IS EVIDENCE IN PRACTICE?

Assessing how cycling education materials reflect research evidence

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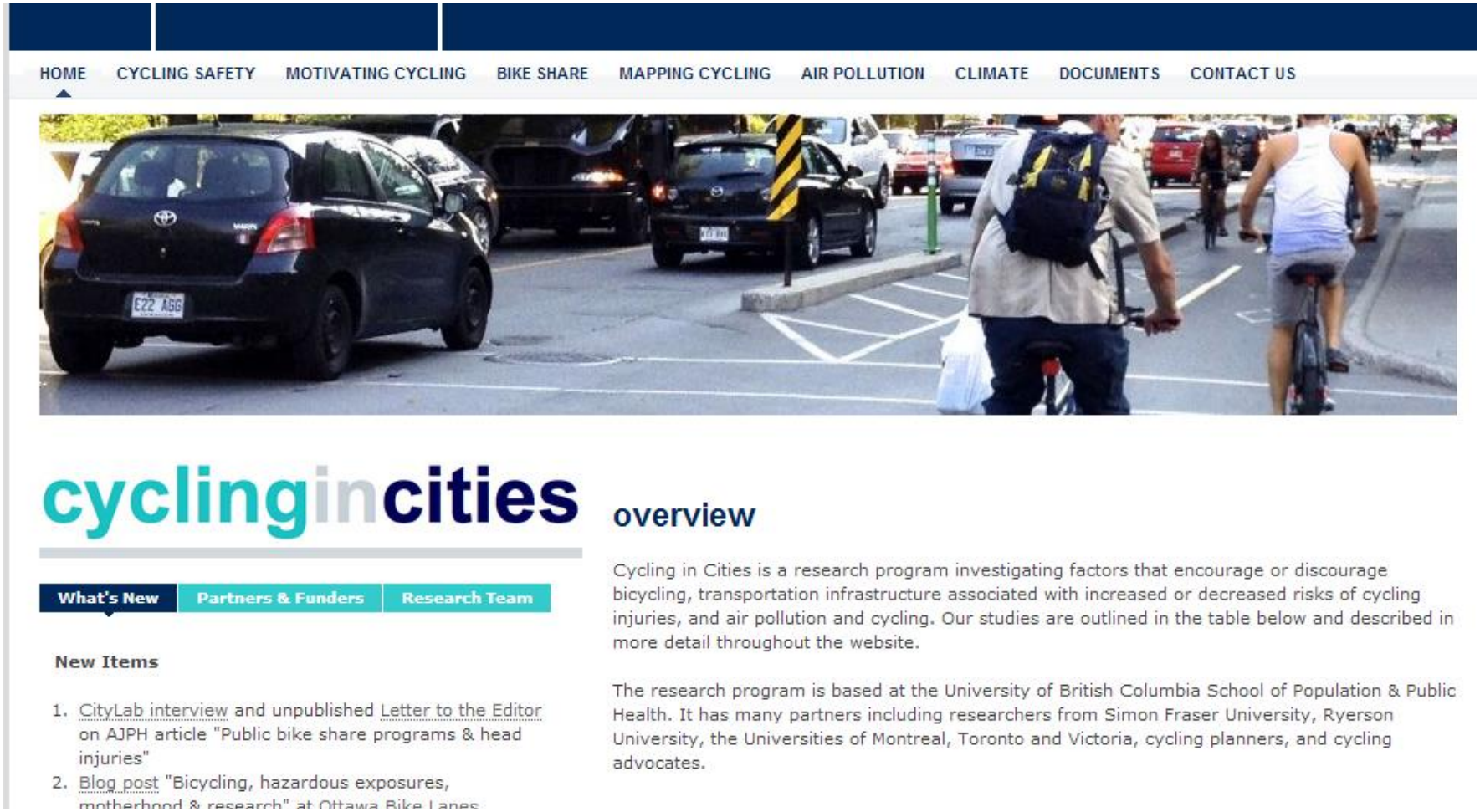
Cycling in Cities – UBC, SFU



www. Cyclingincities.spph.ubc.ca

TRB

TRANSPORTATION RESEARCH RECORD

Is Evidence in Practice?

Review of Driver and Cyclist Education Materials with Respect to Cycling Safety Evidence

Meghan Winters, Angie Weddell, and Kay Teschke

(2013) *2387, 35-45*

Evidence from Safety Research to Update Cycling Training Materials in Canada

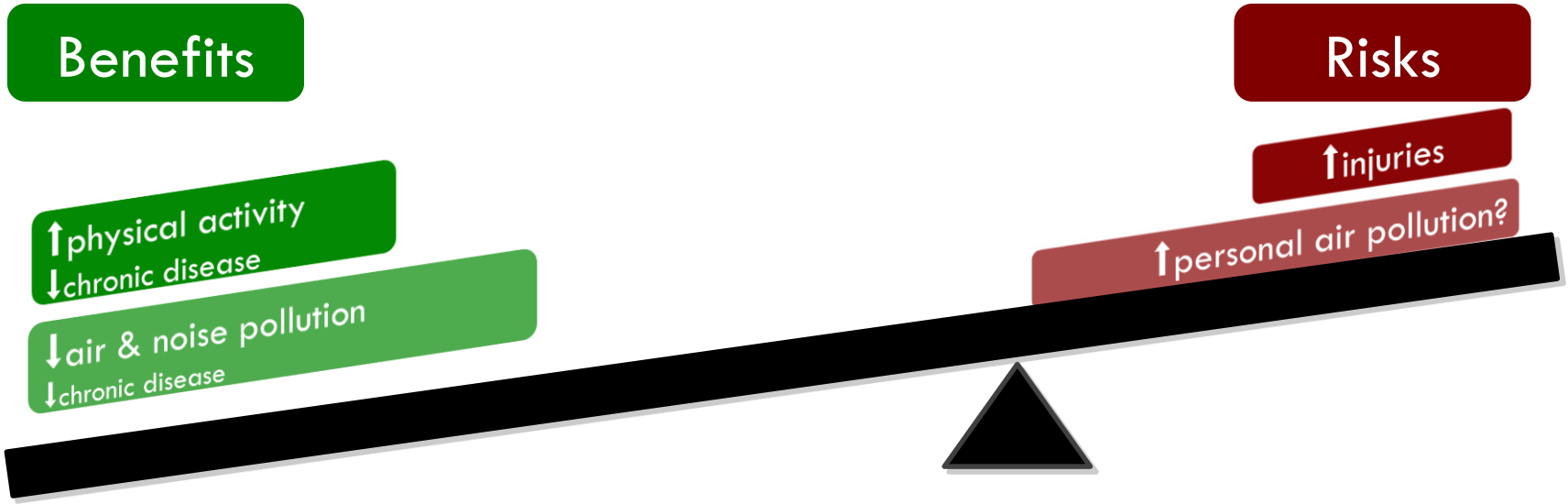
Angie Weddell, Meghan Winters, Kay Teschke

The University of British Columbia & Simon Fraser University

September 2012

Bicycling is fun, inexpensive, safe & healthy

- Evidence from Canada, the US & UK shows that cycling safety is similar to walking.
- Research consistently shows that its health benefits far outweigh injury risks.



British Medical Association (1992); Woodcock (2009); de Hartog (2010); Teschke (2013)

Safety is a major deterrent to cycling

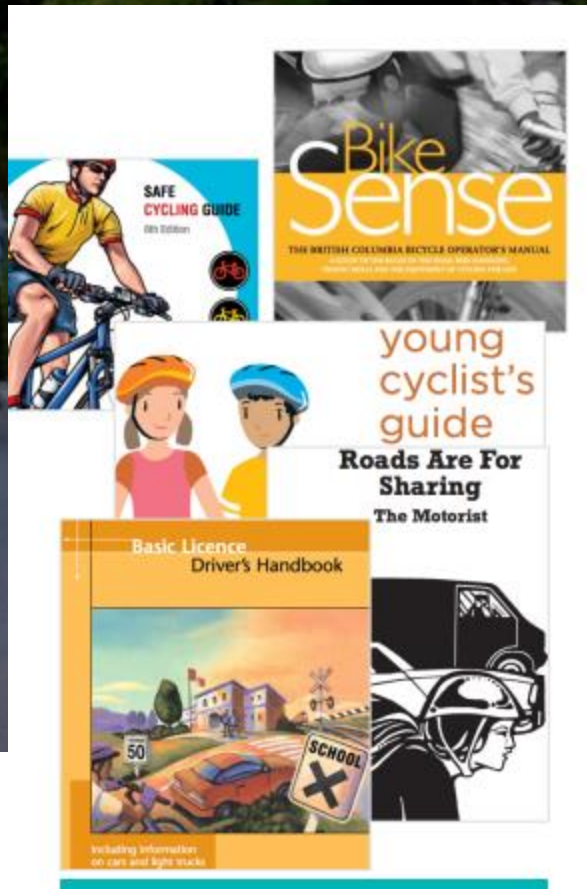
- Motivators: route ease and enjoyment
  - Away from air pollution or traffic noise
  - Beautiful scenery
  - Away from traffic
  - Flat
  - Time to travel shorter than other modes

- Deterrents: safety
  - Ice and snow
  - Car, bus & truck traffic
  - Glass or debris
  - Vehicles traveling faster than 50 km/hr
  - Motorists who don't know how to drive safely near bikes

Winters et al (2011)

Education plays a key role

- Goal: To improve cycling safety training by comparing cycling education materials to research on cycling safety.



Scientific Literature Selection

- Search conducted using PubMed, Medline, and TRIS
  - Updated through January 2012

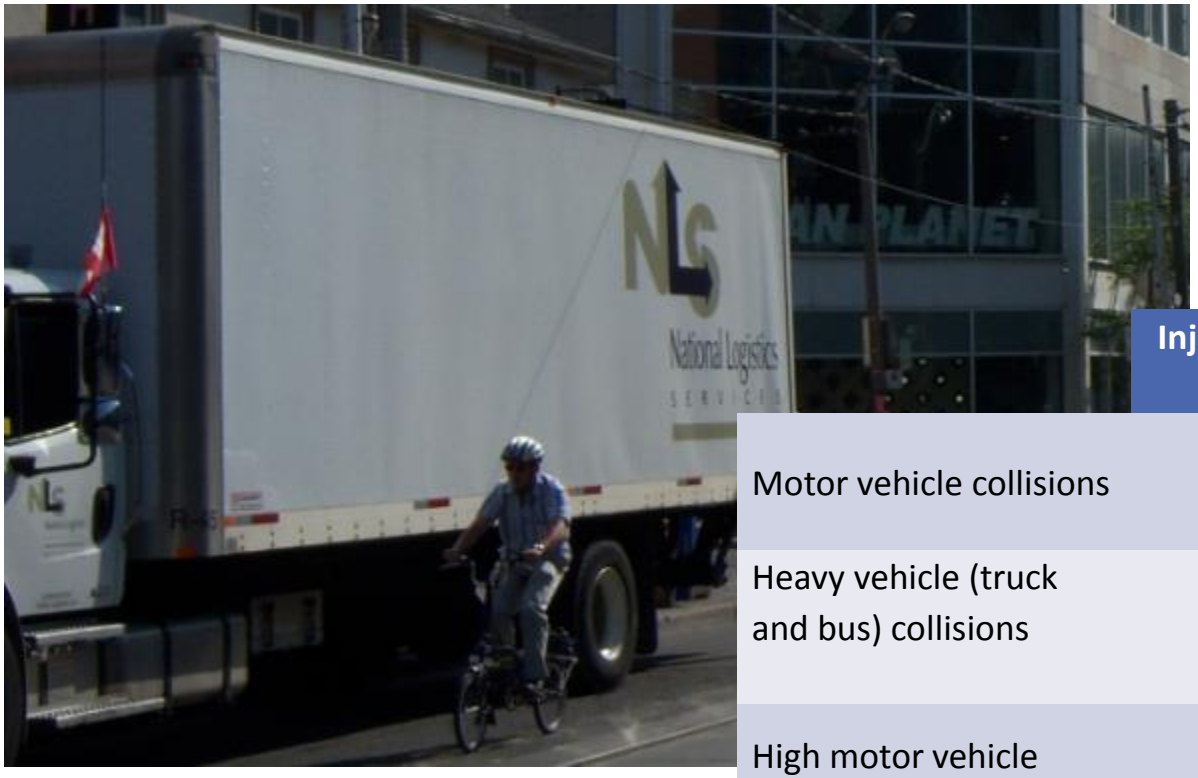
- Selection Criteria
  - Original research
  - Investigates the relationship between cyclist safety and a factor that can be affected by education
  - Uses a measure of relative risk to determine effect

Scientific Literature Selection

Topics Covered by Literature

- Bicycle-Motor Vehicle Interactions
- Route Characteristics and Conditions
- Route Types
- Bicycling Operations
- Safety Equipment

Bicycle-Motor Vehicle Interactions



	Injury/Crash Risk	Injury Severity
Motor vehicle collisions		↑
Heavy vehicle (truck and bus) collisions	↑	↑
High motor vehicle speeds and speed limits	↑	↑
High motor vehicle volume	↑	↓

Bicycle-Motor Vehicle Interactions

	Passing Distances
Cyclists riding far from curb	↓
High speed & high traffic roads	↓
Traffic in opposite direction	↓
Heavy vehicle passing	↓

Route characteristics & conditions

	Injury/Crash Risk	Injury Severity	Other Safety Information
Roundabouts & Traffic Circles	↑	↑	Those with separated cycling facilities are safer
Medians and divided roadways		↓	
Grades	↑	↑	*Downhill grades increase risk
High cyclist traffic volumes at intersections	↑		
Inclement weather (rain, snow, fog)		↑	
Dark, unlit conditions	↑	↑	

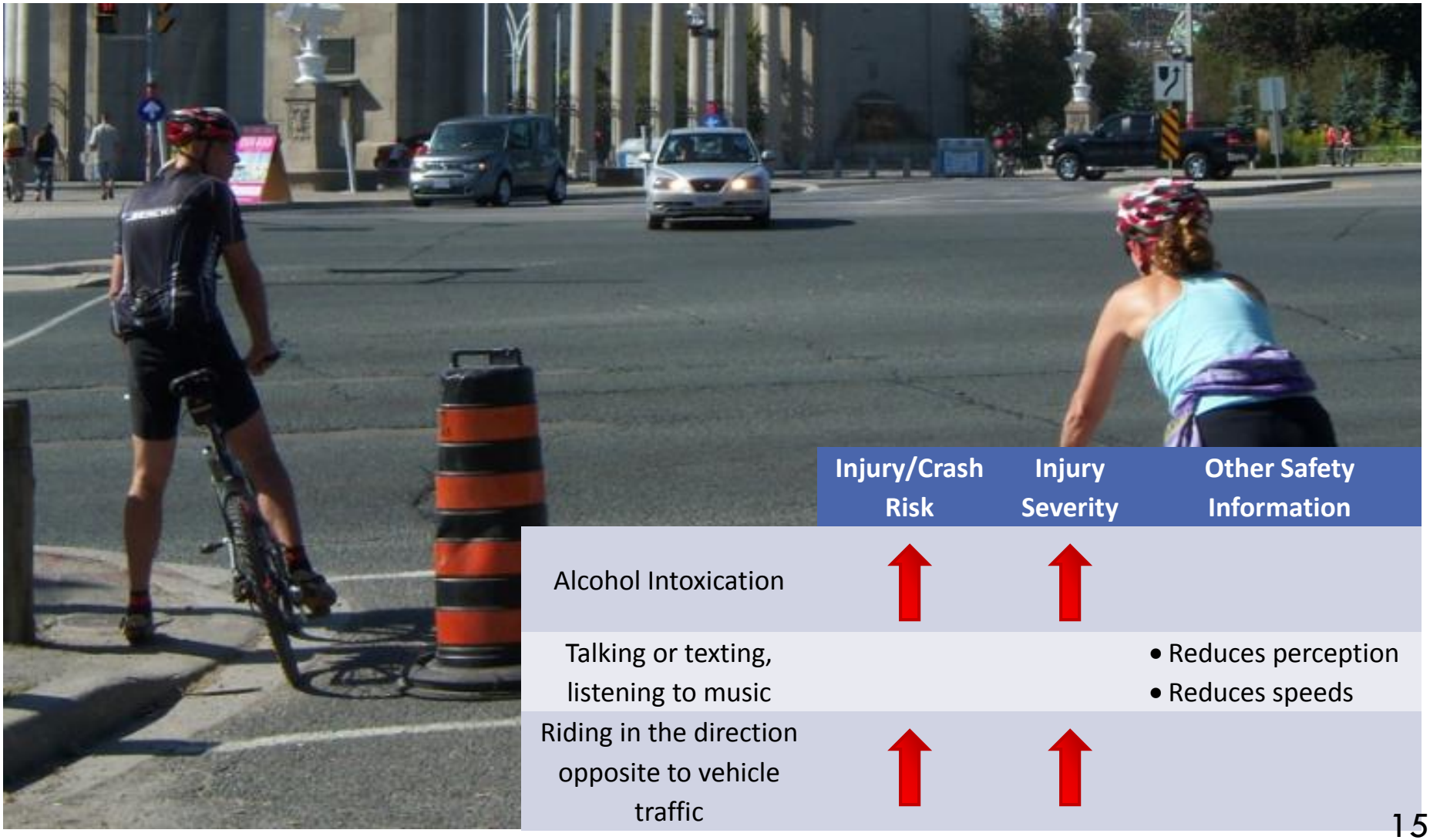
Route Types: safer

	Injury/Crash Risk	Injury Severity
Cycle Tracks	↓	↓
Bike Lanes	↓	
Signed Bike Route	↓	
Minor Street (no bike facilities)	↓	↓
Bike Paths	↓	

Route Types: Less safe

	Injury/Crash Risk	Injury Severity
Multi-use paths	↑	
Sidewalks	↑	
Major Streets without bike facilities	↑	↑
Highways		↑

Bicycling Operations



	Injury/Crash Risk	Injury Severity	Other Safety Information
Alcohol Intoxication	↑	↑	
Talking or texting, listening to music			• Reduces perception • Reduces speeds
Riding in the direction opposite to vehicle traffic	↑	↑	

Safety Equipment

	Injury/Crash Risk	Injury Severity
Bright clothing, reflectors	↓	↓
Running lights	↓	
Helmets		↓

Conflicting Evidence

- Cycling quickly (3 studies)
- Curved roads (3 studies)
- Intersections (3 studies)
- Children riding on the sidewalk (3 studies)
- Off-road and unpaved paths (3 studies)

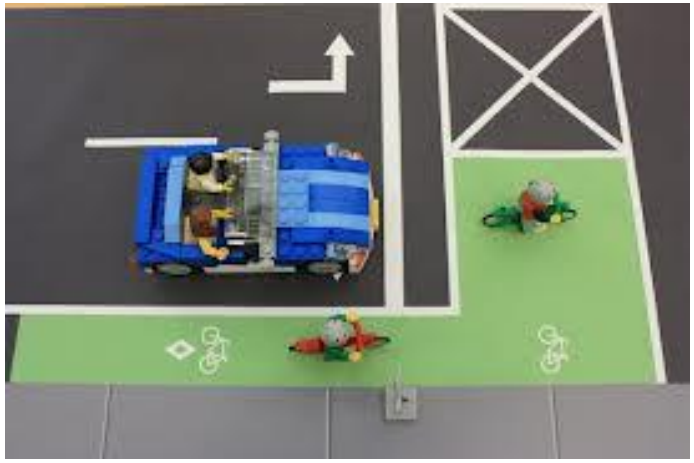
Single studies – further research

Decreased risk/severity(*):

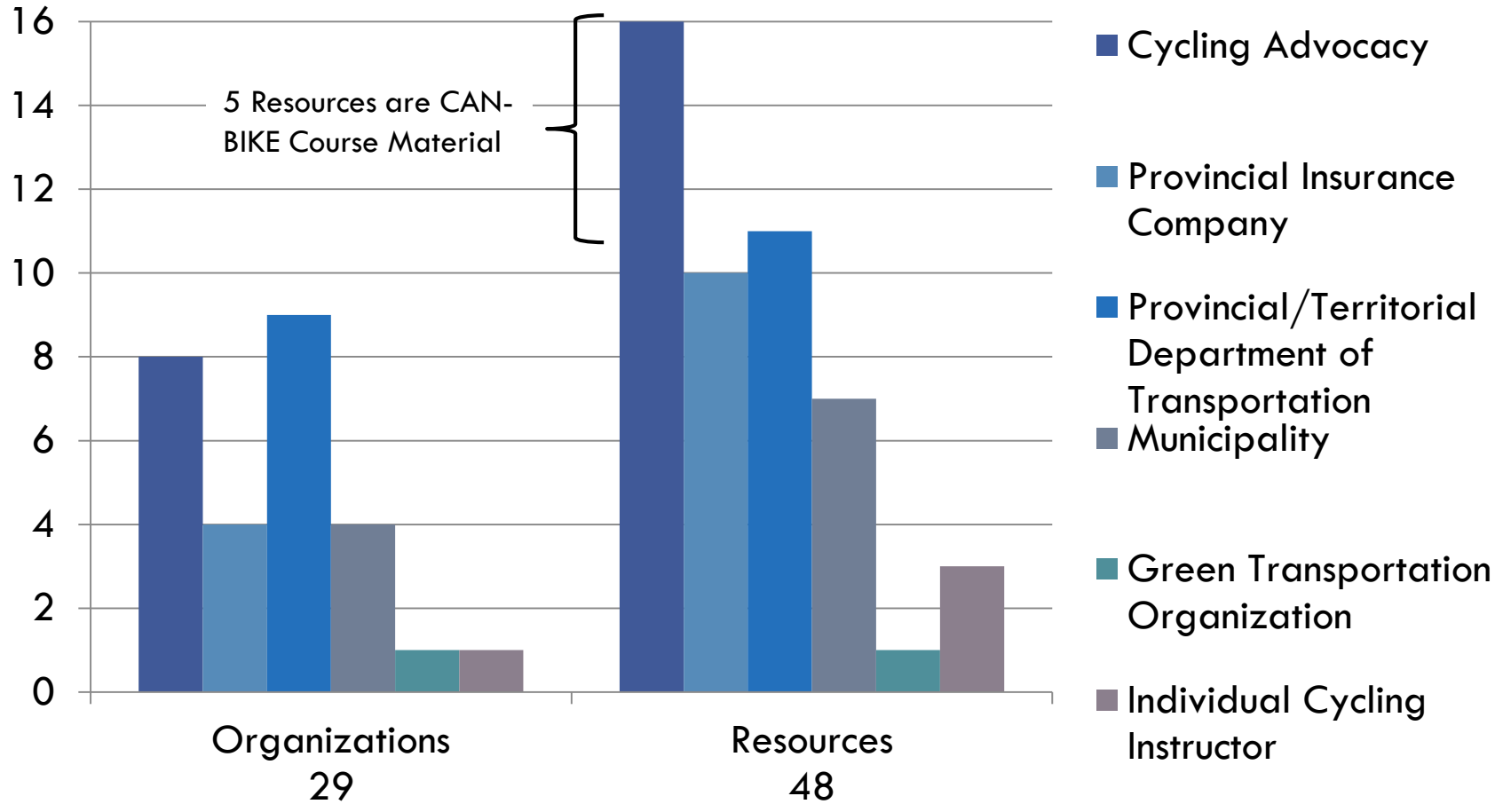
- Bike boxes
- Colored bike lanes
- Separated left turn lanes
- Recently paved roads*

Increased risk/severity(*):

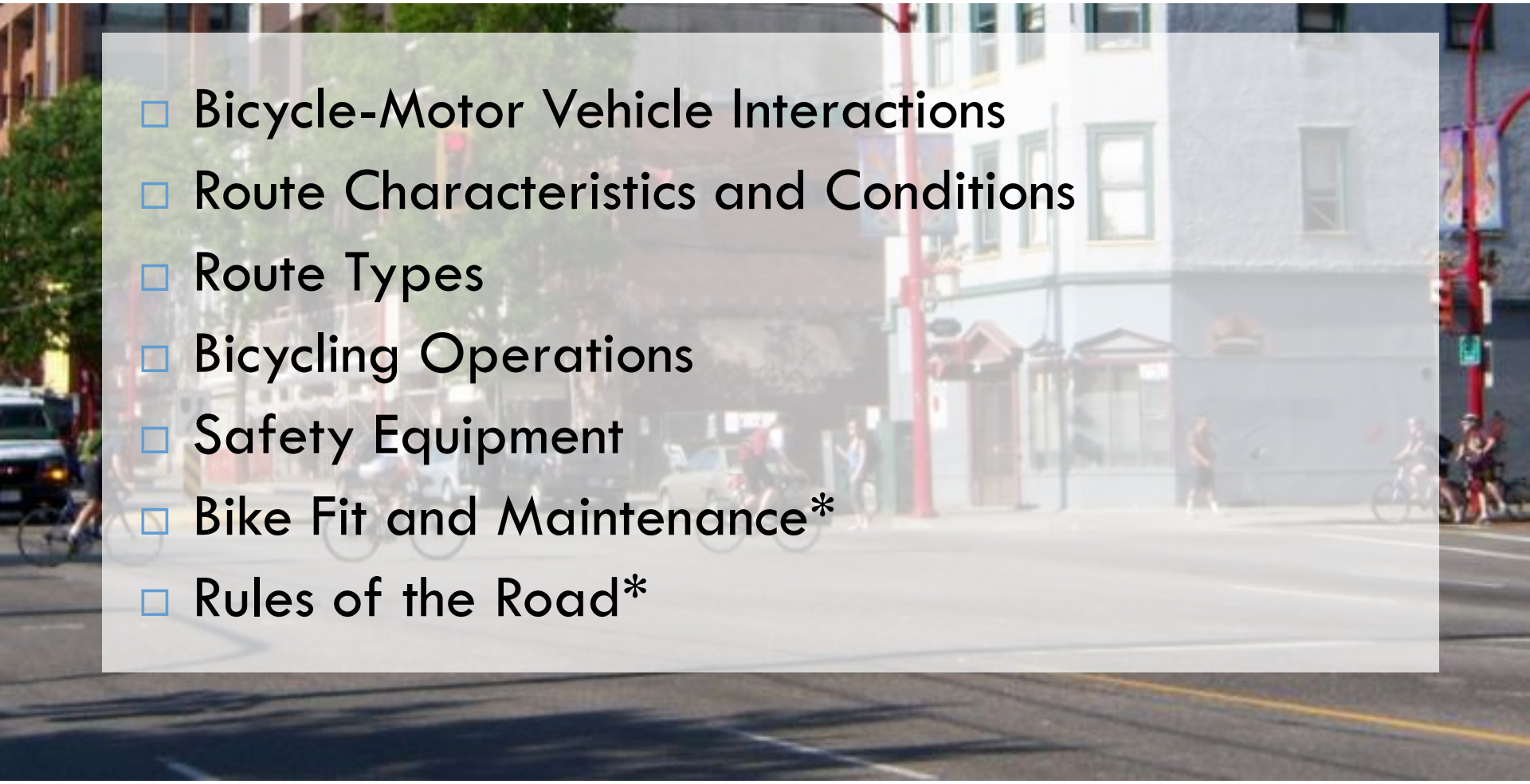
- Streetcar tracks
- Construction
- Cyclists looking away from route*
- Cyclists failing to give right-of-way*



Education Resources

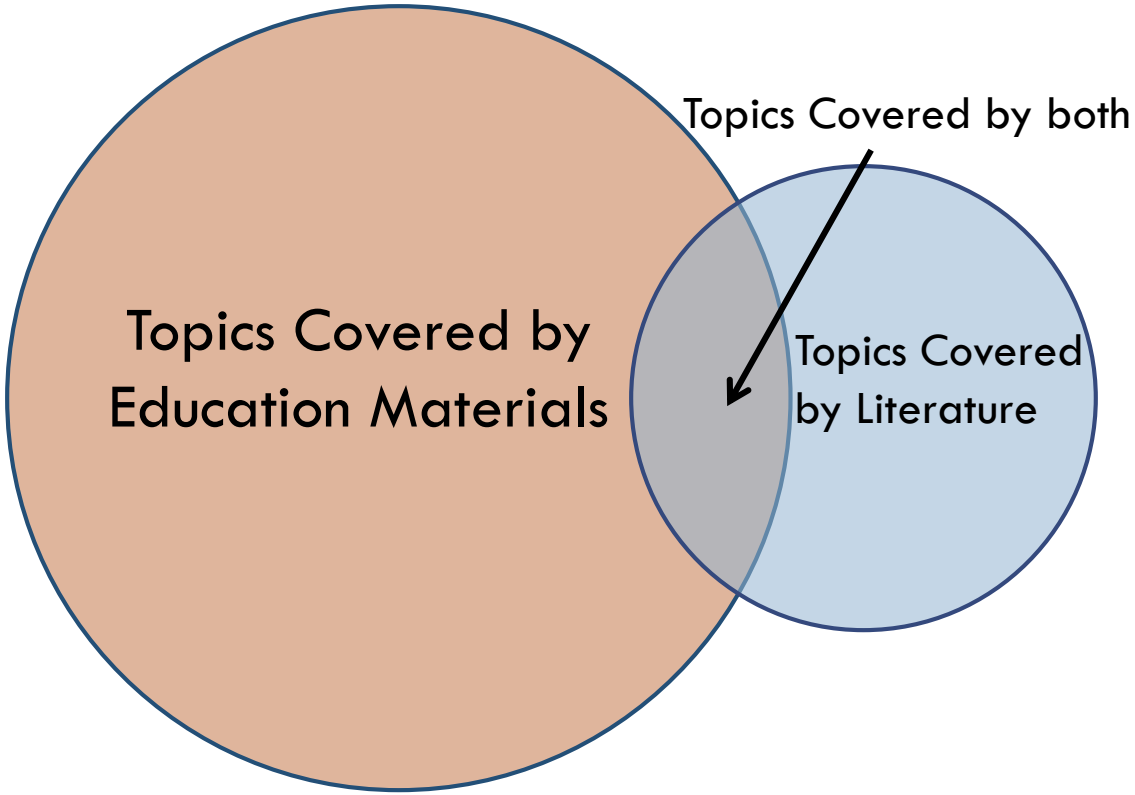


Education Topics



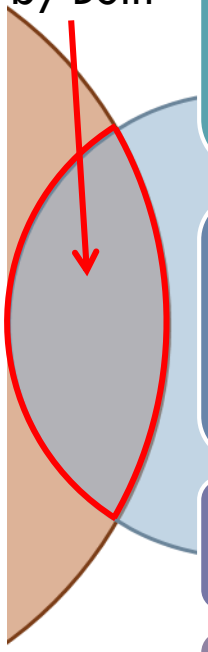
- Bicycle-Motor Vehicle Interactions
- Route Characteristics and Conditions
- Route Types
- Bicycling Operations
- Safety Equipment
- Bike Fit and Maintenance*
- Rules of the Road*

Education vs. Scientific Literature



Education messages supported by evidence

Topics Covered by Both



Bicycle-Motor Vehicle Interactions

- Stay away from large vehicles
- Beware of parked cars pulling out or opening doors
- Be extra cautious of heavy vehicles turning right
- Ride in the direction of traffic
- Yield to cross traffic

Route Characteristics & Conditions

- Cross railroad tracks at right angle
- Be award of weather conditions, breaks work les well when wet
- Ride slowly, brake lightly in snow & ice

Route types

- Avoid riding on major roads and highways
- Don't ride on sidewalks

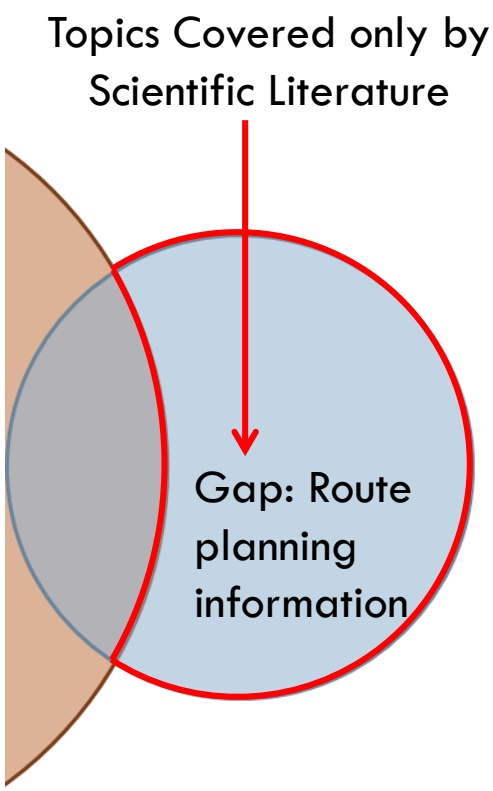
Bicycling Operations

- Don't ride while intoxicated
- Don't use a mobile device while riding
- Pay attention & keep eyes on the road

Safety Equipment

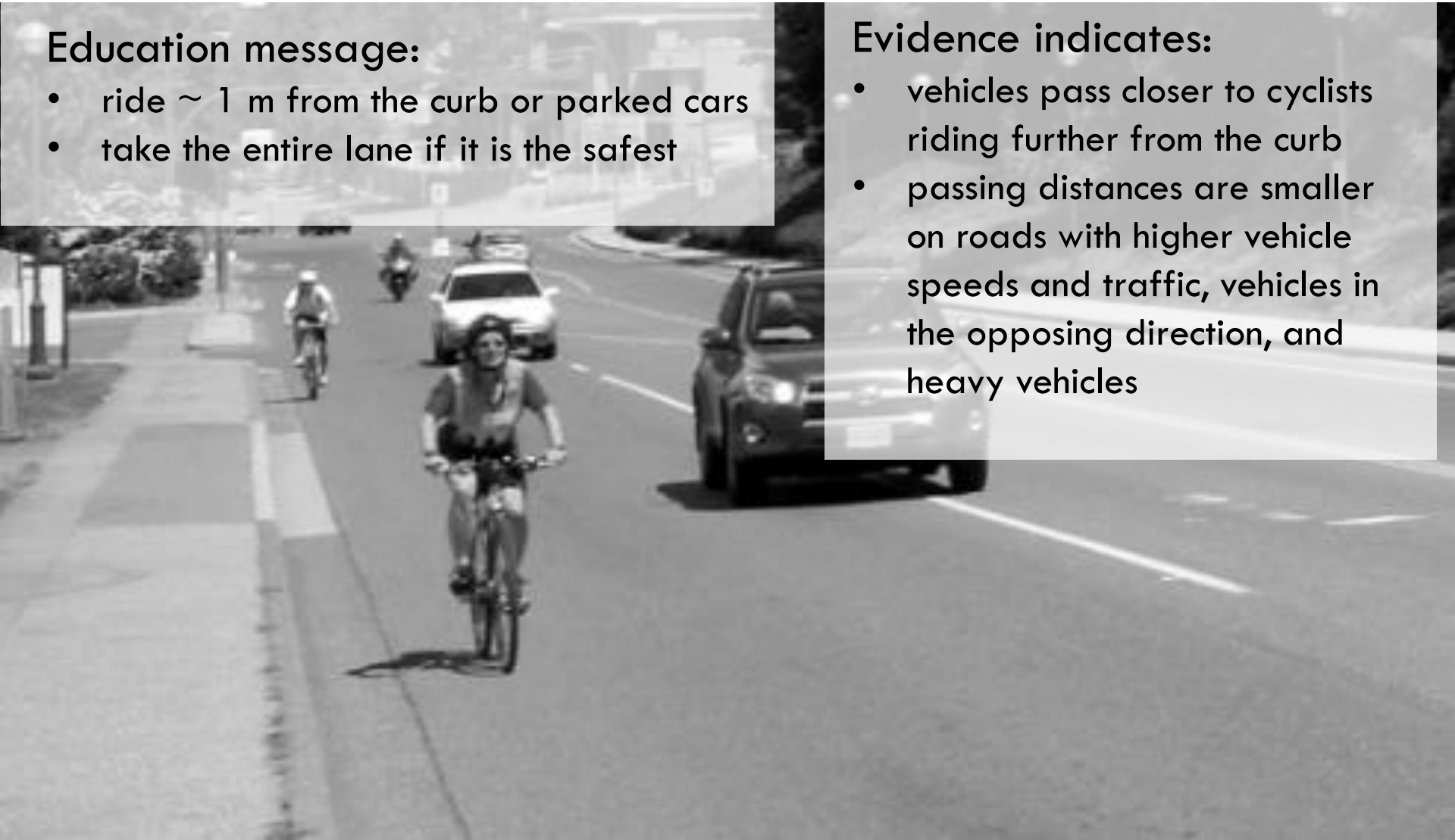
- Use lights after dark
- Wear reflective or bright clothing
- Wear a helmet

Missing education messages



Bicycle-Motor Vehicle Interactions	
Route Characteristics & Conditions	• Increased risk with foggy conditions, or after dark on routes without street lights • Increased risk associated with roundabouts or traffic circles
Route Types	• Decreased risk associated with bike-specific routes: cycle tracks, bike lanes, bike paths • Decreased risk associated with low traffic volumes, including residential street bike routes
Bicycle Operations	• Decreased stability and perception when listening to music while cycling
Safety Equipment	

Incomplete message: Passing Distances



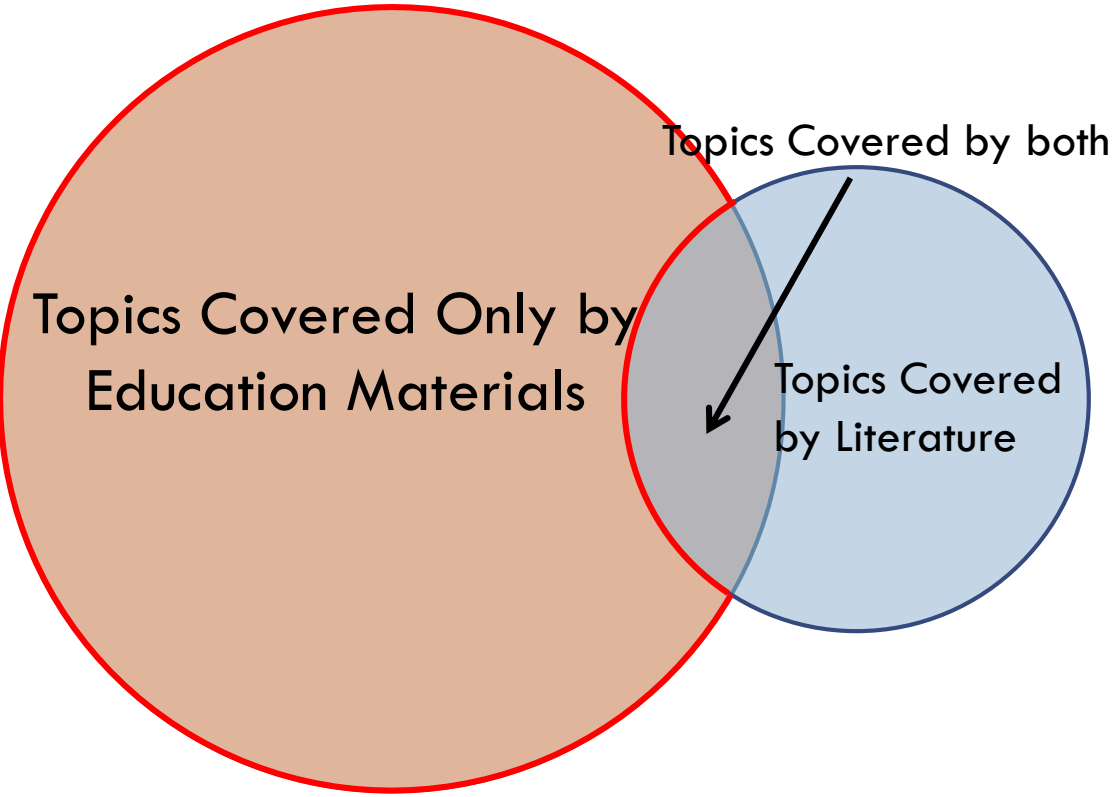
Education message:

- ride ~ 1 m from the curb or parked cars
- take the entire lane if it is the safest

Evidence indicates:

- vehicles pass closer to cyclists riding further from the curb
- passing distances are smaller on roads with higher vehicle speeds and traffic, vehicles in the opposing direction, and heavy vehicles

Topics Not Covered by Literature



Two broad topic areas not addressed in the research:

- bike fit & maintenance
- rules of the road

Others were "common sense" (inflated tires, proper fit, yield to pedestrians)

To note, rules about cycling-related infrastructure such as bike lanes, bike boxes, sharrows or traffic circles were rarely explained.

Education Materials: Ambiguous "facts"

"75% of accidents happen at intersections"

"Most accidents occur at intersections"

"80% of accidents occur at intersections"

"Most car-bike collisions involve vehicles turning /crossing the path of cyclists"

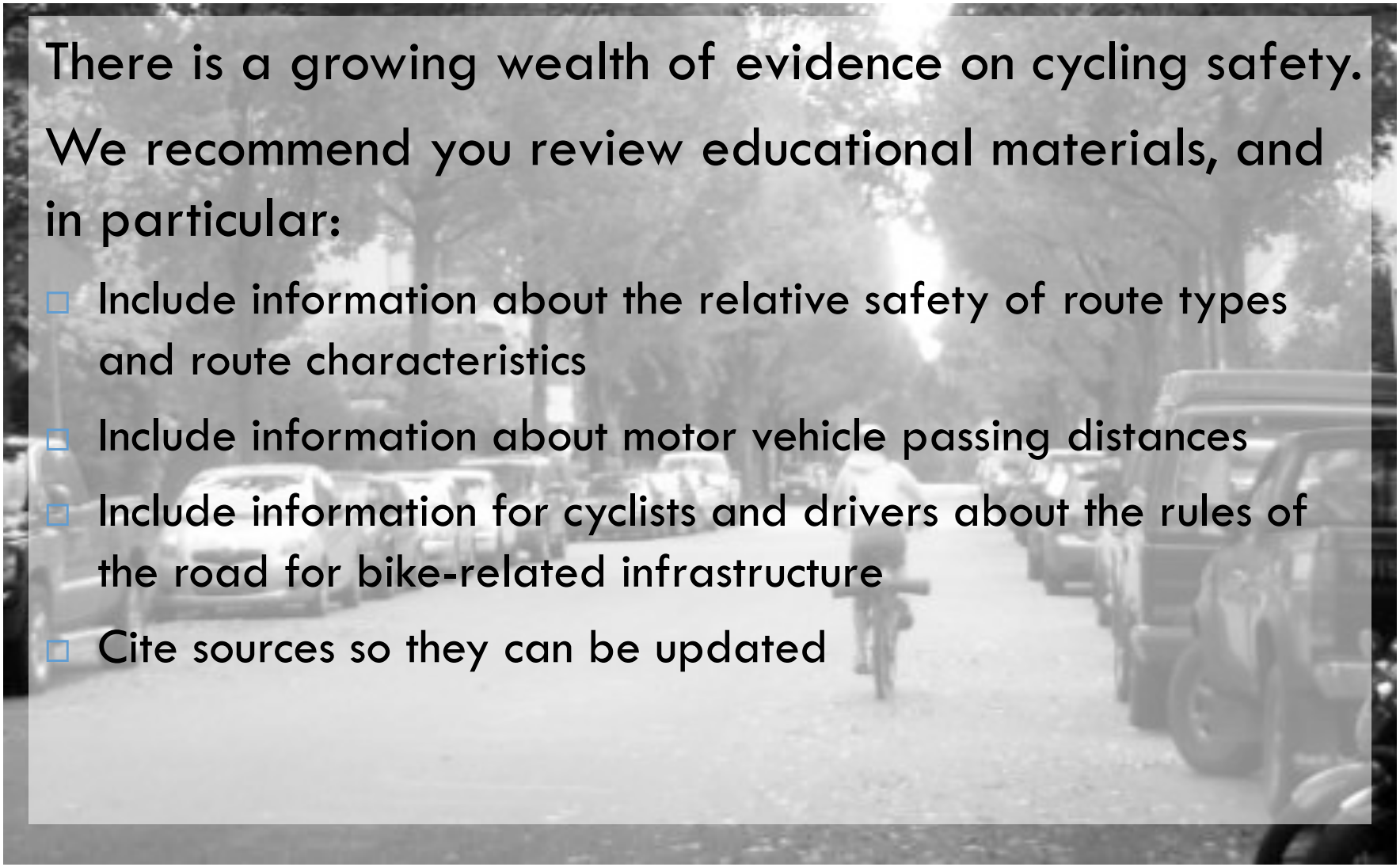
"Adults most likely injured by motorist error"
"Only 4% are motorist error (0.8% of all collisions)"

"Disobeying rules of the road factor in 1/2 of collisions (51%)"

"6% are caused by cyclists swerving into traffic"

- No citation (can't update or check)
- No context (when, where, types of crash included)
- Conflicting facts, even within same resource
- No control for exposure (e.g., how many cyclists)

Conclusions and recommendations



There is a growing wealth of evidence on cycling safety.

We recommend you review educational materials, and in particular:

- Include information about the relative safety of route types and route characteristics
- Include information about motor vehicle passing distances
- Include information for cyclists and drivers about the rules of the road for bike-related infrastructure
- Cite sources so they can be updated

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and

Canadian Institutes for Health Research