

AUTONOMOUS VEHICLES

Good..



**Sam
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Transportation
Consultants

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October 25, 2017

AUTONOMOUS VEHICLES

..Bad or Ugly?



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PROMISES OF AUTOISTS

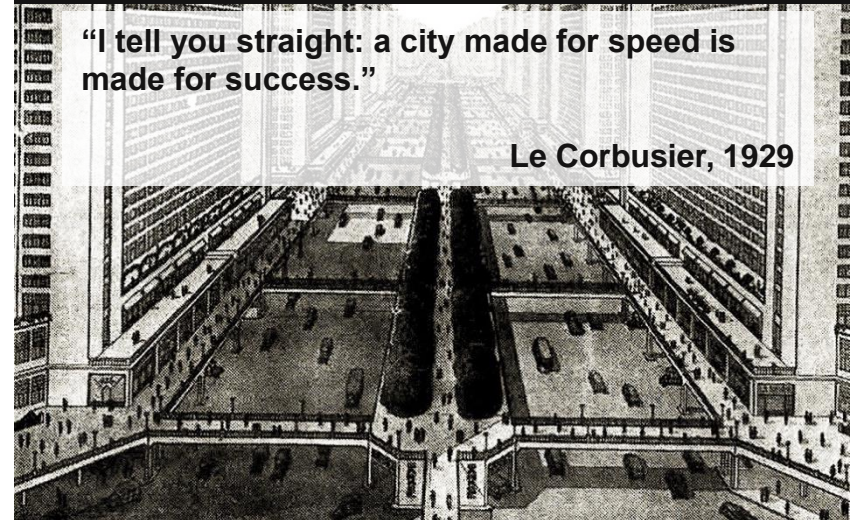
1900 Dawn of the Auto



“Dispense with a horse and save the expense, care and anxiety of keeping it.”

The Winton Motor Carriage Company, 1898

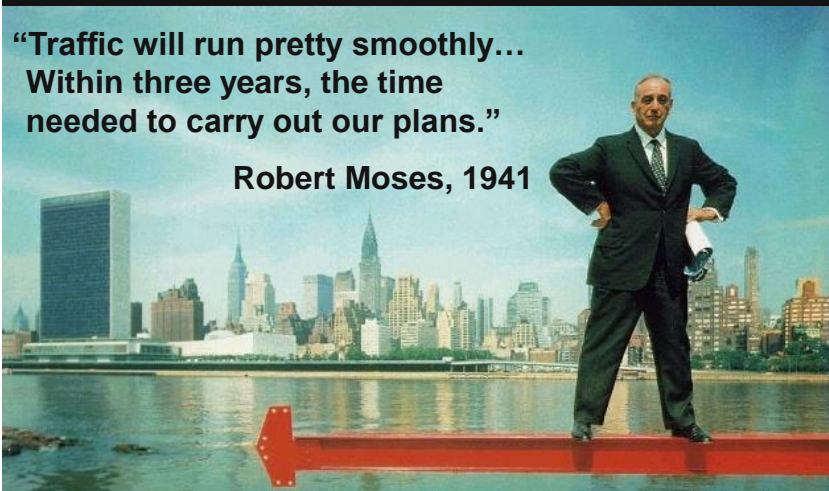
1920s Modernist Era



“I tell you straight: a city made for speed is made for success.”

Le Corbusier, 1929

1940s Sprawl + Interstate Era



“Traffic will run pretty smoothly... Within three years, the time needed to carry out our plans.”

Robert Moses, 1941

2017 Dawn of Autonomous Vehicles



“In less than 20 years, owning a car will be like owning a horse.”

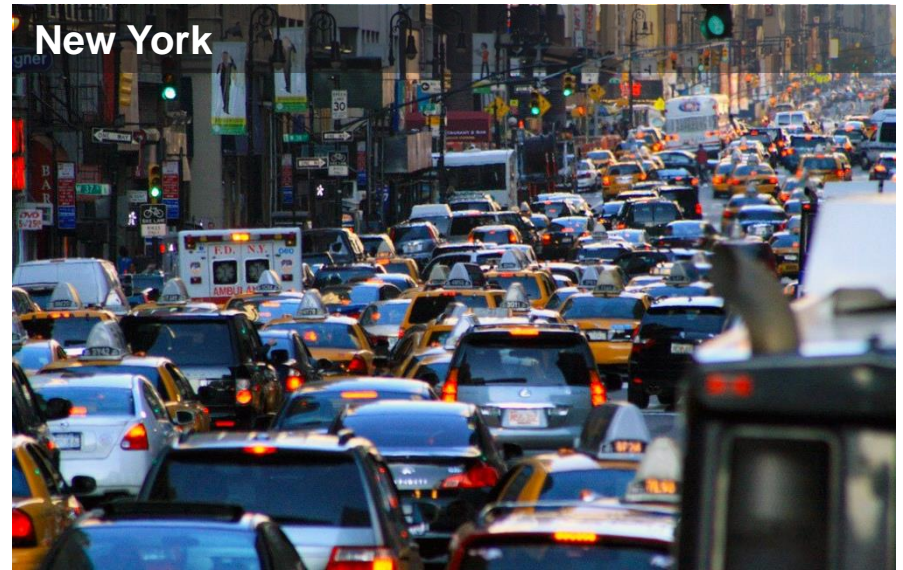
Elon Musk, 2015

SO, HOW DID IT WORK OUT?

Madrid



New York



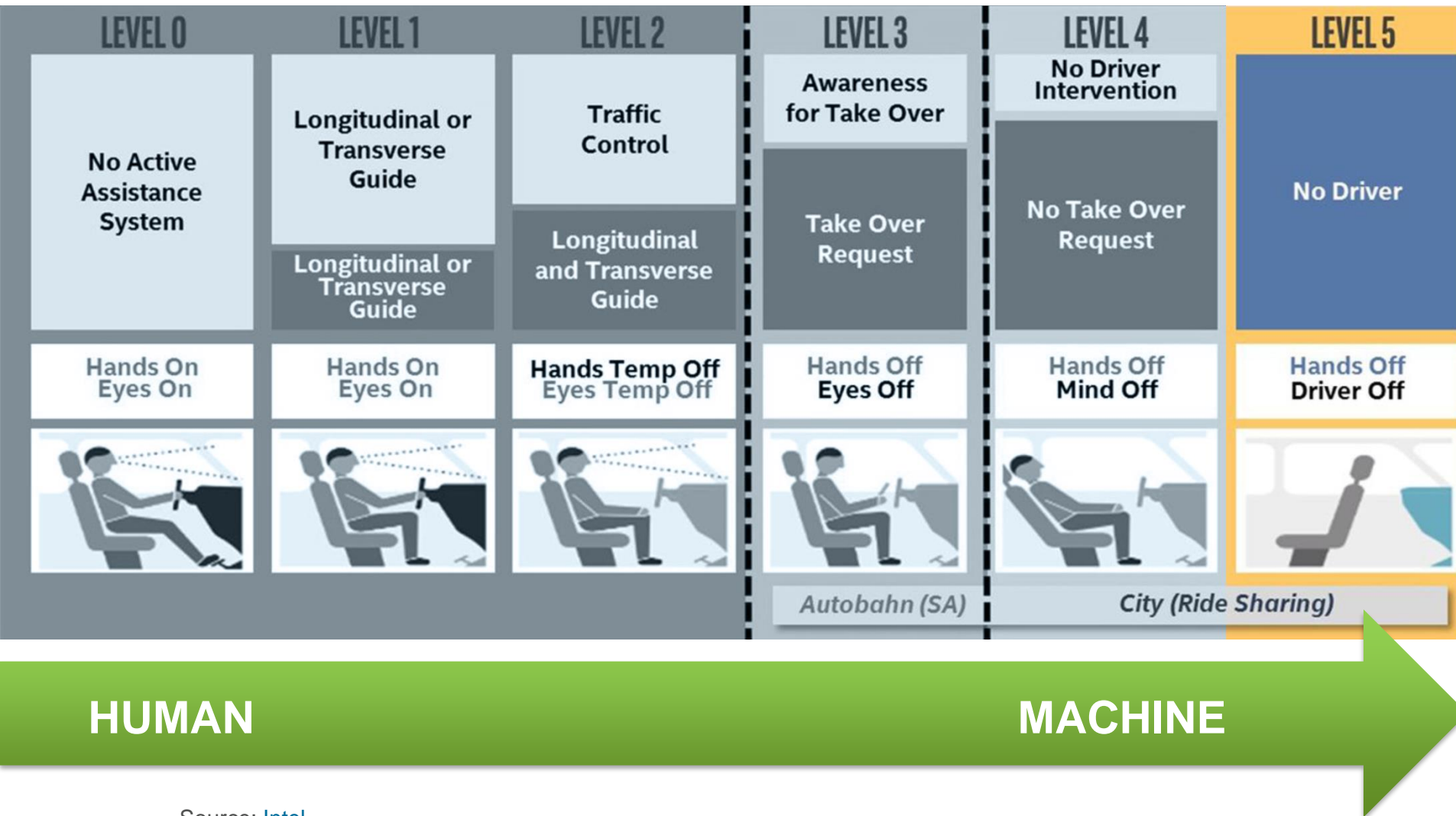
Beijing



Paris



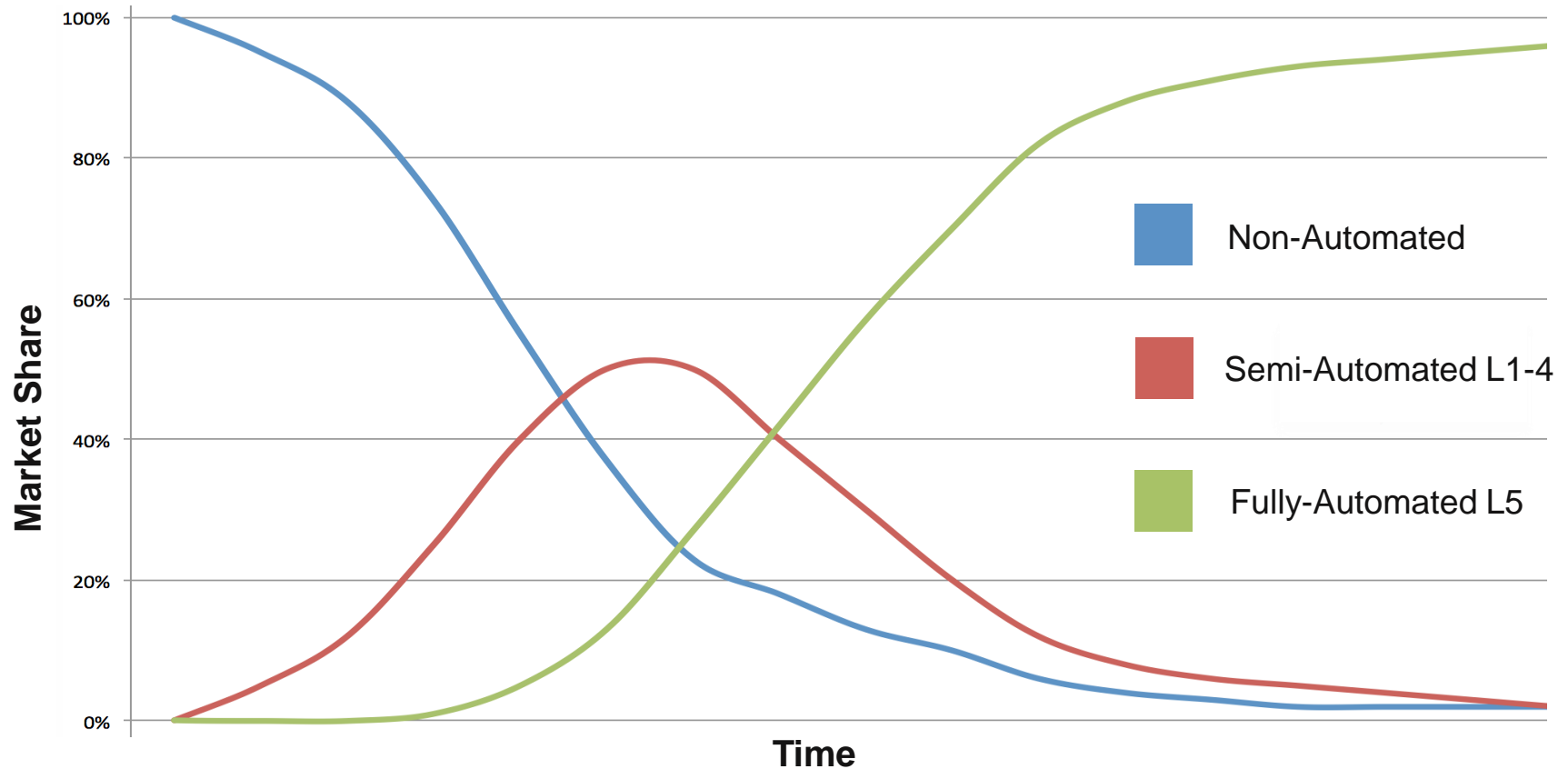
STAGES OF AUTONOMY



Source: [Intel](#)

WARNING: MIXED TECHNOLOGIES AHEAD

(UNCERTAIN TIME SCALE)



2020

40 - 50 years of mixed car technologies

2050-2100

THE GOOD, THE BAD AND THE UGLY (POSSIBILITIES)

the GOOD

- Congestion diminishes
- Crashes, injuries, and deaths plummet
- Disabled and low-income well-served
- Mobility as a Service (MaaS) with transit integration
- Last mile solved
- Parking demand goes way down

the BAD

- VMT soars & congestion increases
- Many jobs disappear
- Peds, bikes squeezed out
- Unaffordable for poor and rural dwellers
- Reverses millennial trend eschewing driving
- Competes with and undermines existing transit

and the UGLY

- Widespread gridlock
- Public transportation decimated
- Heart disease/stroke/diabetes skyrocket
- Everybody gets a license (even your dog)
- A new “modernist” view of cities
- Encourages sprawl

Good

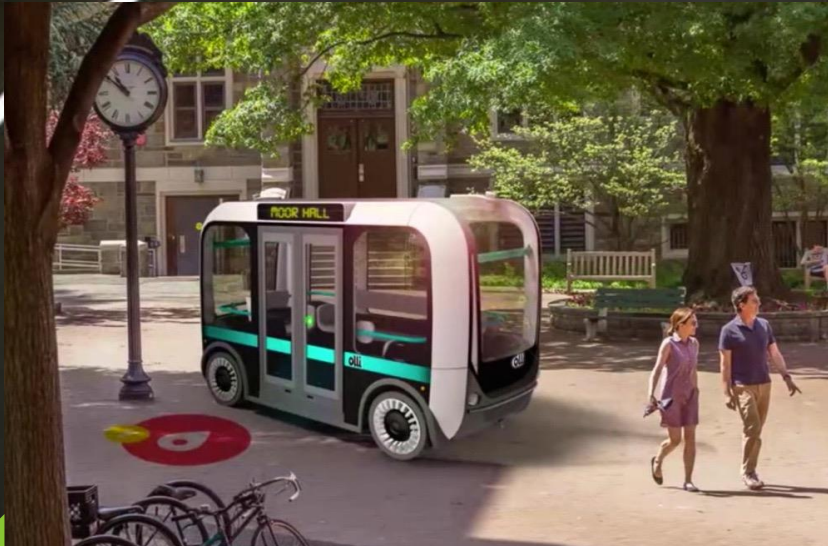
Bad

Ugly

2017

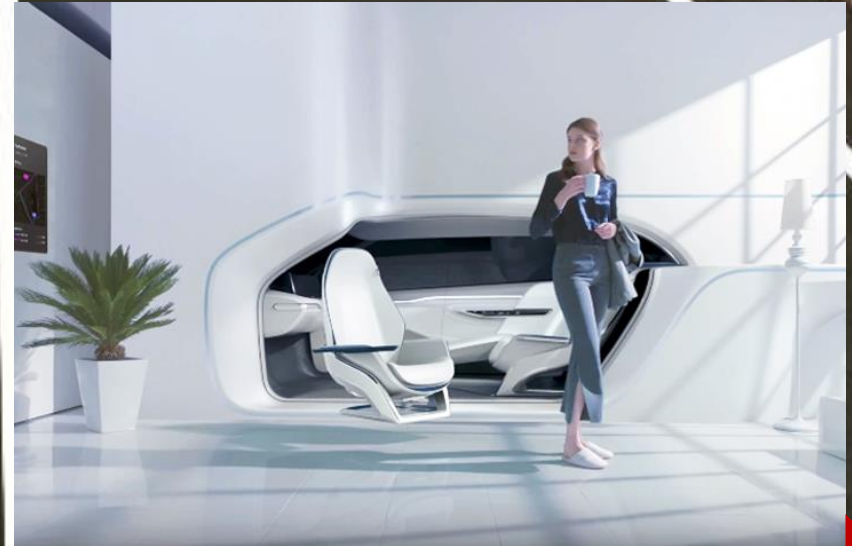
Less Traffic
Lower Carbon
Lower Societal Cost
Less Parking
Requires some walking

More congestion
Less sustainable
Higher cost
Keeps parking
Minimizes walking



MaaS + Transit Integrated

MaaS vs. Transit

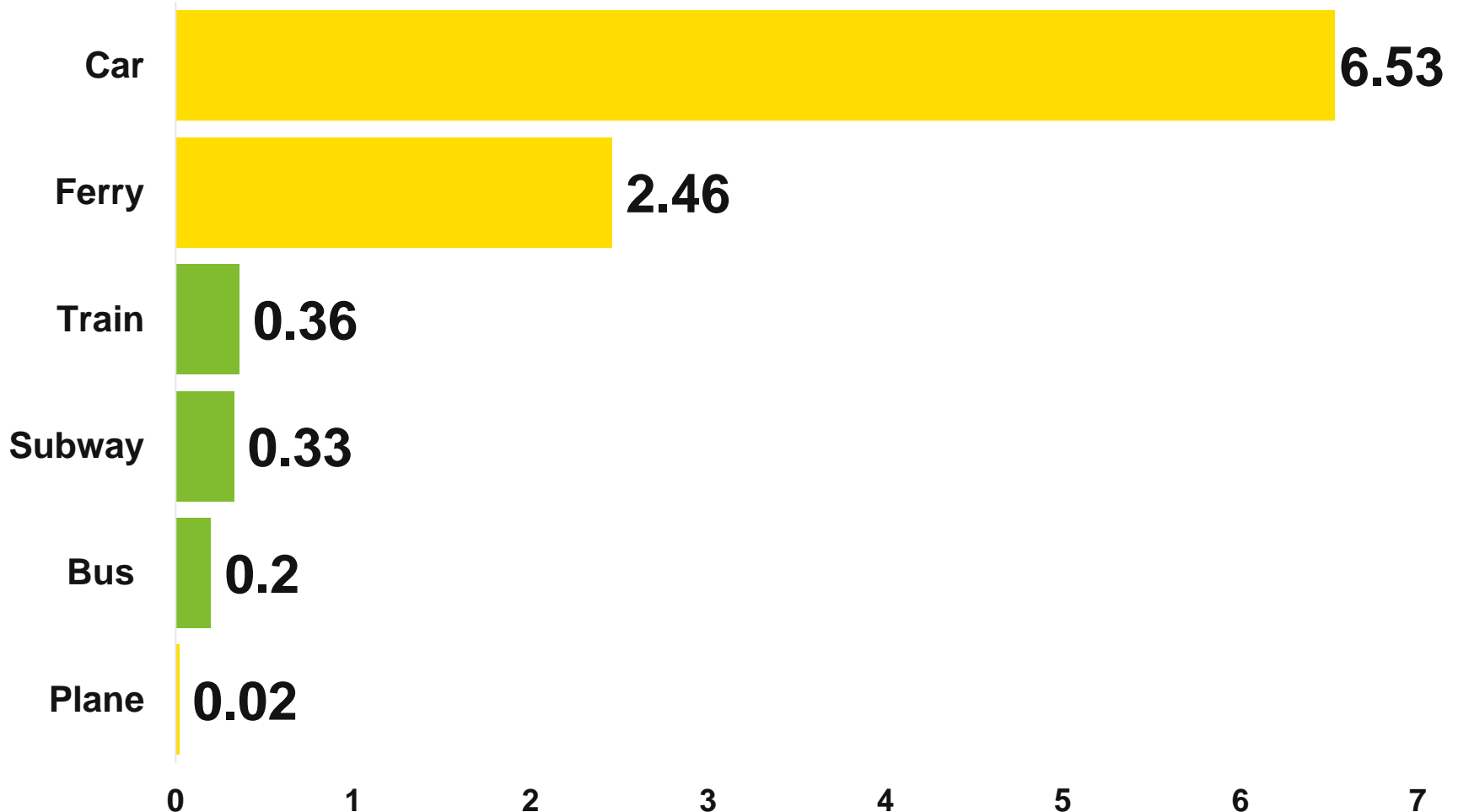


Private Ownership

THE GOOD – EVEN IF 90% SAFER THAN CARS

Passenger Deaths per 1 Billion Passenger Miles, 2000-2014

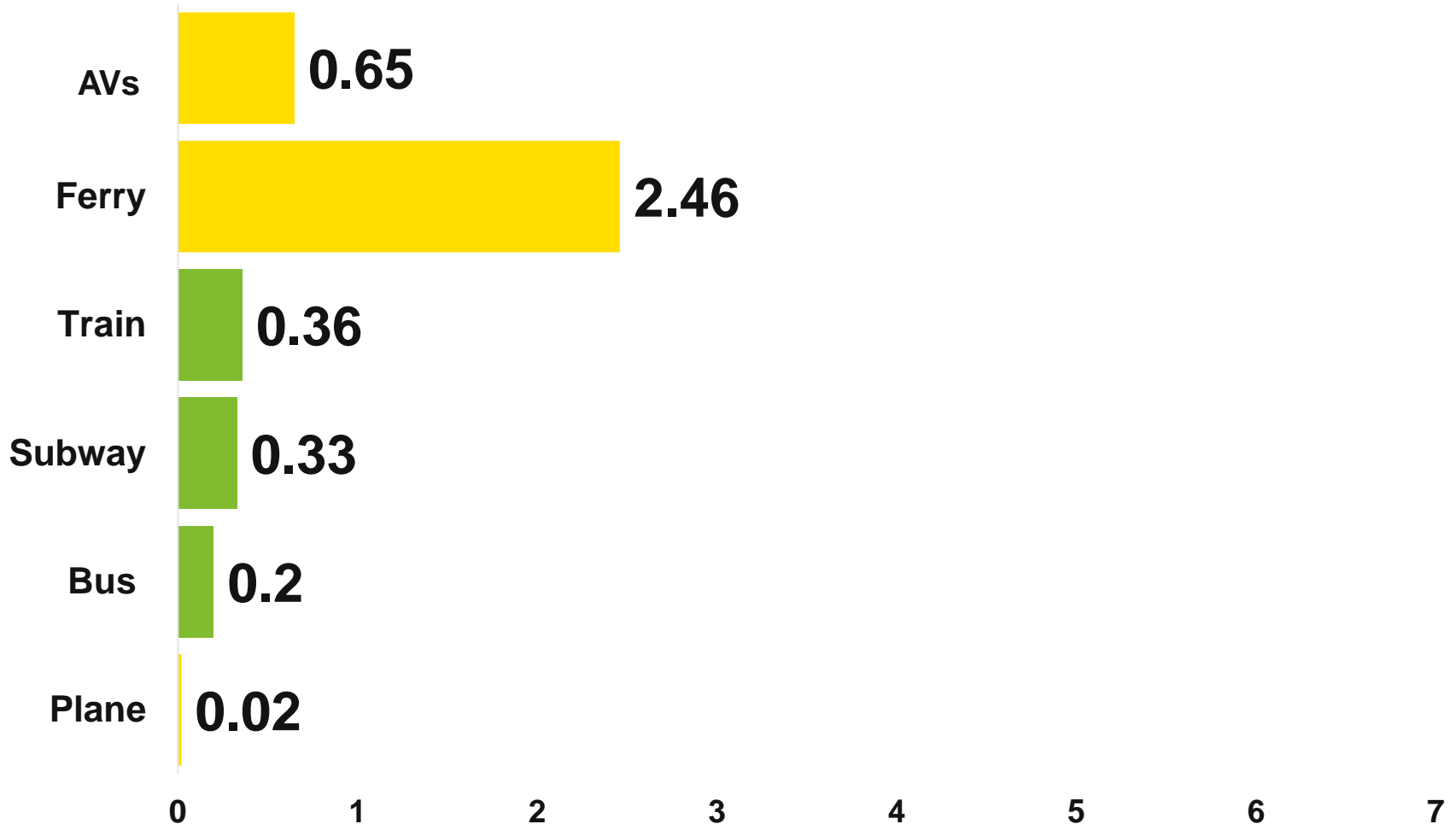
Deaths per Billion Passenger-Miles



THE GOOD – EVEN IF 90% SAFER THAN CARS

Passenger Deaths per 1 Billion Passenger Miles, 2000-2014

Transit is Already 95% Safer



BUT MOST SAFETY BENEFITS CAN BE ACHIEVED WITH “SAFE CARS” WITHOUT FULL AUTOMATION

Safe Driving



Driver is in control of car with assistance from safety technology

Self-Driving



Driver is in driver's seat but the car is in control to improve driver's safety

Driverless

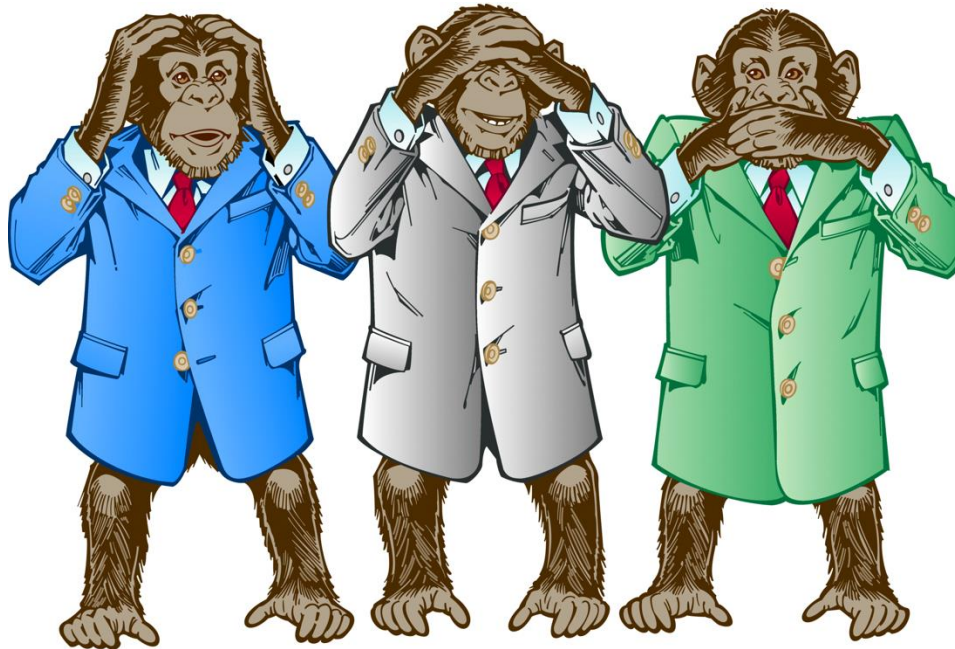



Driver is not in control and not necessarily even in the vehicle

Adapted from Professor Alain Kornhauser

KEY TAKEAWAY

Don't let the safety argument blind you to a more holistic approach toward the introduction of AVs to our society.



A close-up photograph of Elon Musk speaking. He is looking slightly to his left with an open mouth, as if in the middle of a sentence. He is wearing a dark jacket over a dark shirt. The background is dark and out of focus.

“..if, in writing some article that’s negative,
“If you're not concerned about A.I. safety, you
should be. Vastly more risk than North Korea.”

Elon Musk

Twitter, August 11, 2017

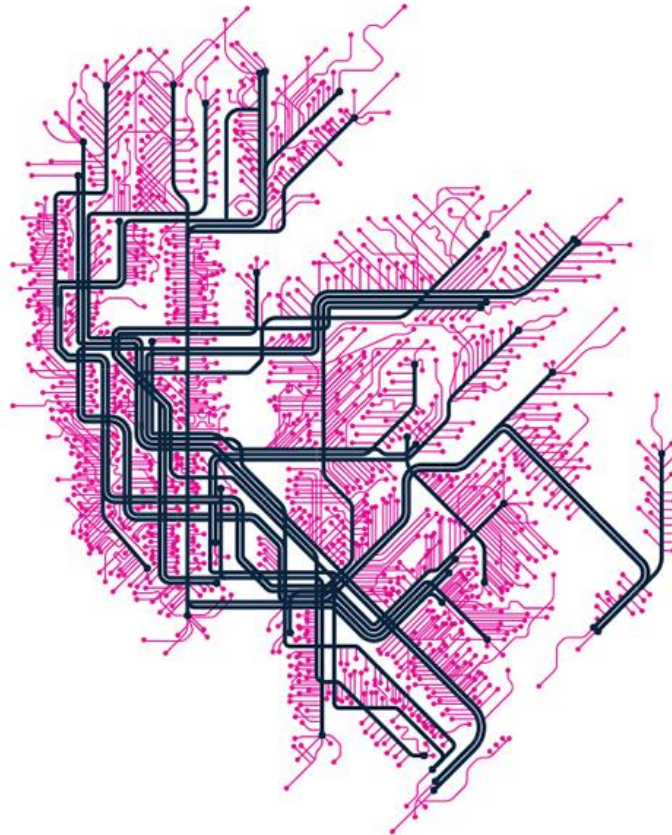
**MY PREDICTION, WE WILL SOON SEE AV ADS LIKE THIS:
“IF YOU LOVE YOUR FAMILY, AND WANT TO KEEP THEM
SAFE, A TESFORD IS FOR YOU.”**



THE GOOD – IMPROVED LAST MILE FOR TRANSIT ACCESS



**ONE GAJILLION
NEW STOPS.**

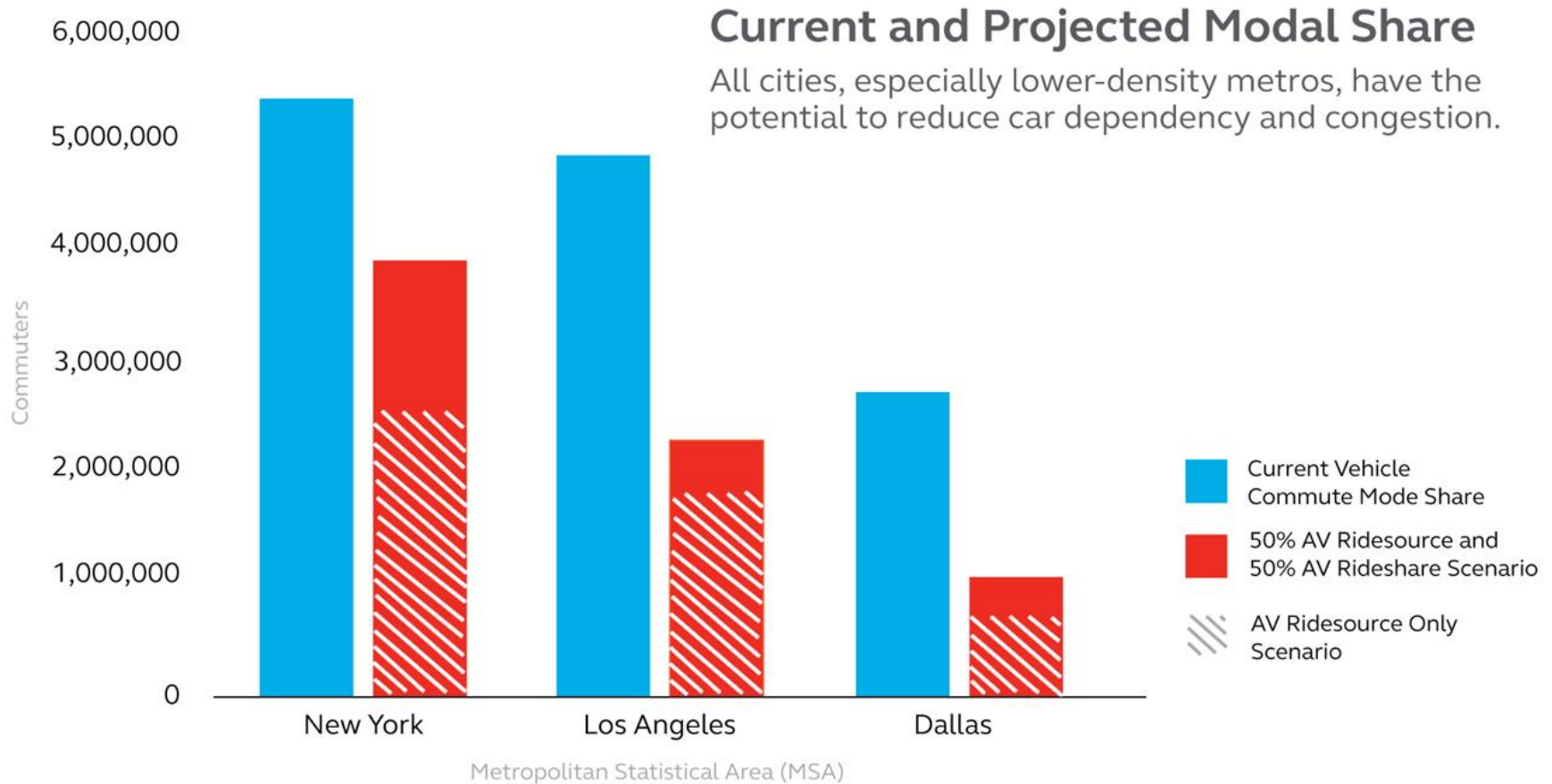


↓ 🚗 DOWNLOAD & RIDE

lyft



THE GOOD – SHARP REDUCTION IN PRIVATELY OWNED CARS



A GLIMPSE INTO THE FUTURE COURTESY OF (TRANSPORTATION NETWORK COS. – **TNCs**)

Yellow Taxicab and TNC Trip Volumes, NYC 2014-17

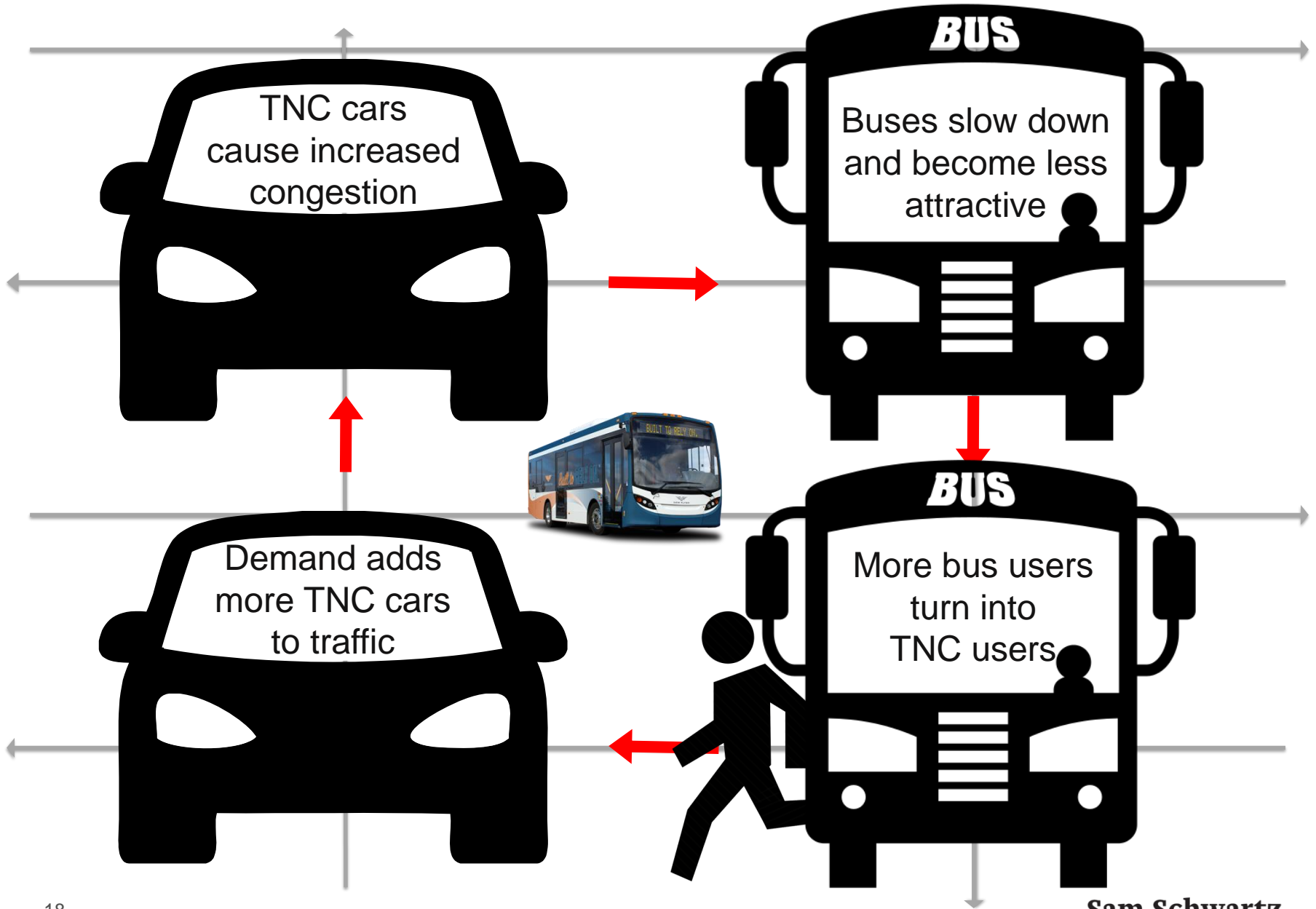
(TNC includes Uber, Lyft, Juno, Via, Gett)



500% increase
in TNC trips
January 2015-17

TNCs overtake
taxis

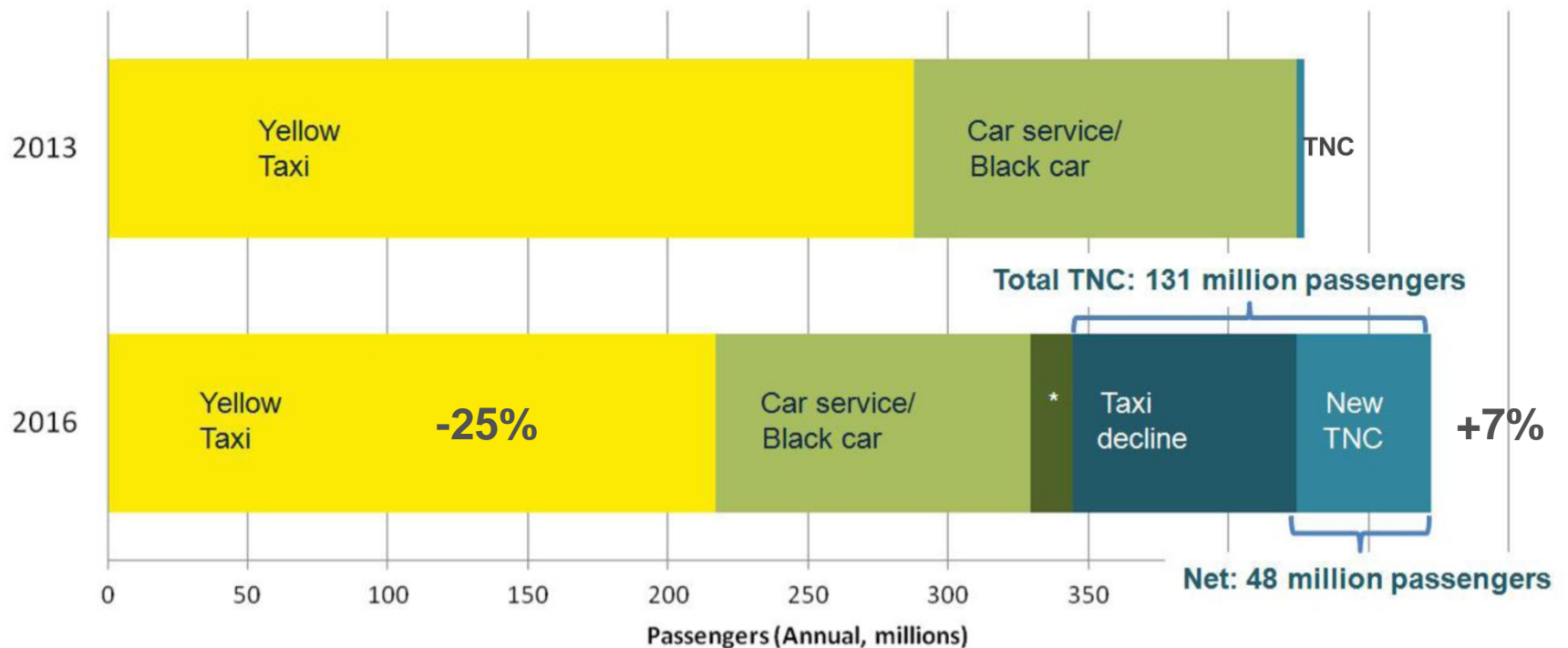
VICIOUS CYCLE OF TNC INDUCED TRAFFIC



THE TNC EFFECT ON NYC 2013-2016

- Taxi Share Decreased 25%
- Vehicle Miles Travelled (VMT) Jumped 7%
- Speeds Dropped by 20% in Midtown

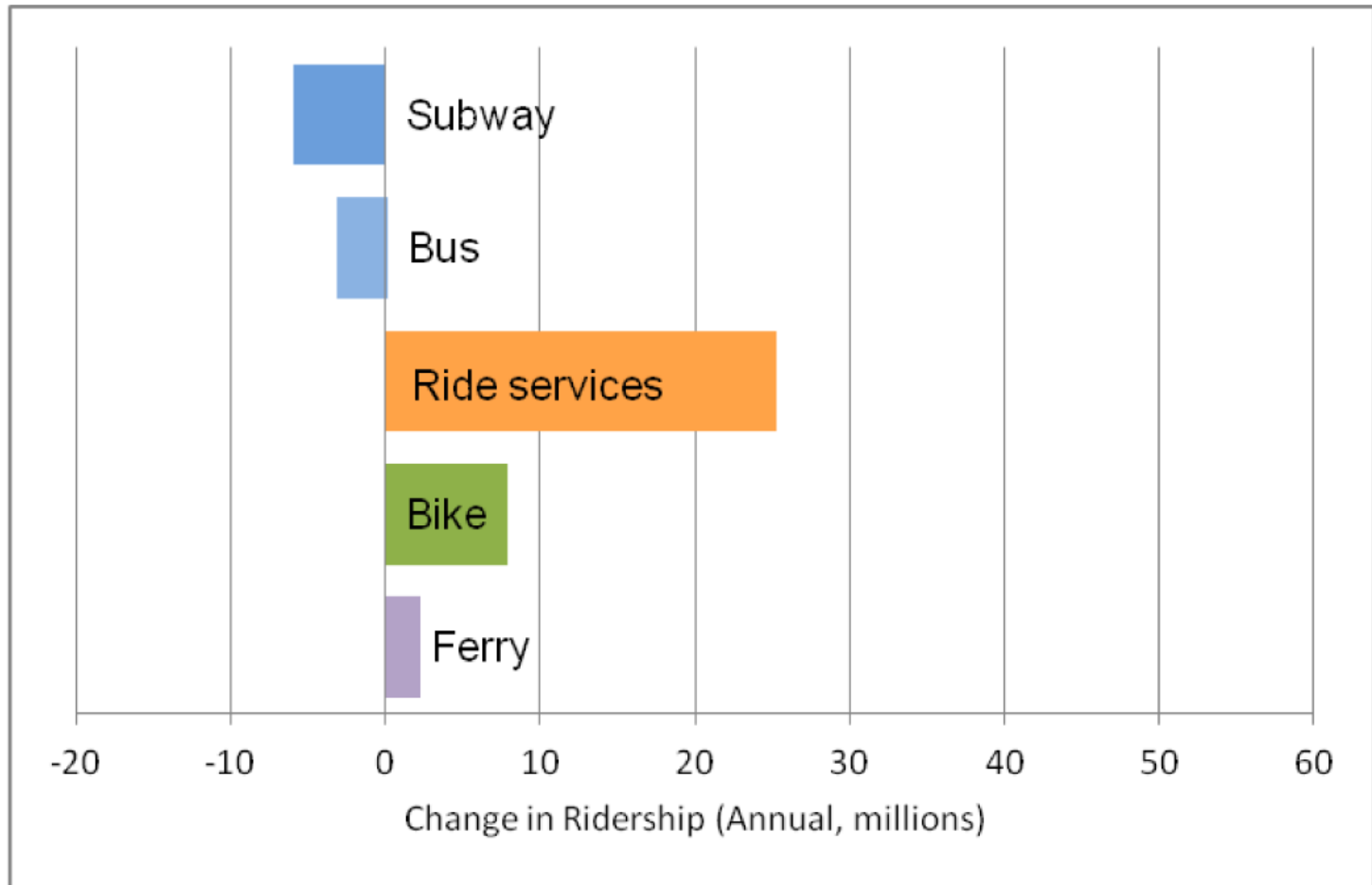
Figure 2. Passengers, 2013 and 2016



Source: Unsustainable by Schaller Consulting February 2017

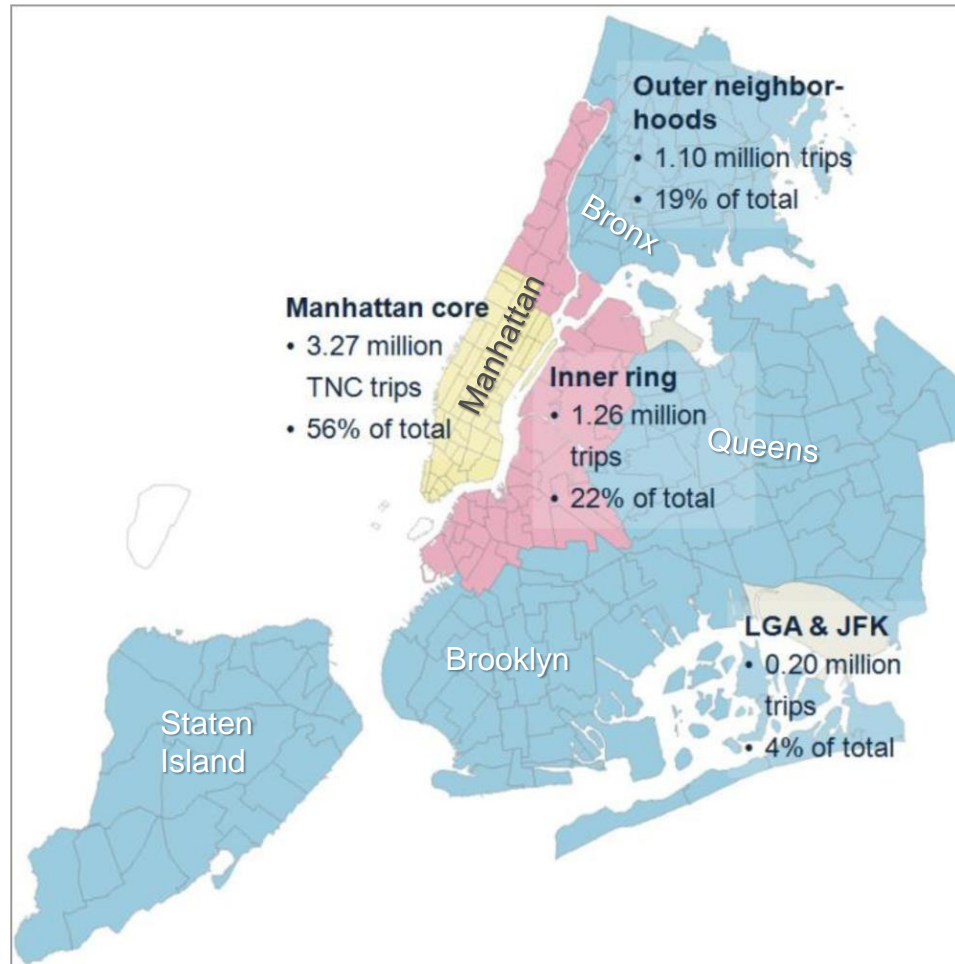
WHERE DID THEY GO?

Changes in NYC Ridership by Mode 2015-2016



Source: Unsustainable by Schaller Consulting February 2017

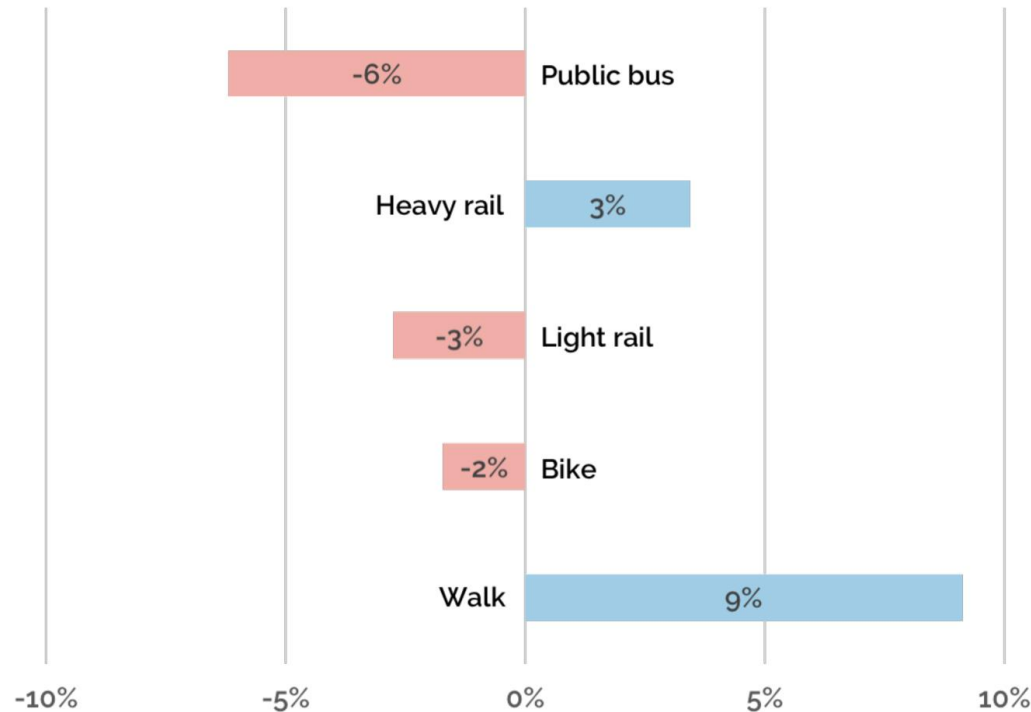
TNCs LARGELY SERVE MANHATTAN AND THE BROOKLYN-QUEENS EAST RIVER WATERFRONT – where transit is most plentiful, traffic is the worst and the highest income people live



Source: “Unsustainable? The Growth of App-Based Ride Services and Traffic, Travel and the Future of NYC Report by Bruce Schaller, February 2017. TLC trip files. Data are for Uber, Lyft and Via. (Geographic distribution is not available for Juno and Gett trips in June 2016.)

DISRUPTIVE TRANSPORTATION: THE ADOPTION, UTILIZATION, AND IMPACTS OF RIDE-HAILING IN THE U.S.

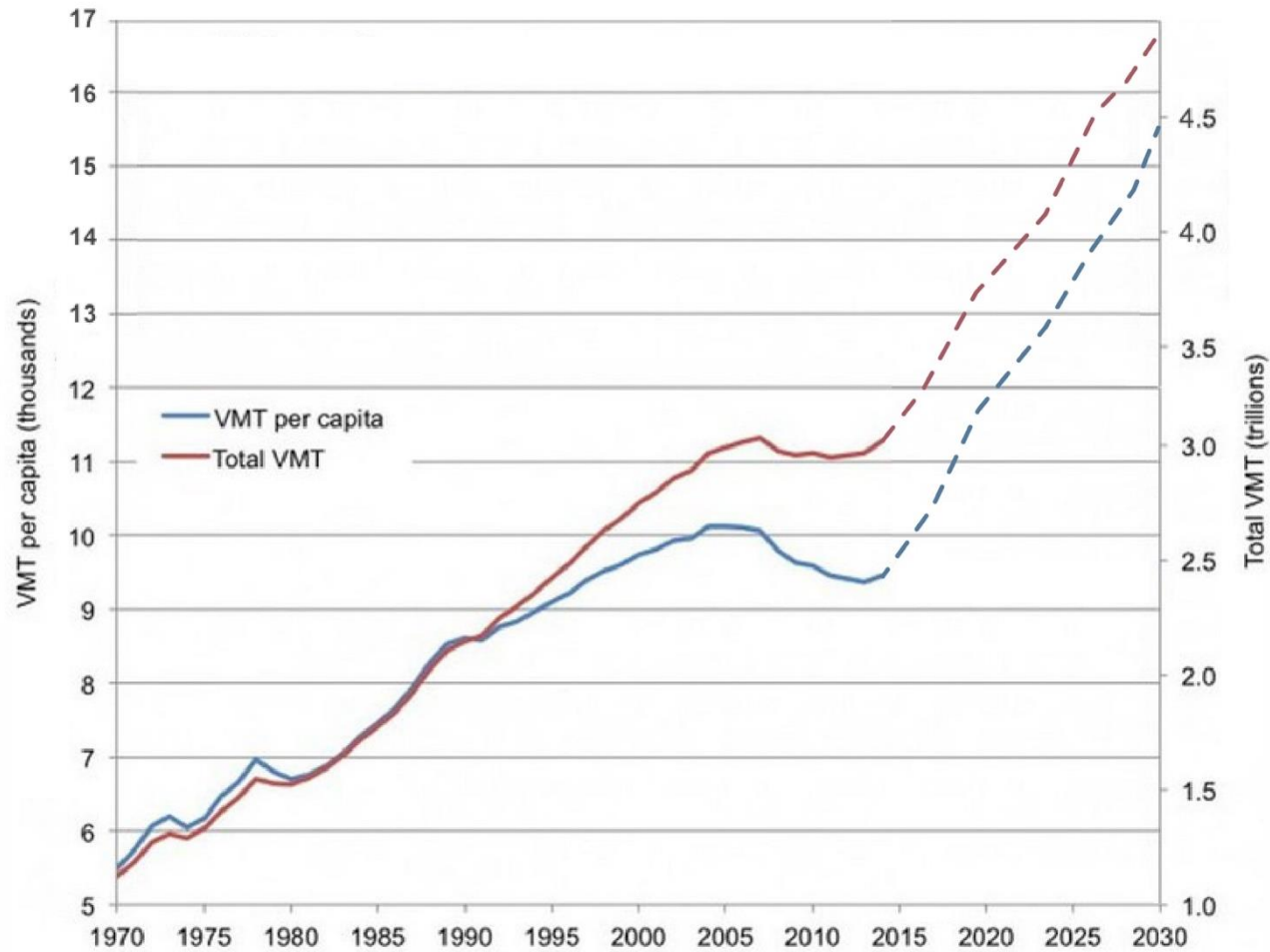
Figure 12. Changes in transit use, biking, and walking after adoption of ride-hailing services



Survey question: "Since you started using on-demand mobility services such as Uber and Lyft, do you find that you use the following transportation options more or less?"

THE BAD – VMT SOARS

Total and Per Capita Vehicle Miles Traveled (VMT) 1900 - 2030



Annual vehicle-miles traveled (VMT), total and per capita, in United States.

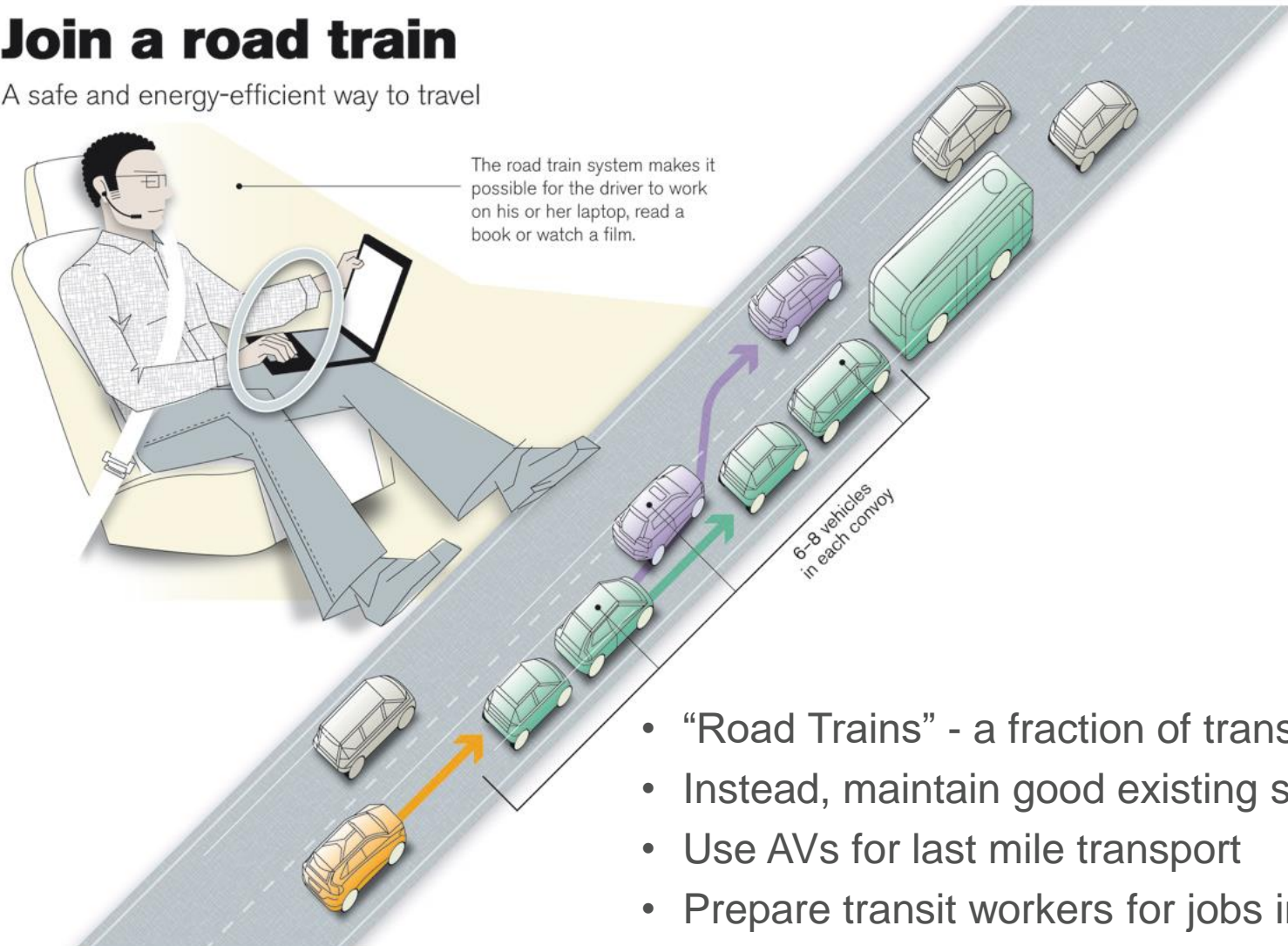
THE BAD – CONGESTION REMAINS AWFUL



THE BAD - DON'T BELIEVE THE HYPE ON “ROAD TRAINS”

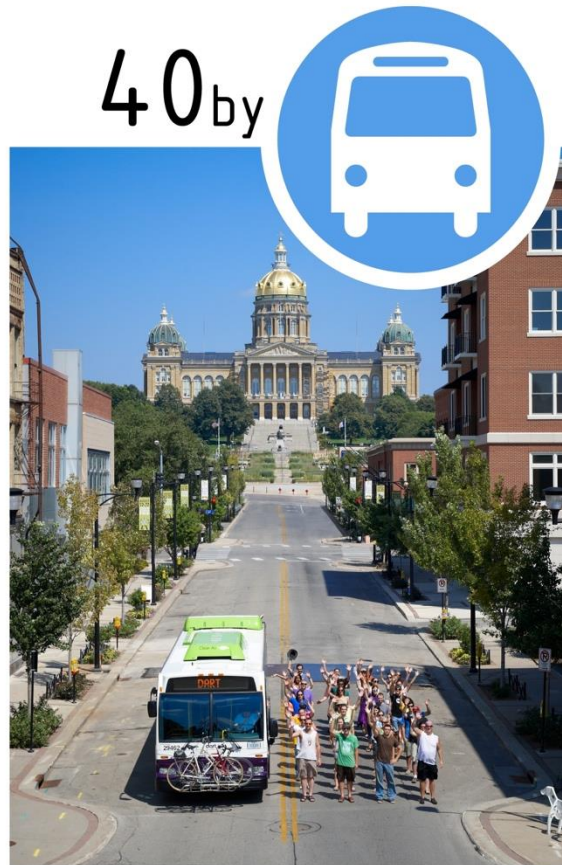
Join a road train

A safe and energy-efficient way to travel



- “Road Trains” - a fraction of transit capacity
- Instead, maintain good existing systems
- Use AVs for last mile transport
- Prepare transit workers for jobs in AV transit

AVs DON'T CHANGE THIS EQUATION

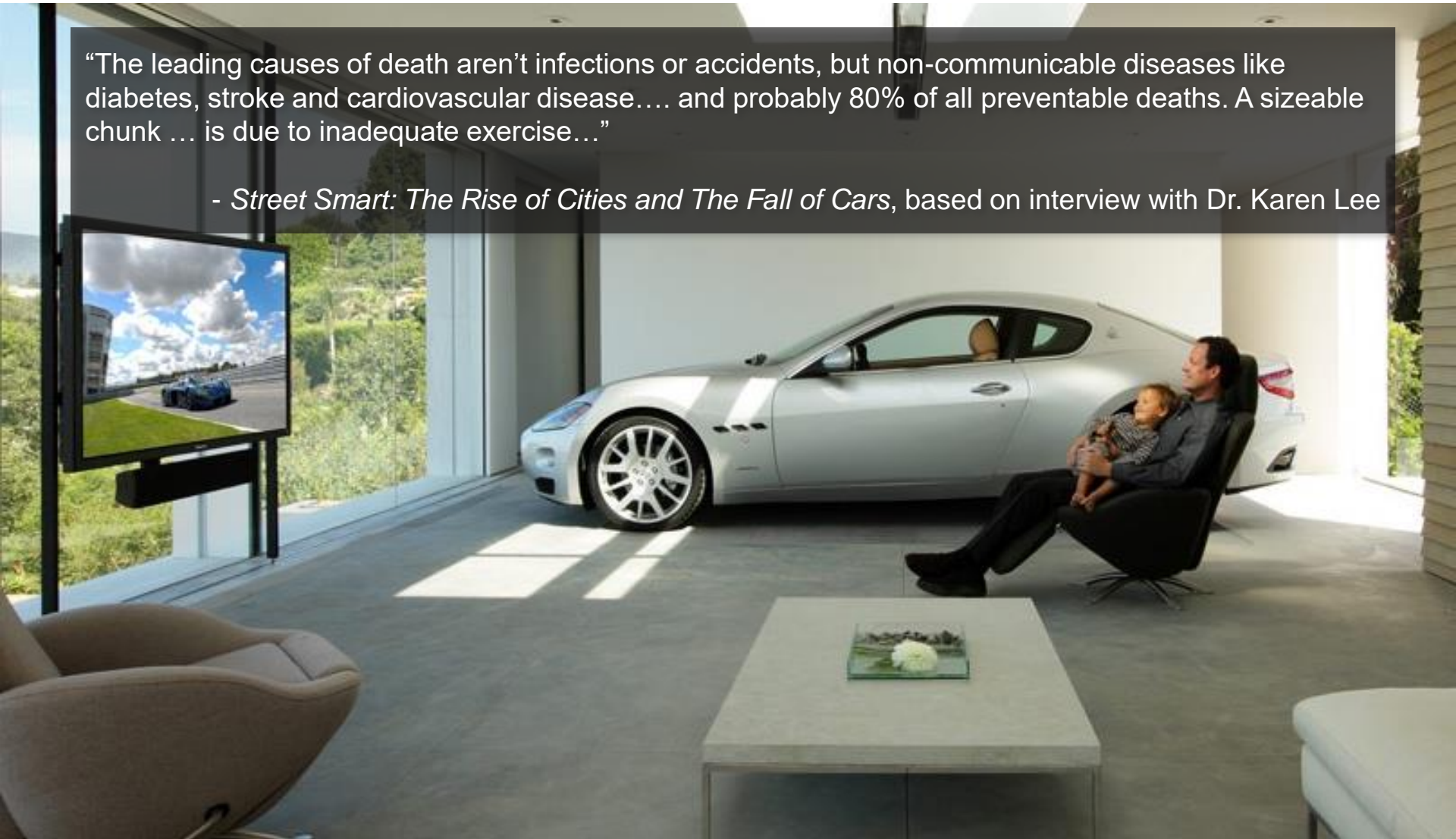


Amount of space required to transport the same number of passengers by driverless car, by bus, or bicycle.
(Urban Ambassadors, Des Moines, Iowa – August 2010)

THE UGLY – MORE INACTIVITY: A LEADING CAUSE OF DEATH

“The leading causes of death aren’t infections or accidents, but non-communicable diseases like diabetes, stroke and cardiovascular disease.... and probably 80% of all preventable deaths. A sizeable chunk ... is due to inadequate exercise...”

- *Street Smart: The Rise of Cities and The Fall of Cars*, based on interview with Dr. Karen Lee



THE UGLY – WALL-E

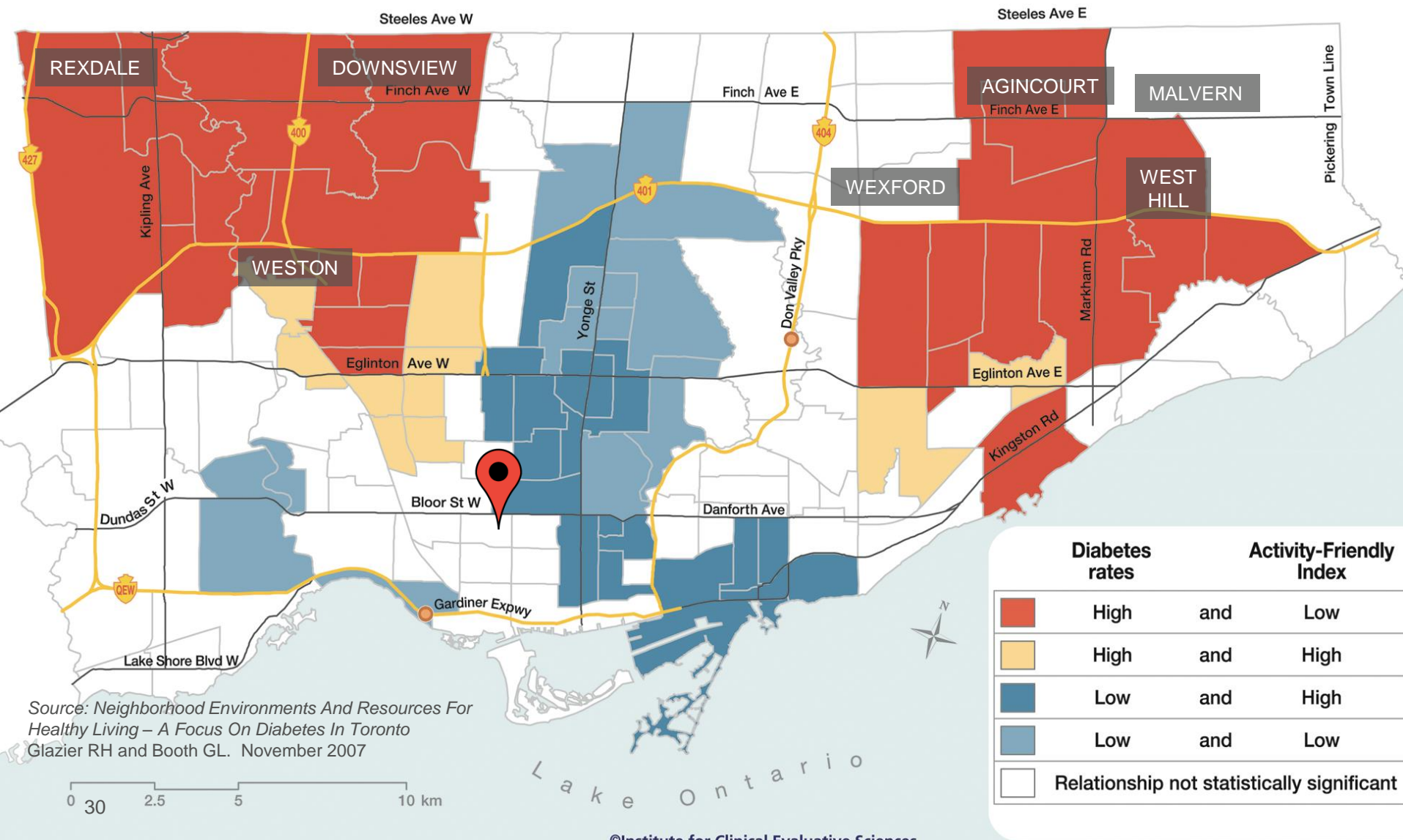


THE UGLY – WALL-E



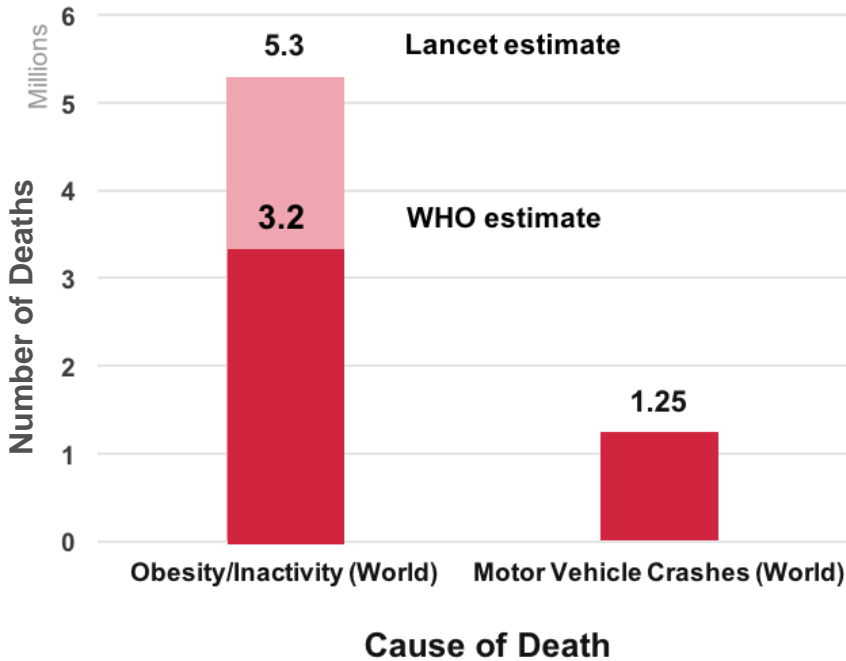
NATURAL ALLIES: PUBLIC HEALTH AND TRANSPORTATION PROFESSIONALS

Obesogenic Environment: Infrastructure, Land-use, Policies, Foods That Lead To Obesity

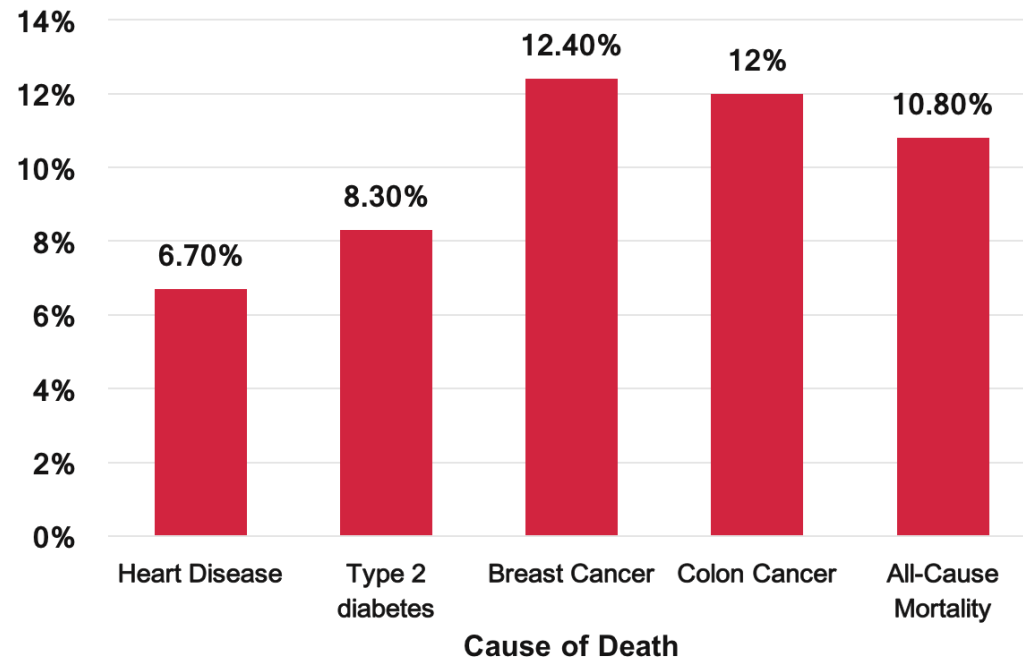


INACTIVITY TAKES MORE LIVES THAN CRASHES

World Deaths (Inactivity vs. Crashes)



U.S. Percent of Deaths Attributable to Inactivity



Inactivity Levels:
U.S. - 40.5%

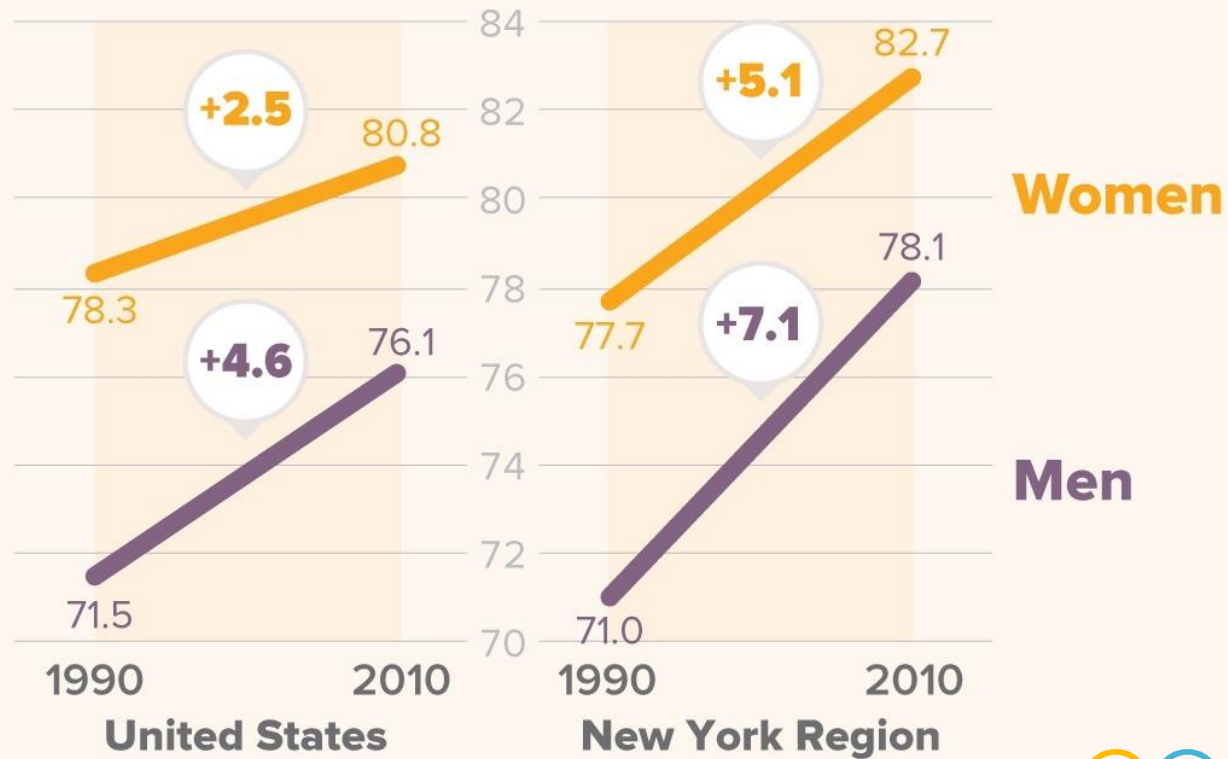
Sources:
WHO, National Safety Council, 2013
The Lancet, 2008

Source:
CDC, 2014

NY REGION'S LIFE SPAN AMONG HIGHEST IN NATION

Life expectancy in the New York region has surpassed that of the United States.

Life expectancy, 1990-2010

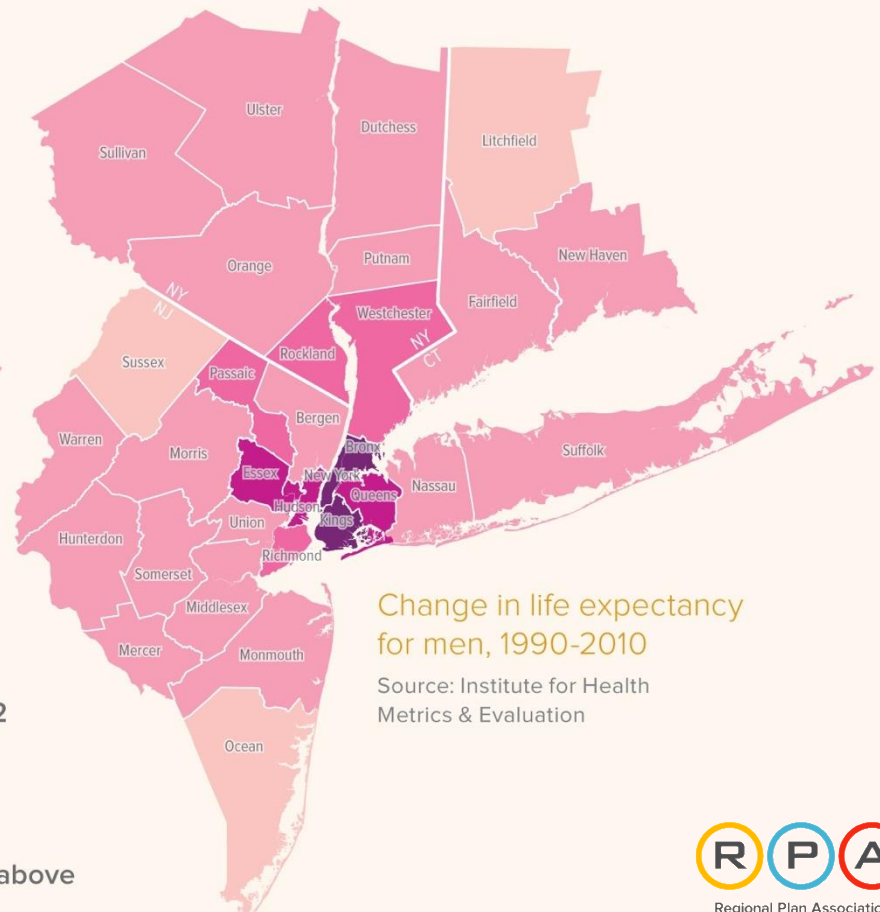
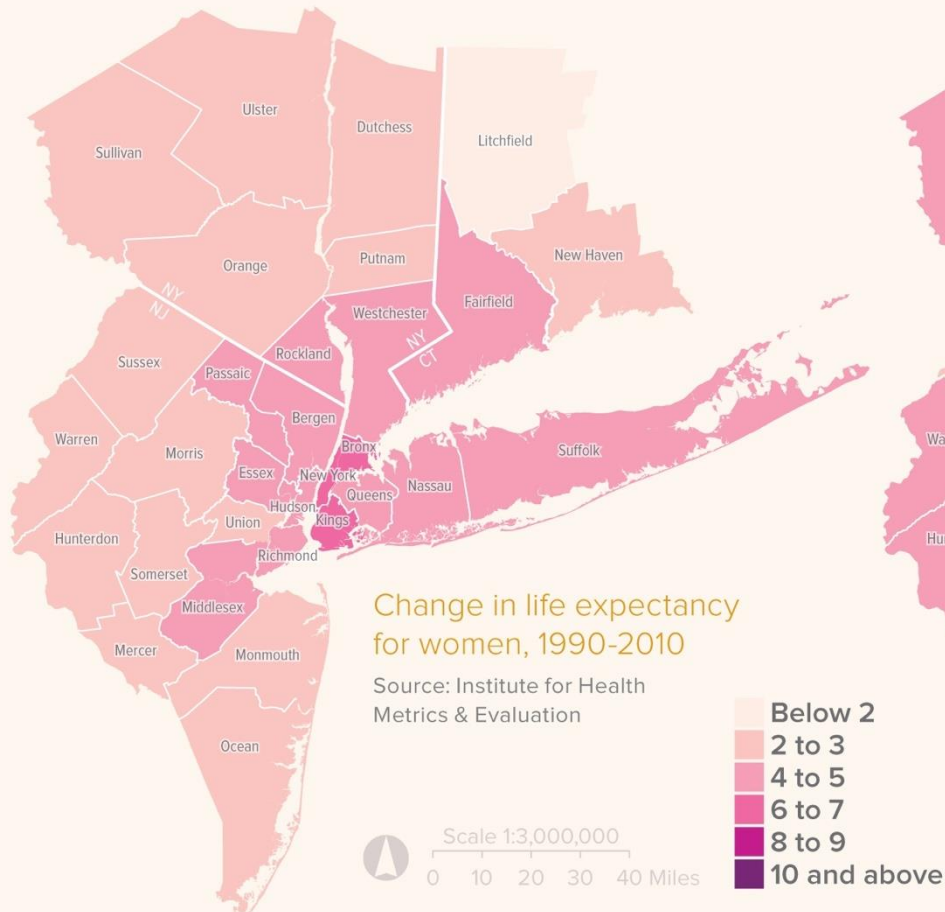


Institute for Health Metrics & Evaluation



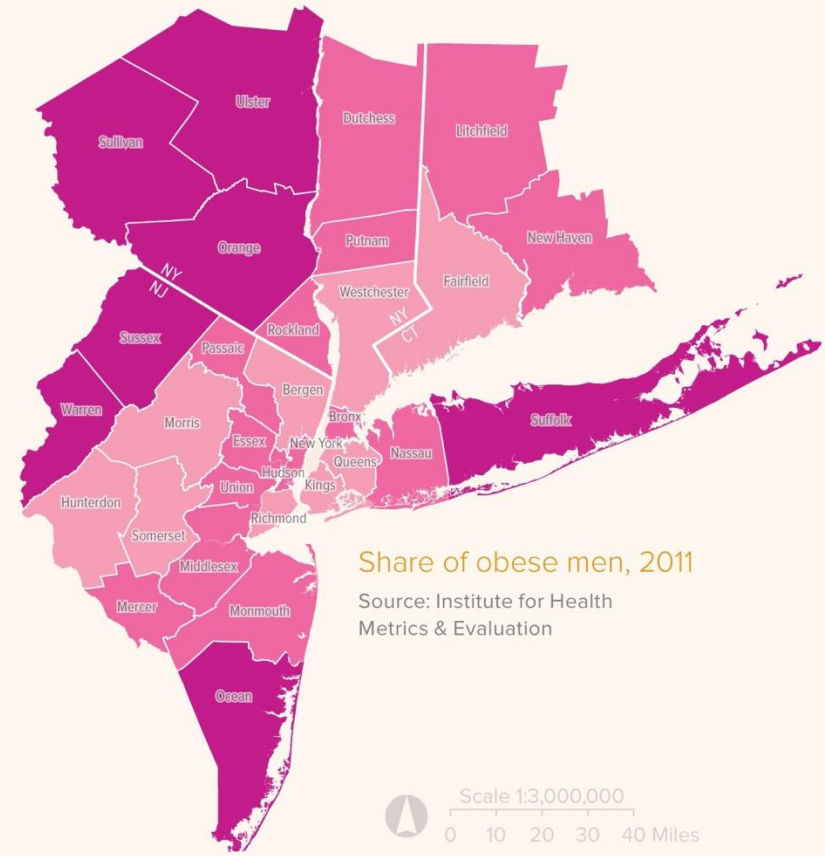
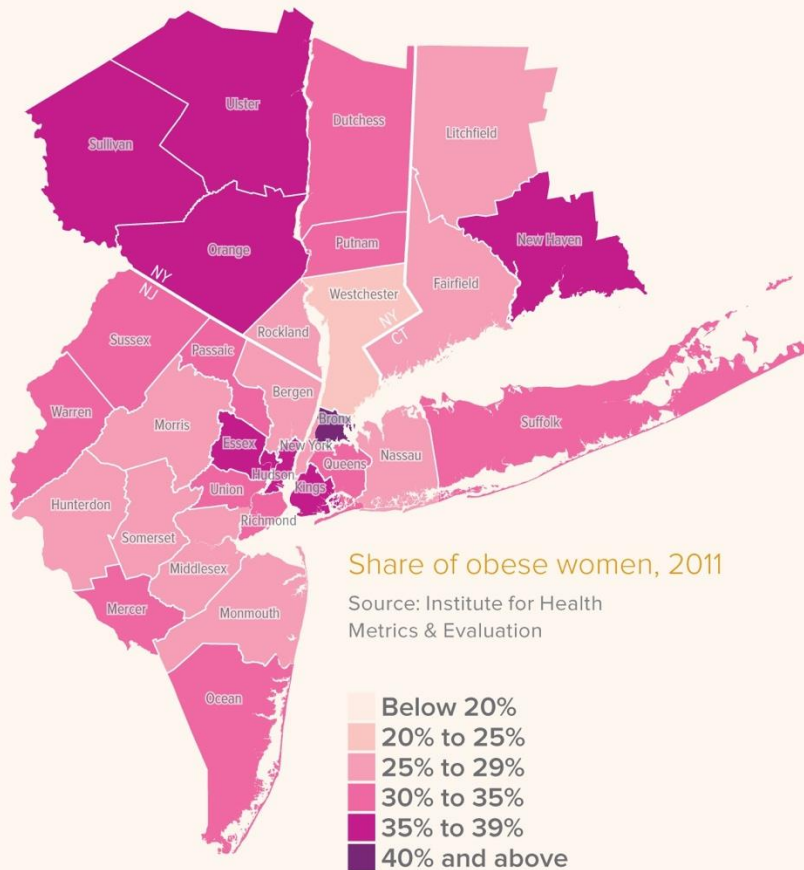
PAYOFFS HIGHEST IN MORE WALKABLE COUNTIES

While life expectancy has increased overall, New York City in particular has seen impressive gains.



OBESITY RATES GENERALLY HIGHEST IN COUNTIES FURTHEST FROM MANHATTAN – MORE CAR-RELIANT

There are big disparities in obesity rates between different counties.



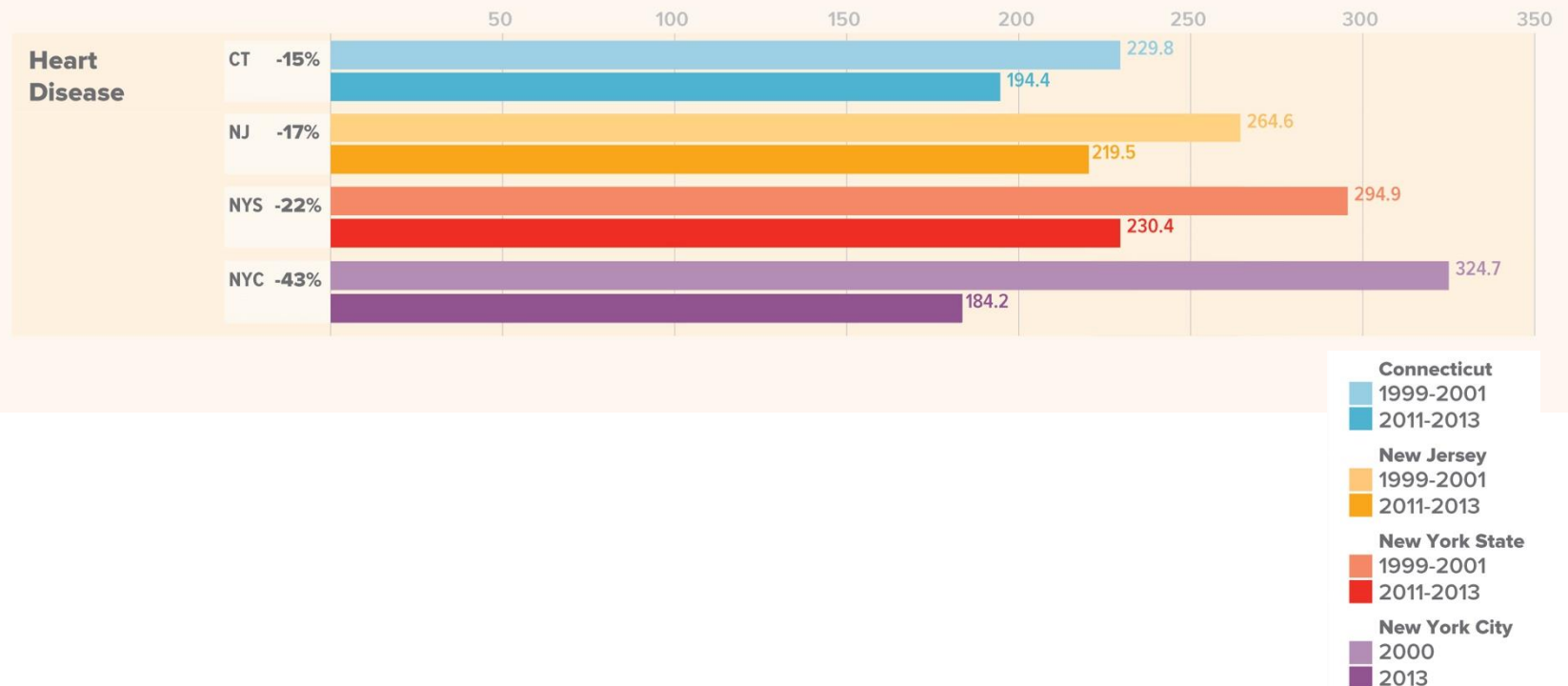
TRI-STATE METROPOLITAN AREA HEART DISEASE DEATHS DROP THE MOST IN NYC

The last decade saw a drop in mortality from many chronic diseases in Connecticut, New Jersey and New York.

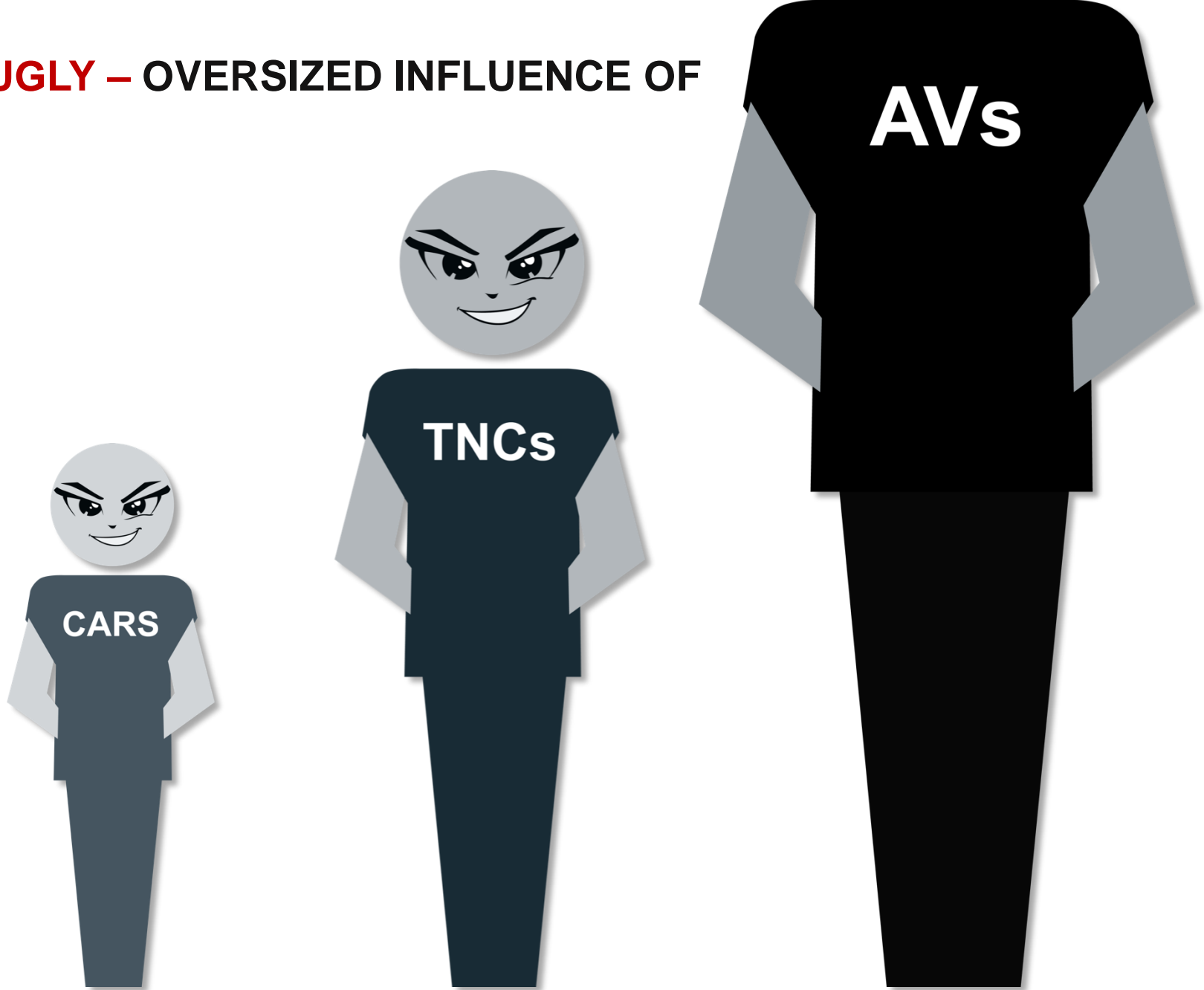


Change in mortality rates per 100,000 people

Sources: Centers for Disease Control and Prevention, New York City Department of Health and Mental Hygiene



THE UGLY – OVERSIZED INFLUENCE OF

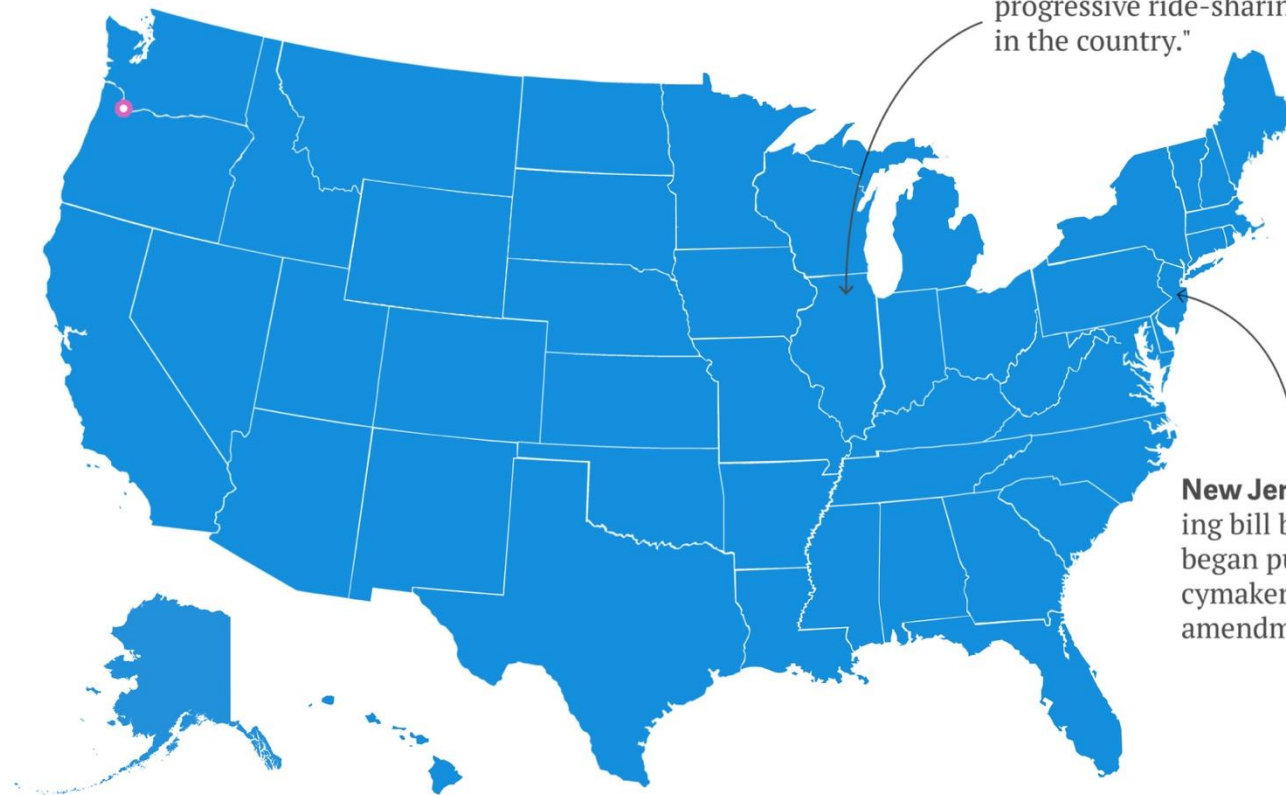


WE WERE CAUGHT FLAT-FOOTED BY UBER ET AL.

Uber's Lobbying Empire Extends From Coast To Coast

Uber pulled off a spectacular political coup and hardly anyone noticed

Uber's America



Quartz | Nikhil Sonnad | *Regulations as of January 2016

Data: News reports, Quartz analysis

SO WHAT SHOULD WE DO?

Government and Society Should Get Ahead of the Curve

- Discourage private AV ownership; support AV-transit integration
- Maintain and support good *mass* transit
- Emphasize last mile in sprawl areas and transit deserts
- Ensure system equity for low income, disabled, and elderly
- Utilize congestion pricing strategies to maintain adequate mobility
- Don't mess with bike/ped growth in cities
- Reallocate parking for better use
- Enact legislation and enforcement policies preemptively
- Humanize street design: widen sidewalks, don't add lanes
- Develop AV street typology plan

STREET TYPOLOGIES FOR AVs

EXAMPLES



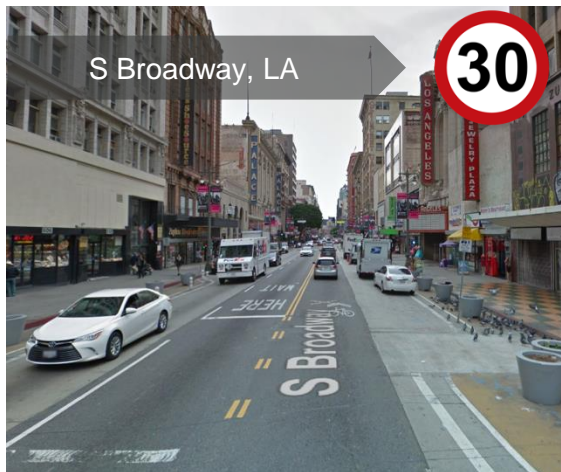
Car Free



Pedestrians Rule, Car is Intruder



Slow Streets



Moderate



Urban Arterial



Freeway/Highway

XX Km/hr

Sam Schwartz

HUMANIZE STREET DESIGN



New York City: Amsterdam Avenue

HUMANIZE STREET DESIGN



New York City: Amsterdam Avenue

HUMANIZE STREET DESIGN



New York City: Amsterdam Avenue

FORD CITY OF TOMORROW



Bill Ford, Executive Chairman of Ford Motor Company warns of “*global gridlock*” by 2050 “*if we continue on the **path** we’re on.*” He adds, “*Our infrastructure cannot support such a large volume of vehicles without creating massive congestion that would have serious consequences for our environment, health, economic progress and quality of life.*”

FORD CITY OF TOMORROW



A black and white photograph of George Santayana. He is an older man with a receding hairline and a mustache, looking thoughtfully to his right. He is wearing a dark sweater over a collared shirt. His hands are clasped together, resting on a surface in front of him. The background is dark and out of focus.

**“Those who do not remember the past
are condemned to repeat it.”**

George Santayana
Spanish-American Philosopher (1863-1952)

RESPECTING HISTORY – A WALK BACK IN TIME

NYC 1911



RESPECTING HISTORY – A WALK BACK IN TIME

NYC 1911

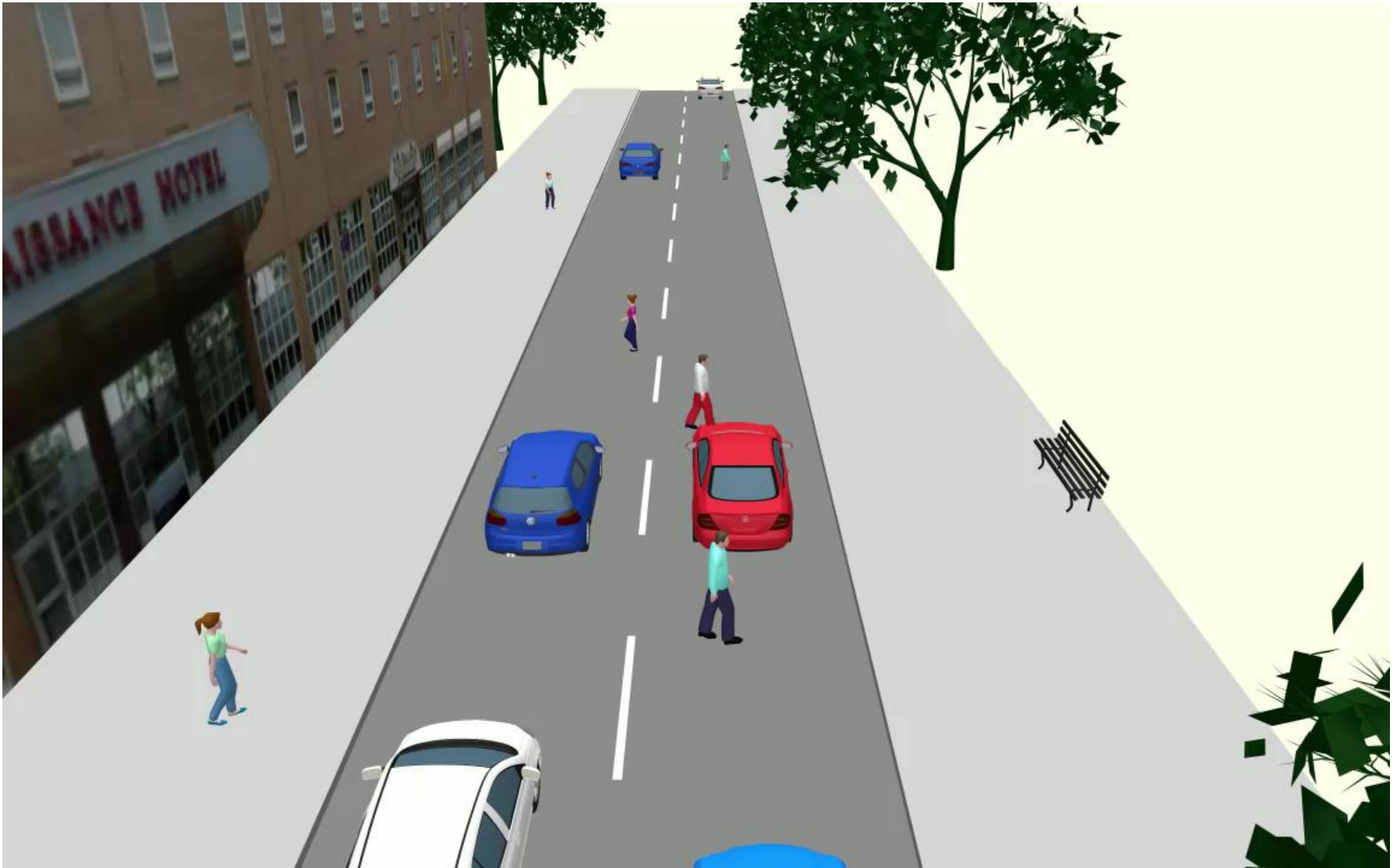


RESPECTING HISTORY – A WALK BACK IN TIME

NYC 1911

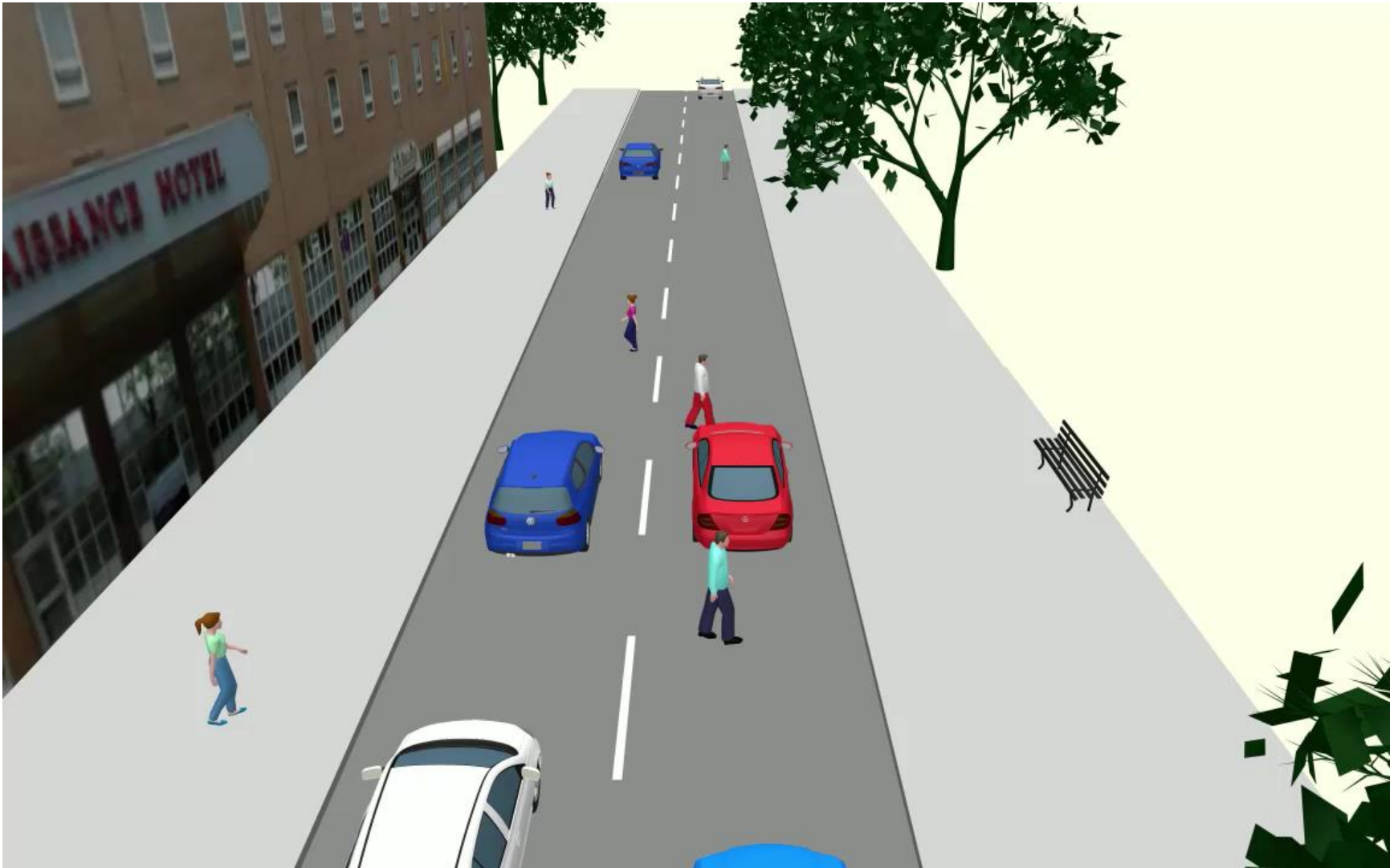


MY FEAR, HISTORY WILL REPEAT ITSELF



MY FEAR, HISTORY WILL REPEAT ITSELF

AVs INDUSTRY COMPLEX WILL PRESSURE CITIES TO FENCE IN PEDS



CITIES WILL FENCE IN PEDESTRIANS ALREADY DONE IN ATHENS - LEOFRUS SYNGROU



CITIES WILL FENCE IN PEDESTRIANS ALREADY DONE IN ATHENS



MORE WALKING = HAPPIER, HEALTHIER, MORE PROSPEROUS CITY

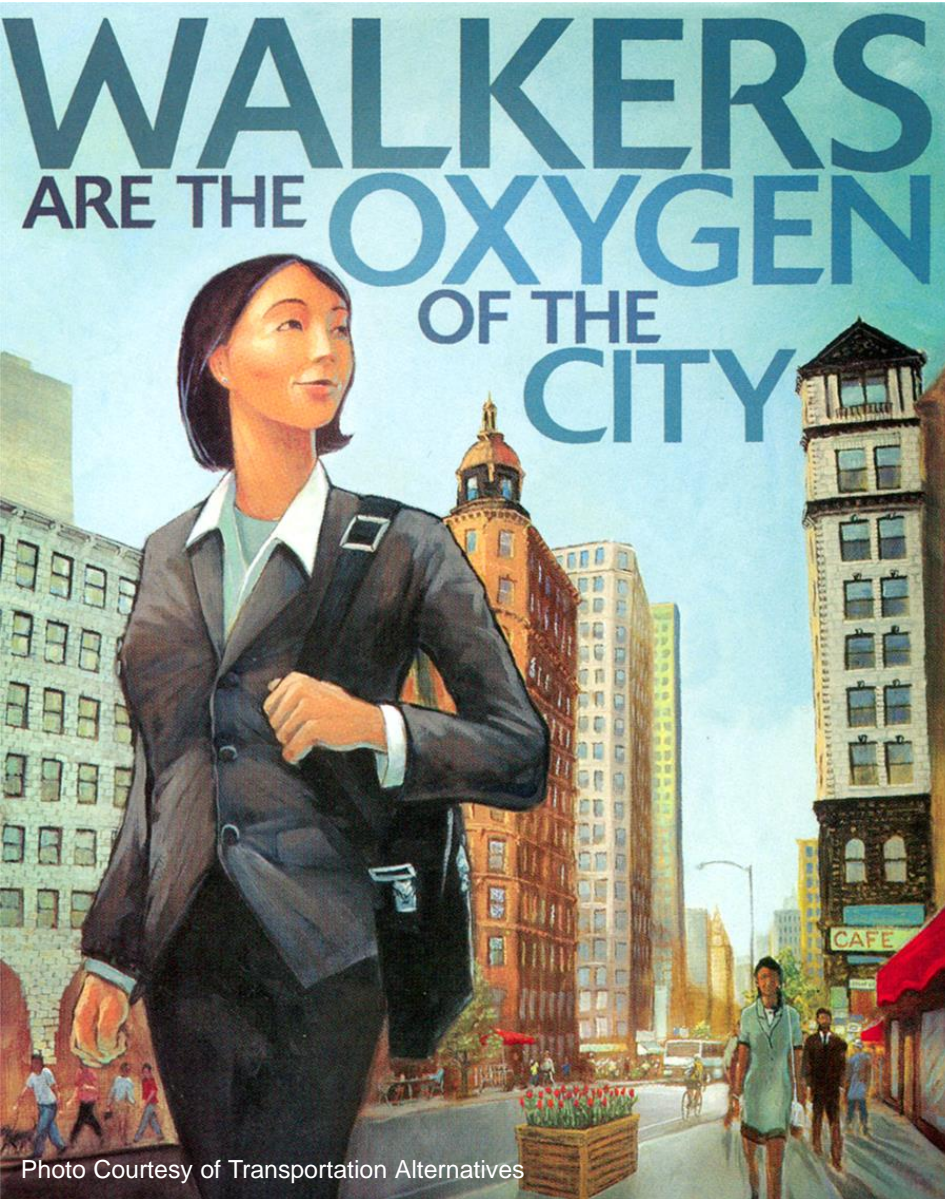


Photo Courtesy of Transportation Alternatives

NEXT GENERATION MOBILITY



NEXT GENERATION MOBILITY





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New York + Jersey City + Chicago + Washington D.C. + Tampa + Los Angeles