SALUD URBANA EN AMÉRICA LATINA

Urban landscape and street design factors associated with road traffic mortality in Latin American cities

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wellcome

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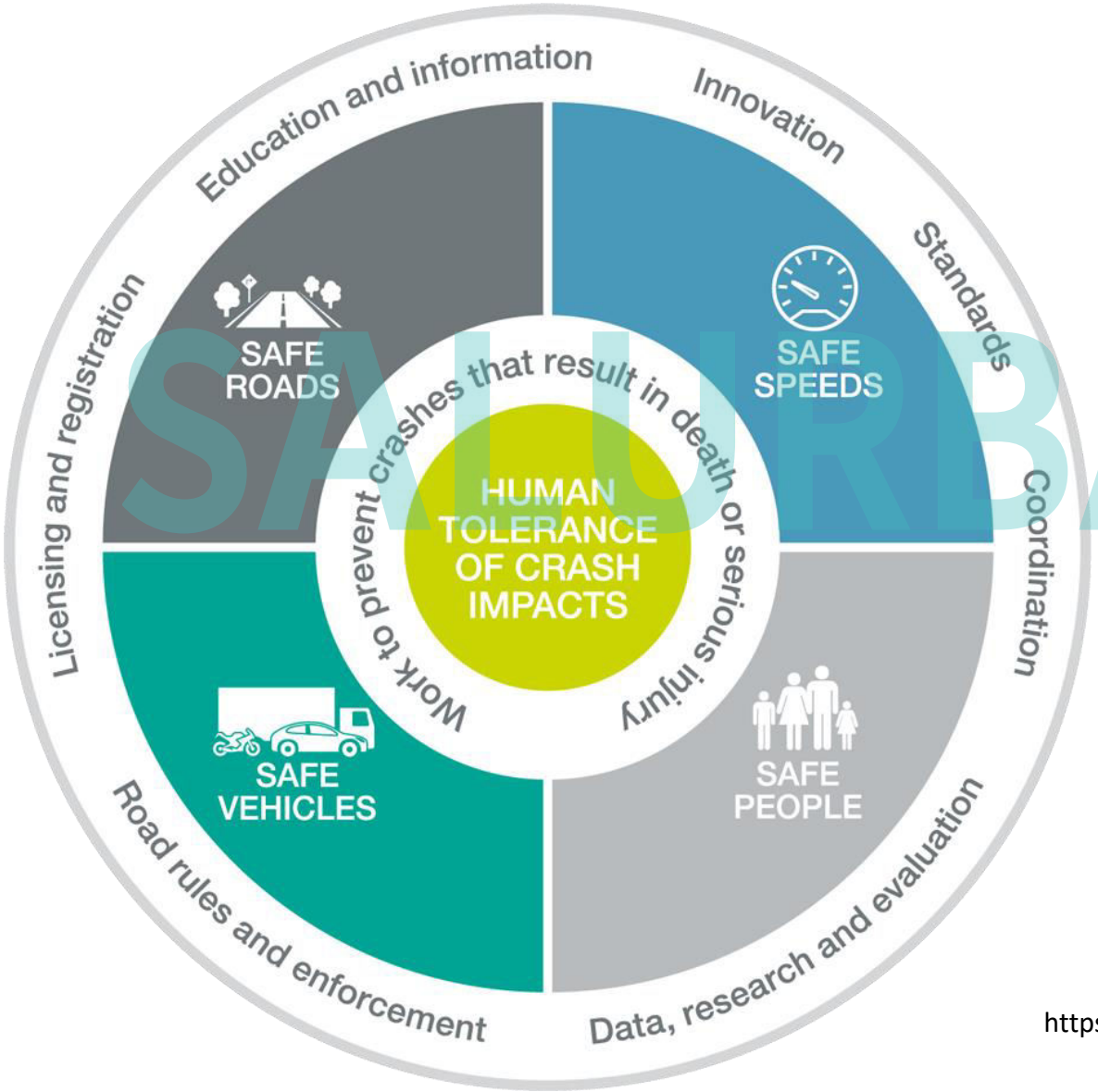
Salud Urbana en América Latina

LAC-URBAN HEALTH
Urban Health Network for Latin America and the Caribbean

There are on average **95,000 road traffic deaths in Latin America** annually and are the leading cause of death of 5-14-year old's in the Americas and 2nd leading cause of 15-44-year old's

https://www.childinthecity.org/2019/01/17/why-we-need-a-summit-on-youth-urban-road-safety/

ROAD SAFETY SYSTEMS

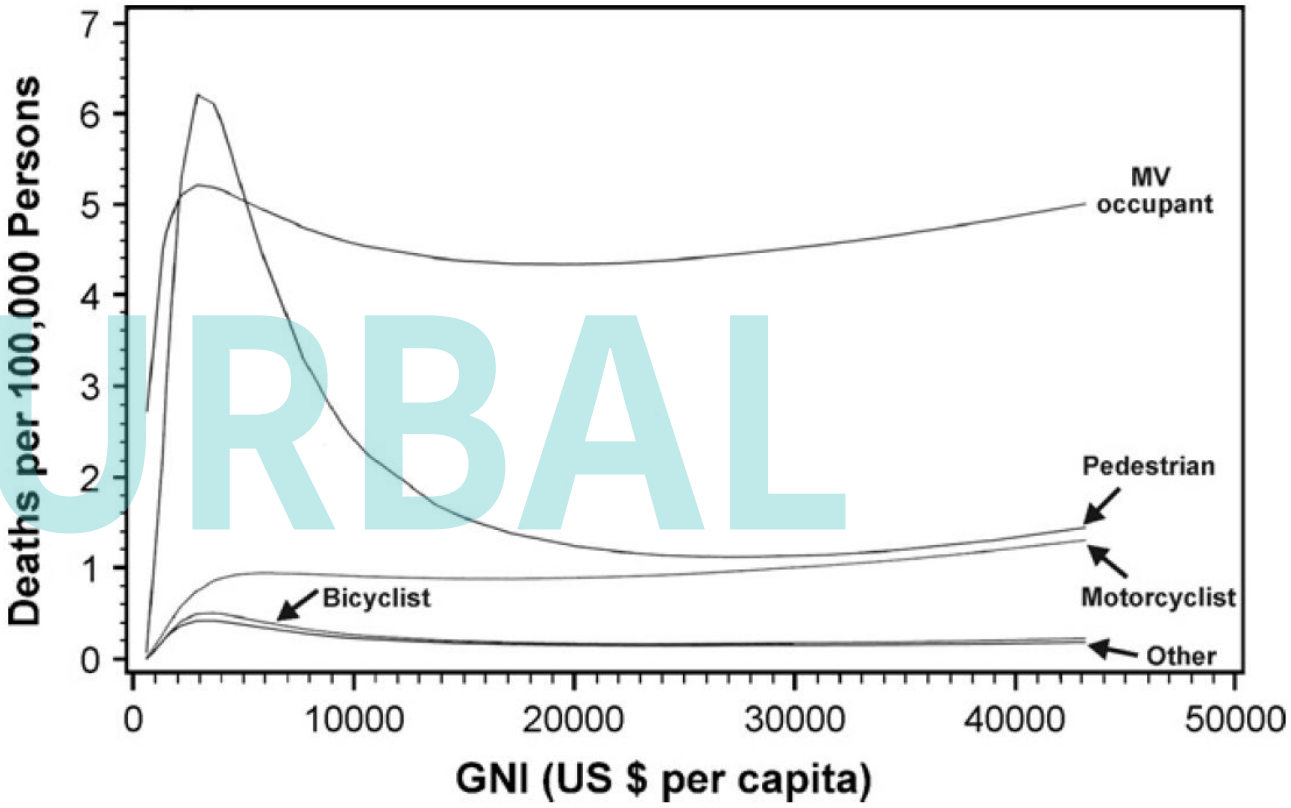


https://www.roadsafety.gov.au/nrss/safe-system

They also result in a major economic impact of

annual 4.4% Gross Domestic Product (GDP) loss in the region

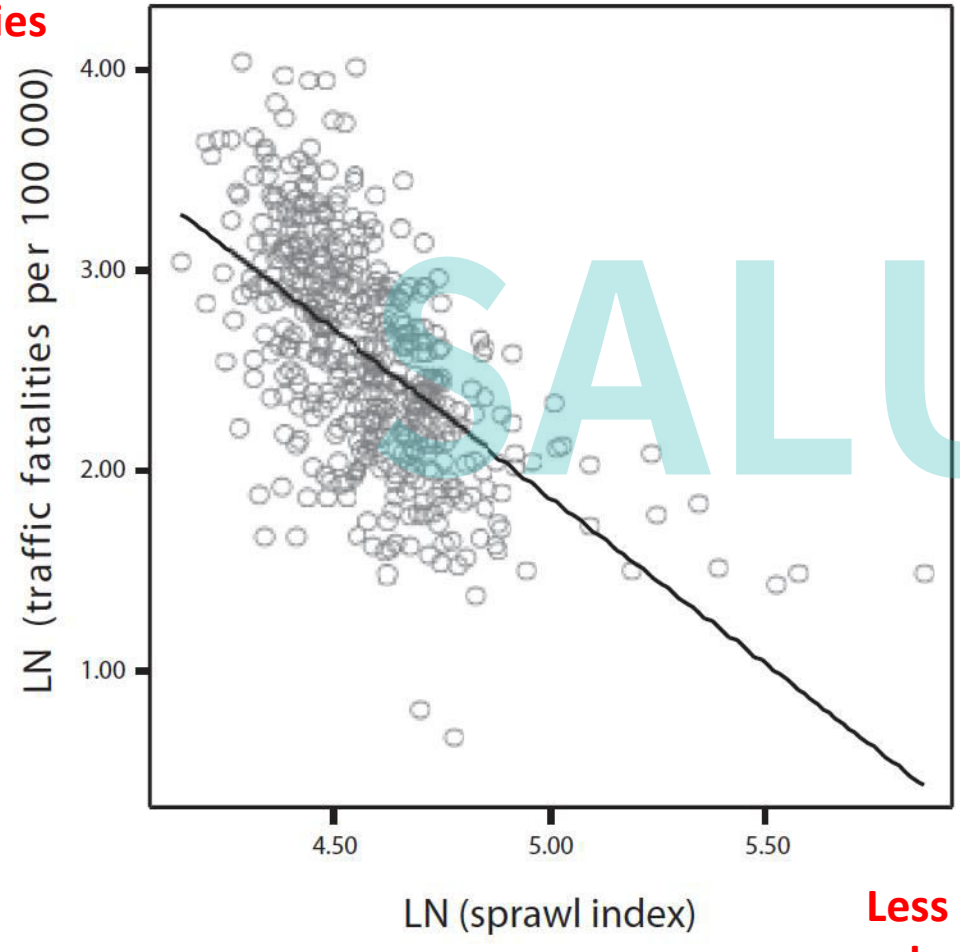
due to impacts on young lives, trauma care costs, employment, and other impacts



Paulozzi, 2007, Acc An Prev

CITY-LEVEL FACTORS

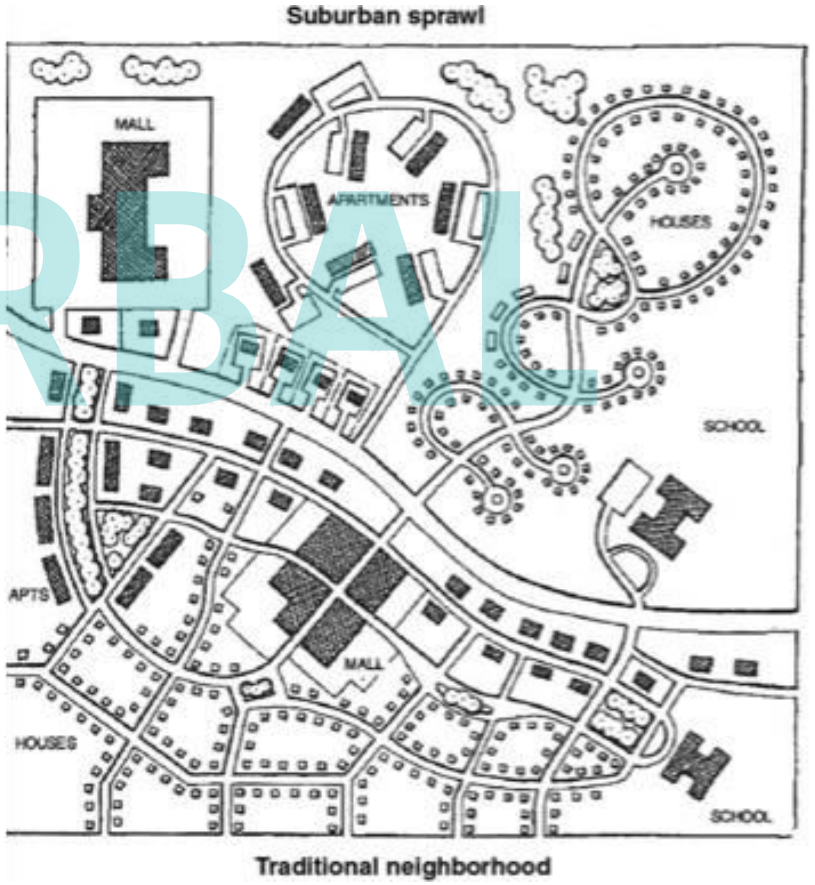
More traffic fatalities



Less urban sprawl

Ewing, 2003 *AJPH*

NEIGHBORHOOD-LEVEL FACTORS



AAP Committee on Environmental Health, 2009, *Pediatrics*

STREET-LEVEL FACTORS

ROAD TRAFFIC SAFETY POLICIES

TRADITIONAL APPROACH	VISION ZERO
Traffic deaths are **INEVITABLE**	Traffic deaths are **PREVENTABLE**
PERFECT human behavior	Integrate **HUMAN FAILING** in approach
Prevent **COLLISIONS**	Prevent **FATAL AND SEVERE CRASHES**
INDIVIDUAL responsibility	**SYSTEMS** approach
Saving lives is **EXPENSIVE**	Saving lives is **NOT EXPENSIVE**

VS

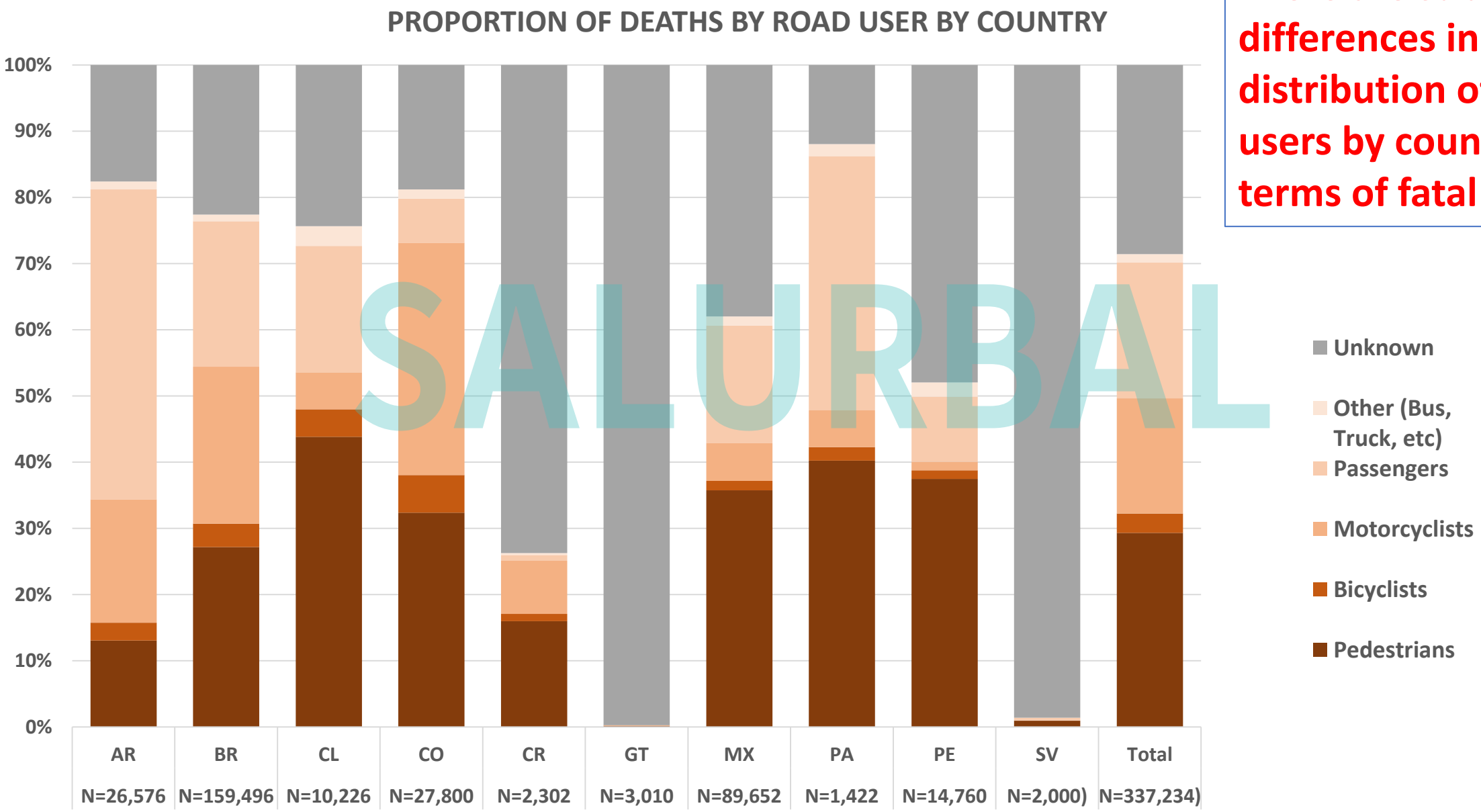
RESEARCH OBJECTIVES

- Assess quality of road traffic death data
- Examine city-level epidemiology of road traffic deaths across cities in Latin America
- Evaluate the association between city-level built and social environment factors with road traffic mortality

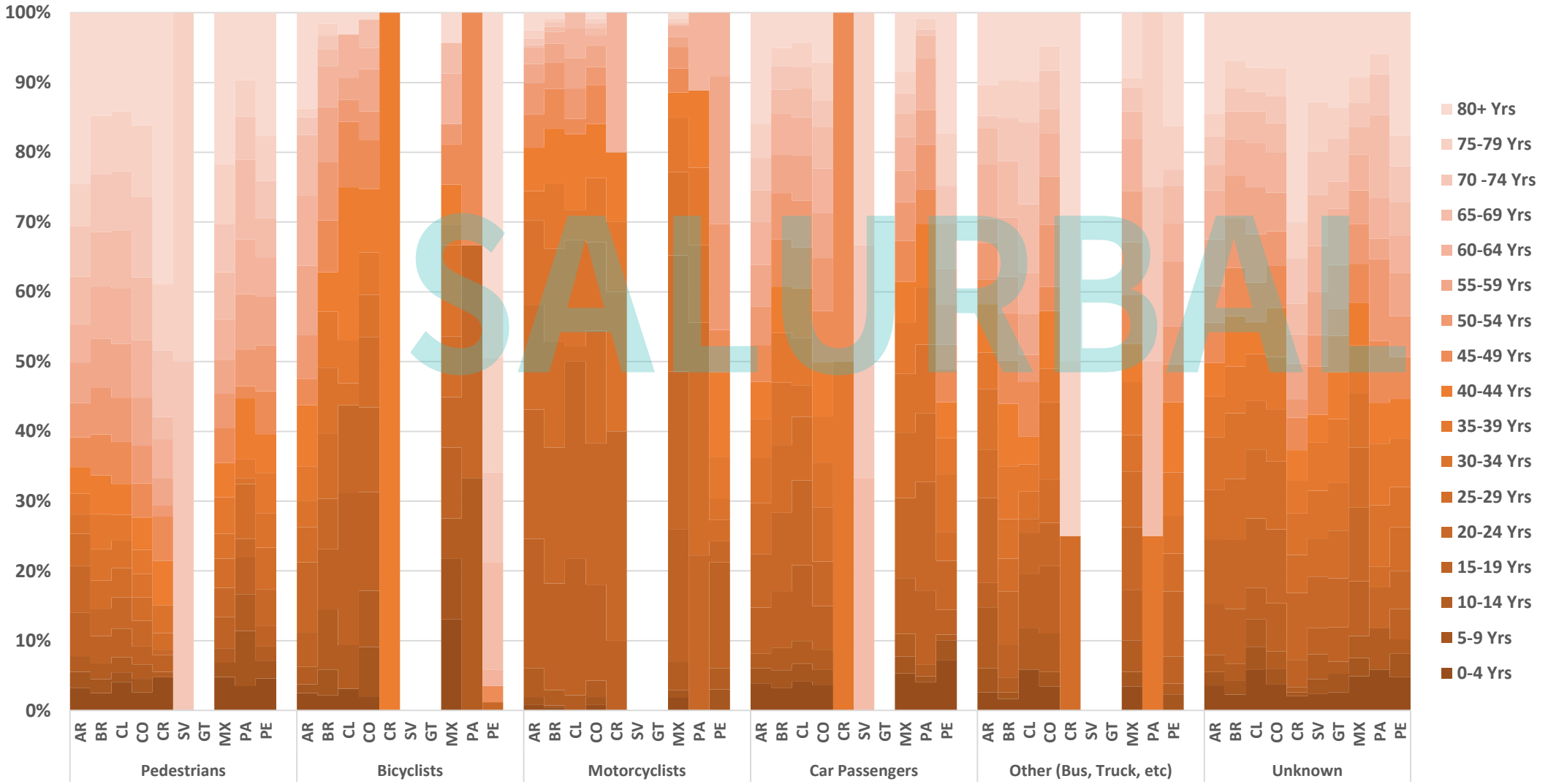
METHODS

- 366 cities ≥100,000 population from 10 countries
- Deaths 2010-2016 from city-level vital registry data
- Examined 5-year age groups by sex
- Assessed factors like population density, urban fragmentation, intersection density, GDP in regression analyses

There are substantial differences in the distribution of road users by country in terms of fatal victims



PROPORTION OF DEATHS BY ROAD USER BY 5-YEAR AGE GROUPS AND COUNTRY - Female



Pedestrians were from older age groups, while other groups tended to be younger

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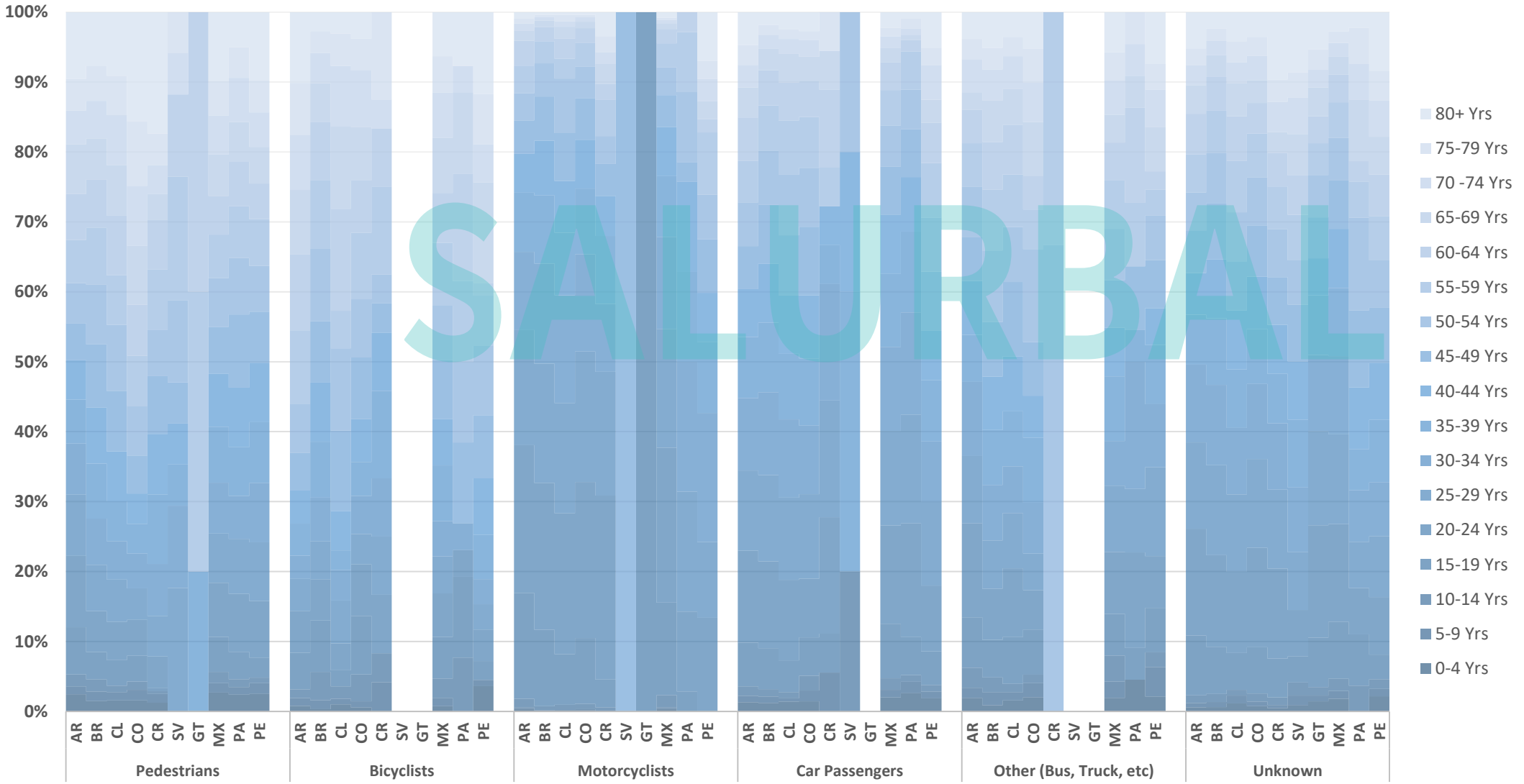
PROPORTION OF DEATHS BY ROAD USERS BY 5-YEAR AGE GROUPS AND COUNTRY - Male



Pedestrians and bicyclists tended to be older, motorcyclists and car passenger occupants were younger

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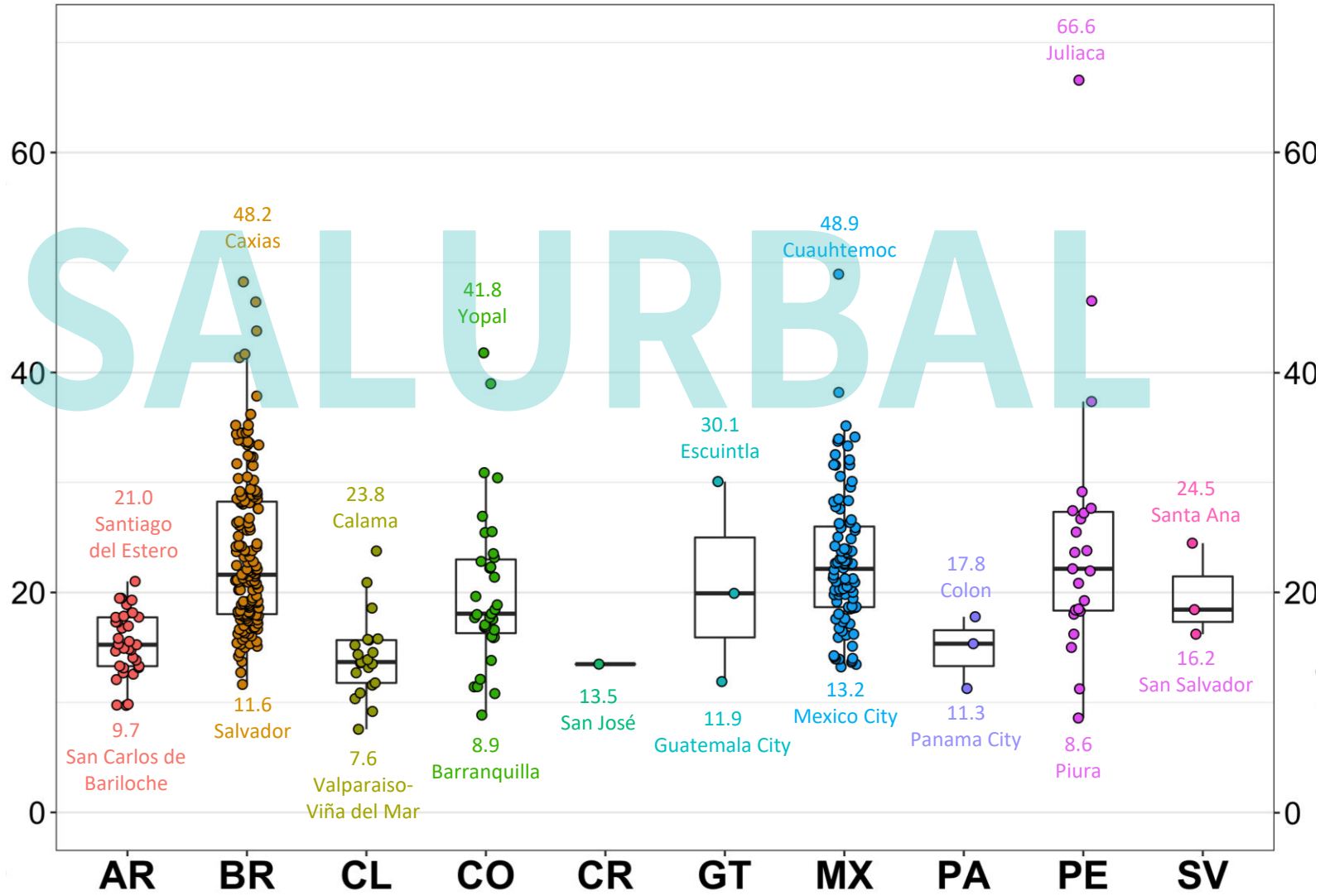
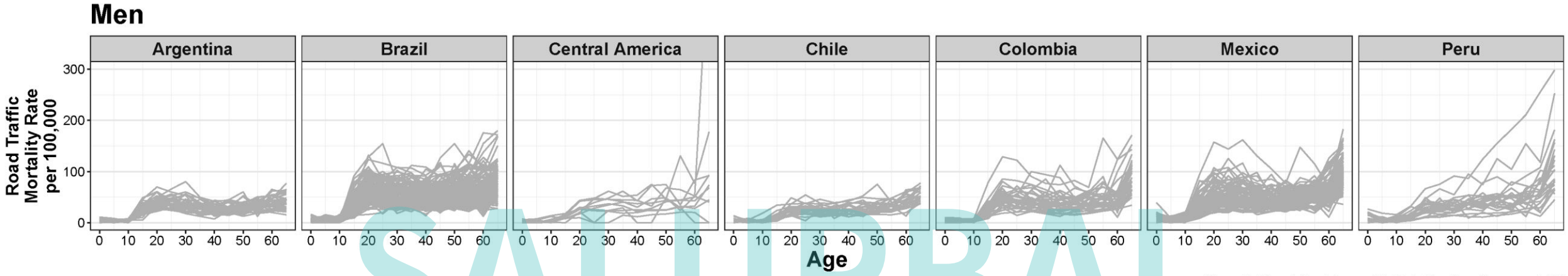
AGE STANDARDIZED ROAD MORTALITY PER 100,000 POPULATION

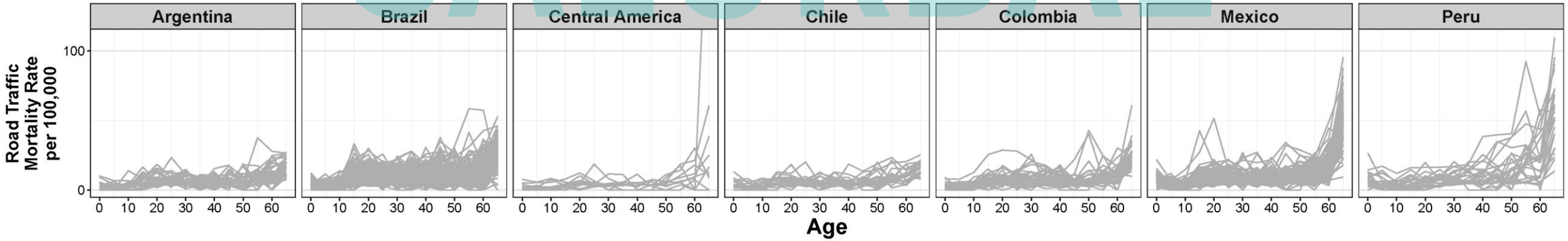
Substantial variation between and within countries in terms of city-level road traffic death rates



BY SEX AND 5-YEAR AGE GROUPS



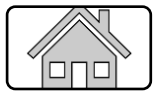
The road traffic mortality rate for one of the Central American cities goes up to 544



The road traffic mortality rate for one of the Central American cities goes up to 232

WHICH CHARACTERISTICS OF THE URBAN ENVIRONMENT ARE LINKED TO Road Traffic MORTALITY IN CITIES?

Urban Environment Characteristics

	Characteristic	Definition
	Population Density	2010 Population per 2010 built-up area in square kilometers
	Population Growth	Annual average change in population 2010-2016
	Annual GDP	Annual gross domestic product in 2010
	Social Environment Index	- % population age 25+ ≥ primary school level - % Households overcrowding (>3 people/bedroom) - % Households piped water access - % Households sewage network connection
	Urban Development Isolation	Average distance between urban developments in city boundaries
	Intersection Density	Number of intersections per square kilometer
	Street Length Average	Average length of street segments
	Streets per Intersection	Average number of streets emanating from intersections
	Mass Transit System	Presence or absence of a bus rapid transit system or subway system
	Urban Travel Delay Index	Average minutes delay

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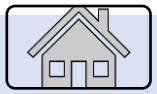
WHICH CHARACTERISTICS OF THE URBAN ENVIRONMENT ARE LINKED TO Road Traffic MORTALITY IN CITIES?

Urban Environment Characteristics

	Characteristic	Association	Risk Ratio (95% Confidence Interval)
	Population Density	6% Lower	**0.94 (0.90, 0.98)**
	Population Growth	5% Higher	1.03 (1.00, 1.06)
	Social Environment Index	4% Lower	0.96 (0.91, 1.02)
	Annual GDP	4% Lower	**0.96 (0.94, 0.98)**
	Urban Development Isolation	5% Higher	**1.05 (1.02, 1.09)**
	Intersection Density	8% Lower	**0.92 (0.89, 0.95)**
	Street Length Average	4% Lower	0.96 (0.92, 1.00)
	Streets per Intersection	2% Higher	1.02 (0.99, 1.05)
	Mass Transit System	8% Lower	**0.92 (0.86, 0.99)**
	Urban Travel Delay Index	No Association	0.98 (0.94, 1.02)

Association is per 1 standard deviation, bolded values were statistically significant at P<0.05

CONCLUSIONS

- Urban planners and traffic engineers can consider ways to **increase street connectivity and reduce fragmented urban development**
- Cities can consider **mass transit systems, such as BRT and subways**, which also can provide other health benefits (e.g., less air pollution)
- Future work should **examine other road safety outcomes** (e.g., police reports), **subgroups** (e.g., pedestrians) and **smaller geographic areas** within cities
- Given heterogeneity, it is important to look beyond only the largest capital cities and see what smaller and middle-sized cities are doing successfully

THANK YOU!

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