stop lines for cars
- Bicycle box and measures to put cyclists up front
- Brightly painted/textured bicycle lanes
- Enhanced pavement markings and tactile markings
- Locations of bus stops and driveways to improve visibility
- Removal of on street parking near intersections
- Absence of clutter and elimination of roadside advertising

Principle #4 (con't)

Examples of 'nudged' decision-making:

- 'Rest in Walk' and 'Pedestrian Recall'
- Pedestrian buttons that confirm when pressed
- Near sided pedestrian signals
- Danish offset crossing
- Shorter cycle times
- Sensors that automatically detect pedestrians and cyclists
- 'Green waves' for cyclists
- Place-making, street furniture, and things that send the message to go slow and watch out for people
- Automated speed enforcement/feedback systems

Photo: www.pedbikeimages.org/ Mike Cynecki

Photo: www.pedbikeimages.org/ Peter Speer

Photo: David Coburn

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Photo: David Coburn

Principle #5: Modal shift

Examples of ways to achieve greater diffusion in travel modes:

- Giving greatest priority to active modes, then public transit, and finally private autos
- More and better public transit
- Dedicated rail lines, dedicated bus lanes, and bus queue jump lanes
- Infrastructure to support multi-modal trips
- Road pricing
- High priced parking (and gas taxes)
- Closed off roads
- Road diets
- Volume diversion
- Disruptive (non-grid) street design for cars
- Non disruptive (continuous and connected) pathways for pedestrians and cyclists
- The “twenty minute” neighborhood

New order of the Big Three

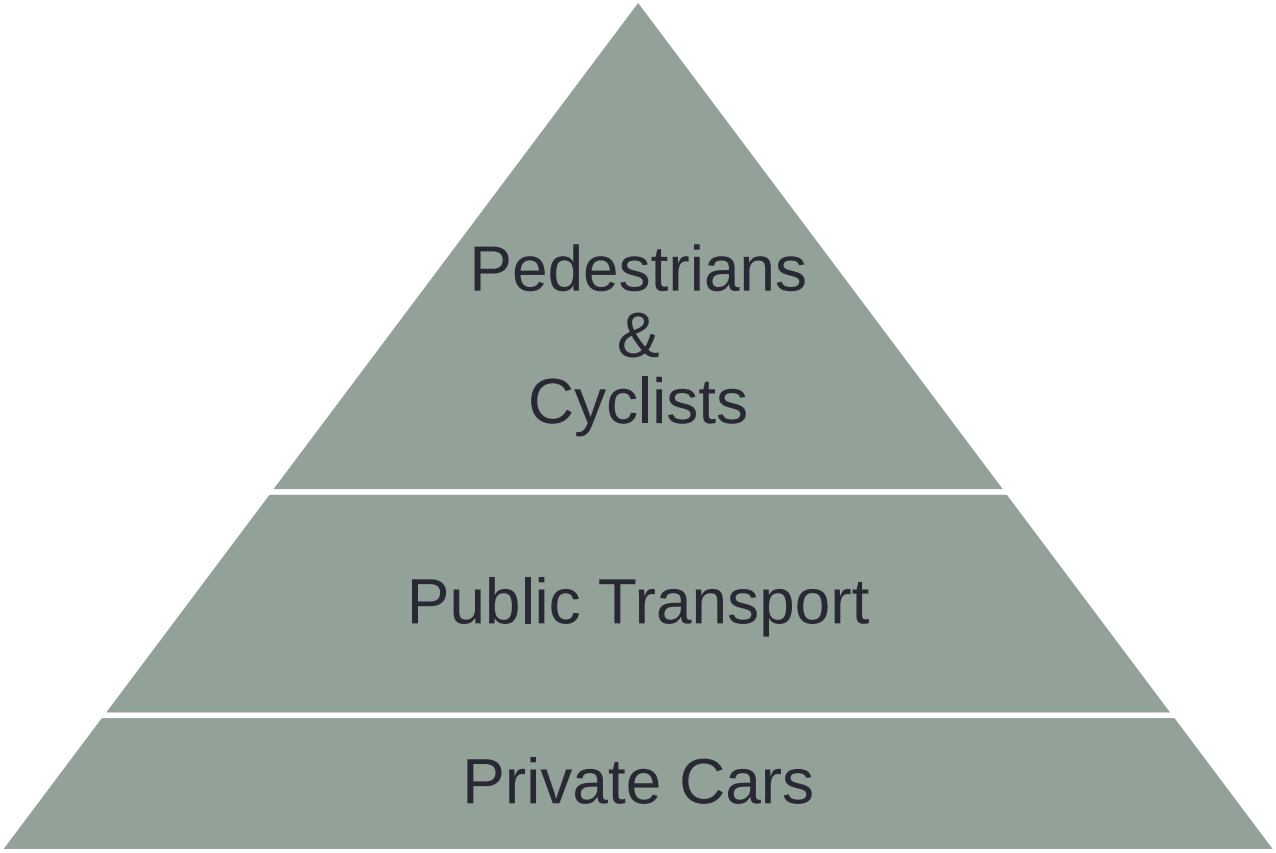


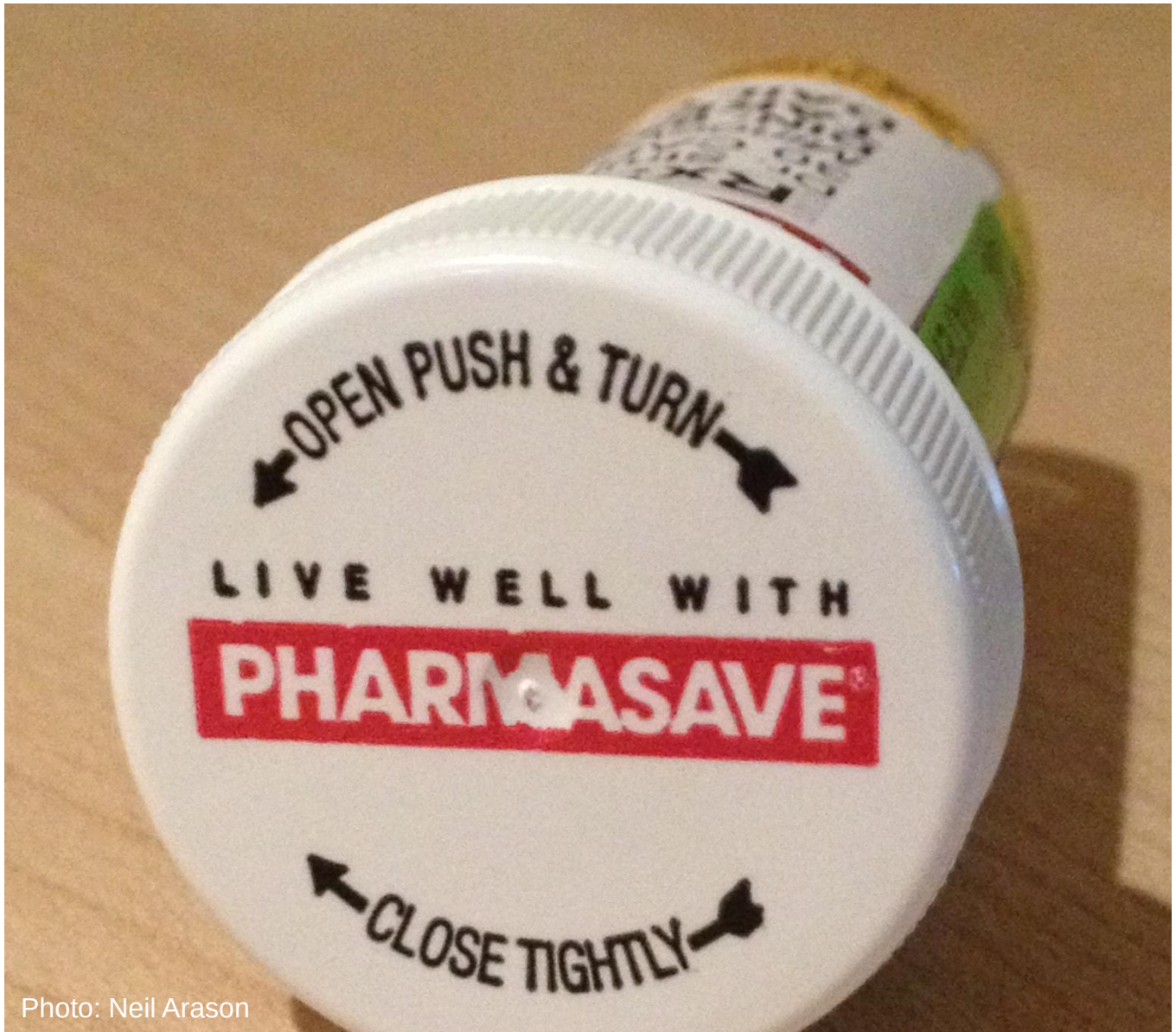
Photo: www.pedbikeimages.org / Ryan Snyder

Photo: www.pedbikeimages.org / Adam Fukushima

These five principles of safe multi-modal design can be used:

- as a planning framework
- to assess levels of safety
- to help guide new innovation

Why Does it Work?



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