

Physical activity & transport in Bogotá:

The case of TransMilenio

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Outline

1. Context

- Bus Rapid Transit (BRT) worldwide
- TransMilenio

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5. Conclusions & policy implications

Bus Rapid Transit (BRT) & Bus of High Level of Service (BHLS)

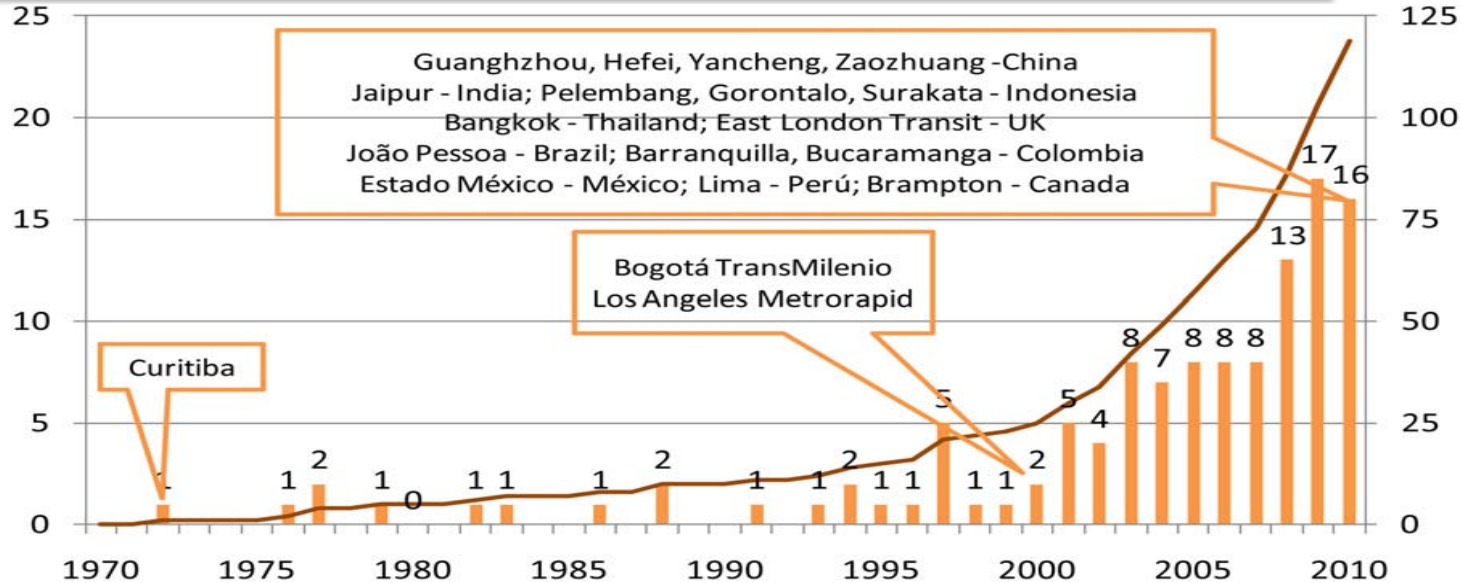
“Flexible, rubber-tired form of rapid transit that combines stations, vehicles, services, running ways and information technologies into an integrated system with strong identity” (*Levinson, Zimmerman, Clinger, Gast, et al., 2003*).

BRT are usually considered part of multimodal transport systems



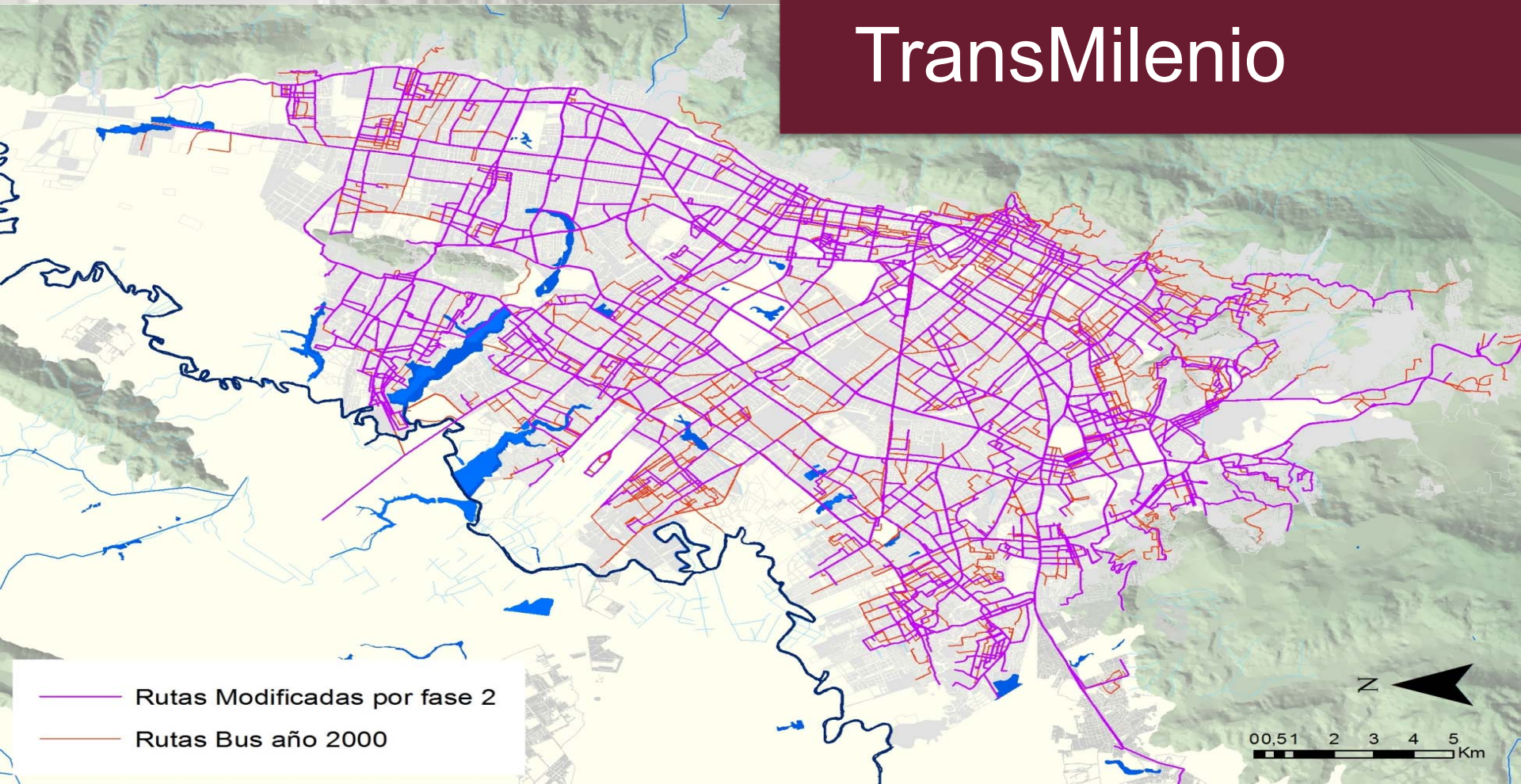
BRT & BHLS around the world

- 120 cities
- 280 corridors
- 4,300 Km
- 6,700 stations
- 30,000 buses
- 28 million passangers/day



Source: Hidalgo, D., & Gutiérrez, L., BRT and BHLS around the world: Explosive growth, large positive impacts and many issues outstanding, *Research in Transportation Economics* (2012)

TransMilenio



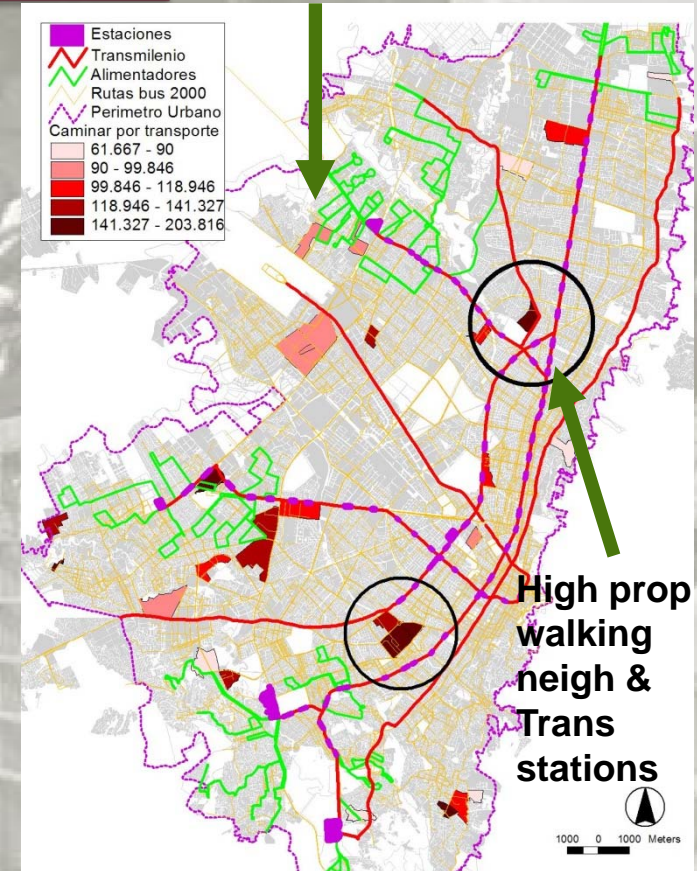
TransMilenio

- 30% of the trips in Bogotá are made by public transport (9% TransMilenio)
- TransMilenio buses operate in exclusive lanes with fixed stations ~500m
- Average of 1.2million passengers per day
- The fastest mode of transport 28km/h

TransMilenio & physical activity

Low prop
walking
neigh &
feeders

- Having ≥ 1 TransMilenio stations within the 1000-m buffer of the neighborhood periphery increased the odds of walking for utilitarian purposes (≥ 150 min/wk) **POR: 1.72 (IC 95% 1.19-2.47), $p=0.006$)**
- Having ≥ 1 TransMilenio stations within the neighborhood increased the odds of reporting 10-149 min/wk of Leisure activity **POR: 1.3 (IC 95% 1.07-1.50), $p=0.009$)**



Aim

To assess the association between the use of TransMilenio and walking for transport in adults from Bogotá



Methods



Study Population

2010-2011

30 neighborhoods stratification variables:

- SES, slope, proximity to TransMilenio and public park provision

IPEN

- Walkability index (median split) and SES (high vs. low)

Random selection

- **5 blocks** within each neighborhood
 - **10 households** within each block
 - **1 adult** within each household 18-70 years N=1000



Outcome and independent variables

- **Utilitarian physical activity**: minutes of walking for transport during the last 7 days (<150 minutes vs. ≥ 150 minutes (IPAQ)).
- **Module of transport** designed for IPEN (Curitiba, Cuernavaca and Bogotá)
 - Number of days that the adult used TransMilenio, bus, Car, taxi motorcycle (0 vs. ≥ 1 day)
- **Sociodemographic characteristics & BMI**
- **Built environment variables** (walkability index, distance to TM, # of TM stations, slope)– 1000m street network buffers around the centroid of the block
- **Multilevel Poisson-model** SAS 9.2 and Stata 12.0

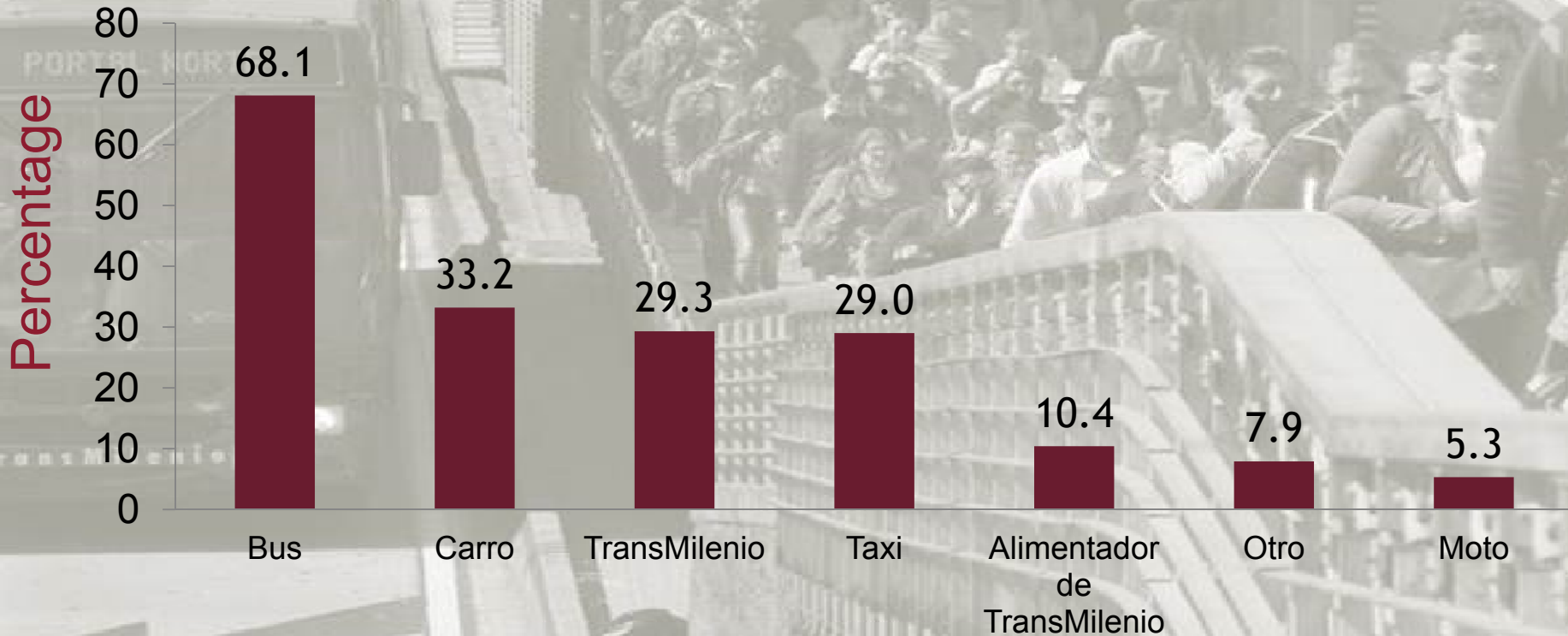
Results



Characteristics of study population

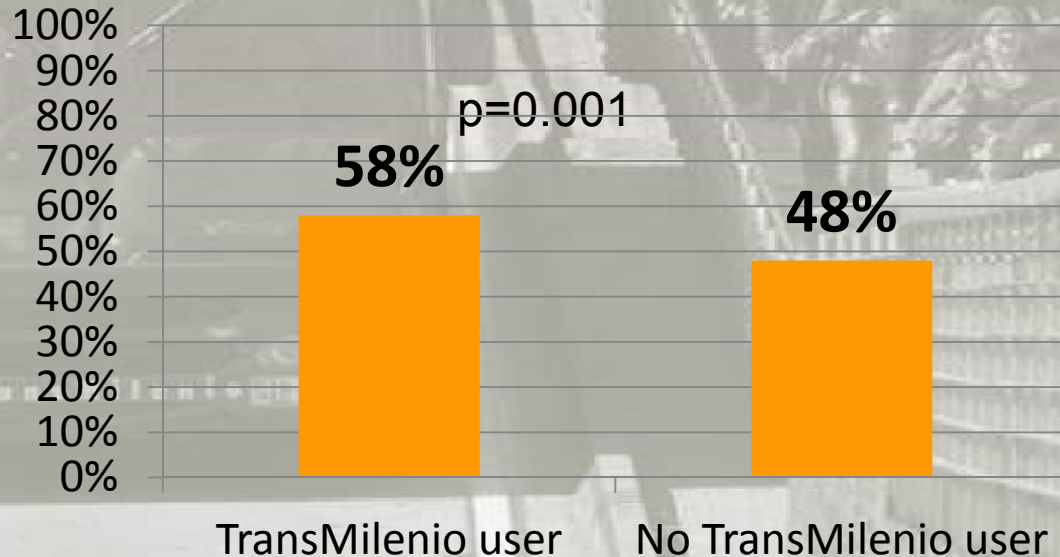
Study Population	N=1000
Age	40.1 (SD:14.5)
Sex	Male: 36.3% Female: 63.7%
Education level	<High school: 61.0% ≥High school: 39.0%
Socioeconomic status	1-2: 49.0% 3-5: 50.7%
BMI	Normal: 38.2 % Overweight: 44.4% Obesity: 17.4%
Car in the household	32%

Modes of transport in the last 7 days



Physical activity & TM

≥150 min/wk



51%

Met PA recommendations walking for transport

Adjusted PR and 95% CI for the Association Between Walking ≥ 150 min for transport and TM use in the last 7 days



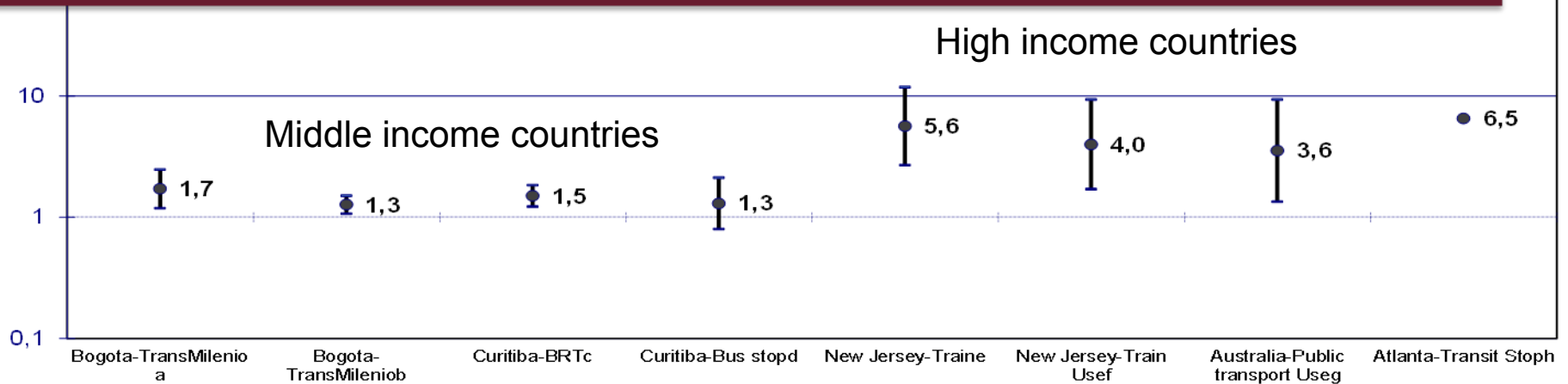
Model adjusted for sex, age, ses, education, occupation, BMI, walkability index, distance to TM and # TM stations, slope

Limitations

A grayscale photograph of a crowded train platform. In the foreground, a metal railing runs across the frame. Behind it, a large group of people is waiting, some looking towards the camera. In the background, a train is visible, with the words "TransMilenio" and "PORTAL NO" partially legible on its side.

- The cross-sectional design of this study did not allow us to infer causality.
- Reliability and validity of PA measures could be overestimated

Transport & Walking



a. Association between walking for transport 150 minutes per week (30 minutes per day per 5 days) and TransMilenio access

b. Association between walking during leisure time at least 10 minutes and TransMilenio access

c. Association between walking for transportation at least 10 minutes and BRT bus stop number (≥ 2)

d. Association between walking for transportation at least 10 minutes and bus stop number

e. Association between walking for transportation at least 10 minutes and train use

f. Association between walking 10.000 steps day and public transport use

g. Association between walking 10.000 steps day and public transport use

h. Association between walking for transport (up to 2,4Km/day) and Transit stop distance

Conclusions & policy implications

- Use of public transport contributes to meeting physical activity recommendations.
- TransMilenio users were more likely to walk ≥ 150 minutes compared to non-users of TransMilenio.
 - Manager of TransMilenio SA --co-benefit of the BRT system
- Continued improvements to public transit systems can lead to lasting improvements to opportunities for physical activity.

What is next....

- Bogotá
 - cross-sectional repeated study
 - Agent based modeling to assess scenarios of walking and TM used with the projected expansion
- IPEN network
 - To assess the association between PA and access to public transportation in 12 countries.

Gracias



