Designing Safe Streets for All Users

Responses to the challenges posed by growing motorcycle use

Eduardo Pompeo
eduardo@gdci.global

ADB GRRSO Dialogue on Motorcycle Safety

Manila, Oct 12, 2022

@GlobalStreets
www.globaldesigningcities.org

GDCI Global Designing Cities Initiative


STREETS

STREETS

are the platform to...

Move

Istanbul, Turkey

Dine

Paris, France

Play

Fortaleza, Brazil

Learn to Ride

Bogot , Colombia

Spaces to relax

New Delhi, India

To spend time with old friends

Madrid, Spain

....or meet new ones

Portland, USA

STREETS

serve many functions...

Mobility and Access
Environmental Sustainability
Economic Sustainability
Livability and Quality of Life
Public Health and Safety

Largest network of continuous public space

we must make better, more efficient use of this valuable space


S. Daurada
GUR

A lot can be done for the safety of motorcyclists

- Universal helmet use
- Safer motorcycles
- Strategic enforcement
- Better training for motorcyclists
- Improved crash response
- Better crash data management
- …

When it comes to street design, we should acknowledge that the street is a single space where multiple users interact...

We can we avoid repeating mistakes from the past...

...of considering only one user in isolation...

?

...to asking how do we make our cities safe for all people!

Global Designing Cities Initiative

NACTO

Global Designing Cities Initiative

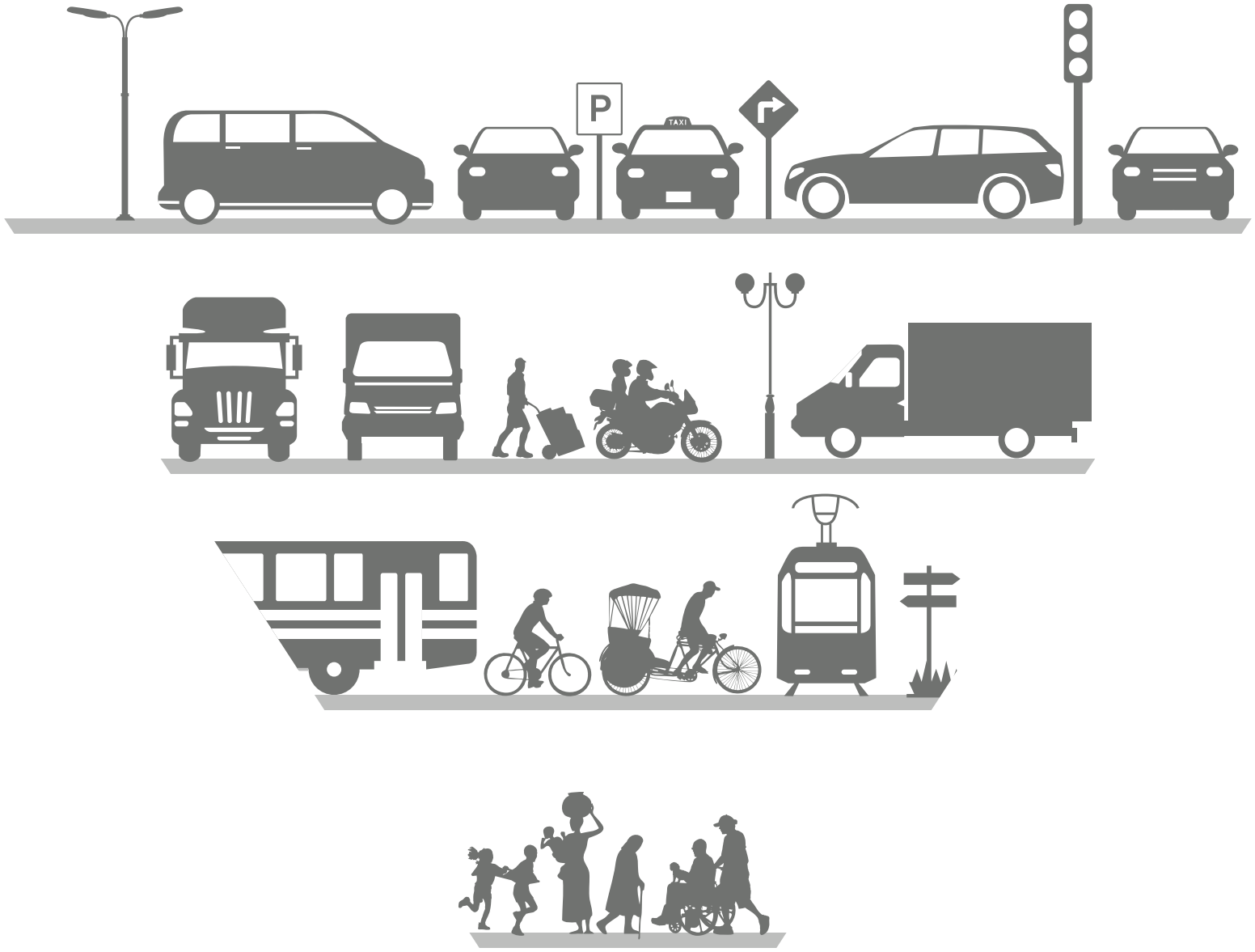
Bloomberg Philanthropies

INITIATIVE FOR GLOBAL ROAD SAFETY

Global Expert Contributing Network

40+ countries

70+ cities


P
TAXI


P

What is Possible?

People: Design for All Street Users

Pedestrians

Cyclists

Transit Riders

Motorists

Freight Operators and Service Providers

People Doing Business

We do not have all the answers...

We do not have all the answers...

...but together we can dialogue to formulate the right questions ☺

Motorcyclists are highly vulnerable

Motorcyclists

Car occupants

Motorcyclists are 38x more likely to be killed

than car drivers in London

Motorcyclists are a unique vulnerable road user

Motorcyclists are a unique vulnerable road user

Motorcyclists

Cyclists

Pedestrians

User Protection	Low	Low	Low

Motorcyclists are a unique vulnerable road user

	Motorcyclists	Cyclists	Pedestrians
User Protection	Low	Low	Low
Max Speed		~20km/h	~6km/h
User Mass		Low	Low

Motorcyclists are a unique vulnerable road user

Motorcyclists

Minimal risk

(low mass and speed differential)

Cyclists

Pedestrians

	Motorcyclists	Cyclists	Pedestrians
User Protection	Low	Low	Low
Max Speed		~20km/h	~6km/h
User Mass		Low	Low

They also pose risks to other vulnerable users

High risk

Motorcyclists | **Cyclists** | **Pedestrians**

User Protection	Low	Low	Low
Max Speed	**~100km/h +**	~20km/h	~6km/h
User Mass	**Medium**	Low	Low

They also pose risks to other vulnerable users

High risk

In Bogota, motorcycles are the **LEADING cause of death for pedestrians** (cause 33% of ped deaths, 2020)

Motorcyclists → **Pedestrians**

Victim/Vehicle	Light vehicle	Motorcycle	Heavy vehicle	Passenger vehicle	Pedestrians	Bicycle	Single-vehicle crash	Missing vehicle	Total
Motorcyclist	25	8	37	33	4	3	43	0	153
Pedestrian	21	44	13	28	0	2	0	22	130
Cyclist	9	6	21	18	1	0	13	0	68
4-wheeler occu.	2	1	5	2	0	0	16	0	26
Total	57	59	76	81	5	5	72	22	377

Source: City of Bogotá / Vital Strategies

They also pose risks to other vulnerable users

Motorcyclists

Motorcycles caused or participated in 27% of all road traffic fatalities in the city, despite mode share of only 5.5%

Victim/Vehicle	Light vehicle	Motorcycle	Heavy vehicle	Passenger vehicle	Pedestrians	Bicycle	Single-vehicle crash	Missing vehicle	Total
Motorcyclist	25	8	37	33	4	3	43	0	153
Pedestrian	21	44	13	28	0	2	0	22	130
Cyclist	9	6	21	18	1	0	13	0	68
4-wheeler occu.	2	1	5	2	0	0	16	0	26
Total	57	59	76	81	5	5	72	22	377

Source: City of Bogotá / Vital Strategies

They also pose risks to other vulnerable users

Motorcyclists

At high speeds, **motorcycling is inherently unsafe in urban areas**

What does the rapid growth and danger posed by motorcycles mean for the physical design of streets?

Is the implementation of Dedicated Motorcycle Facilities the right design response in cities?

Dedicated motorcycle lane

Advanced stop bar for motorcycles

(a)
Are motorcycling facilities proven to make our streets safer for all users?

(b)
How can we redesign streets to promote safe and sustainable mobility?

(c)
Focus on speeds to make streets safe for all users

(a)

Are motorcycling facilities proven to make our streets safer for all users?

Dedicated Motorcycle Facilities

In motorways, there are positive trends

Dedicated Motorcycle Facilities

In cities, there are mixed results

Precedent: pilot implementation of dedicated motorcycle lanes in São Paulo, Brazil

Dedicated Motorcycle Facilities

In cities, there are mixed results

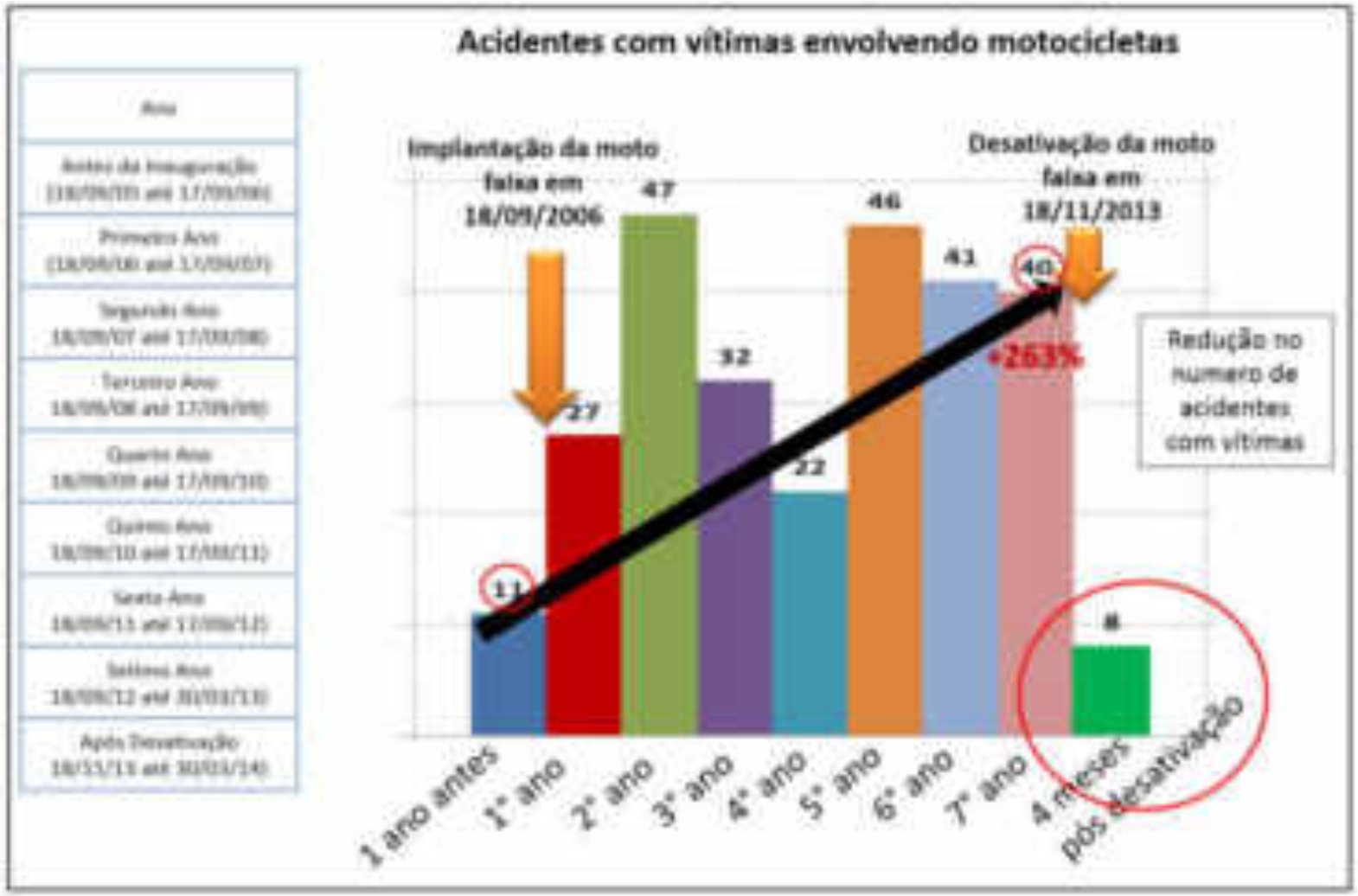


Gráfico 8 – Acidentes veiculares com vítimas envolvendo motocicletas Av. Sumaré e Av. Paulo VI- SAT CET

Dedicated Motorcycle Facilities

In cities, there are mixed results

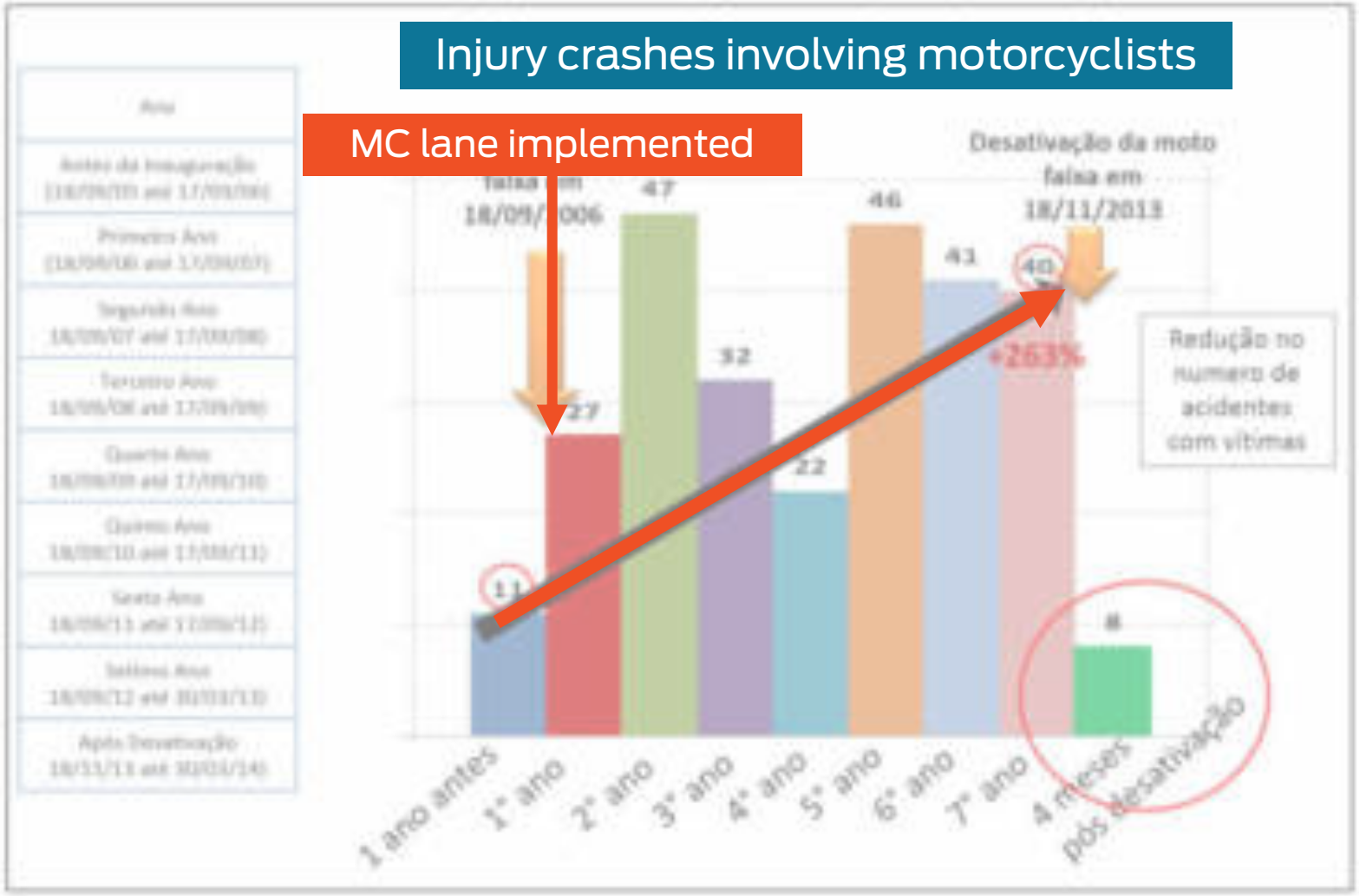


Gráfico 8 – Acidentes veiculares com vítimas envolvendo motocicletas Av. Sumaré e Av. Paulo VI- SAT CET

+263% injury crashes

Dedicated Motorcycle Facilities

In cities, there are mixed results

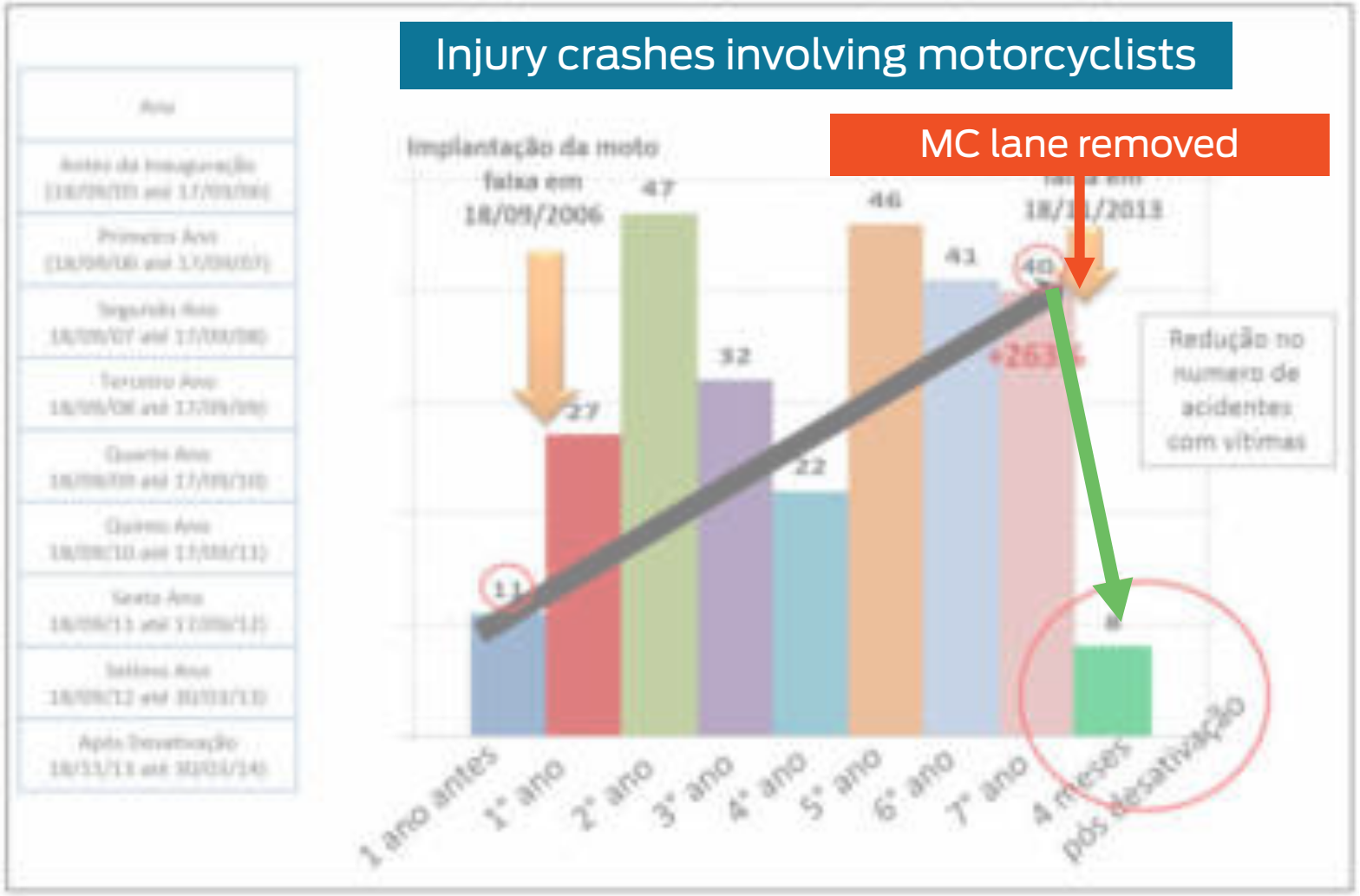


Gráfico 8 – Acidentes veiculares com vítimas envolvendo motocicletas Av. Sumaré e Av. Paulo VI- SAT CET

Immediate safety improvement after removal

In cities, there are mixed results

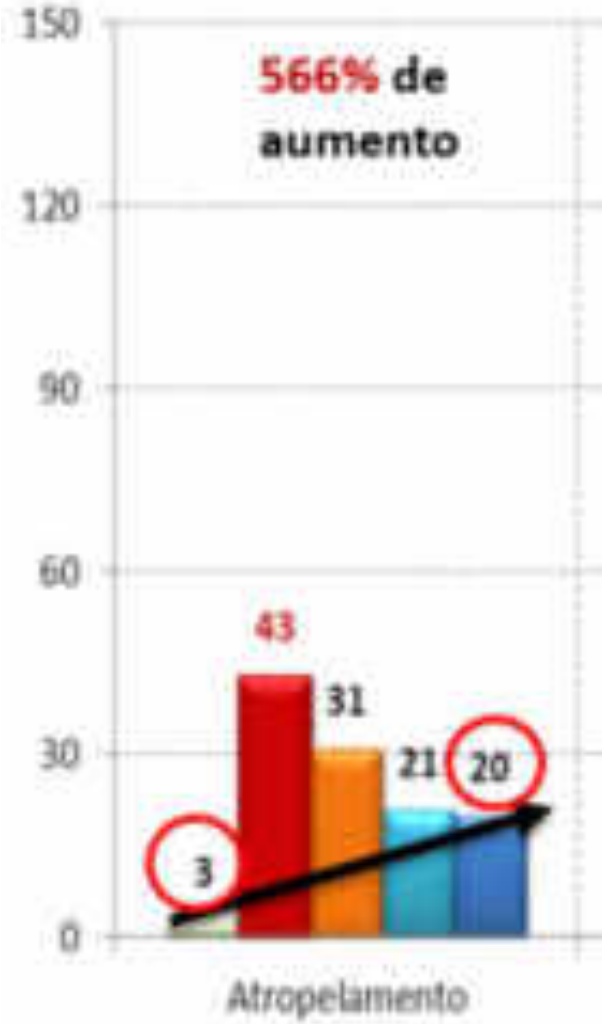


Gráfico 13 – Dados de acidentes Av. Liberdade/ Av. Vergueiro/ Av. Noé Azevedo "antes" e "depois" – SAT CET

On another corridor with the same typology, there was a **566% increase in motorcycle-pedestrian crashes**

Dedicated Motorcycle Facilities

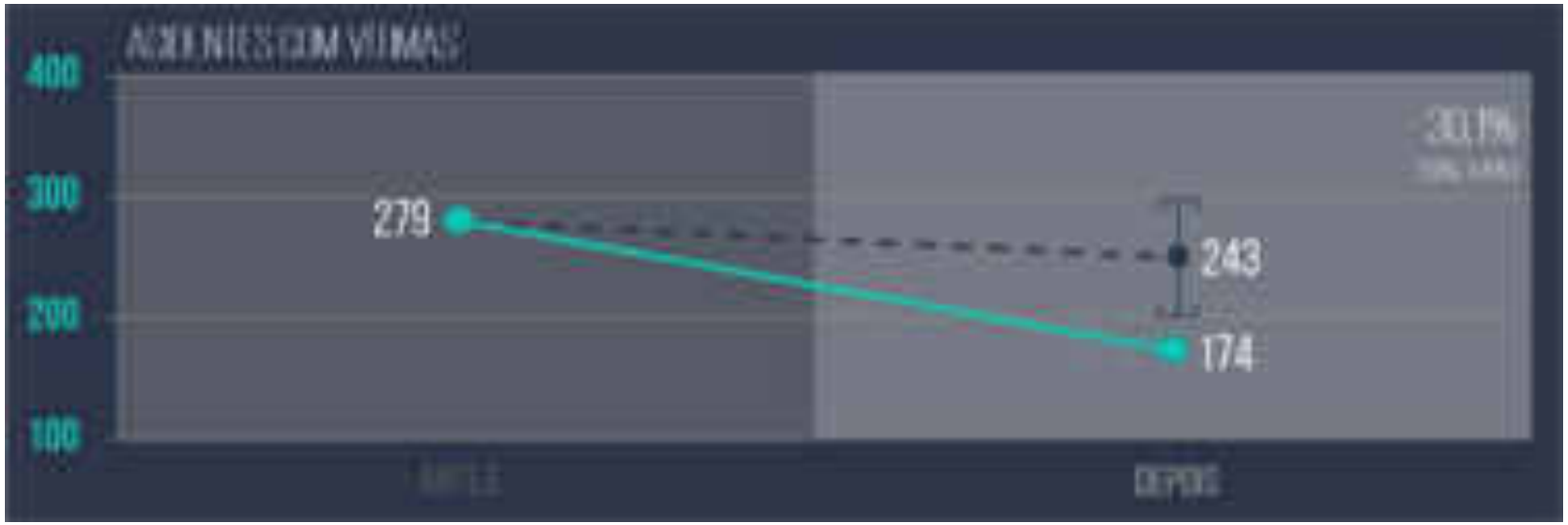
Advanced Stop Bars

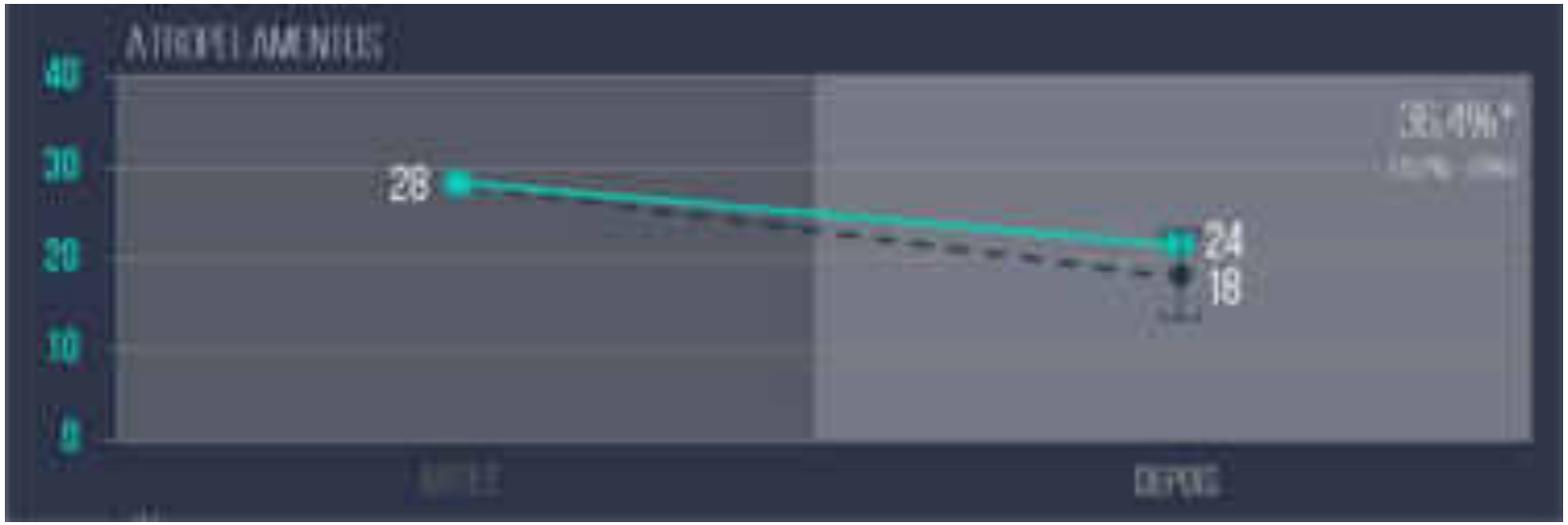
Dedicated Motorcycle Facilities

Advanced Stop Bars

Dedicated Motorcycle Facilities

Advanced Stop Bars

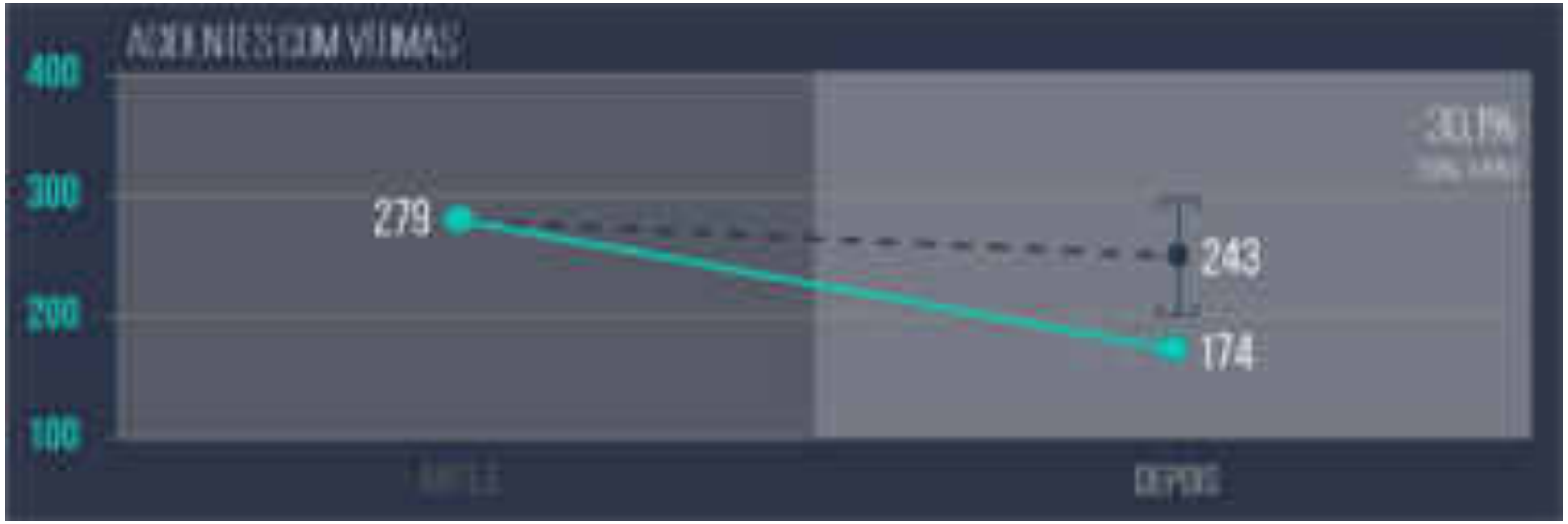




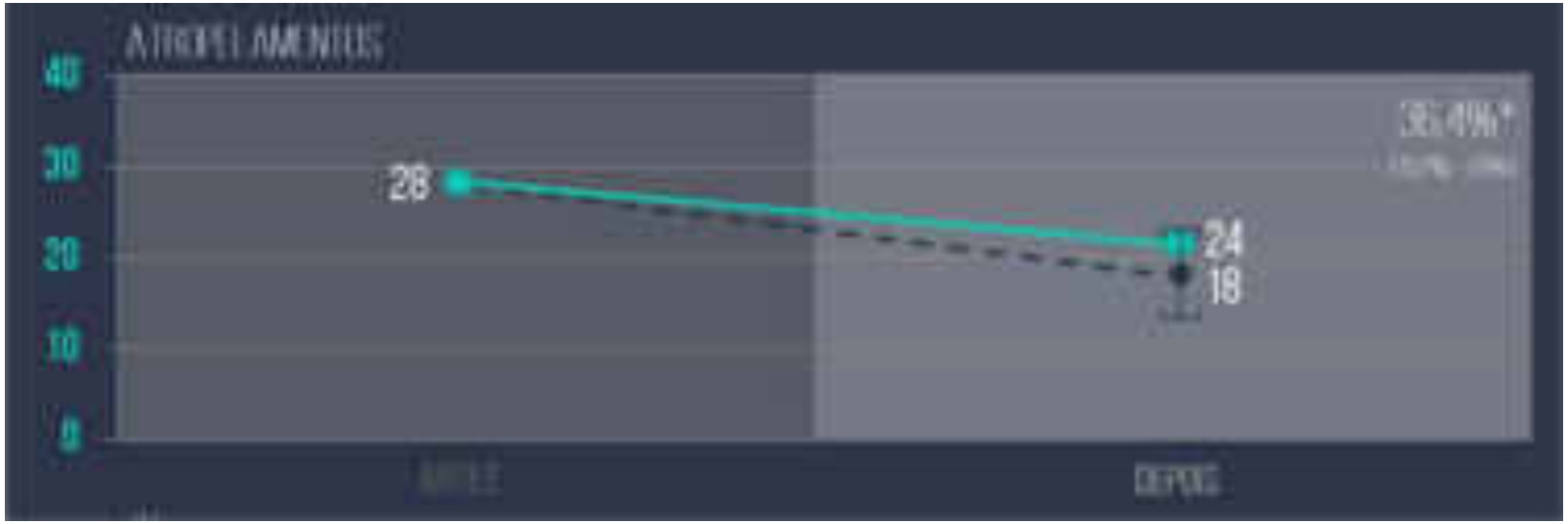
-30.1% injury crashes

Dedicated Motorcycle Facilities

Advanced Stop Bars



-30.1% injury crashes



+36.4% pedestrian crashes

Multiple contexts and typologies

To evaluate their impact we should understand:

- The context
- The typology
- Safety of all users
- Why does it work or doesn't?

Travel Lane Widths

Can wider lanes make it safer for MCs to filter through traffic?

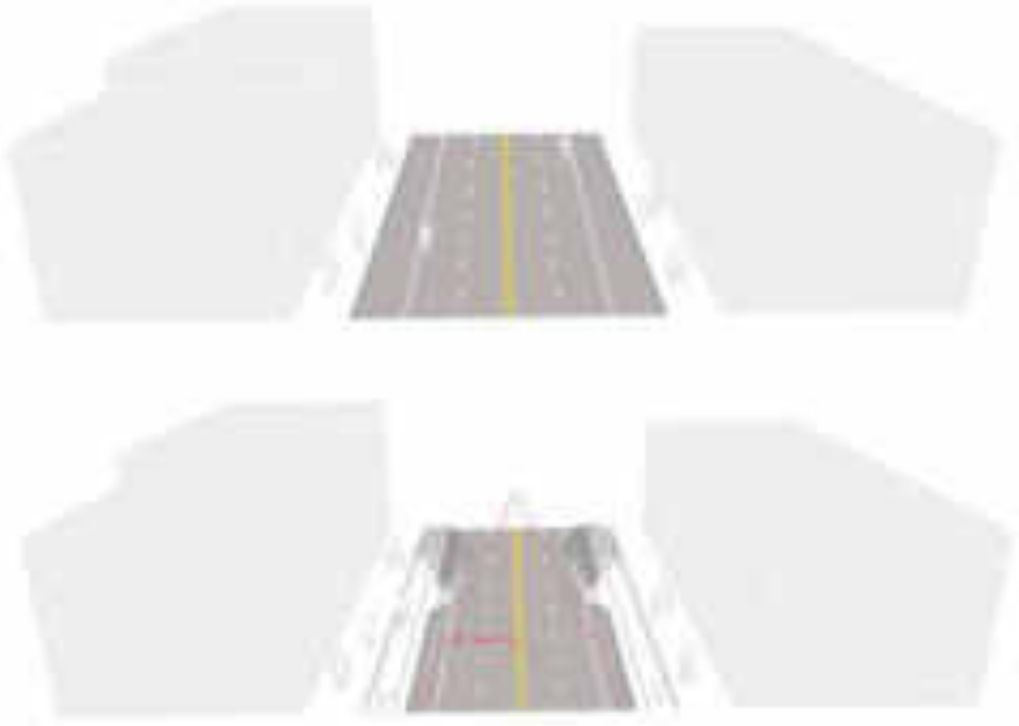
Filtering traffic

Travel Lane Widths

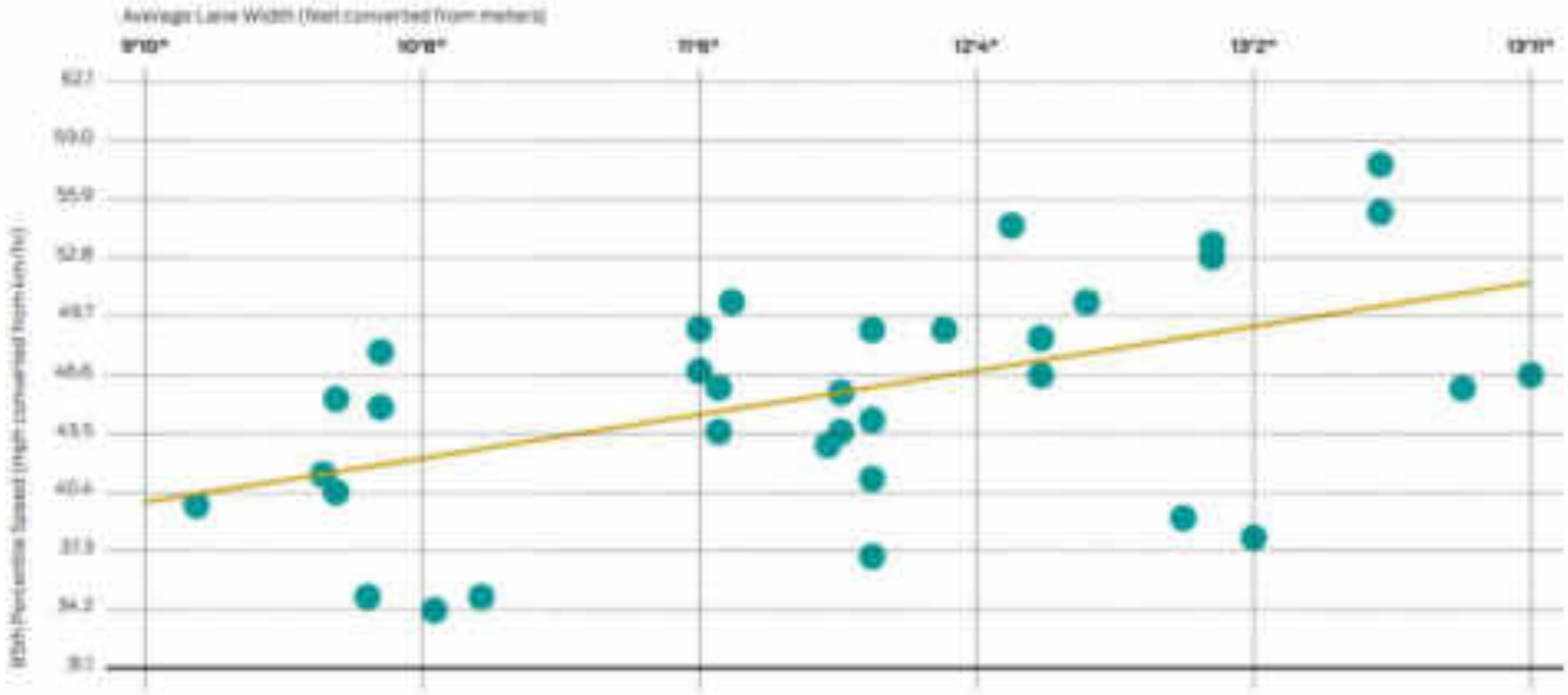
Can narrower travel lanes limit speeding opportunities?

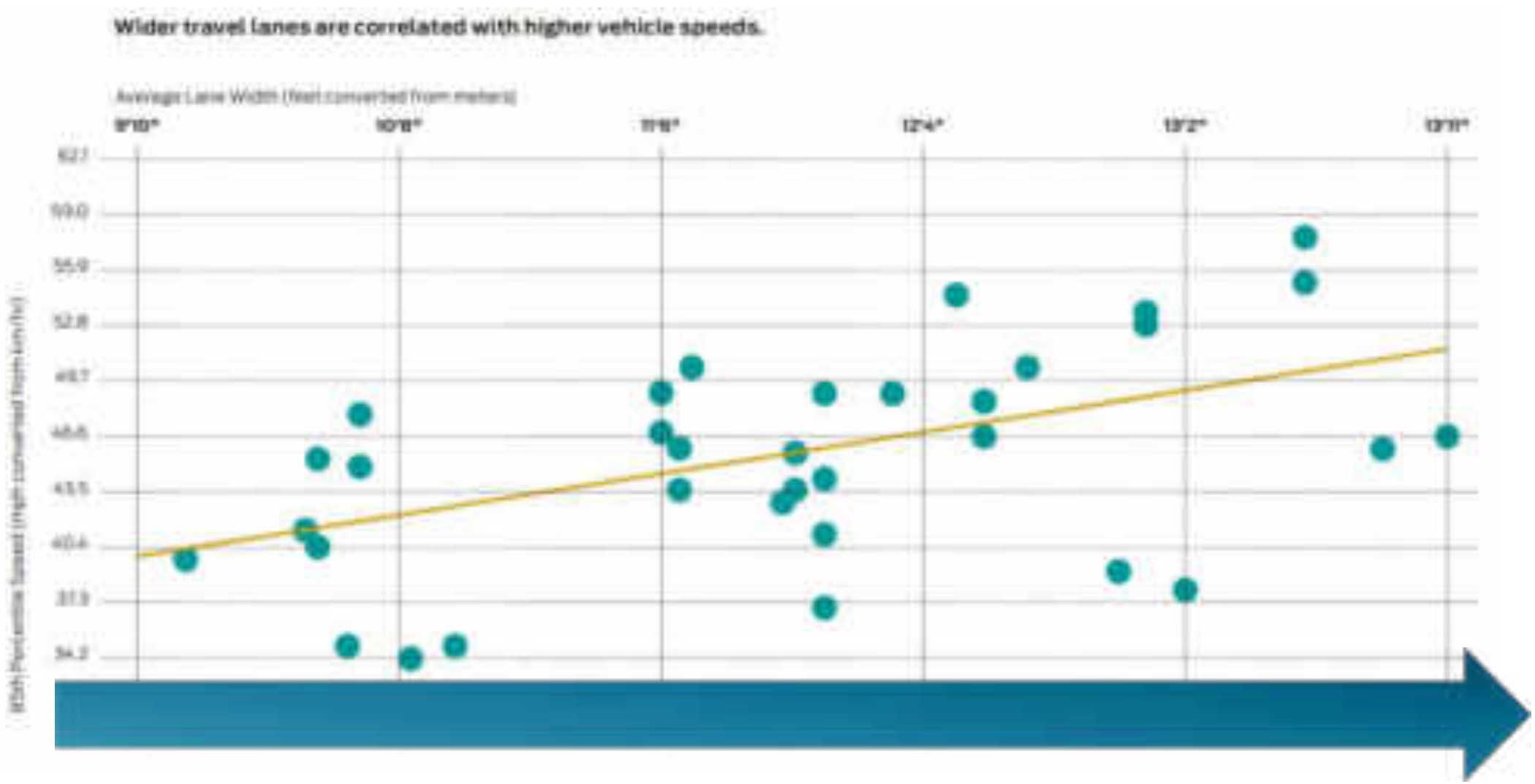
Street Design Strategies

Narrow travel lanes

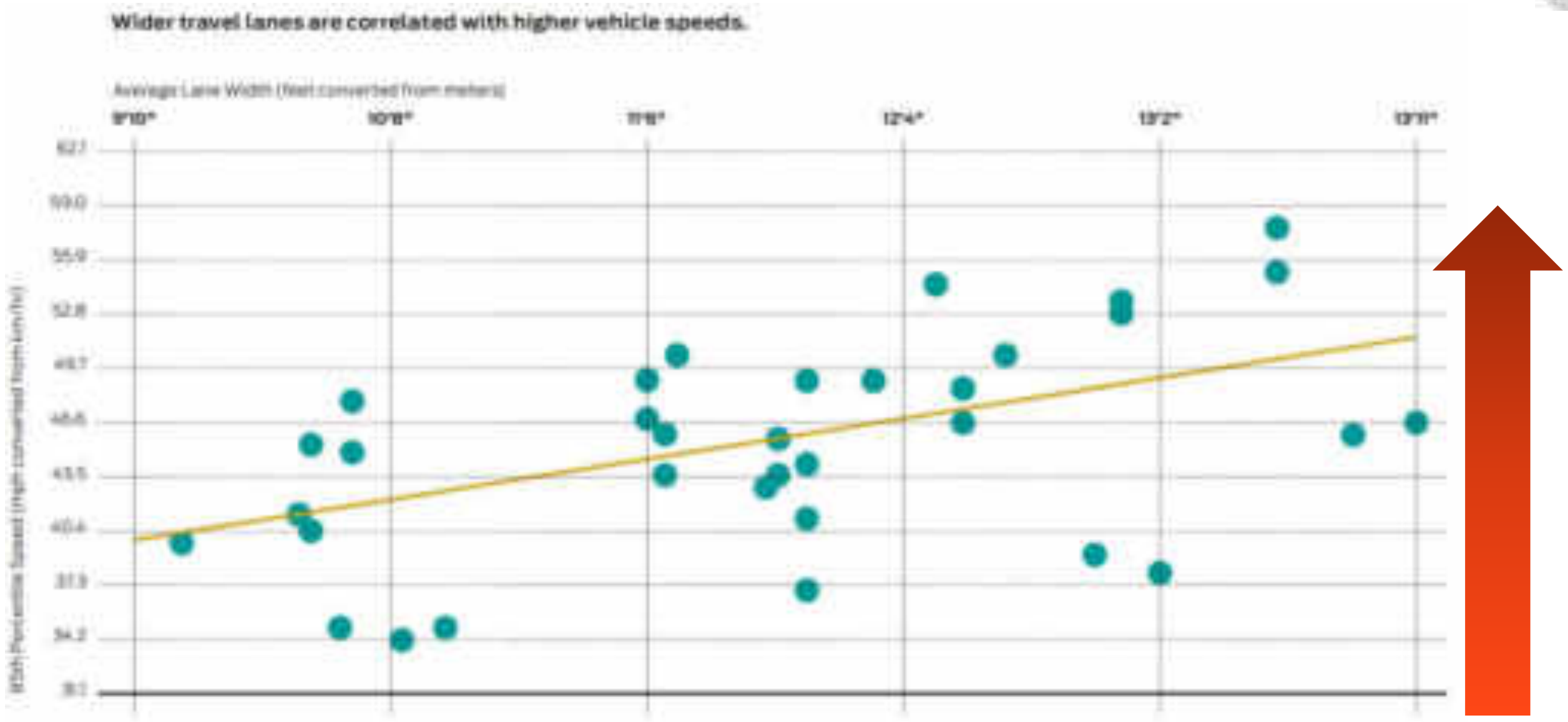


Wider travel lanes are correlated with higher vehicle speeds.




Wider travel lanes are correlated with higher vehicle speeds.

Wider lanes



Wider lanes = Higher Speeds

Research questions:

What is the impact of lane width on motorcyclists speeds and safety?

How does it impact safety **for all street users?**

(b)

The street space is finite. What should we prioritize to promote safe and sustainable mobility?

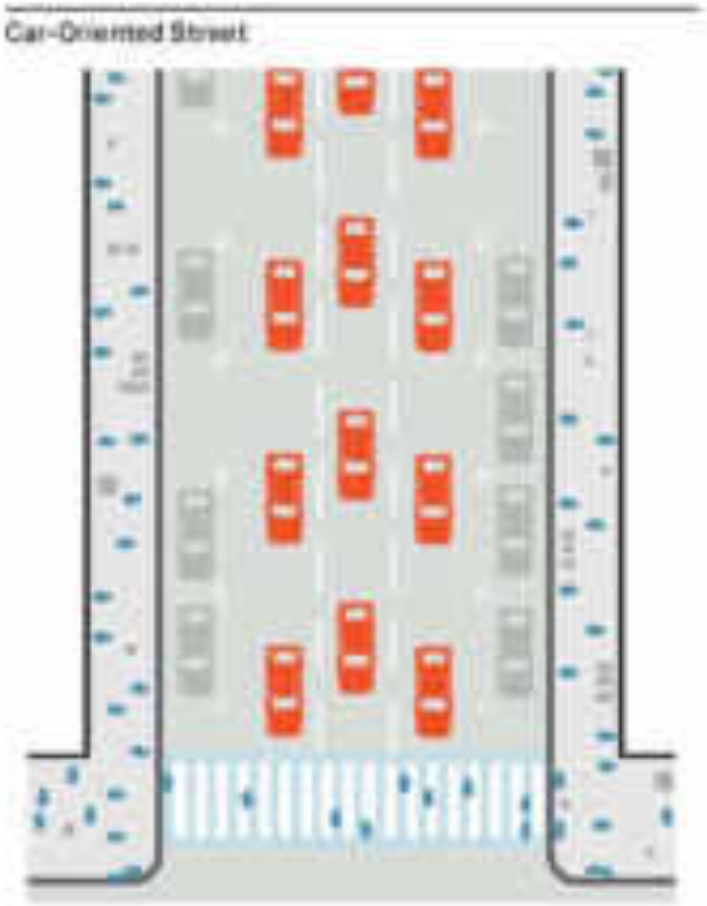
Promote a shift to sustainable modes

Reallocate street space

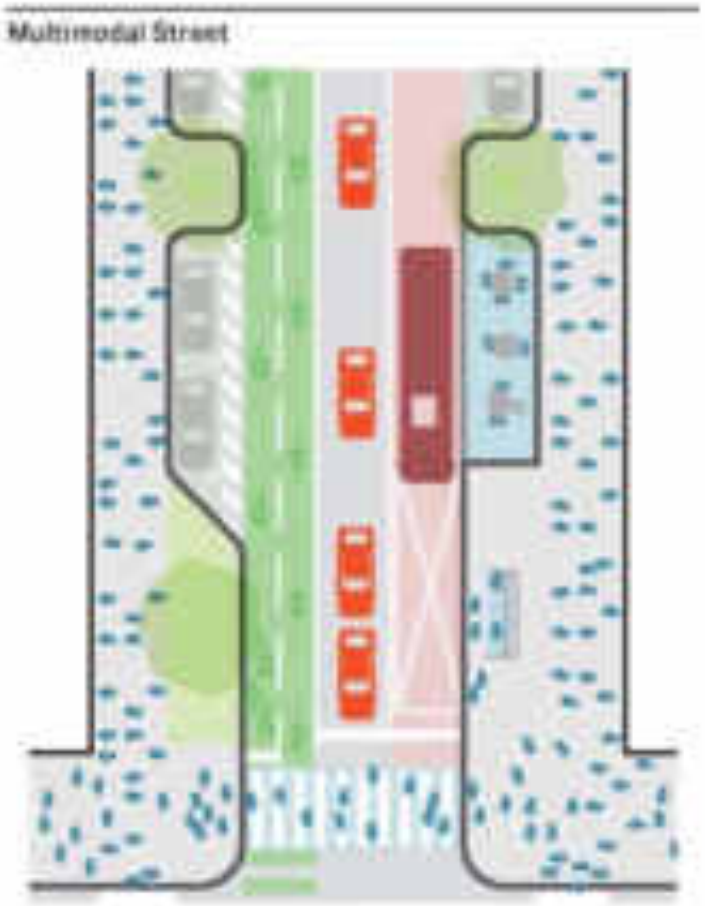
Promote a shift to sustainable modes

To make safe alternatives convenient and attractive

Multimodal streets are more efficient



Total capacity: **12,300** people/ h

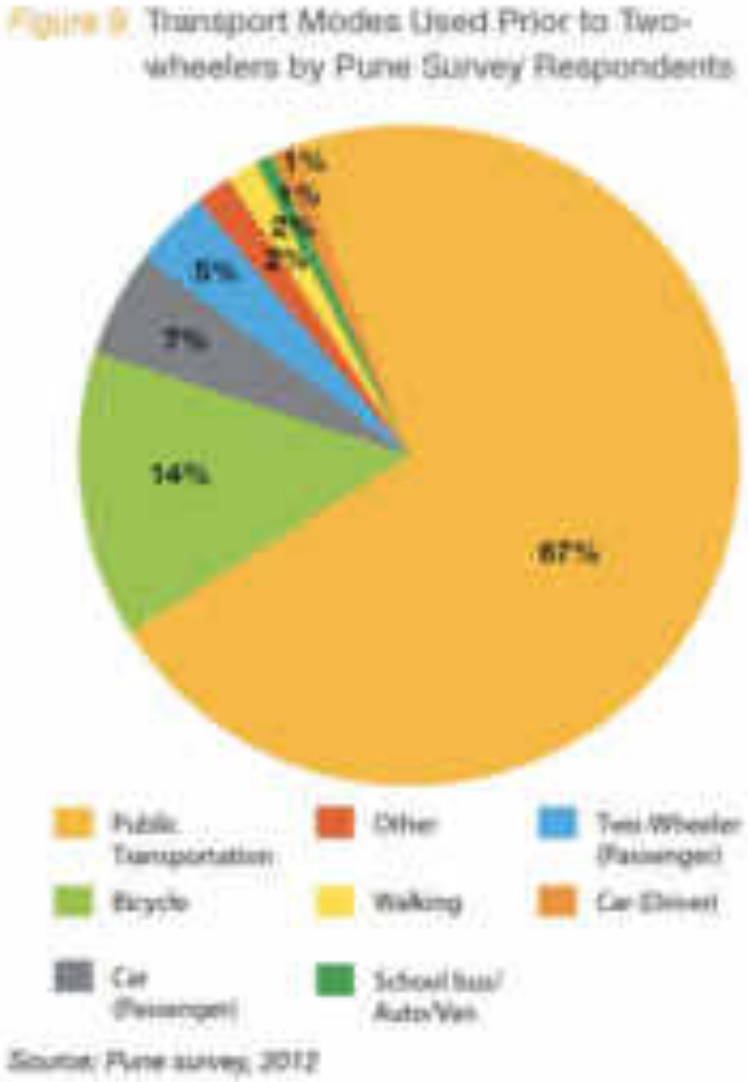


Total capacity: **30,100** people/ h

x 2.4 people

How can we reverse the trend of transit riders shifting to motorcycles?

Prevent a shift from sustainable modes...



Motorcyclists in Pune, India:

67% of formerly used public transit

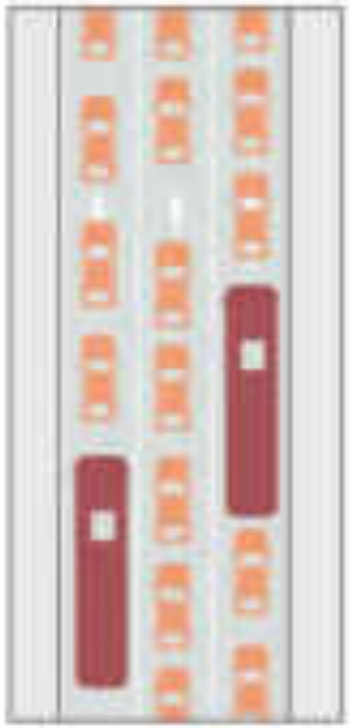
14% formerly used bicycle

Source: Embarq India, 2014

Save travel time with dedicated transit facilities

Transit stuck in congestion

1000-2800 people/ hour



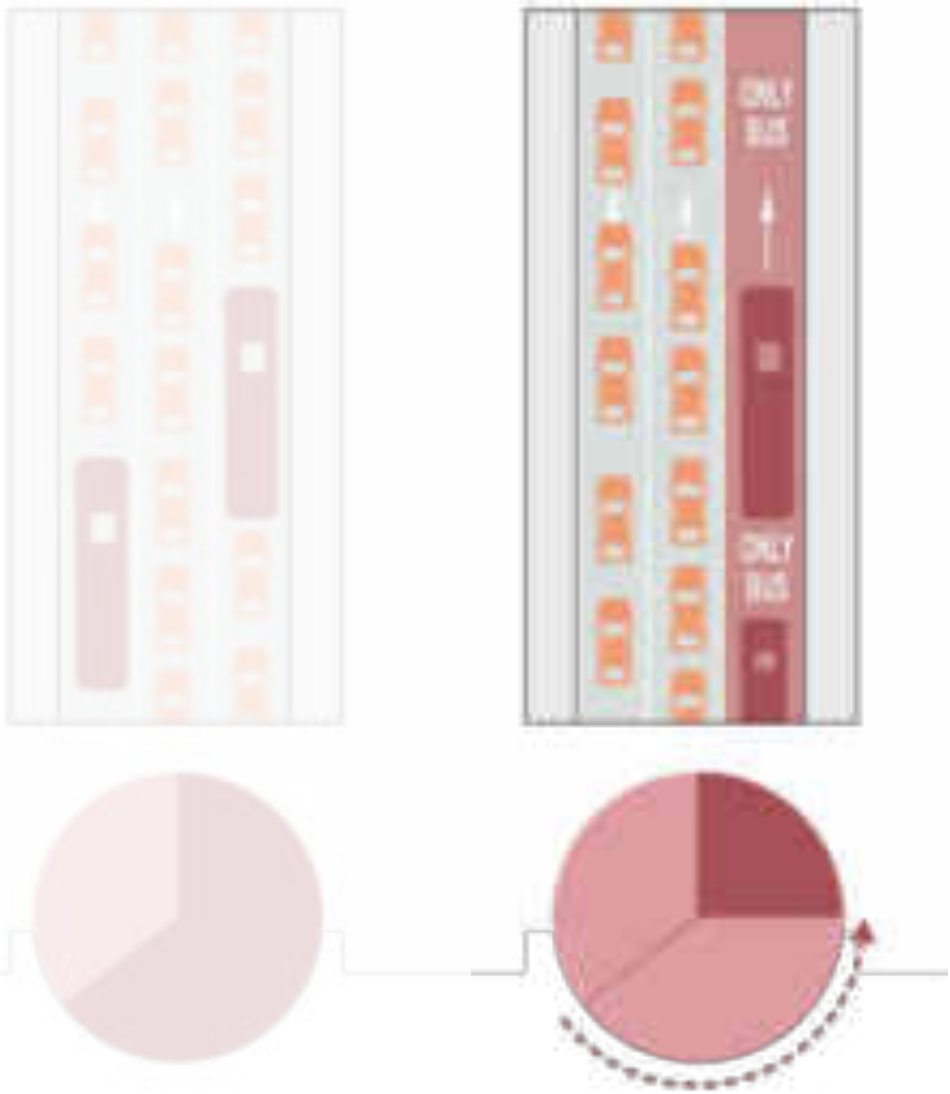
Transit given dedicated space

4000-8000 people/ hour

Save travel time with dedicated transit facilities

Transit stuck in congestion

1000-2800 people/ hour



Transit given dedicated space

4000-8000 people/ hour

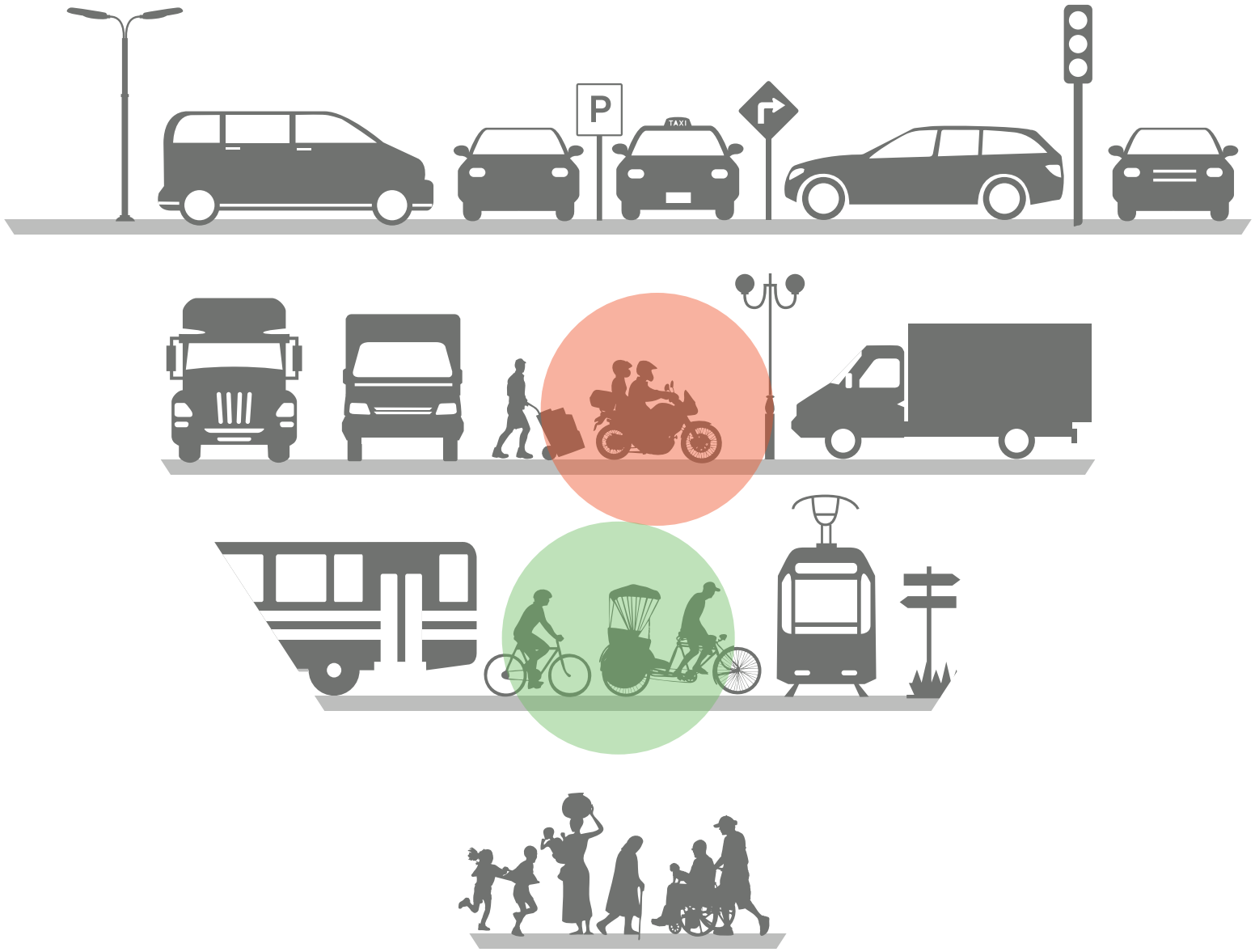
Transit, motorcycles and road safety

Roll out the red carpet

Different types of transit facilities

Nantes, France

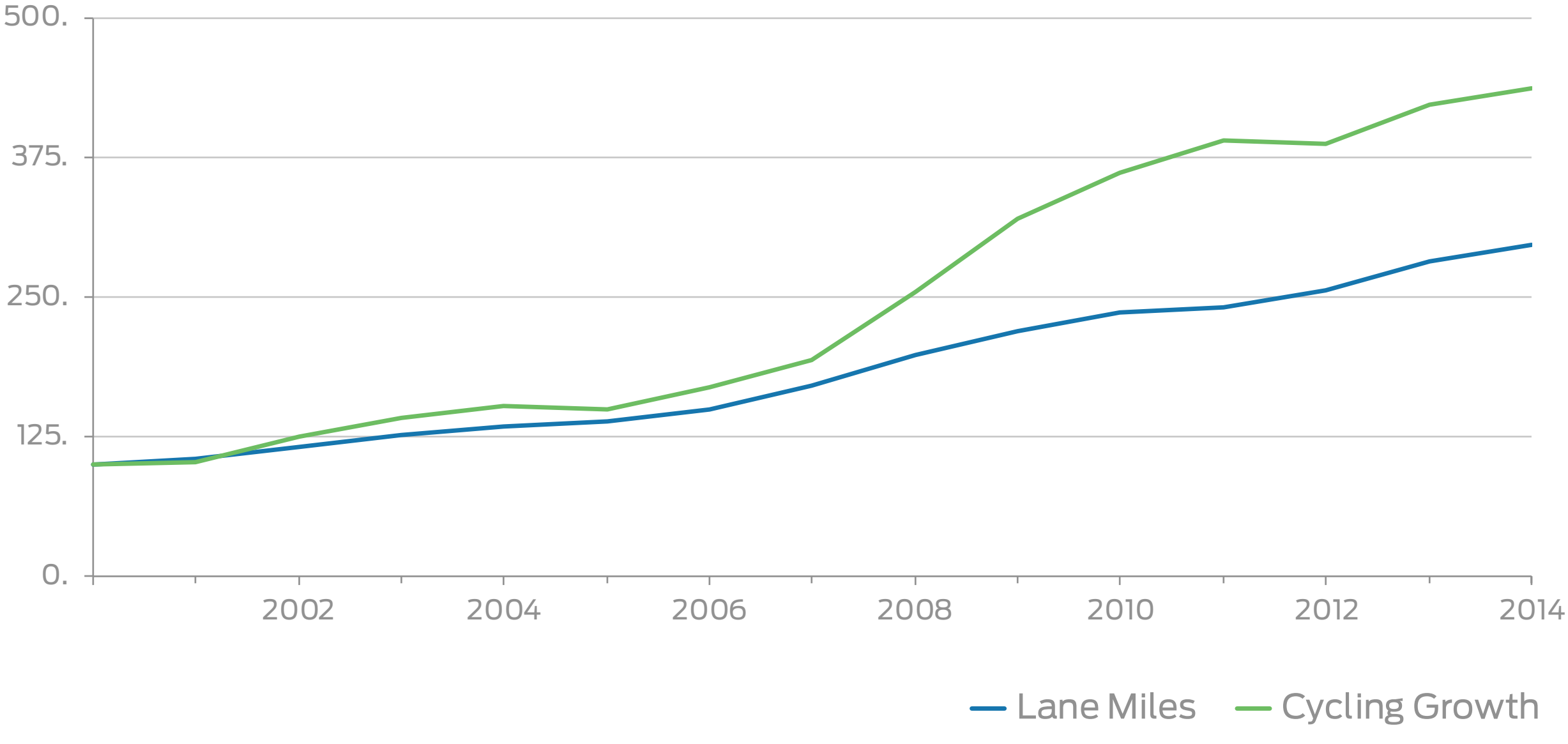
Why should we not treat cycle and motorcycle facilities equally?


P
TAXI

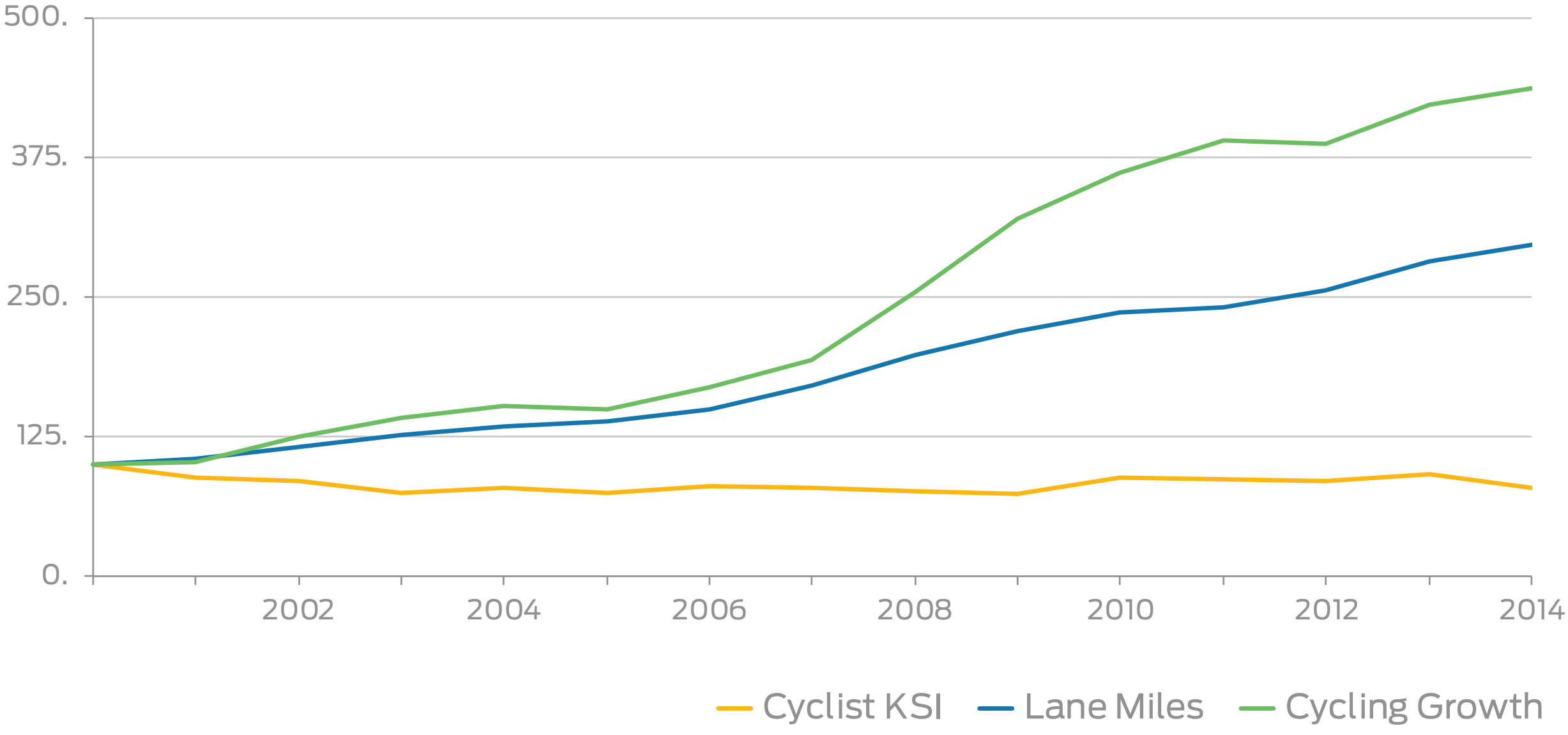

P

Designing for all ages and abilities

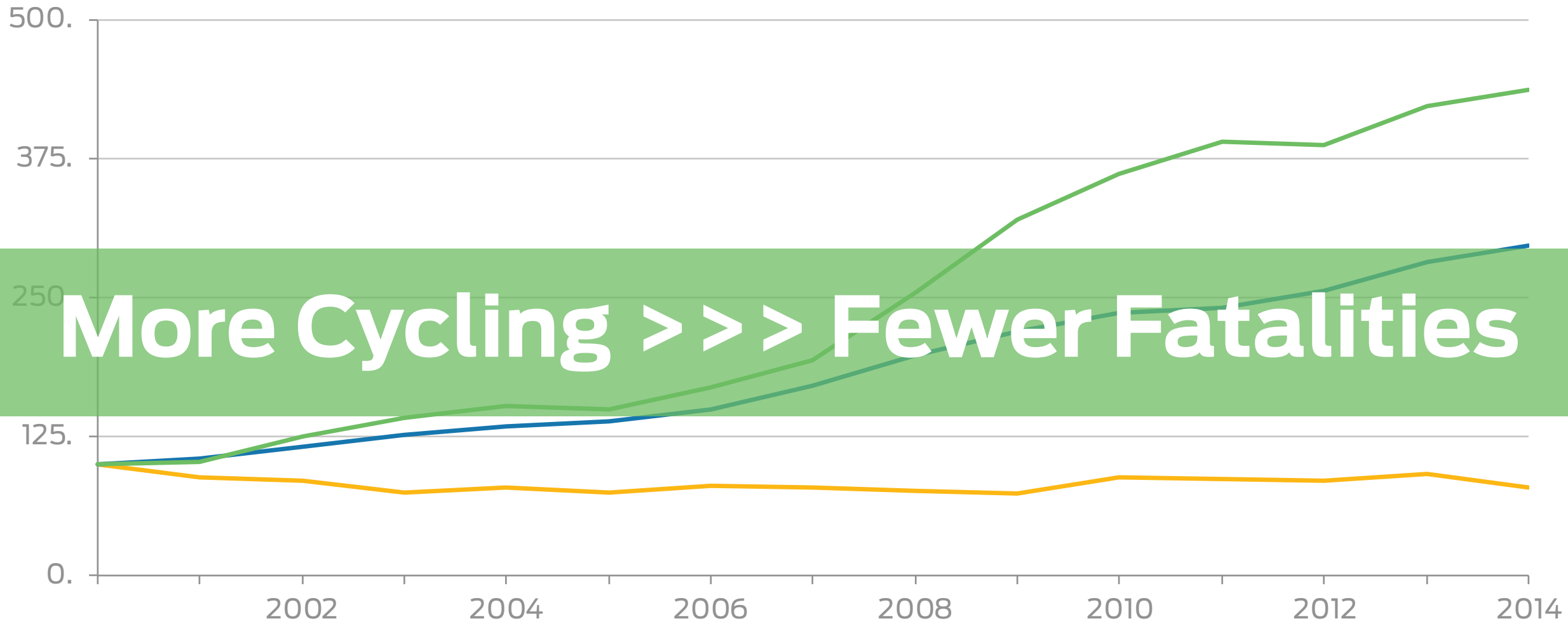
More Lanes = More Cyclists



More Lanes + More Cyclists = Reduced Risk (For All Users)

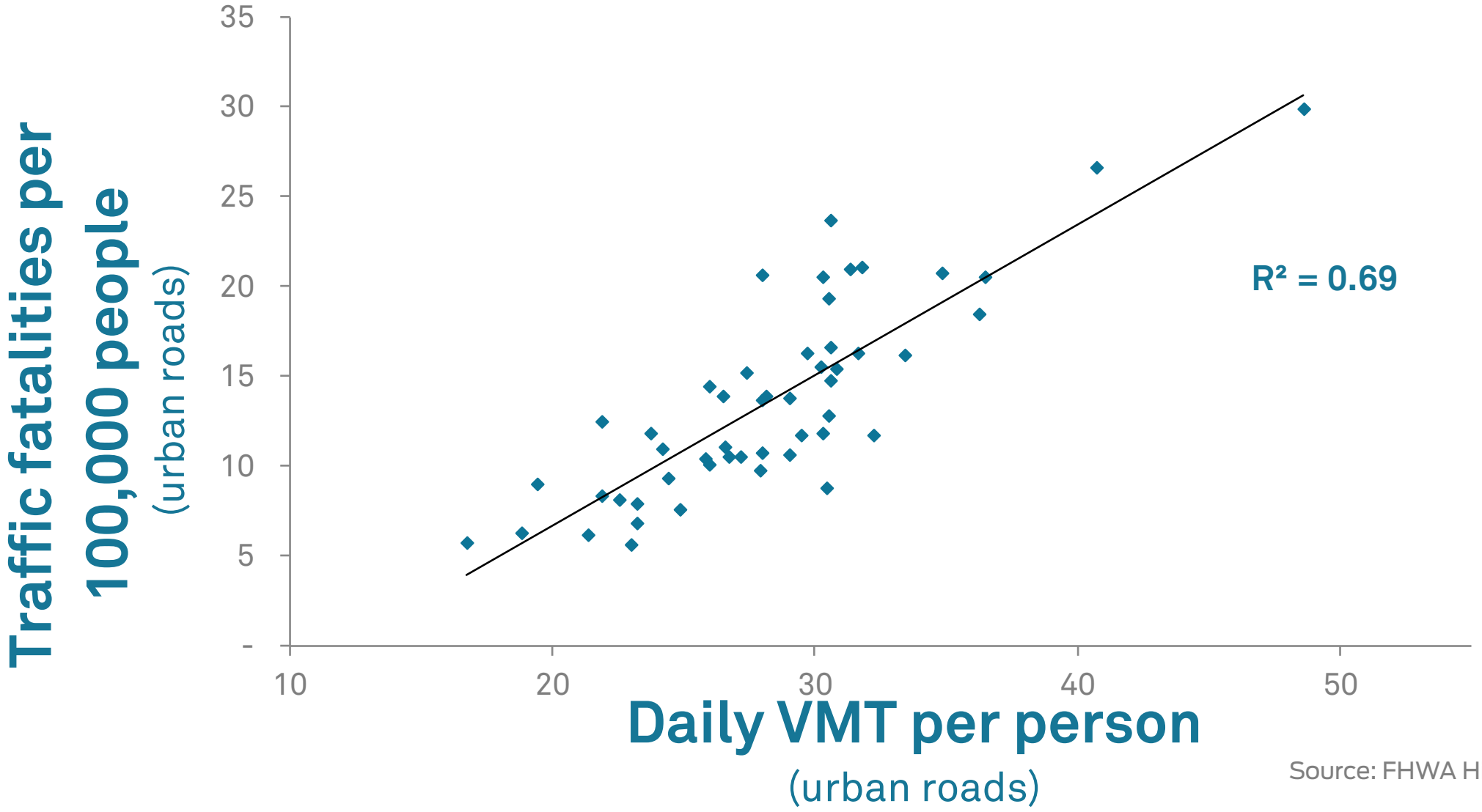


More Lanes + More Cyclists = Reduced Risk (For All Users)



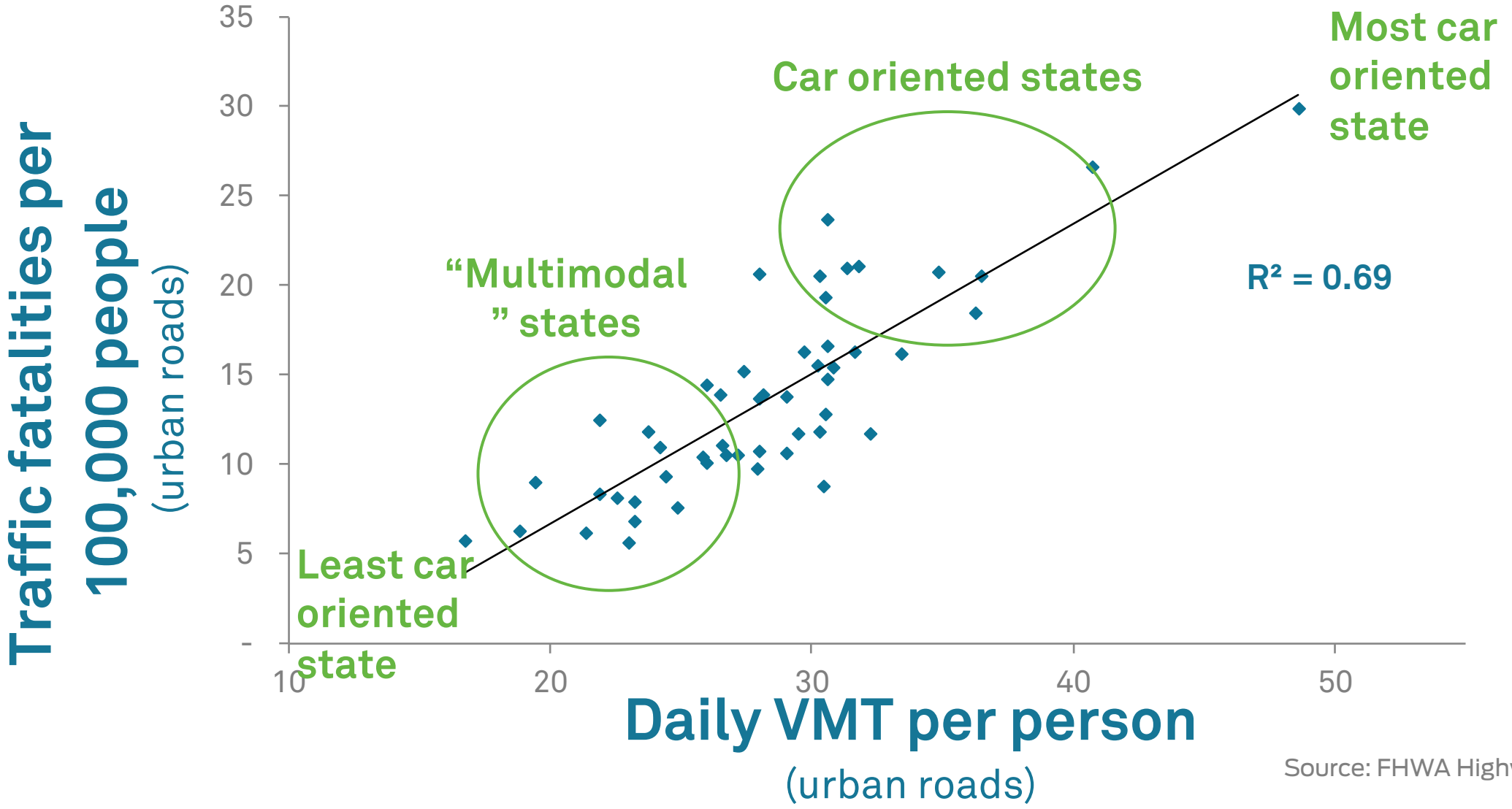
More Cycling >>> Fewer Fatalities

More Personal Driving is Associated with More Traffic Fatalities



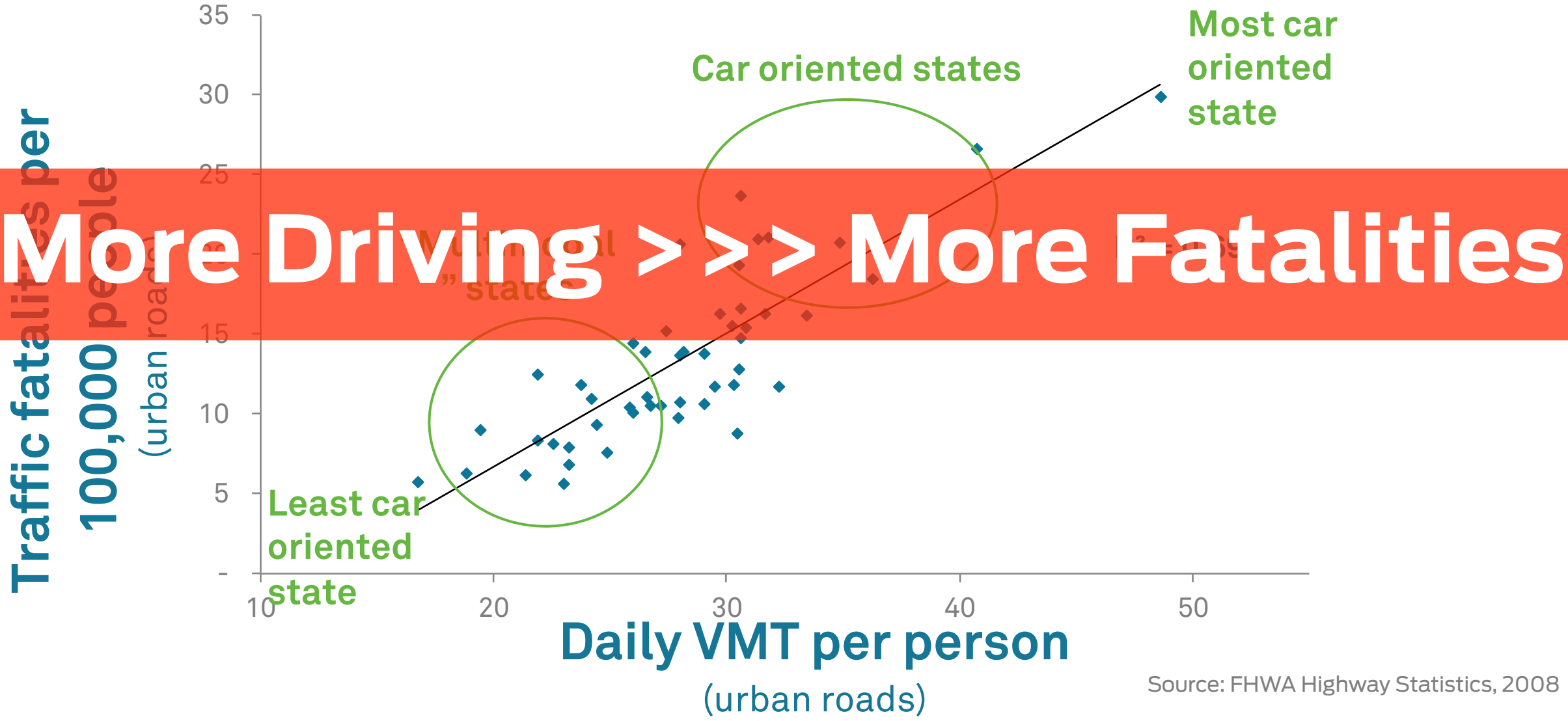
Source: FHWA Highway Statistics, 2008

More Personal Driving is Associated with More Traffic Fatalities



Source: FHWA Highway Statistics, 2008

More Personal Driving is Associated with More Traffic Fatalities



More Driving >>> More Fatalities

Source: FHWA Highway Statistics, 2008

Research question:

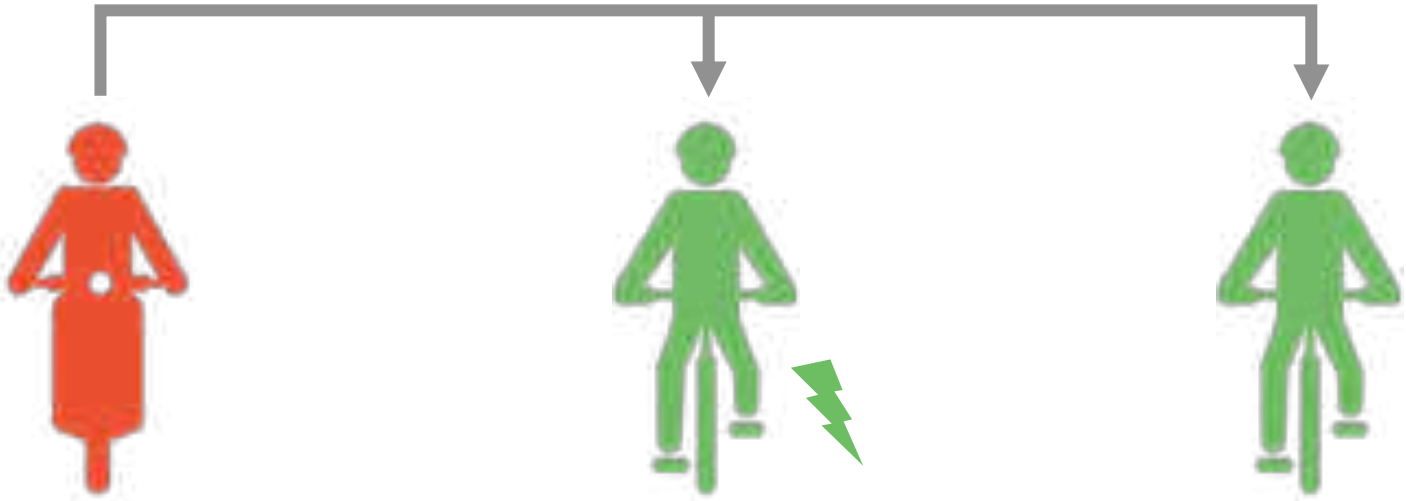
Does dedicated infrastructure induce demand for motorcycling?

Research question:

Are higher percentages of motorcycle use/higher VKT also correlated with higher fatality rates?

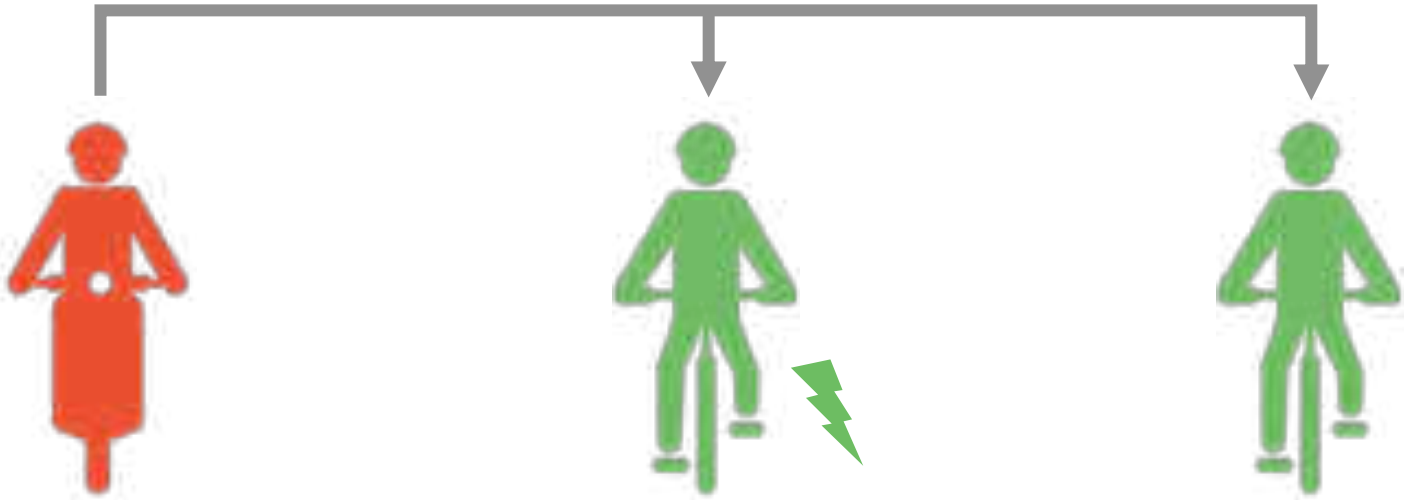
How can we capture the benefits of motorcycles but avoid the negative impacts?

Can governments support a shift towards bikes and e-bikes?



	Motorcycles	E-bicycles	Bicycles
Max Speed	~100km/h +	~25km/h ?	~20km/h
User Mass	Medium	Low ?	Low

Can governments support a shift towards bikes and e-bikes?



	Motorcycles	E-bicycles	Bicycles
Max Speed	~100km/h +	~25km/h ?	~20km/h
User Mass	Medium	Low ?	Low

Needs careful definition and regulation

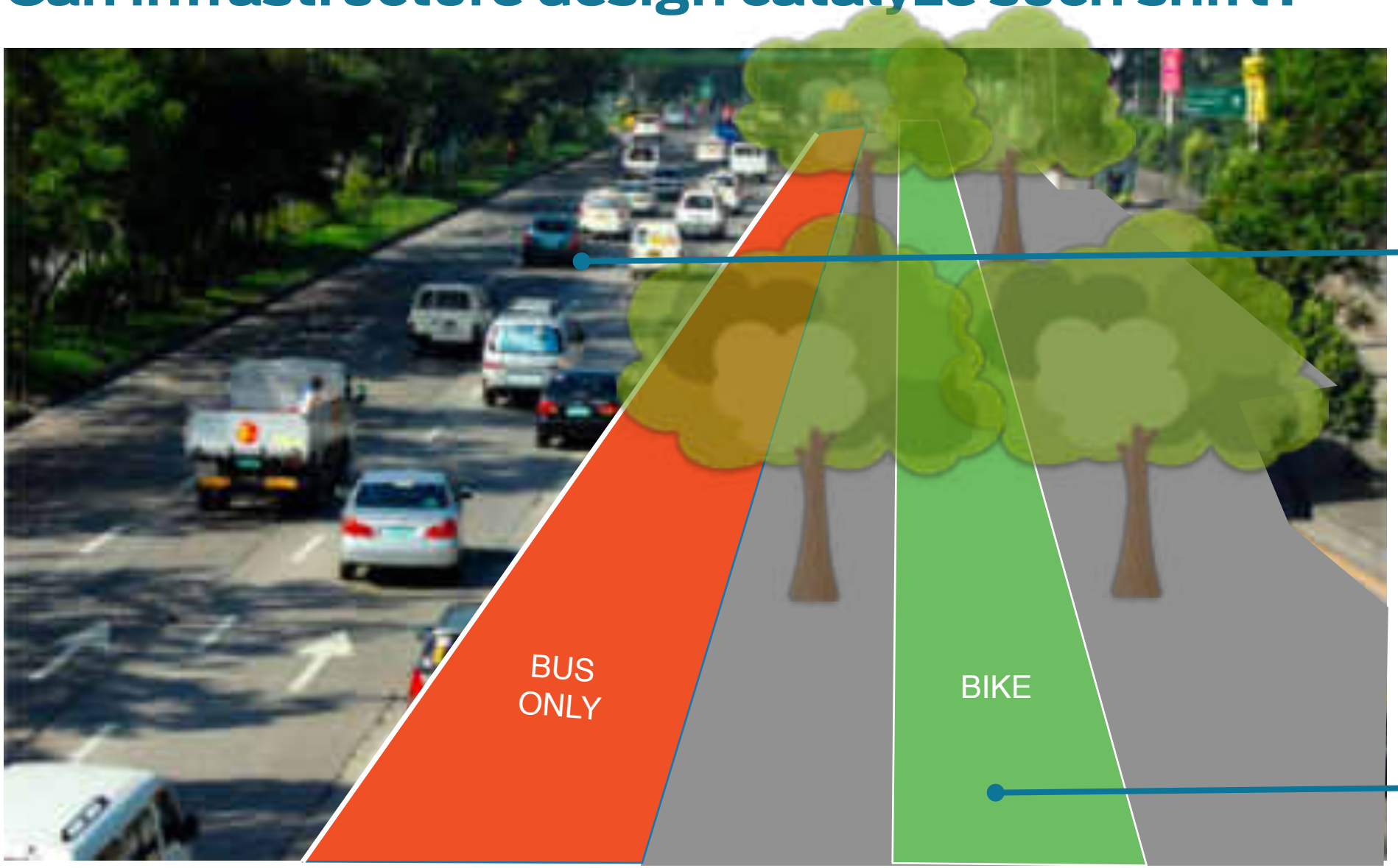
Shift to Cycles

What will they look like?

Shift to Cycles

Can infrastructure design catalyze such shift?

Can infrastructure design catalyze such shift?



Motorcyclists in mixed traffic + Speed limit reduction + Roadbed width reduction

Cycles and E-Cycles

(c)
Act now - Focus on speeds to make streets safe for all users

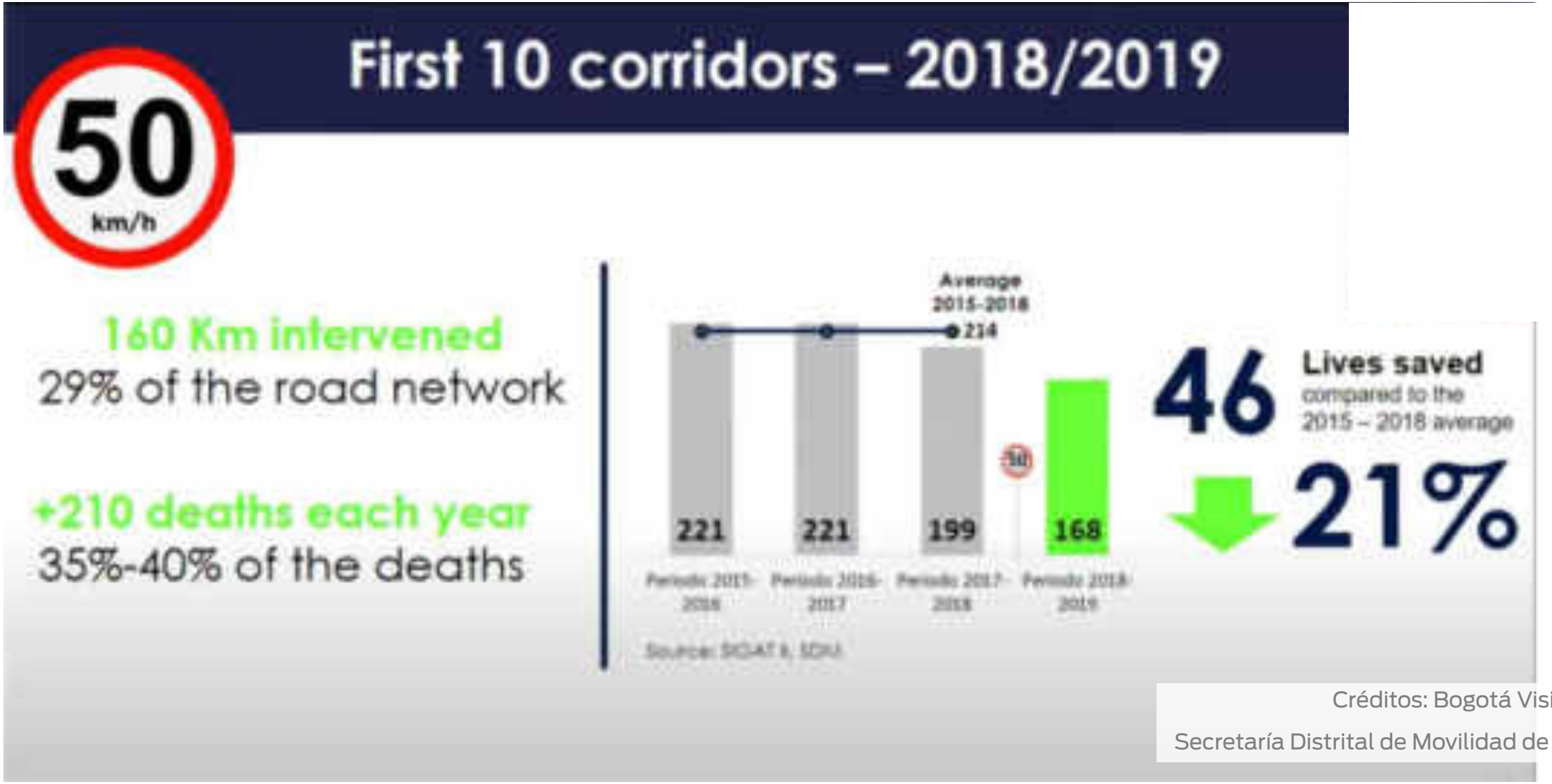
We know that

Speed kills!

And that lowering it

saves lives!

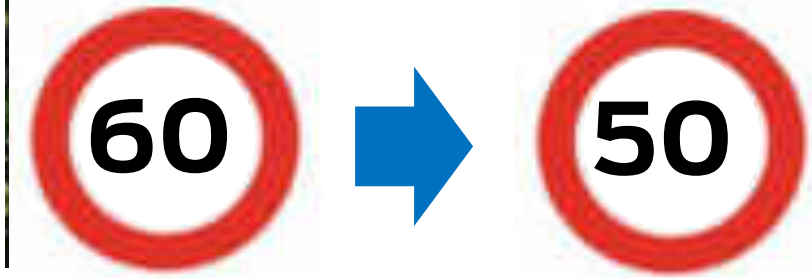
Bogota



Créditos: Bogotá Visión Cero

Secretaría Distrital de Movilidad de Bogotá

Fortaleza, Av. Leste-Oeste



Fortaleza, Av. Leste-Oeste

Redesign + Enforcement

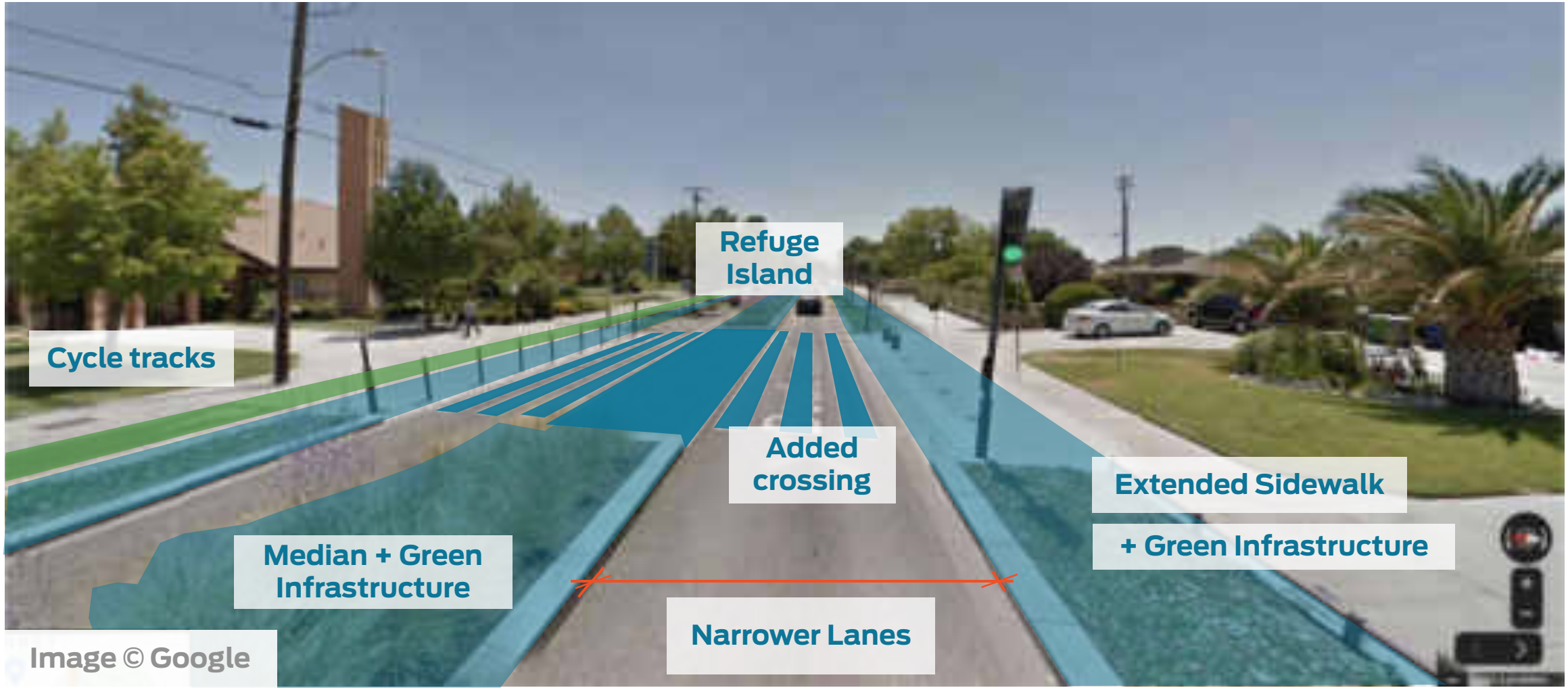
42% reduction in crashes with injuries

83% reduction in crashes involving pedestrians

Can design help reduce speeds?

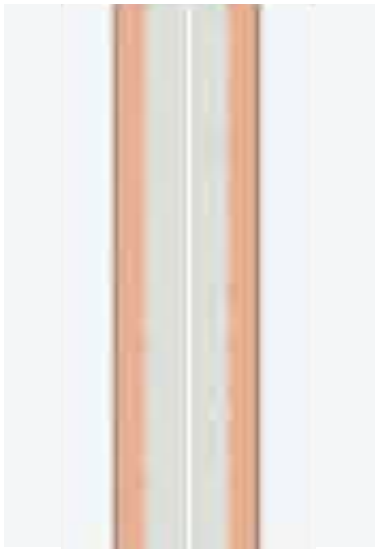
Yes, the way streets are designed impact how they are used!

Yes, the way streets are designed impact how they are used!

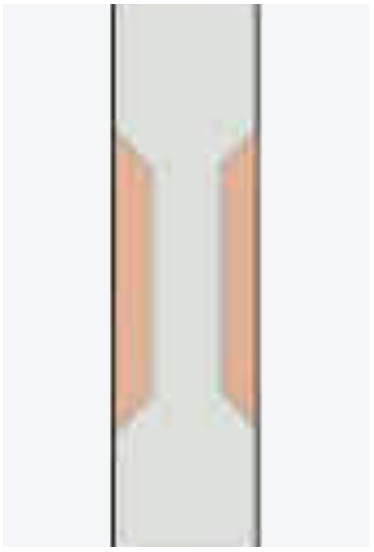


Geometric Design

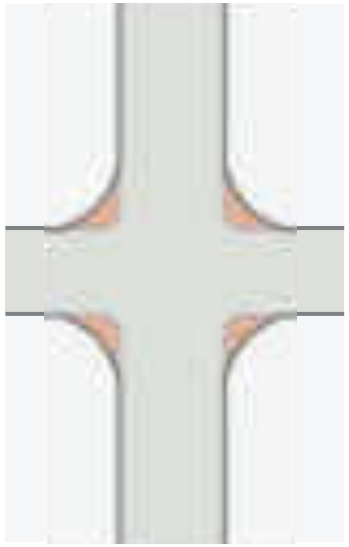
(Vertical + Horizontal Deflection, Compact Intersections, Narrower Lanes etc.)



Lane Narrowing



Pinchpoints

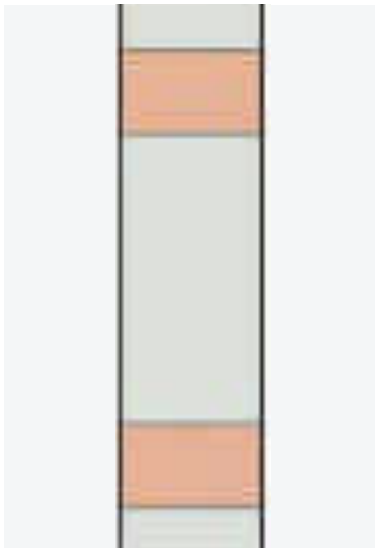


Corner Radii

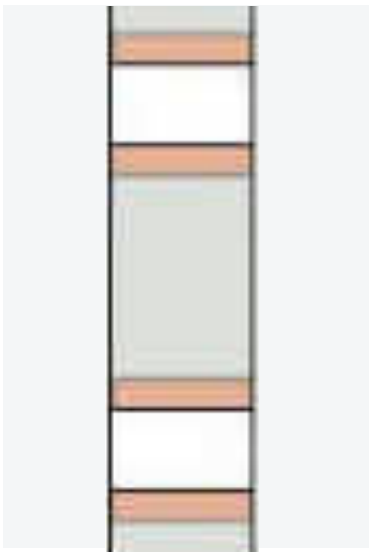
Chicanes and Lane Shifts

Geometric Design

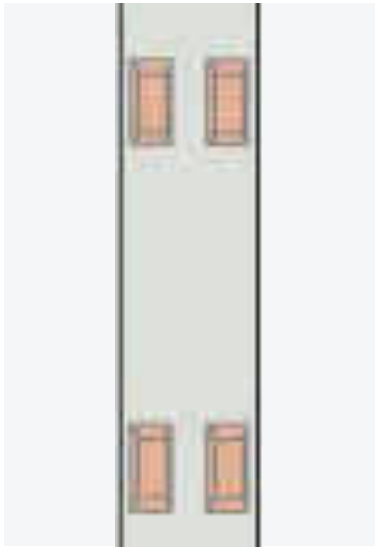
(Vertical + Horizontal Deflection, Compact Intersections, Narrower Lanes etc.)



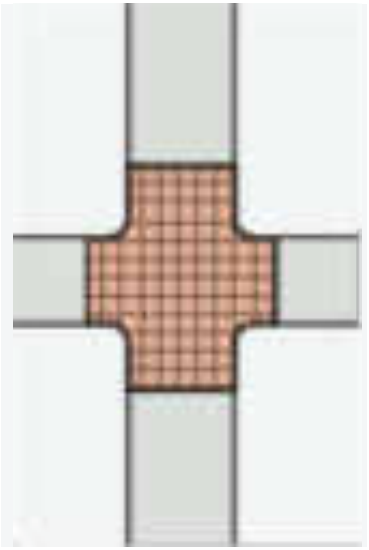
Speed Humps



Speed Tables



Speed Cushions



Pavement Material and Appearance

Traffic calming area

Albert Sabin Children Hospital - Fortaleza, Brazil

1. Focus on speeds

reducing the overall speed of traffic will directly improve safety of motorcyclists (and all other users)

1. Focus on speeds

reducing the overall speed of traffic will directly improve safety of motorcyclists (and all other users)

2. Consider all users

When it comes to street design, do not address the needs of motorcyclists in isolation – evaluate the impact of decisions for all users

1. Focus on speeds

reducing the overall speed of traffic will directly improve safety of motorcyclists (and all other users)

2. Consider all users

When it comes to street design, do not address the needs of motorcyclists in isolation – evaluate the impact of decisions for all users

3. Shift to safer modes

Street space is finite – use it wisely to promote a shift from motorcycling to safe and sustainable mobility


GAP

reimagine,
reinvent, and
redesign safer,
more
sustainable
streets!

Thank you!

Eduardo Pompeo
eduardo@gdci.global

ADB GRRSO Dialogue on
Motorcycle Safety

Manila, Oct 12, 2022

@GlobalStreets
www.globaldesigningcities.org

GDCI Global Designing Cities Initiative