



*A group of 1,300 independent scientific experts from countries all over the world under the auspices of the United Nations, concluded there's a more than 95 percent probability that human activities over the past 50 years have warmed our planet.*

NASA

<https://climate.nasa.gov/causes/>



## Sustainability and Cities

Professor Deborah Ryan, RLA

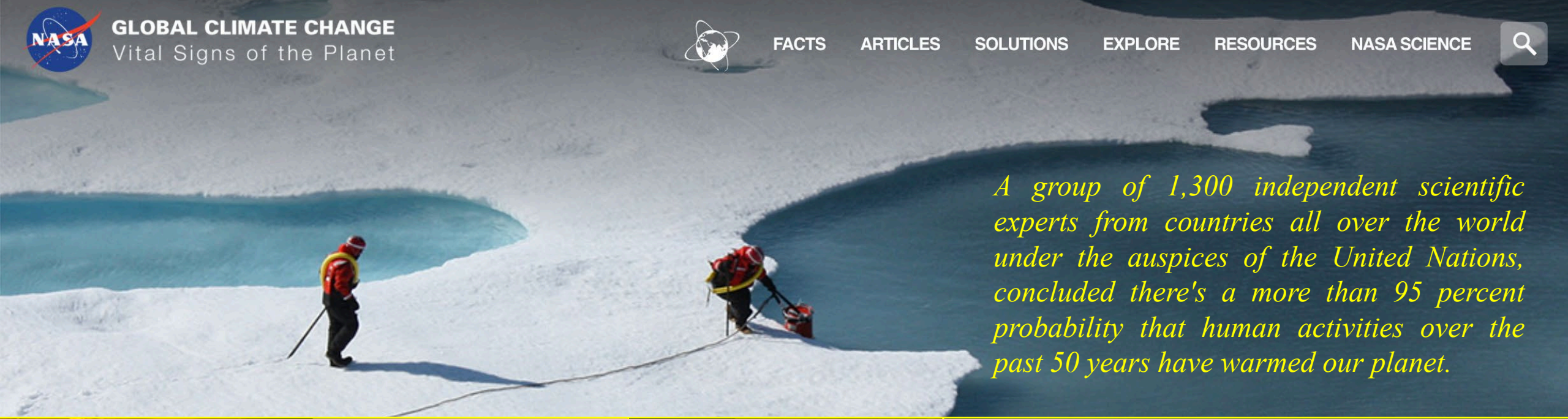
College of Arts and Architecture

University of North Carolina Charlotte

deryan@uncc.edu







*A group of 1,300 independent scientific experts from countries all over the world under the auspices of the United Nations, concluded there's a more than 95 percent probability that human activities over the past 50 years have warmed our planet.*



<https://www.citizen-times.com/story/news/local/2018/09/17/hurricane-florence-tropical-storm-florence-north-carolina-floods-wilmington-roads-governor-cooper/1335384002/>





# sustainability | səˌstānəˈbɪlədē | noun

the ability to be maintained at a certain rate or level: *the sustainability of economic growth* | *the long-term sustainability of the project.*

avoidance of the depletion of natural resources in order to maintain an ecological balance: *the pursuit of global environmental sustainability* | *the ecological sustainability of the planet.*

*First do no harm; then try to prevent it.*

Geoffrey Hughes, Emergency Medicine Journal, May 2007



<https://www.citizen-times.com/story/news/local/2018/09/17/hurricane-florence-tropical-storm-florence-north-carolina-floods-wilmington-roads-governor-cooper/1335384002/>



## North Carolina Is The Good Roads State

The story of how our roads went from muddy wagon trails to the largest state-maintained highway system in the country.

by Bryan Mims



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By the time workers completed a federally funded highway from Durham to Roxboro in 1919, local residents had already “motored out” to see the new road. Image Courtesy of the NC Collection, UNC CH.



<http://mshistorynow.mdah.state.ms.us/articles/291/cotton-and-the-civil-war>

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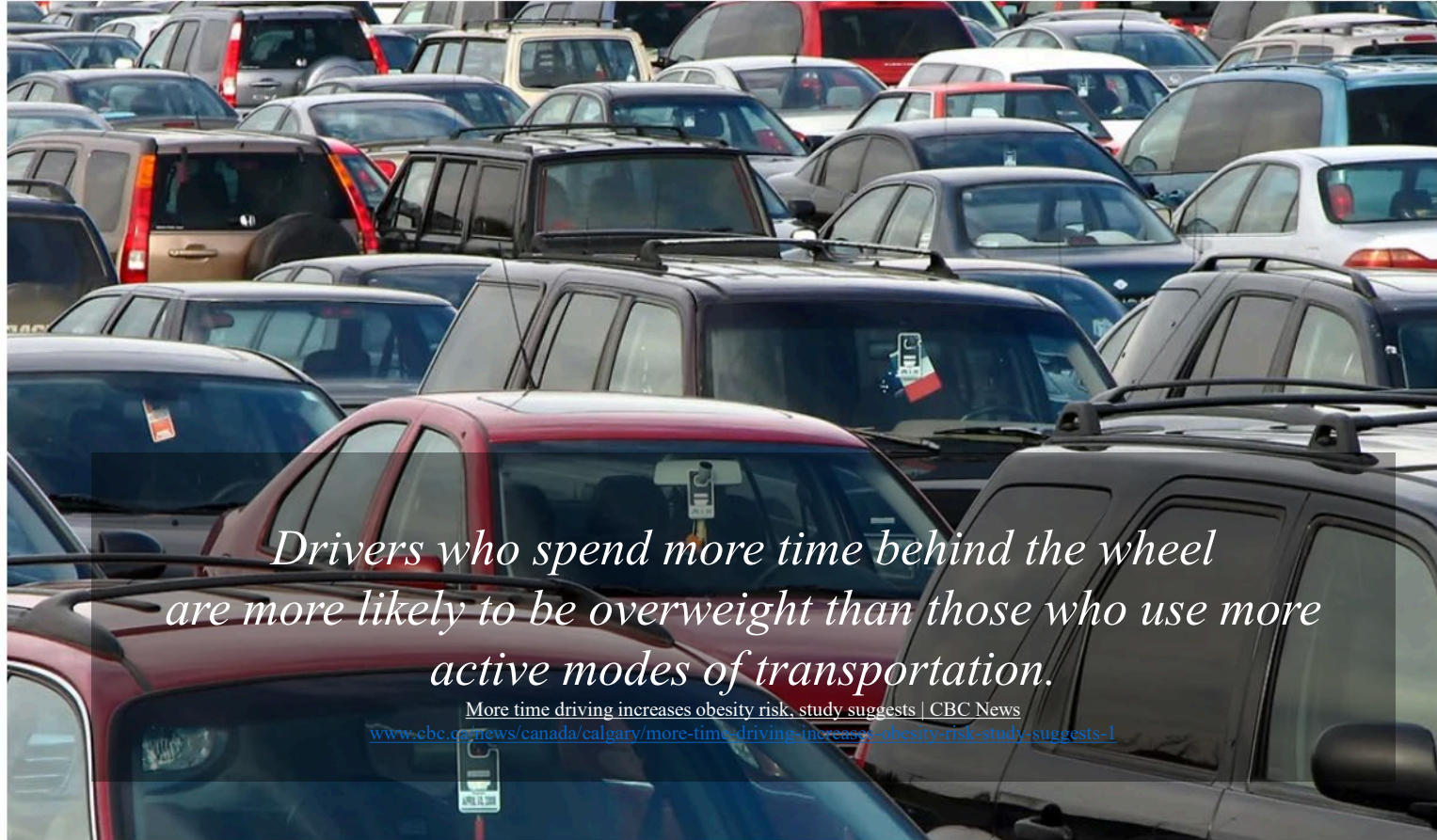
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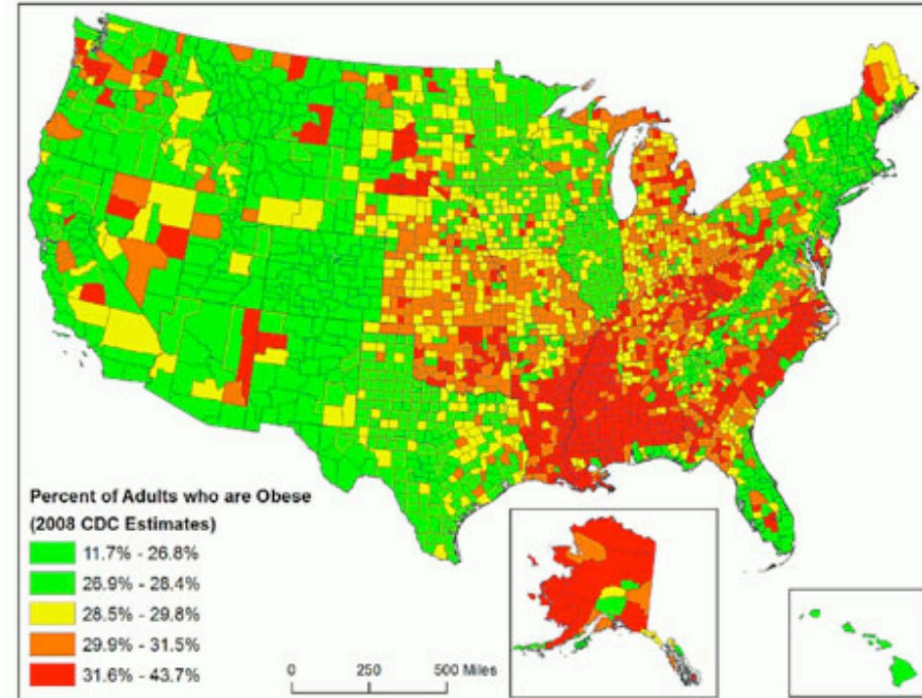
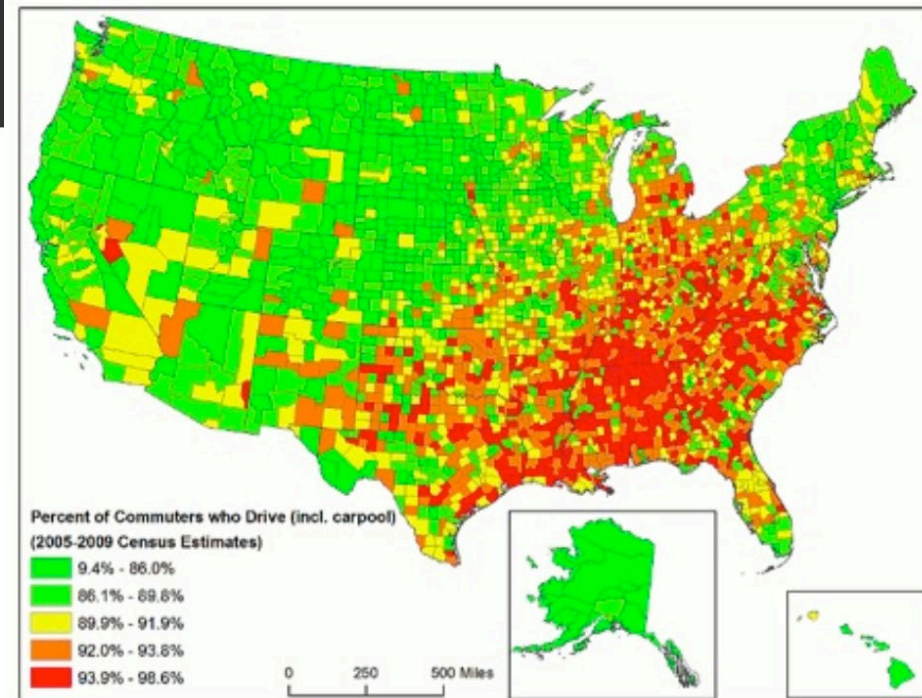
# Mapping The Link Between Obesity And Car Driving

What are you doing when you're driving? Not exercising, that's for sure. And in the parts of the country where people drive the most, they also pack on the most pounds.



*Drivers who spend more time behind the wheel are more likely to be overweight than those who use more active modes of transportation.*

[More time driving increases obesity risk, study suggests | CBC News](http://www.cbc.ca/news/canada/calgary/more-time-driving-increases-obesity-risk-study-suggests-1)  
[www.cbc.ca/news/canada/calgary/more-time-driving-increases-obesity-risk-study-suggests-1](http://www.cbc.ca/news/canada/calgary/more-time-driving-increases-obesity-risk-study-suggests-1)





# Car Emissions and Global Warming

Published Jul 18, 2014

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*Our personal vehicles are a major cause of global warming... accounting for nearly one fifth of all US emissions.*

<https://www.ucsusa.org/resources/car-emissions-globalwarming#:~:text=Our%20personal%20vehicles%20are%20a,for%20every%20gallon%20of%20gas>

*For the first time in more than 40 years, the largest source of greenhouse gas pollution in the US isn't electricity but transport – cars, trucks, planes, trains and shipping. (2017)*

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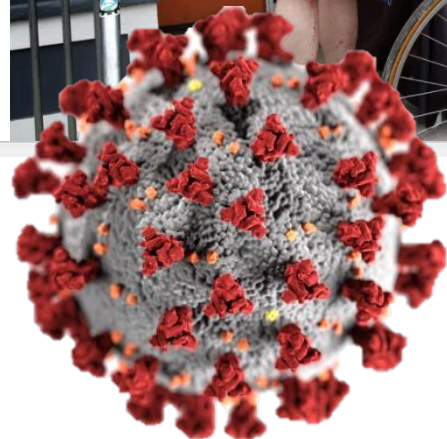
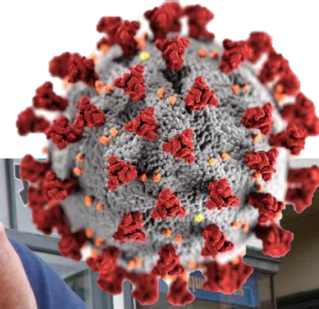
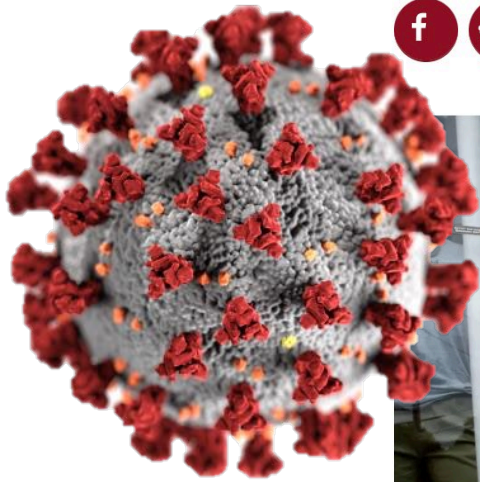
<https://www.theguardian.com/environment/2018/jan/01/vehicles-climate-change-emissions-trump-administration>





# Coronavirus pandemic leads to a bicycle boom, and shortage, around world

Sales over the past two months saw their biggest spike in the U.S. since the oil crisis of the 1970s



<https://www.denverpost.com/2020/06/14/coronavirus-bicycle-boom/>

*Our personal vehicles are a major cause of global warming... accounting for nearly one fifth of all US emissions.*

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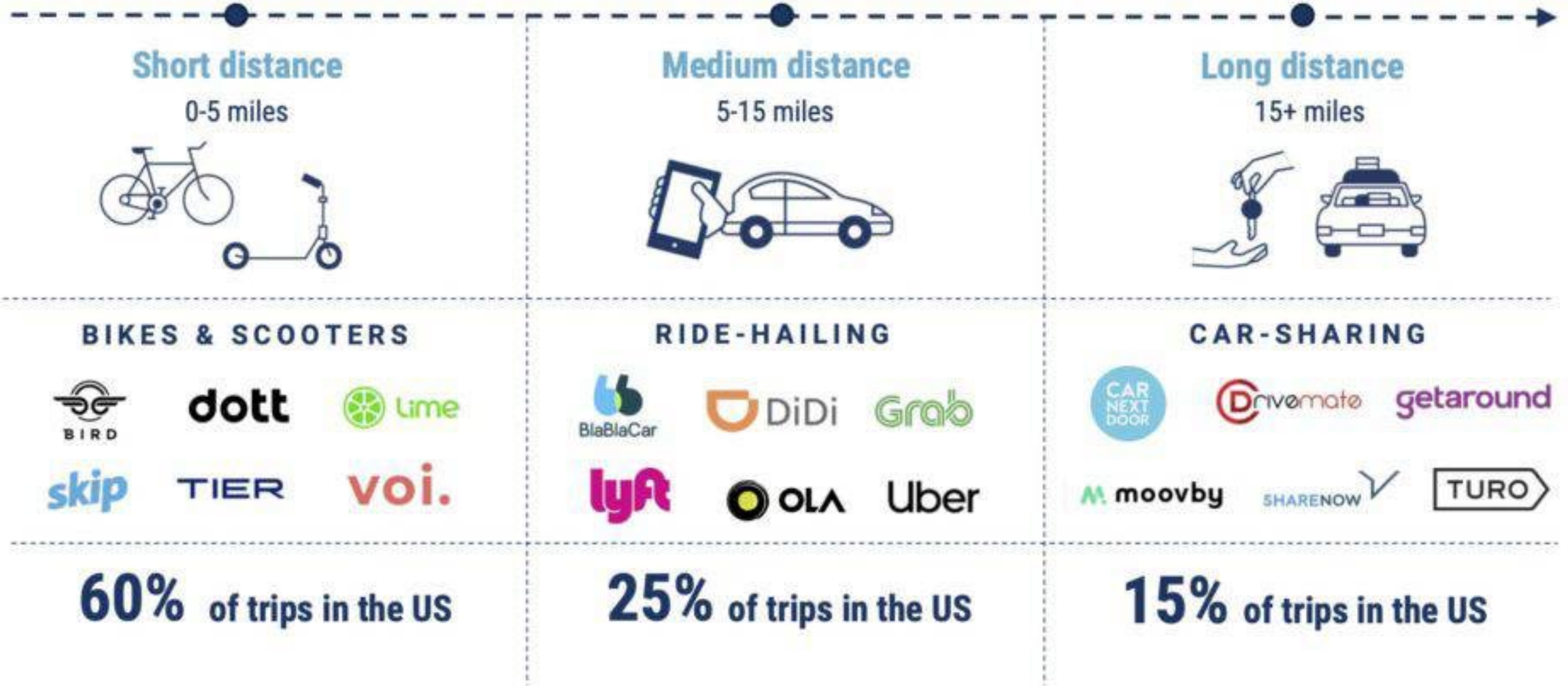
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# DISRUPTING THE CAR

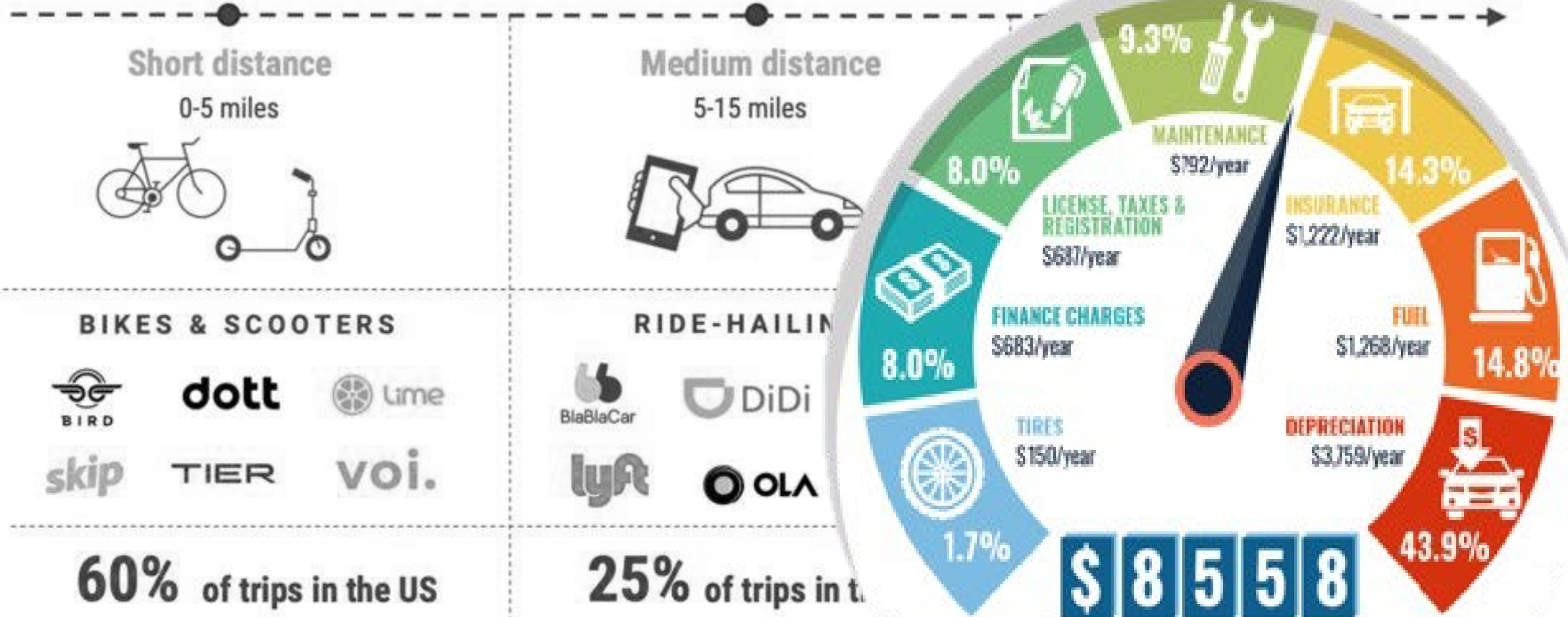
Alternatives to car ownership by trip length





# DISRUPTING THE CAR

Alternatives to car ownership by trip length



The average cost to own and operate a sedan in the US.



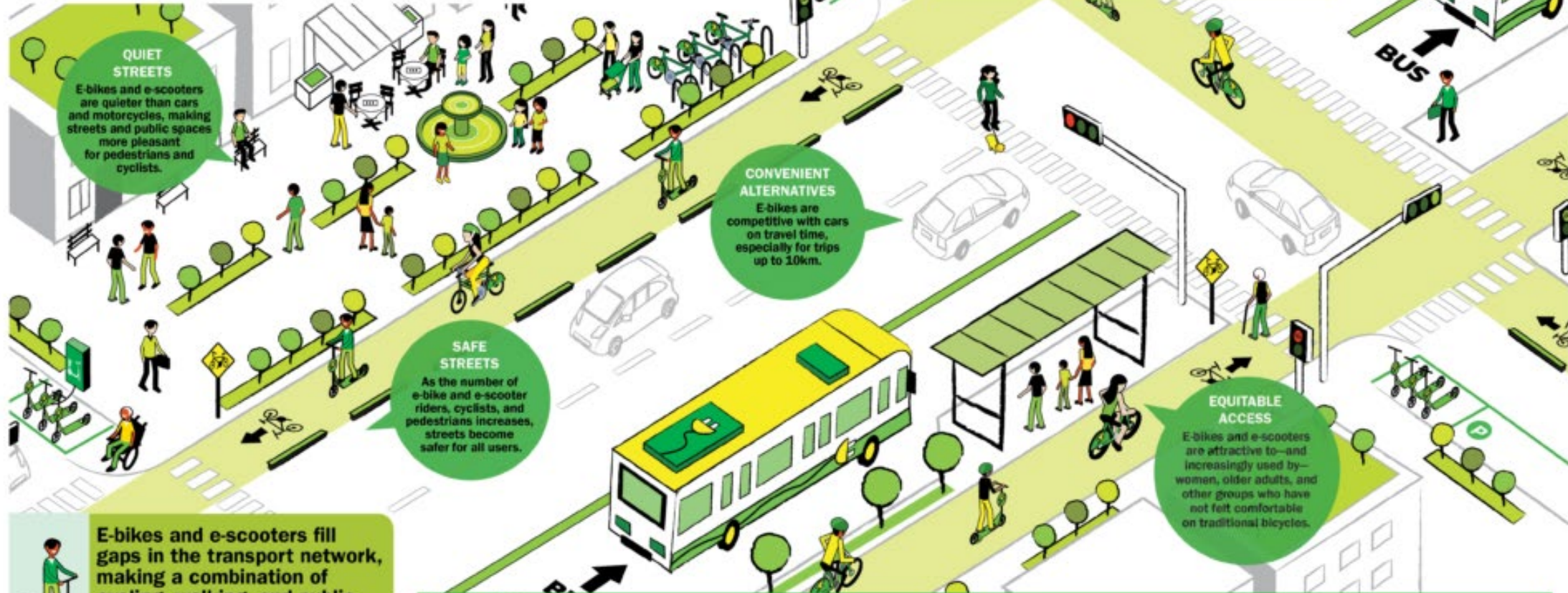
# E-BIKES AND E-SCOOTERS: DRIVERS OF CLIMATE ACTION

Electric bikes and scooters are more than a convenient first-last mile solution in cities. They also reduce emissions while catalyzing a broader shift toward sustainable transport.



**Choosing an e-bike or e-scooter instead of a car translates to measurable emissions reductions:**

A 5% increase in trips made by bicycle and electric micromobility instead of cars globally would reduce CO<sub>2</sub> emissions by 7%—the equivalent of taking more than **134 million cars off the road** by 2030.



**QUIET STREETS**

E-bikes and e-scooters are quieter than cars and motorcycles, making streets and public spaces more pleasant for pedestrians and cyclists.

**CONVENIENT ALTERNATIVES**

E-bikes are competitive with cars on travel time, especially for trips up to 10km.

**SAFE STREETS**

As the number of e-bike and e-scooter riders, cyclists, and pedestrians increases, streets become safer for all users.

**EQUITABLE ACCESS**

E-bikes and e-scooters are attractive to—and increasingly used by—women, older adults, and other groups who have not felt comfortable on traditional bicycles.

**E-bikes and e-scooters fill gaps in the transport network, making a combination of cycling, walking, and public transit the easy choice over cars for more trips:**

In Portland, Oregon, **6% of e-scooter users reported getting rid of a car** due to the availability of micromobility options.

**What cities can do:**

**LEGALIZE**

Make low-speed e-bikes and scooters legal in cities. Regulate them as bicycles, not motor vehicles, so license and insurance are not required to ride.

**STANDARDIZE**

Clearly define and enforce speed maximums for e-bikes and e-scooters to distinguish where they can safely share cycle lanes with pedal bicycles.

**DESIGN**

Ensure cycle lanes are protected and form a complete network, safely accommodating low-speed e-bike and e-scooter riders in addition to pedal cyclists.

**MANAGE**

Enforce rules for bikeshare and scootershare operators to ensure that sidewalks are clear, and shared bicycles and scooters are well-maintained.

**MONITOR**

Collect and analyze data on trip length, frequency of use, and destinations to better quantify personal e-mobility use, and scale and improve shared systems.

**VISIT [ITDP.ORG](http://ITDP.ORG) TO LEARN MORE**



DEEP DIVE

# As scooters go mainstream, infrastructure falls behind

Scooter safety has a new urgency with accidents and deaths on the rise. Cities are now questioning where it's best to ride them — and who's going to pay for the infrastructure.

*Scooter rides totaled 38.5 million trips in 2018, while dockless bike-share totaled 9 million trips and e-bikes totaled 6.5 million trips.*

<https://www.smartcitiesdive.com/news/as-scooters-go-mainstream-infrastructure-falls-behind/561626/>





# BICYCLIST DESIGN USER PROFILES

## Interested but Concerned

**51%-56%** of the total population

Often not comfortable with bike lanes, may bike on sidewalks even if bike lanes are provided; prefer off-street or separated bicycle facilities or quiet or traffic-calmed residential roads. May not bike at all if bicycle facilities do not meet needs for perceived comfort.

## Somewhat Confident

**5-9%** of the total population

Generally prefer more separated facilities, but are comfortable riding in bicycle lanes or on paved shoulders if need be.

## Highly Confident

**4-7%** of the total population

Comfortable riding with traffic; will use roads without bike lanes.



**LOW STRESS TOLERANCE**

**HIGH STRESS TOLERANCE**

Note: the percentages above reflect only adults who have stated an interest in bicycling.

# Anything But Cars Lanes

**PAINTED LANES**  
Separated space without permanent protection



Montréal, QC



Philadelphia, USA

## PROTECTED BIKE LANES

Physically separate cyclists when speeds are higher



Ljubljana, Slovenia



Chicago, USA

## OFF-STREET BIKE PATHS

The highways for long-distance or recreational cycling



Powell River, BC



Detroit, USA





**OUR VISION**

**PROGRAMS**

**TAKE ACTION**



**DANGEROUS BY DESIGN 2021**

It's impossible to prioritize both...

Speed

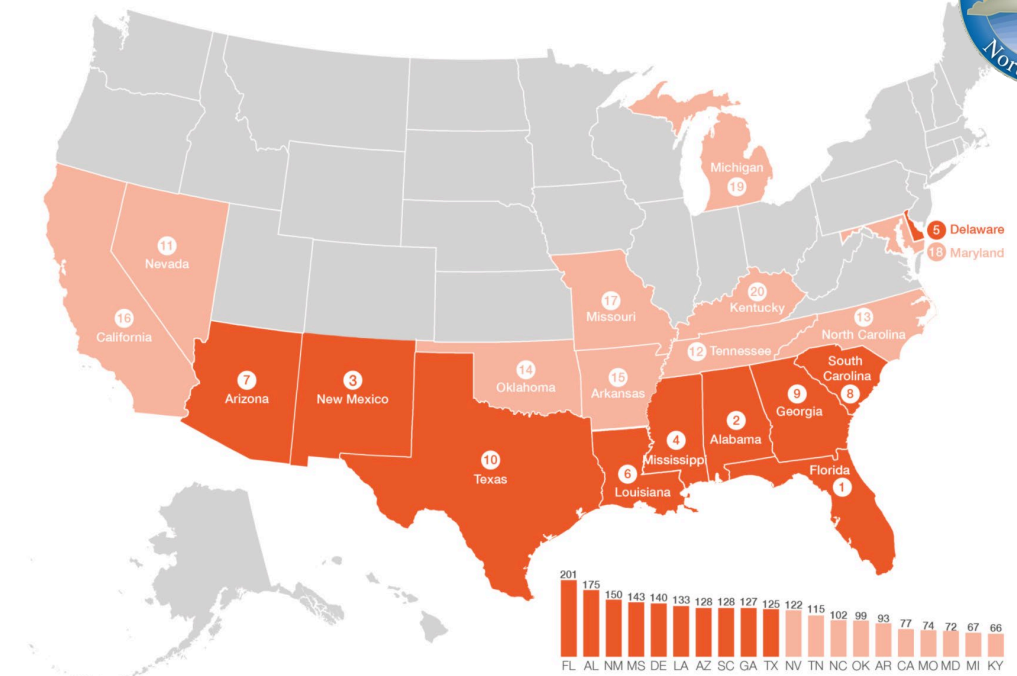
AND

Safety

## Why is this happening?

Because state and local transportation agencies place a higher value on **speed** (and avoiding delay) than they do on **safety**.

It's simply not possible to prioritize both. When faced with decisions that would elevate and prioritize safety for people walking but increase delay for vehicles, the decision-makers' true priorities are laid bare.







Aaron Naparstek  
SFBC Golden Wheels // Tuesday, July 15, 2014

@naparstek #bikelash @sfbike

# Ten common myths about bike lanes – and why they're wrong

Peter Walker

1. Cycle lanes increase congestion/pollution
2. Hardly anyone uses them
3. They're only used by white, middle-class men/commuters
4. They're bad for business
5. They're dangerous for pedestrians
6. Cyclists break laws, so they shouldn't get lanes
7. How do I carry work tools/a fridge on a bike?
8. We're not the Netherlands/Denmark
9. They cost too much
10. There's no need

Bikelash is emerging as a 2013 mayoral campaign issue.



Rep. Anthony Weiner  
Remember this guy?

When I become mayor, you know what I'm going to spend my first year doing? I'm going to have a bunch of ribbon-cuttings tearing out your f\*king bike lanes.

Meanwhile, in Toronto...



Mayor Rob Ford

It's no secret. Cyclists are a pain in the ass to the motorists.

Roads are built for buses, cars, and trucks, not for people on bikes.

*You could write a whole column – even a book – about why this is absurd, but it's always worth stressing this point to the cycling naysayers: OK, what's your solution to gridlock, pollution, a climate emergency; to cities that are noisy, dangerous and unjust?*

<https://www.theguardian.com/environment/bike-blog/2019/jul/03/ten-common-myths-about-bike-lanes-and-why-theyre-wrong>





North Carolina cities recognize that providing walking and bicycling facilities has a positive impact on retaining residents, recruiting major employers, and improving health and quality of life.

## Why are walking and bicycling important in North Carolina?

- 1) The growing senior population who will be more dependent on walking and biking.
- 2) The trend of car share, bike share, and e-scooters becoming more prevalent.

**6.3%**

of households in North Carolina **do not have access to a vehicle**.



Major trails such as the Mountains-to-Sea Trail (1,000 miles in NC) and the East Coast Greenway (400 miles in NC) **continue to expand** through planning, design, and construction.



**↓ 5%**

The number of **teens getting their full provisional driver's license** dropped by 5 percent from 2008-2010 in North Carolina.\*\*



**31.8%**

Approximately 2.52 million of North Carolina's 7.92 million adults are considered obese. This is the **16th highest obesity rate in the country**.\*\*\*

\* Source: U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates

\*\* Source: 2010, North Carolina Division of Motor Vehicles

\*\*\* Source: Centers for Disease Control and Prevention's behavioral risk factor surveillance system for 2017

## Evaluating the Economic Impacts of Shared Use Paths in North Carolina

Shared use paths, also known as greenways, provide a place for bicycle and pedestrian travel off the roadway. A study evaluating the economic impact of shared use paths in North Carolina found that a one-time \$26.7M capital investment in four greenway projects (Brevard Greenway, Little Sugar Creek, American Tobacco Trail, Duck Trail) supports:

**\$19.4M** Estimated annual **sales revenue** at local businesses along the four greenways.

**\$684K** Estimated annual **local and state sales tax** revenue from businesses along the greenways.

**\$25.7M** Estimated **annual savings** from the use of greenways due to more physical activity, less pollution and congestion, and fewer traffic injuries.

**\$48.7M** Estimated **business revenue** from greenway construction.

**790** Jobs supported **annually** through greenway construction.



**Return on investment: Every \$1 of trail construction supports \$1.72 annually from local business revenue, sales tax revenue, and benefits related to health and transportation.\***

### Key Challenges

- Many roadways lack sidewalks and bicycle facilities.
- Retrofitting North Carolina communities and roadways to include biking and walking facilities can be challenging and costly.
- Many North Carolina communities built between the 1940s and the 1990s, especially suburbs, were built without bicycle and pedestrian infrastructure, leaving large gaps in bicycle and pedestrian networks.
- Relative to the full NCDOT budget, bicycle and pedestrian transportation receives very little dedicated funding.
- Rural communities lack the resources and funding to improve their communities for walking and bicycling on their own.

\* Source: Go.ncsu.edu/sharedusepaths

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By the time workers completed a federally funded highway from Durham to Roxboro in 1919, local residents had already “motored out” to see the new road. Image Courtesy of the NC Collection, UNC CH.



<http://mshistorynow.mdah.state.ms.us/articles/291/cotton-and-the-civil-war>

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Our State

# North Carolina Is ~~The Good Roads State~~

*Could be the Equitable ABC State*

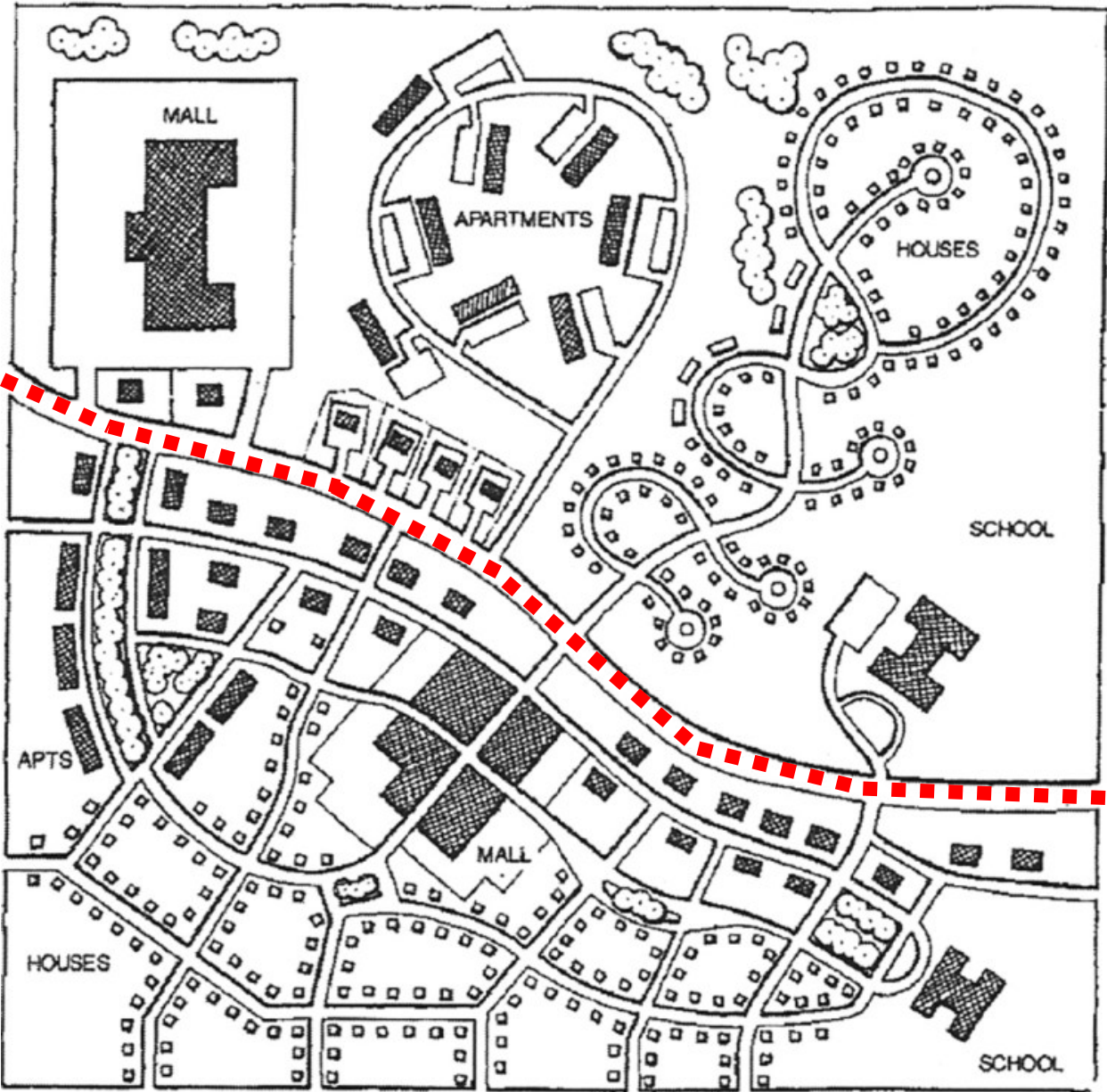


*The fact is that automobiles no longer have a place  
in the big cities of our time.*

Bertrand Delanoë, Mayor of Paris, 2001- 2014



## Suburban sprawl



## Traditional neighborhood

# People walk

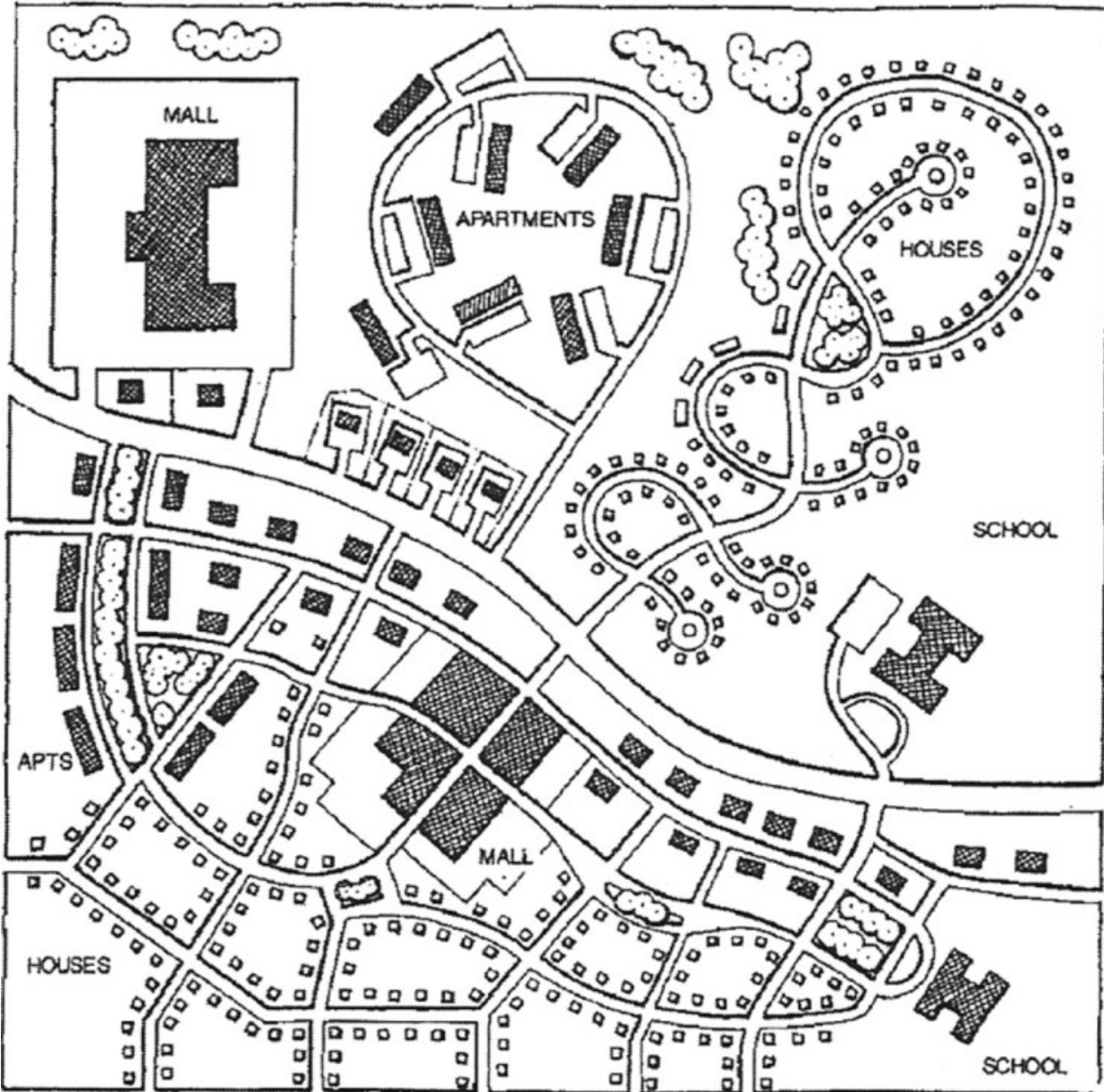
to get to places they want to go when places are nearby.



SOURCE: USDOT, Federal Highway Administration, 2009 National Household Travel Survey.



**Suburban sprawl**

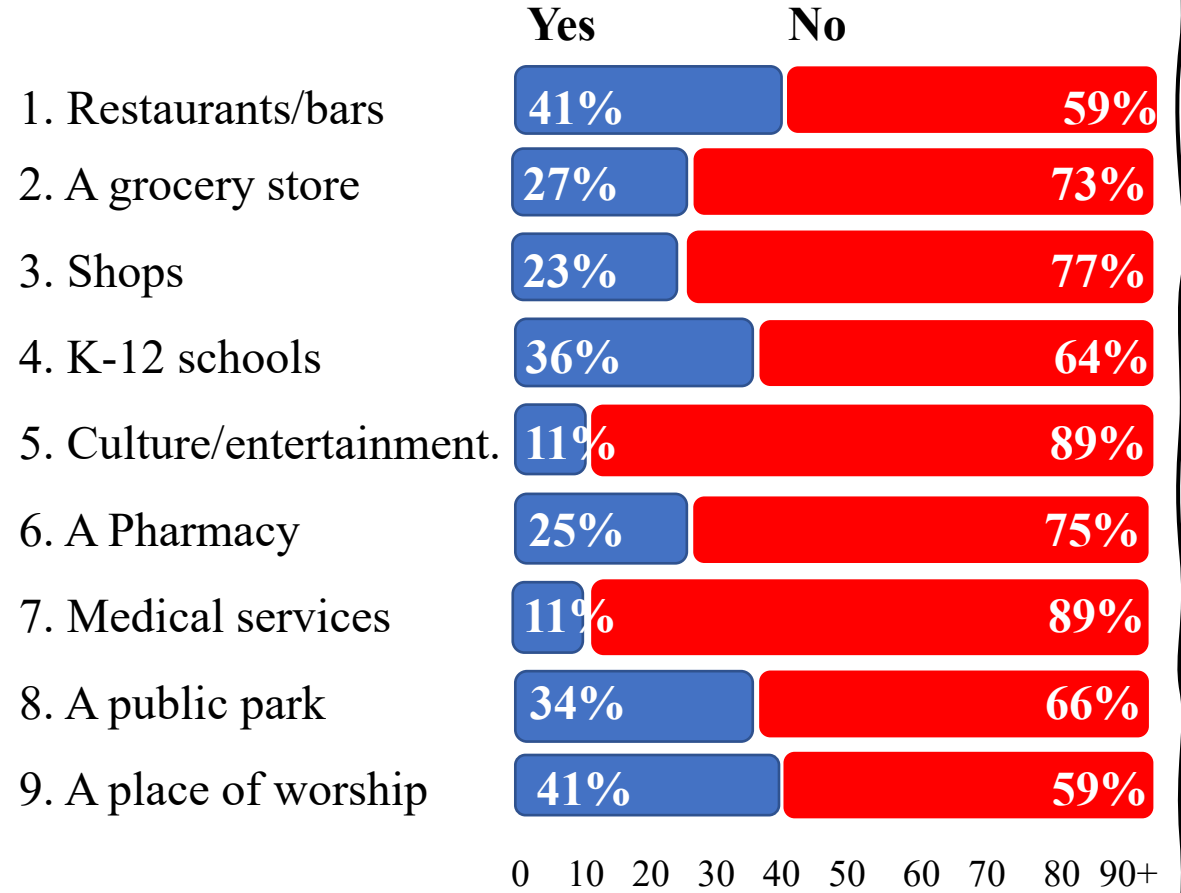


**Traditional neighborhood**



**LNC Poll Results**

**The following places are within a safe 10-minute WALK of my home: (Check all that apply.)**



Source: Drawing by Duany Plater Zyberk as shown in F. Spielberg, "The Traditional Neighborhood Development: How Will Traffic Engineers Respond?" ITE Journal 1989; 59:17-18.



TABLE OF CONTENTS

- ⊕ 01. A Community-Based Vision
- ⊕ 02. Complete Communities
- ⊕ 03. Policy Framework

Introduction

**Goal 1: 10-Minute Neighborhoods**

Goal 2: Neighborhood Diversity and Inclusion

Goal 3: Housing Access for All

Goal 4: Transit- and Trail-Oriented Development (2T-OD)

Goal 5: Safe and Equitable Mobility

Goal 6: Healthy, Safe, and Active Communities

Goal 7: Integrated Natural and Built Environments

Goal 8: Diverse and Resilient Economic Opportunity

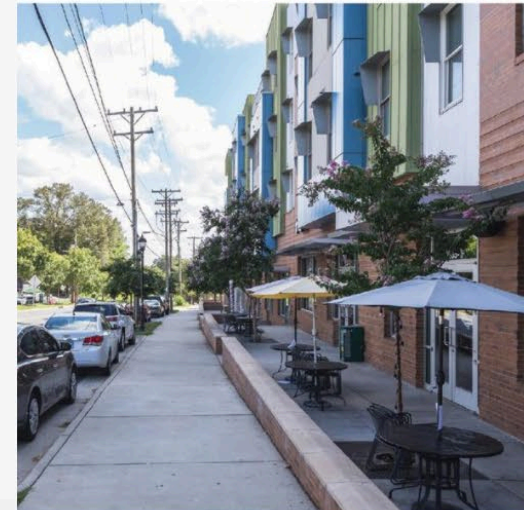
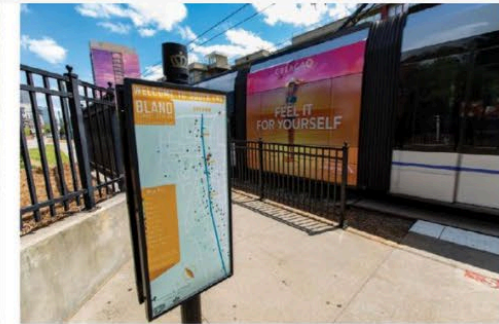
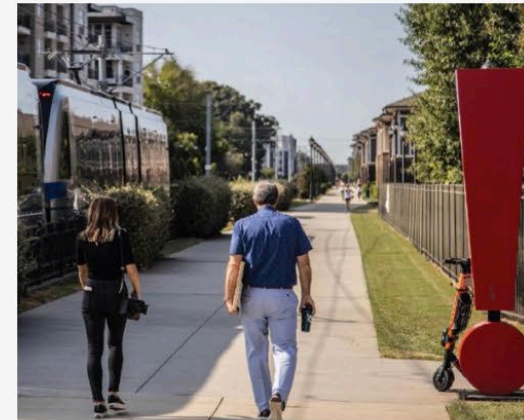
Goal 9: Retain our Identity and Charm

Goal 10: Fiscally Responsible

**Goal 1: 10-Minute Neighborhoods**



All Charlotte households will have access to essential amenities, goods, and services within a comfortable, tree-shaded 10-minute walk, bike, or transit trip by 2040.





BUT 84% of Charlotte is currently zoned for single-family homes.

Charlotte 2040 would shift the city's zoning focus to include more duplexes, triplexes, and in some cases, quadplexes.

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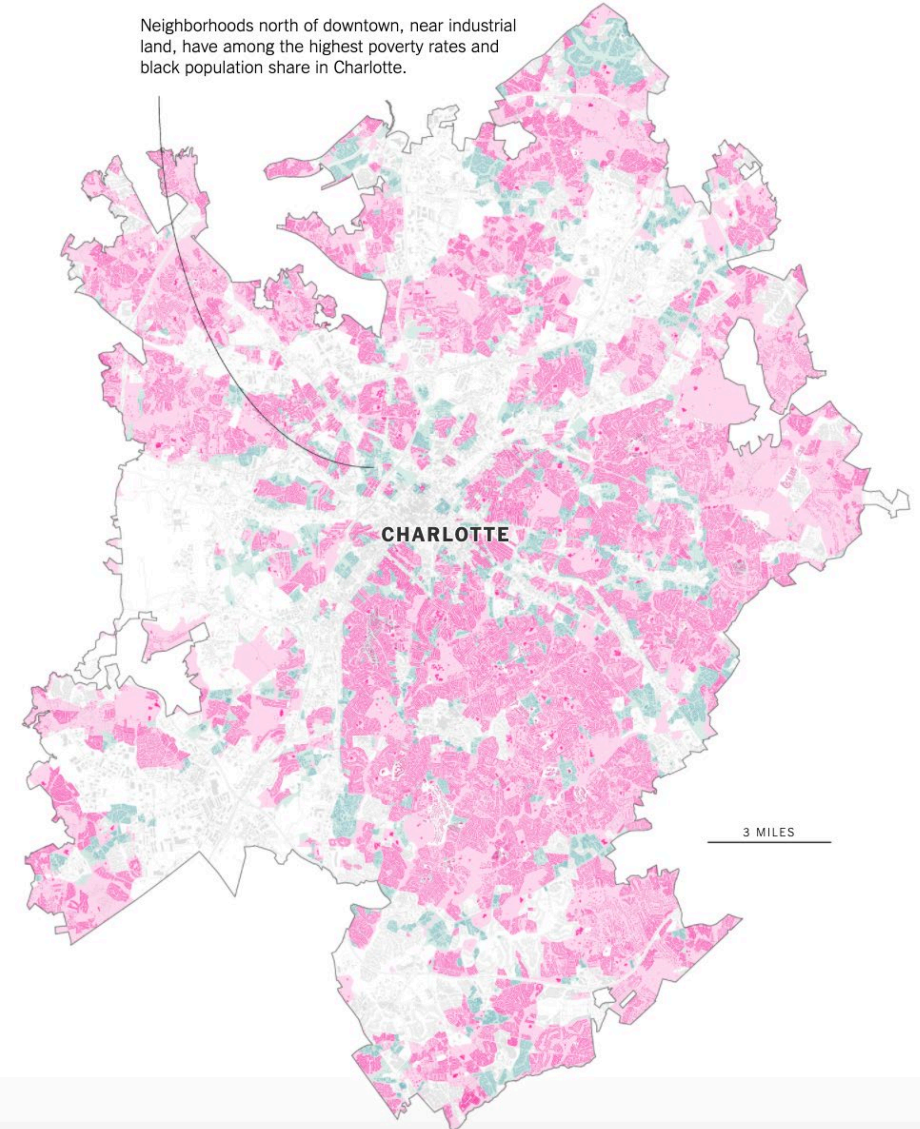
Goal 8: Diverse and Resilient Economic Opportunity

Goal 9: Retain our Identity and Charm

Goal 10: Fiscally Responsible

Goal 1: 10-Minute Neighborhoods

Neighborhoods north of downtown, near industrial land, have among the highest poverty rates and black population share in Charlotte.



https://www.fox43.com/article/news/politics/flashpoint/single-family-zoning-charlotte-planning-housing/275-fce5f1e7-7ec6-4587-bd47-de3e6abeaf2e#:~:text=Currently%2C%2084%25%20of%20Charlotte%20is%20zoned%20for%20a,more%20duplexes%2C%20triplexes%2C%20and%20in%20some%20cases%2C%20quadplexes



https://www.nytimes.com/interactive/2019/06/18/upshot/cities-across-america-question-single-family-zoning.html

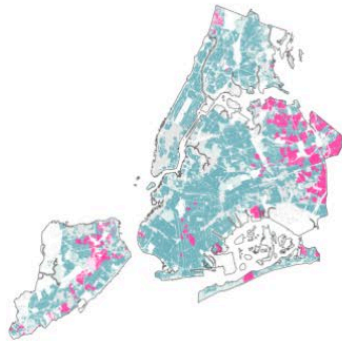


# Cities Start to Question an American Ideal: A House With a Yard on Every Lot

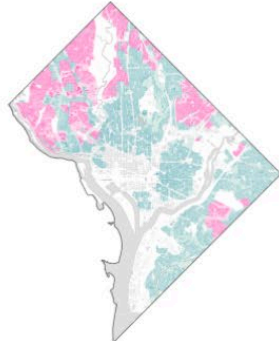
By EMILY BADGER and QUOCTRUNG BUI JUNE 18, 2019

Townhomes, duplexes and apartments are effectively banned in many neighborhoods. Now some communities regret it.

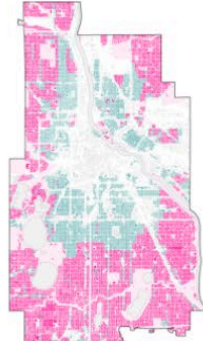
Residential land zoned for: ■ detached single-family homes ■ other housing



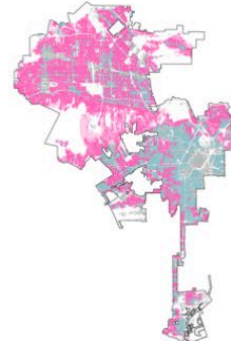
New York 15%



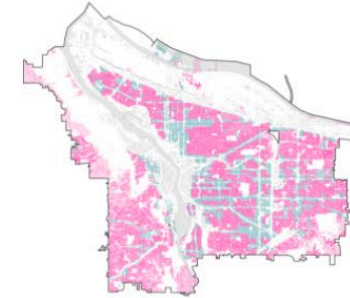
Washington 36%



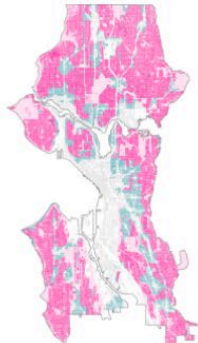
Minneapolis 70%



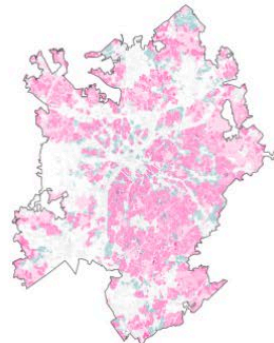
Los Angeles 75%



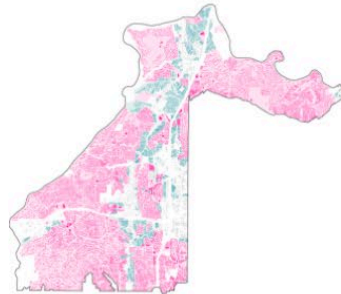
Portland, Ore. 77%



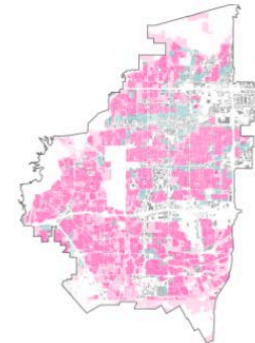
Seattle 81%



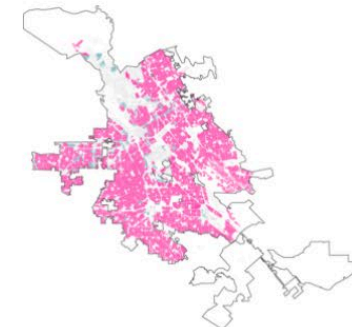
Charlotte, N.C. 84%



Sandy Springs, Ga. 85%



Arlington, Tex. 89%



San Jose, Calif. 94%

Cities not shown to scale. Source: Zoning data for individual cities from UrbanFootprint



# The Racist History of Single-Family Home Zoning



*Today, increased density is viewed by environmentalists as an antidote to sprawling development patterns that feed gridlock and auto emissions.*

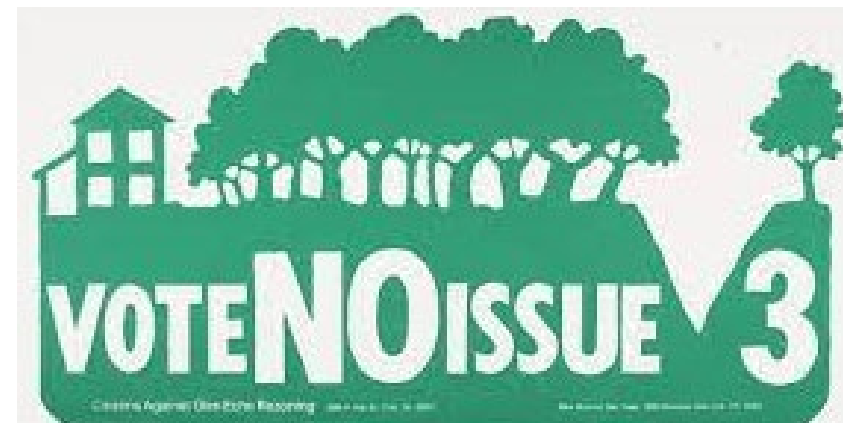
*It's viewed by planners as an essential condition to support public transit, and by economists as the best means of making high-cost cities more affordable.*

<https://www.nytimes.com/interactive/2019/06/18/upshot/cities-across-america-question-single-family-zoning.html>

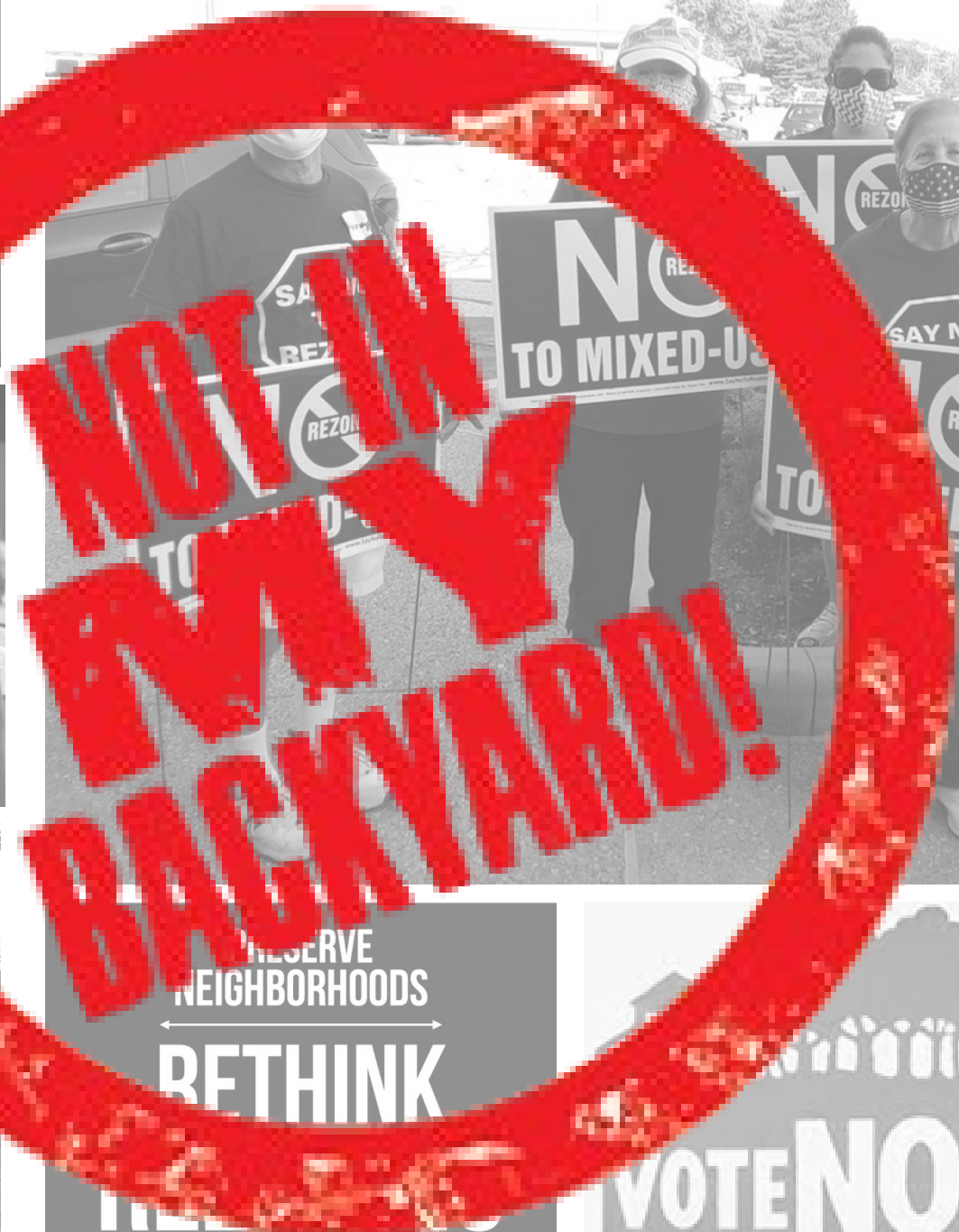
<https://www.kqed.org/news/11840548/the-racist-history-of-single-family-home-zoning>

A postcard depicting the gates to Claremont Court in Berkeley. The gates were built to signify that Claremont was an exclusive residential community. And it came with a big caveat: it was a neighborhood for whites only.













IN OUR NEIGHBORHOOD,  
DENSITY MEANS DIVERSITY  
MORE NEIGHBORS = MORE FUN  
ADUs ARE AWESOME  
CHARACTERS MAKE UP THE NEIGHBORHOOD CHARACTER  
RENTERS ARE WELCOME  
TRIPLEXES & FOURPLEXES ARE PRETTY  
THIS CITY IS FOR EVERYONE



cpsmartgrowth.com

Credit: @MadelineKovacs



**Gina Navarrete**

Love it!! Stealing pic.

Easy to put a sign on our yards saying Black Lives Matter, No Person is Illegal, and Everyone is Welcomed. It is much harder to say all are welcomed here and move into my neighborhood. Talk is cheap, and actions will always speak louder than words.

Like · Reply · 2h



**Bolyn McClung**

...and add the coming wave of battles for on-street parking spaces.

In all the discussions over density the town's bus system never gets love...not even money and land for bus shelters. Hey, what about free big umbrellas with every monthly bus pass.

However, the density of SouthEnd is exhilarating.

Like · Reply · 3h





# Minneapolis, Tackling Housing Crisis and Inequity, Votes to End Single-Family Zoning

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Janne Flisrand at her home in the Lowry Hill neighborhood in Minneapolis on Wednesday. She is part of the group Neighbors for More Neighbors, which is pushing for greater housing density in the city. Jenn Ackerman for The New York Times

# Opinion: Holy cow! California may get rid of single-family zoning



A key legislative committee approved a bill Wednesday that would let property owners throughout the state convert single-family homes into fourplexes. (Todd Goodman / LA Light Photo)

## WILLAMETTE WEEK

### Could Oregon Become the First State to Ban Single-Family Zoning?

Rep. Tina Kotek (D-Portland), speaker of the Oregon House, is drafting legislation that would end single-family zoning in cities of 10,000 or more: "The state's housing crisis requires a combination of bolder strategies."



## EAST BAY TIMES

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TRENDING: Martinez cyclist killed 37th Oakland homicide 38th Oakland homicide Who was Phillip Adams? UC Berkeley data breach

NEWS HOUSING

### Oakland to consider ending zoning laws that allow only single-family homes

Staff to study feasibility of permitting fourplexes



### Berkeley vows to end single-family zoning by end of 2022: 'Right the wrongs of our past'

Sarah Ravani Feb. 25, 2021 | Updated: Feb. 25, 2021 6:19 p.m.

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## The Charlotte Observer

DEVELOPMENT

### Crucial vote on big Charlotte growth plan has been delayed as opposition builds

BY DANIELLE CHEMTOB

MARCH 21, 2021 04:38 PM, UPDATED MARCH 22, 2021 10:18 AM

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# It's Time to End the Reign of Single-Family House Zoning

06.26.2019

By Mark Alan Hewitt



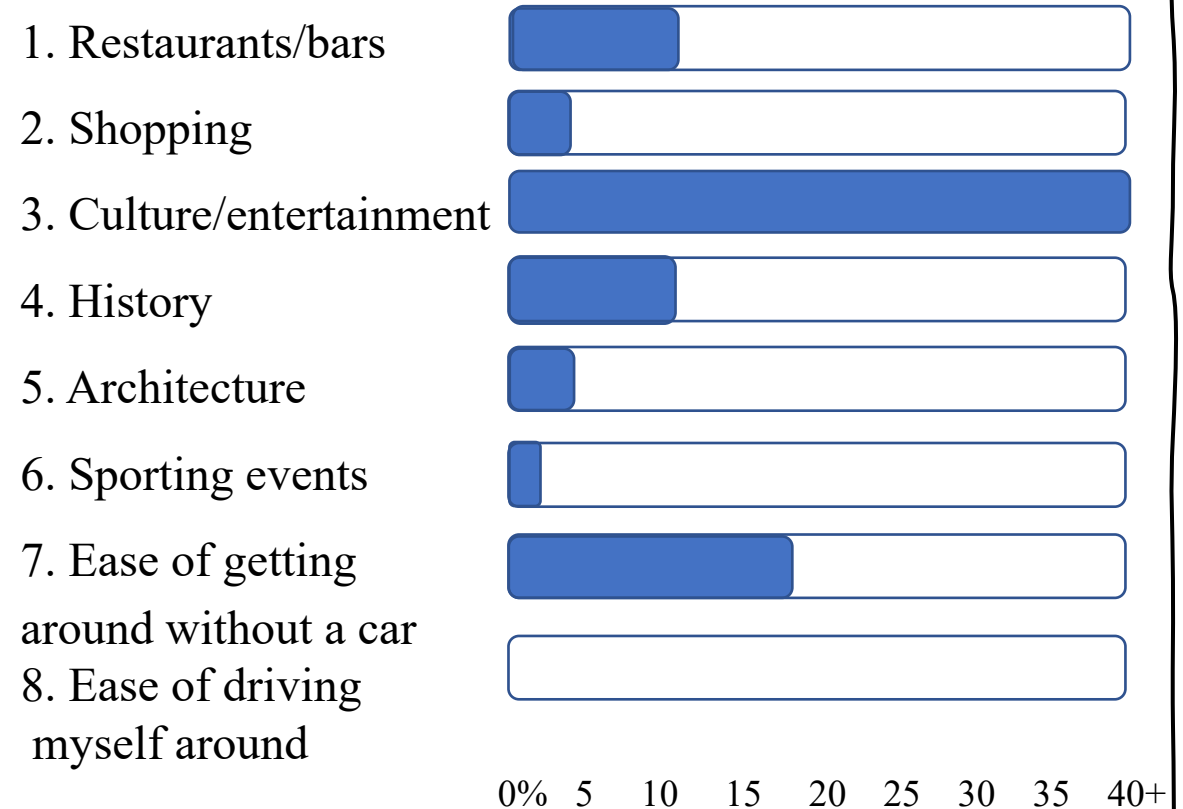


## LNC Poll Results

Other than where I live now, one of my favorite cities to visit is: \_\_\_\_\_

- |                        |                           |
|------------------------|---------------------------|
| Asheville              | Nashville                 |
| Barcelona              | New Orleans               |
| Beaufort               | NYC                       |
| Blowing Rock           | Ocracoke                  |
| Boston                 | Old San Juan, Puerto Rico |
| Bryson City            | San Francisco             |
| Capetown, South Africa | Outer Banks               |
| Charleston             | Philadelphia              |
| Charlotte              | Portland, ME              |
| Cherry Grove, SC       | Puerto Vallarta           |
| Chicago                | Raleigh                   |
| Dallas                 | Savannah                  |
| Denver                 | Sun Valley, Idaho         |
| Emerald Isle           | VA Beach                  |
| Florence, Italy        | Washington, DC            |
| Hendersonville, NC     | Waynesville               |
| Hilton Head            | Wilmington                |

What I like most about the city I listed is its:  
(Check up to one/three boxes)

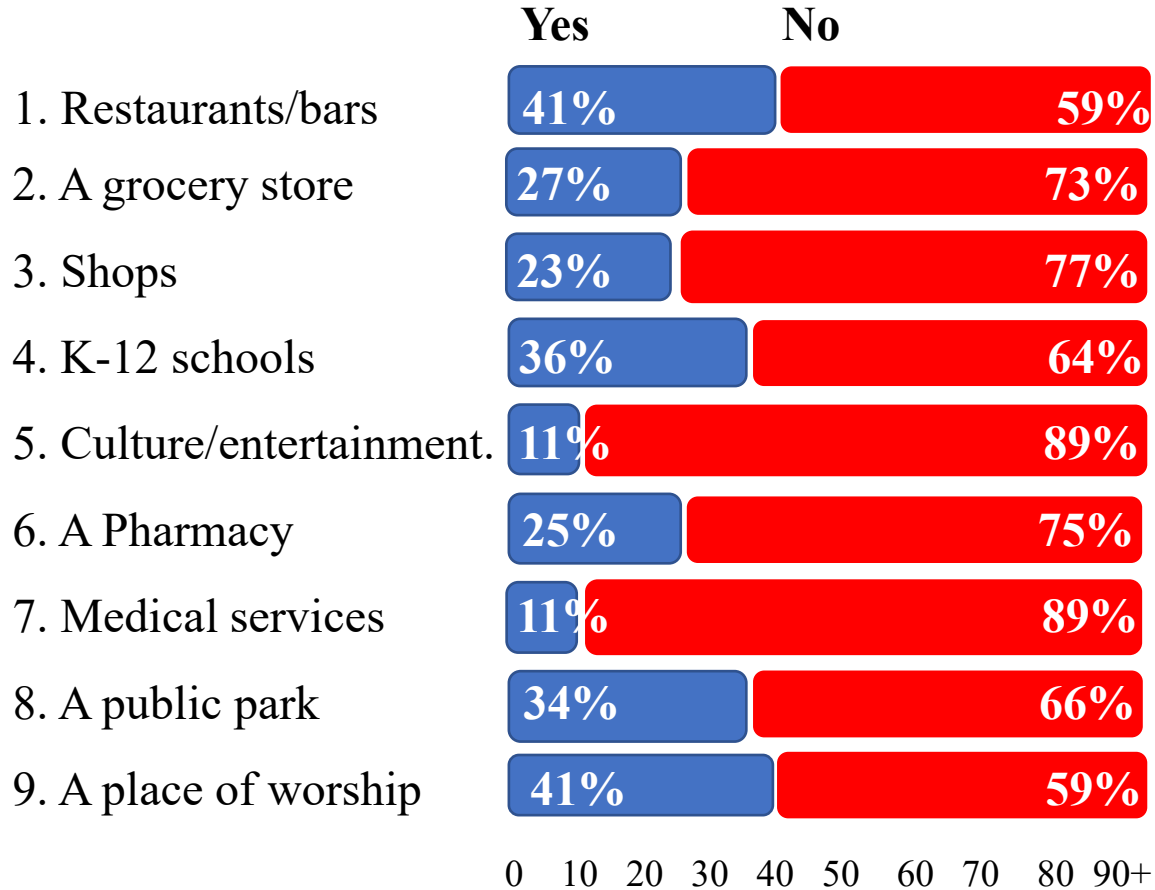




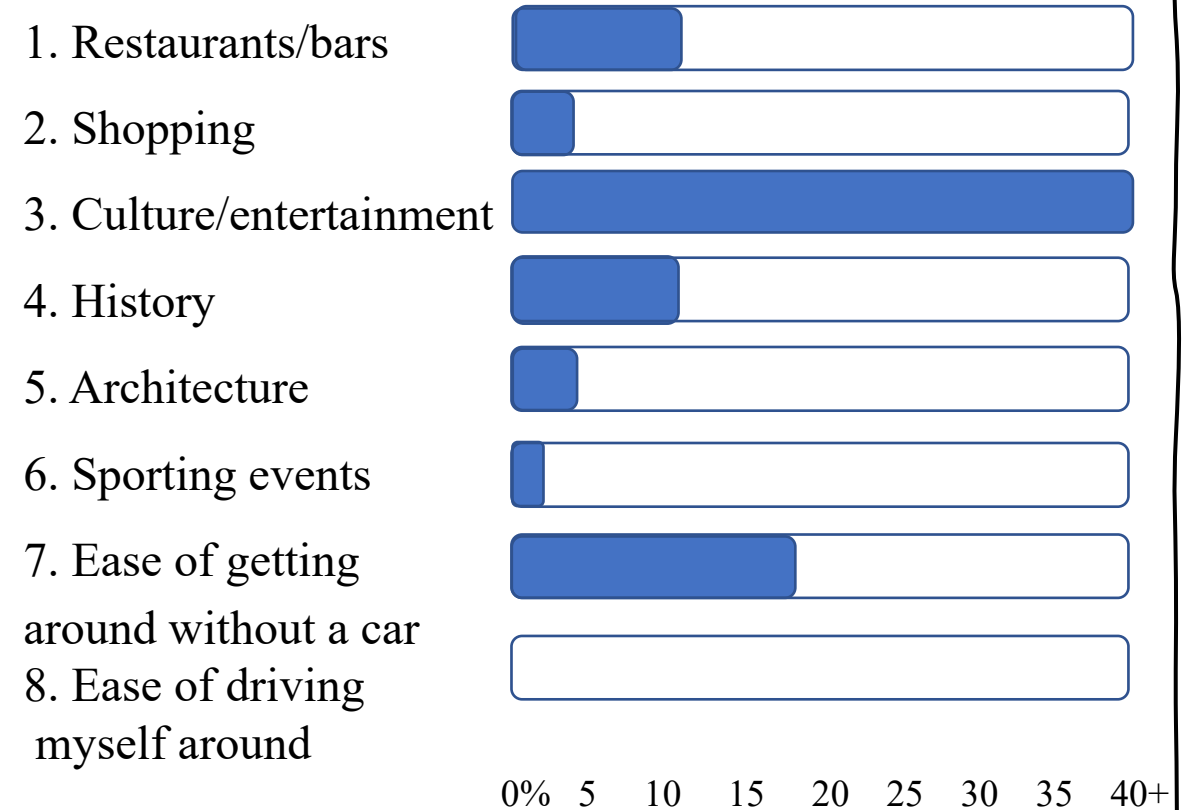


## LNC Poll Results

The following places are within a safe 10-minute WALK of my home: (Check all that apply.)



What I like most about the city I listed is its:  
(Check up to one/three boxes)







<https://american-healthcare.net/step-it-up-the-surgeon-generals-call-to-action-to-promote-walking-and-walkable-communities/>

# Sustainability and Cities

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