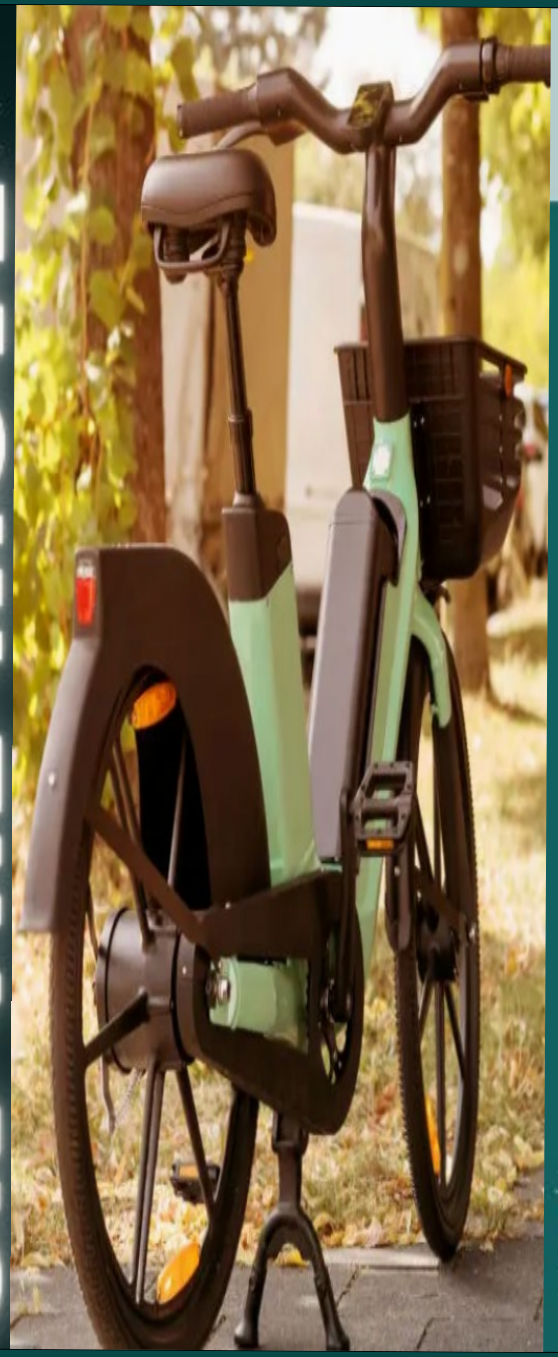
ON THE MOVE



ATRC Active Transportation Resource Center

ATRC On the Move Presents:

SYNERGY 2024

WEBINAR SERIES

California Department of PublicHealth

Caltrans

Rolling Out E-bikes with a Safe Systems Approach

Wednesday, April 3, 2024, 9:30 a.m. – 11:30 a.m.

Special Guest Presenters:

- **Tiffany Smith**, Program Manager, Vision Zero Network
- **Ash Lovell**, PhD, Electric Bicycle Policy & Campaign Director, PeopleForBikes
- **Kendra Ramsey**, Executive Director, California Bicycle Coalition
- **Sergeant Justin Haynes** , Research and Planning Section, California Highway Patrol
- **Colin Chew**, Research Scientist I, Unintentional Injury Prevention Data Unit, CDPH
- **Asha Weinstein Agrawal**, PhD, Director of Education, and **Kevin Fang**, PhD, Researcher, Mineta Transportation Institute

Facilitator:

- **Marianne Hernandez**, ATRC Active Transportation Program Non-infrastructure Technical Assistance Team, Injury and Violence Prevention Branch, California Department of Public Health

Objectives

- Learn how to promote e-bike use with Safe Systems framework.
- Learn about e-bike safety training tools.
- Understand the latest data on e-bike use and injuries.

ATRC Webinar Logistics

- Share your questions throughout the meeting by using the "Q&A" function
- Please complete post-webinar attendee survey
- **The webinar will be recorded** and shared with all registered participants

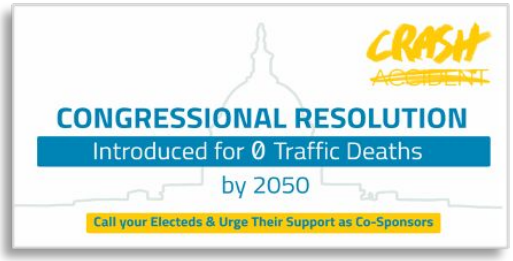
Translating the Safe System Approach for E-Bike Safety

April 3, 2024

VISION 41 NETWORK

What is Vision Zero Network?

- Resources
- Discussions & Webinars
- Peer exchange
- Policy Initiatives
- Events



Learn more at visionzeronetwork.org

VISION ZERO NETWORK

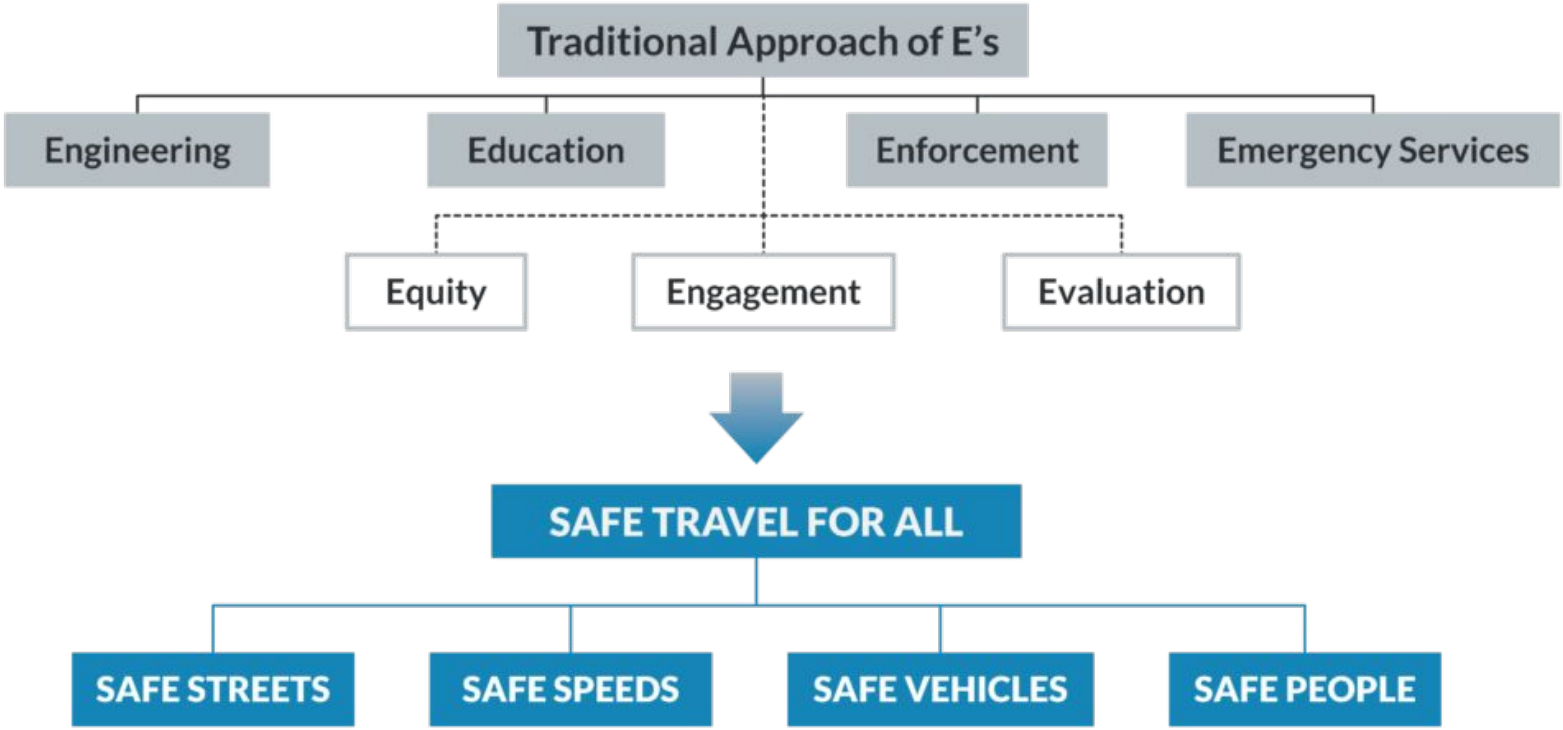
Translating the Safe System Approach for E-Bike Safety

1. Overview of Safe System Approach & How It Differs
2. Translating the Safe System Approach into Action
3. Equity Implications & Considerations
4. Operationalizing the Safe System Approach for Equity
5. Applying the Safe System Approach to E-Bike Safety

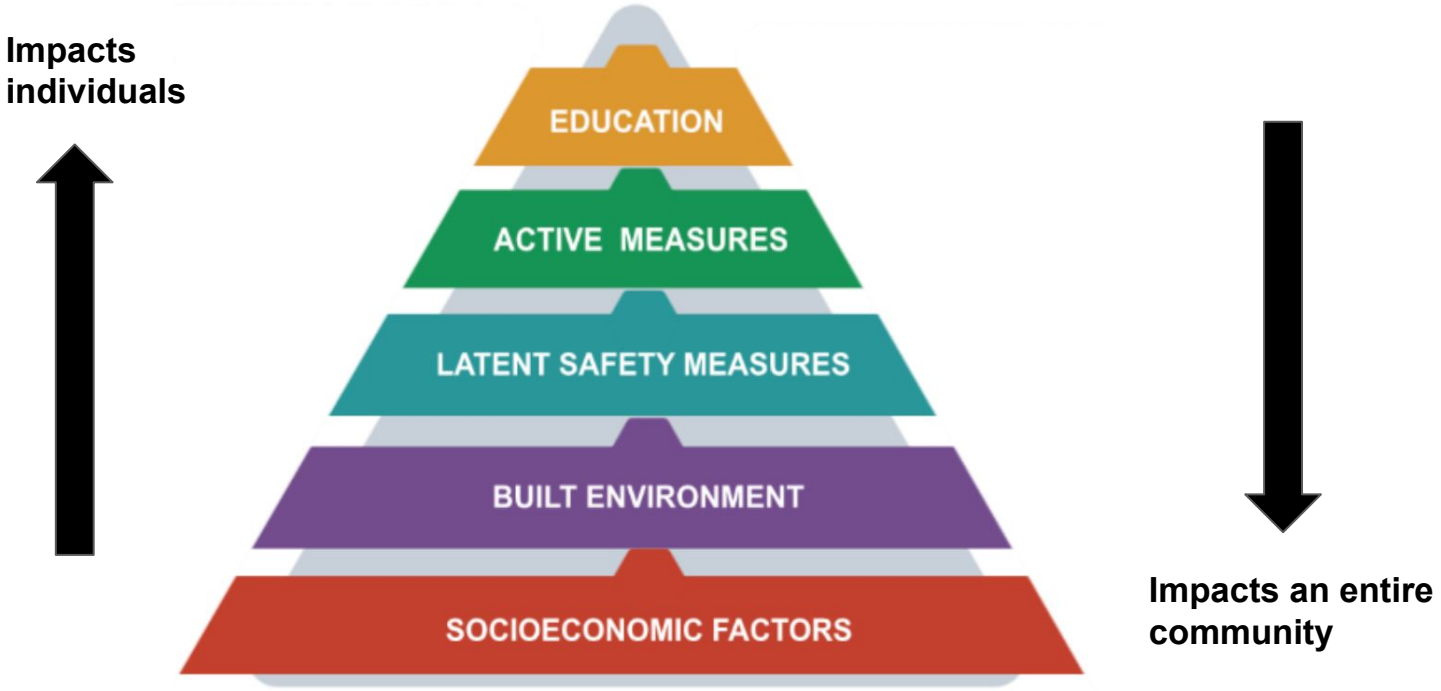
How the Safe System Approach Differs

Traditional approach		Safe System approach
Prevent crashes	→	Prevent death and serious injuries
Improve human behavior	→	Design for human mistakes/limitations
Control speeding	→	Reduce system kinetic energy
Individuals are responsible	→	Share responsibility
React based on crash history	→	Proactively identify and address risks

How the Safe System Approach Differs



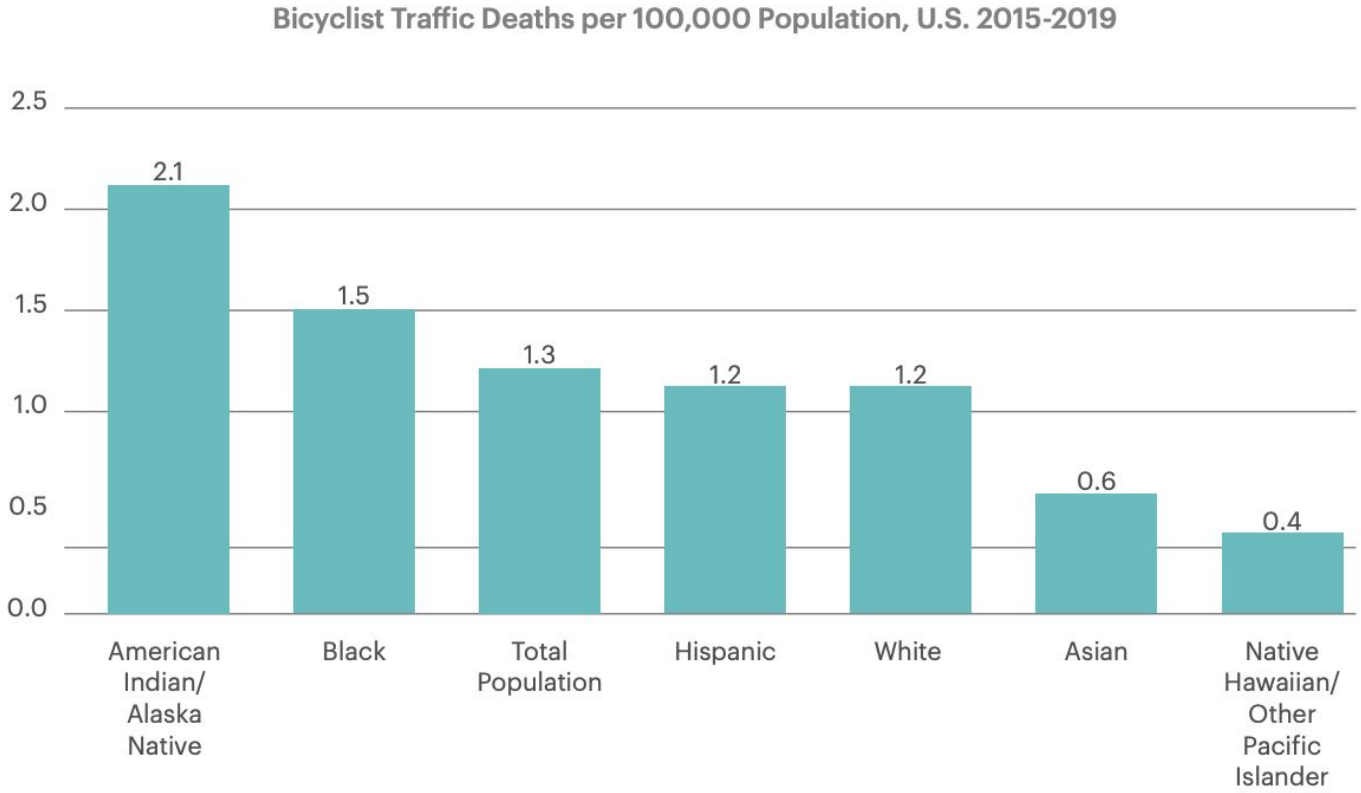
Translating the Safe System Approach into Action



Source: Ederer, et al

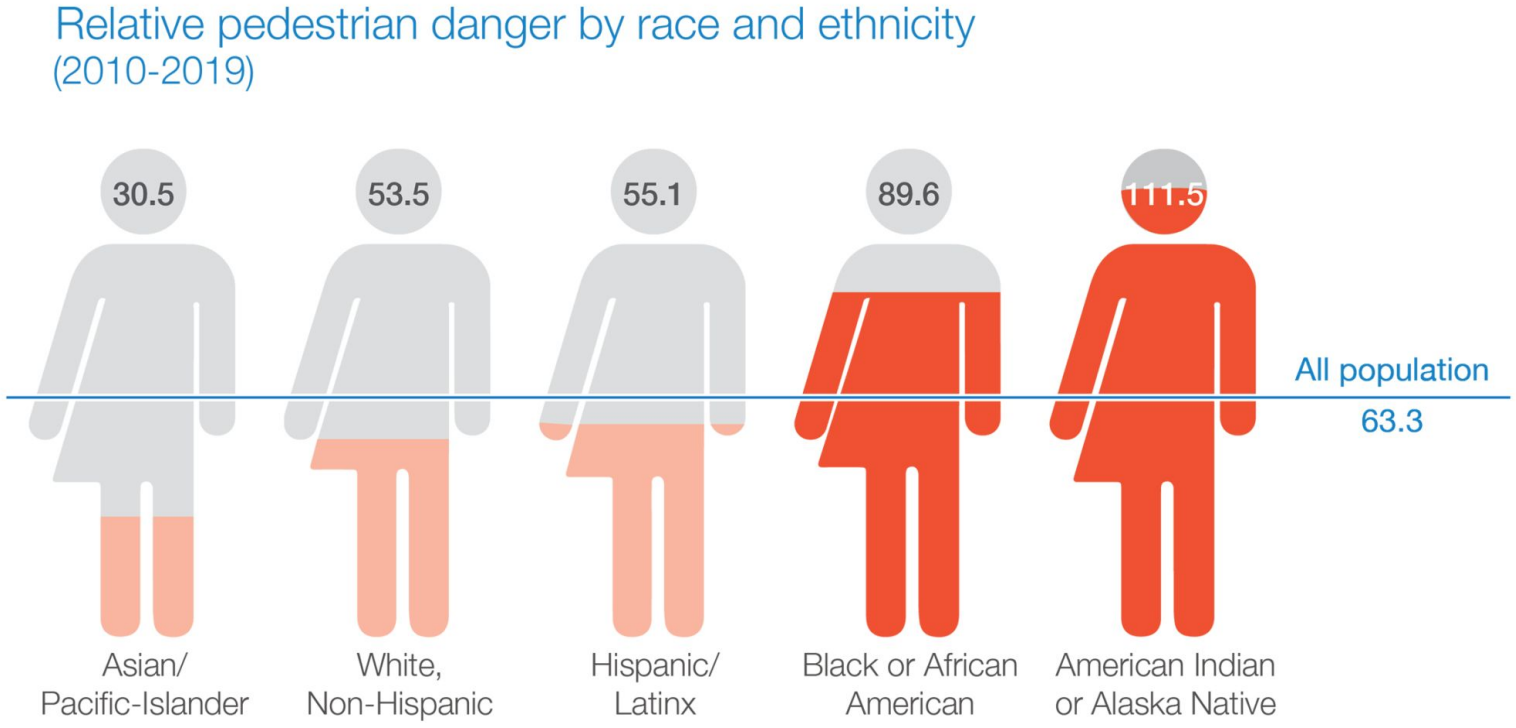
How does this relate to health equity?

3 Safe System Approach & Equity Implications



Source: GHSA

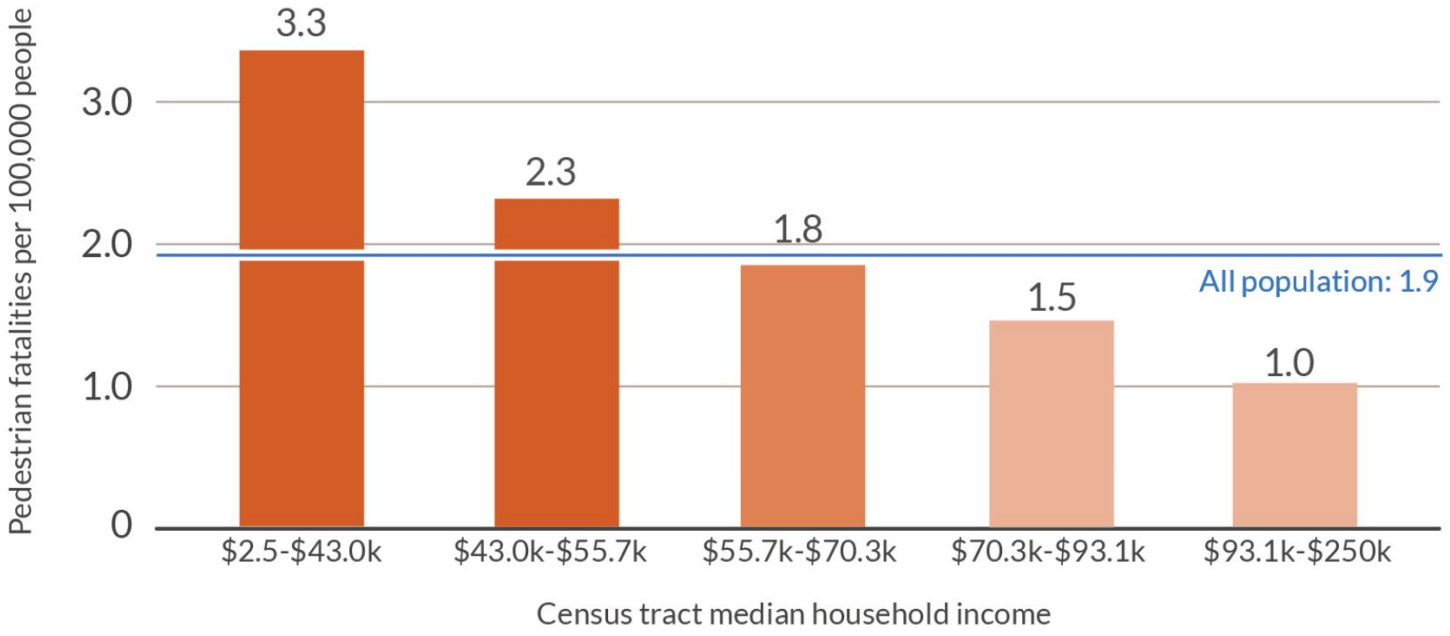
Safe System Approach & Equity Implications



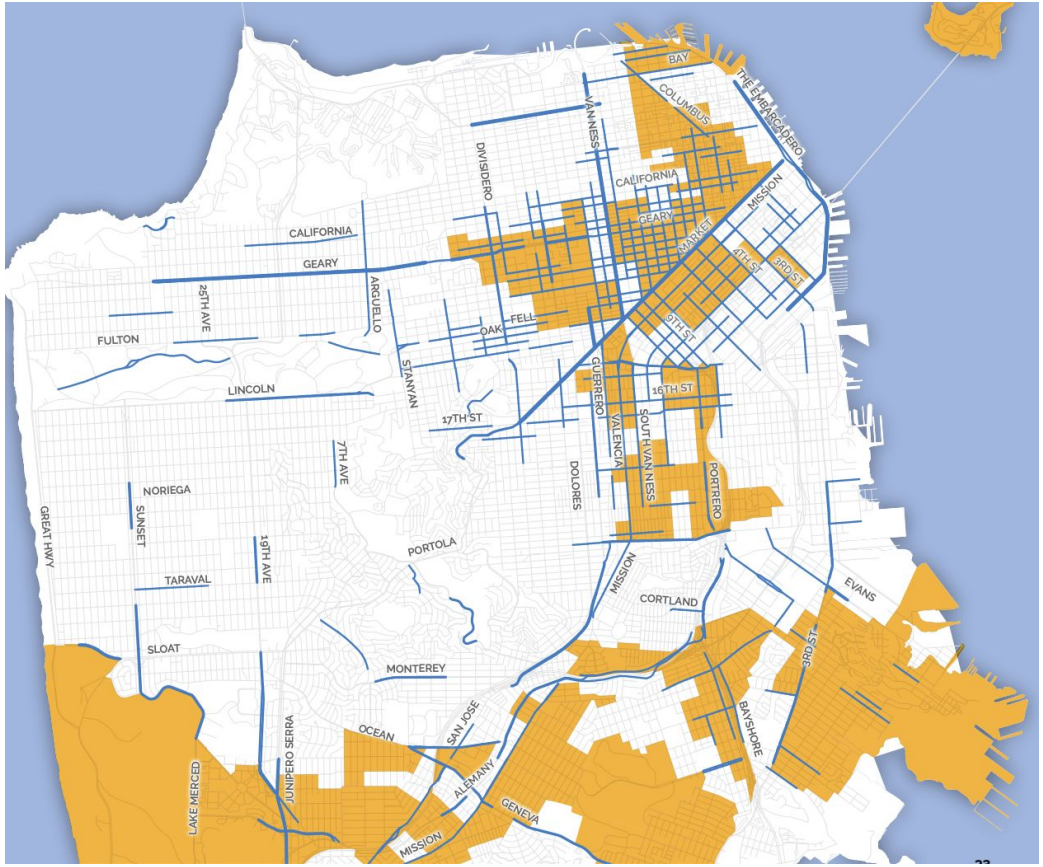
Safe System Approach & Equity Implications

People walking in lower-income areas are killed at far higher rates

Pedestrian fatalities per 100k people by census tract income



3 Safe System Approach & Equity Implications



- 50% of the High Injury Network is within a Community of Concern

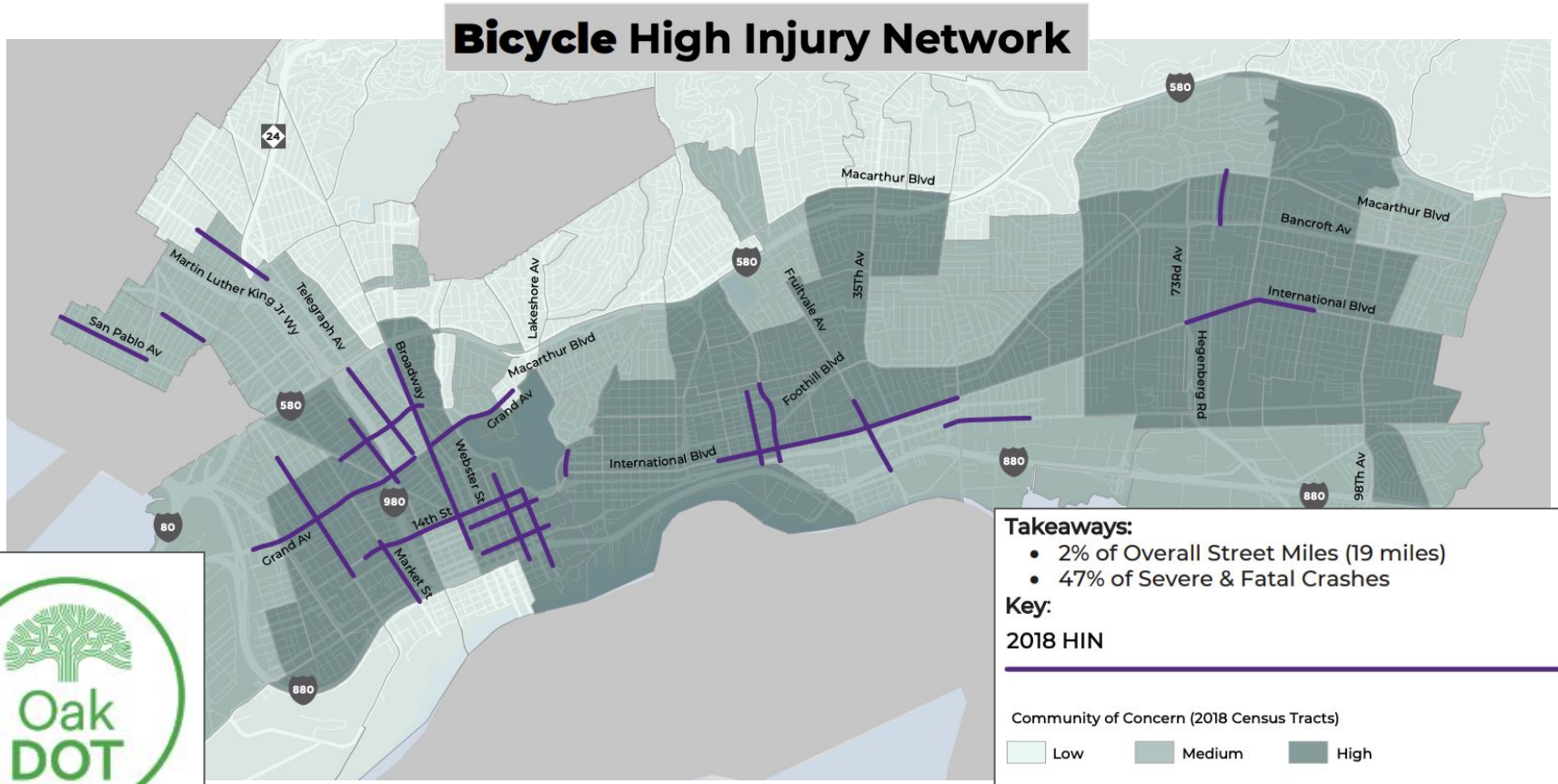
High Injury Network
The 13% of streets where 75% of severe and fatal collisions occur.

Metropolitan Transportation Commission Communities of Concern
Low-income communities, communities of color,

VZ SF 2024 VISION ZERO SF

VISION 4 K NETWORK

Safe System Approach & Equity Implications



Oak DOT

VISION 4 K NETWORK

Operationalizing the Safe System Approach for Equity

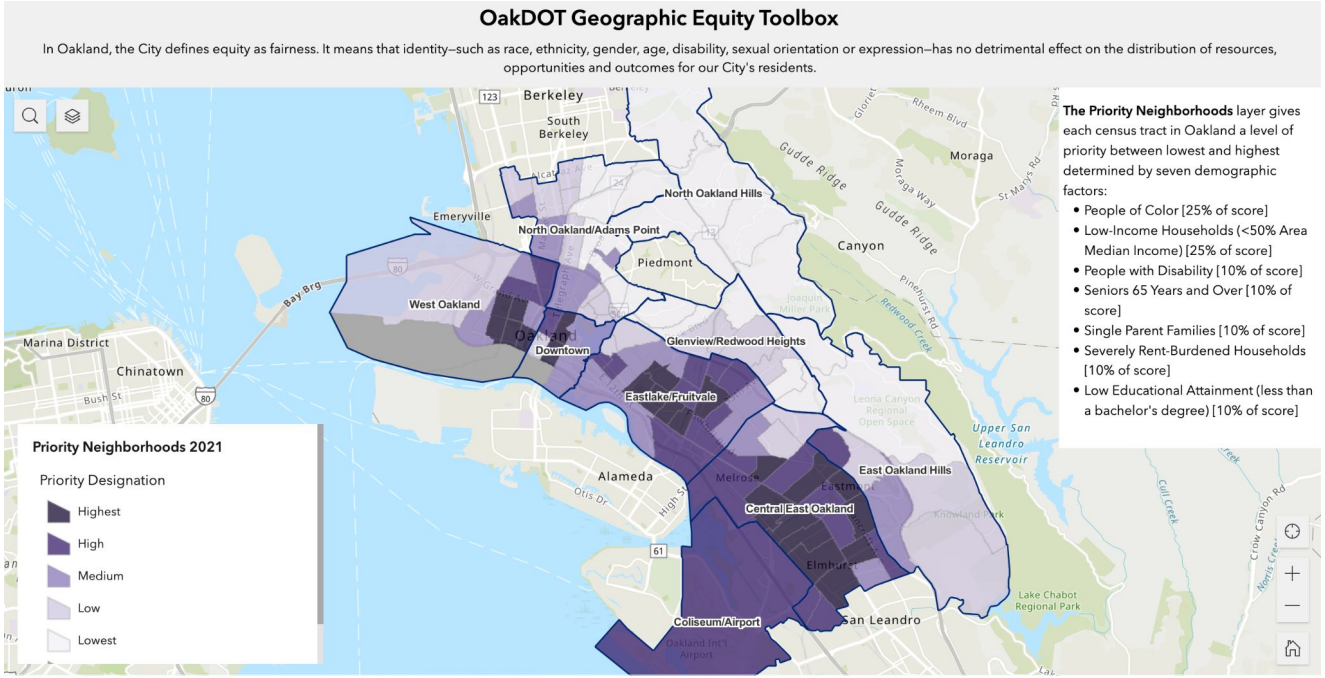
Value all people, communities, and their mobility needs equally: There are no invisible, undervalued, or underrepresented communities in infrastructure decisions and investments.

Recognize and rectify transportation decisions that have exacerbated disparities: Removing infrastructure elements that increase air pollution, noise pollution, chronic stress and create barriers to freedom of movement and public transportation, and retrofitting existing infrastructure with crosswalks, enhancing public transportation accessibility, and creating safer biking and walking routes.

Provide investments in safety policies, practices & infrastructure according to need and risk: Allocating investments and resources equitably, or according to need, rather than distributing resources equally across communities or according to requests or complaints.

Source: Prioritizing Health Equity in Vision Zero Planning

Operationalizing the Safe System Approach for Equity



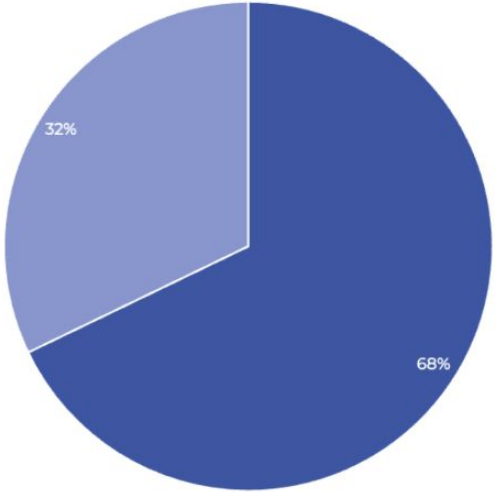
Oakland DOT developed a Geographic Equity Toolbox to ensure the distribution of resources, opportunities and outcomes.

OakDOT
Oakland Department of Transportation

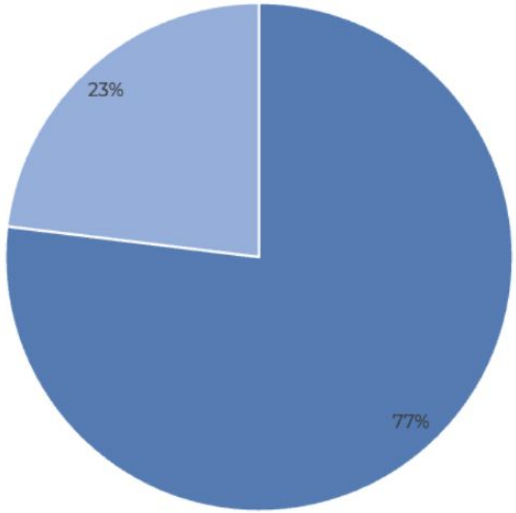
Source: Oakland DOT

Operationalizing the Safe System Approach for Equity

28 CAPITAL PROJECTS, CONSTRUCTION STARTED IN 2022



78 NEAR-TERM PROJECTS COMPLETED IN 2022

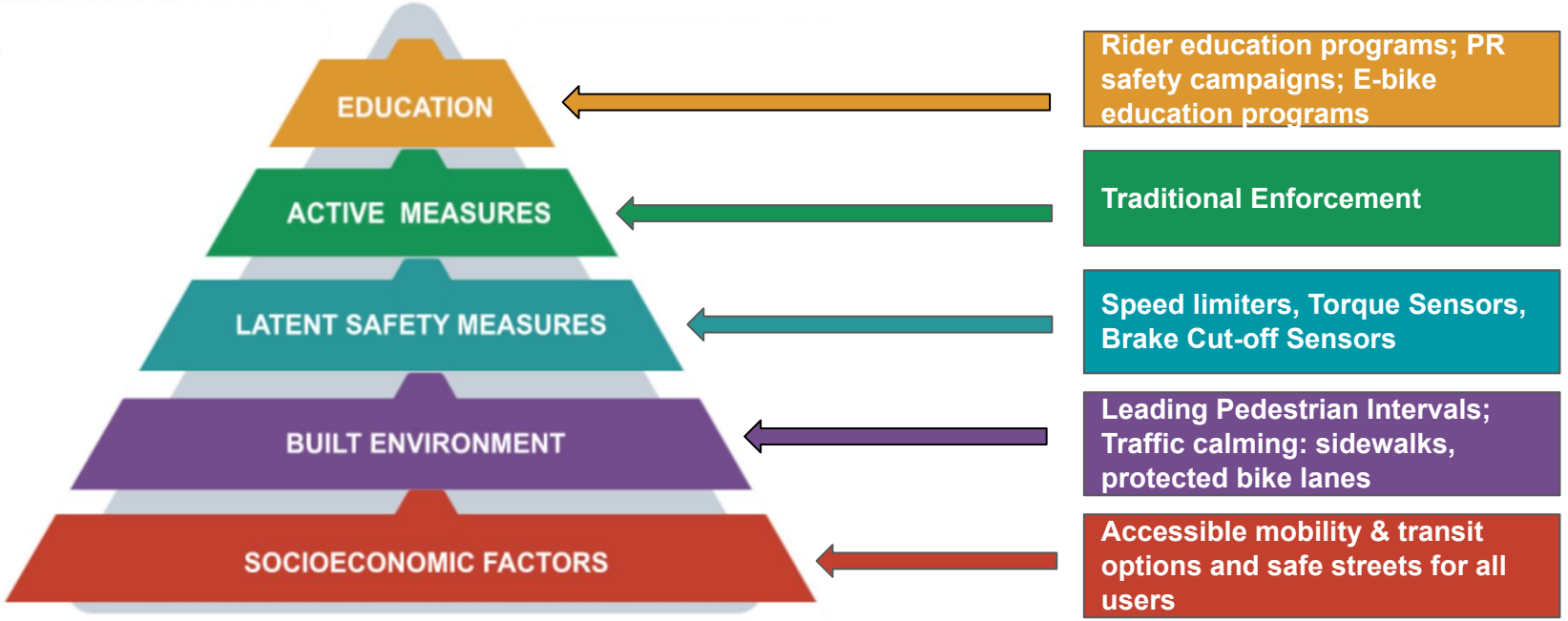


OakDOT
Oakland Department of Transportation

- On HIN and in High/Highest Priority Equity Community
- Not on HIN and in Low and Medium Priority Equity Community
- High and Highest Priority Equity Communities
- Medium, Low and Lowest Priority Equity Communities

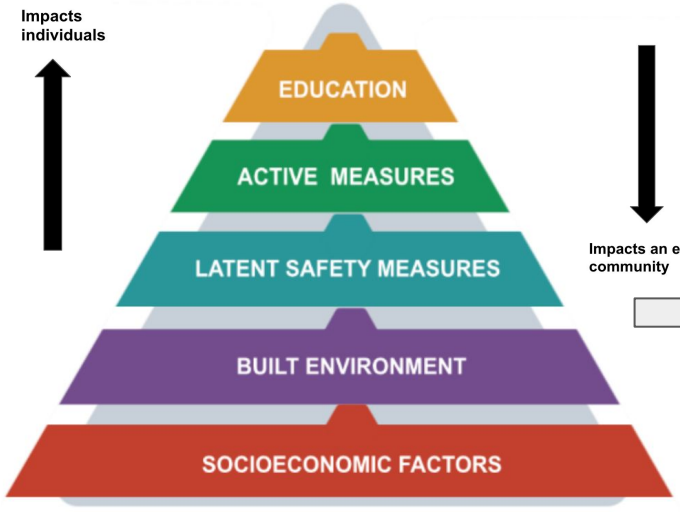
VISION 4 NETWORK

Applying the Safe System Approach to E-Bike Safety



Source: Ederer, et al

Applying the Safe System Approach to E-Bike Safety



Source: Ederer, et al

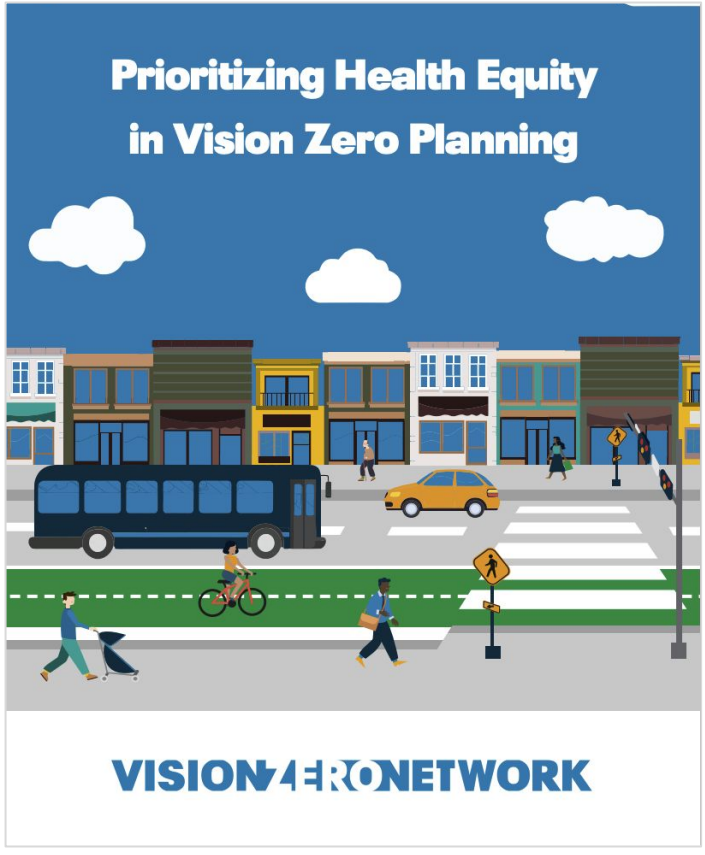
OakDOT
Oakland Department of Transportation

	Engineering	Policy	Planning & Evaluation	Engagement Education & Programs	Enforcement
General Efficacy Score*	High/ Medium	Limited/ Unknown to High (Mixed) Speed limit reduction policies are high efficacy	Limited / Unknown Independent effects difficult to measure but critical complementary strategy	Limited/ Unknown Independent effects difficult to measure but can be complementary strategy	Limited/ Unknown to High (Mixed) Automated enforcement implementation can have a high efficacy
General Equity Score	★★	★★	★★	★★★	★

Equity Key: Benefit = ★★★ It Depends = ★★ Concern = ★

VISION 44 NETWORK

New Resource: Prioritizing Health Equity in Vision Zero Planning



Recommendations

Recommendation 1
Acknowledge Past Harms

Recommendation 2
Define Equity and Infuse it in Safety Planning

Recommendation 3
Establish and Nurture Relationships to Inform Vision Zero Planning

Recommendation 4
Center Equity in Analysis and Prioritization

Recommendation 5
Shift to a Safe System Approach Based on Effective, Equitable Strategies

Recommendation 6
Track & Share Progress of Equity Commitments

VISION ZERO NETWORK

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www.visionzeronetwork.org
@visionzeronet

VISION ZERO NETWORK

Rolling Out E-bikes with a Safe Systems Approach

April 3, 2024

Dr. Ashley (Ash) Lovell

Electric Bicycle Policy + Campaign Director, PeopleForBikes


BE THE BEST PLACE
IN THE WORLD
TO RIDE A BIKE


45NRTH
99 SPOKES
A NEW EARTH PROJECT
ABUS
ASI ACCELERATED SYSTEMS INC.
ACT
AERIUS
ÅKERS DIGITAL
alienation
All-City
ALPEN
ALTA
amazon
American BMX Company
AMERICAN CLASSIC
Ascend
AVENTON
Avid
BCycle
BAFANG
BASIL
BEARCLAW
Beeline CONNECT
BELL
benno
BEST BUY
Bianchi
BICYCLEBLUEBOOK.COM
Bicycle Retailer
bigtruck
BIKEFLIGHTS
BIKE CO
b-cinsure
BIKES
BIRD
bivo
BLACKOPS
Blackburn
BLAUPUNKT
BMC
BONTRAGER
BOSCH
BREEZER
BROMPTON
BROOKLYN BICYCLE
BRP
BTI
Buddy Pegs
BULLS
Burley
buylocalnow
BUZZBIKE
cake
CALOI
CAMELBAK
CANE CREEK
CANYON
CARDINAL CYCLING GROUP
carry freedom
CATRIKE
cervélo
Chamois Buttr
charge
CLEARY
C3
COMPOSE
CRANK FARM
CRESTLINE
CSSE
CYCLE FORCE
CSG
DeFeet
DelSol
DENAGO
DERO
devinci
DIAMONDBACK
DONNELLY
DOREL
DÖST
DT SWISS
EASTON
ECONIC one
Electra
ENDURA
envelo
(e)revolution
EVIL
evo
FactionBike
FEEDBACK
FELT
Fleet Cycles
X
FOX
FOX
FREE AGENT
FREEDOME
PROG
Fuji
FSD
FYXATION
G-Loomis
Gates
Gazelle
GIANT
GIRO
GORE
GORE
GT
GURU
HAIBIKE
HansonBridgett
HAIRO
HLC
HOT
HUFFY
hps
HYPER BIKE CO.
INNTEX
inSTEP
Integral
INTENSE
IZIP
JAMIS BIKES
JBI.BIKE
JENSON
jet
JOBRAD
KENT
KEVIN JAN STUDIOS
KHS
Kia Max
KINEKT
KITSBOW
Kona
KRYPTONITE
LAZER
LECTRIC BIKES
loval one
LIFE TIME
Lishui
LIVE to PLAY
LOOK
Lucidity
lyft
MADSEN
magnum
Manhattan
MARIN
MASI
Massif
MAXXIS
METROPOLIS
MICHELIN
MiiR
MODUS SPORTGROUP
mongoose
mountainflow eco-wax
MSW
NBDA
NEMO EQUIPMENT
Niner
NINER
NORCO
NORTH
npd
n+
nuun
OKAI
ORBEA
ORTLIEB
OTTOLOCK
PACIFIC CYCLES
PACIFICCYCLE
Panasonic
Park Tool
PARTS UNLIMITED
PEDEGO
PHYLION
PIERER MOBILITY AG
PINARELLO
PIVOT
pocampo
POC
pon
pdw
Powertap
PREMIUM
PREVELO
PRIMAL
PRIORITY BICYCLES
problem solvers
Promovec
propain
PUBLIC
Pytes
QBP
QUARQ
QUIETKAT
RACEFACE
RAD POWER BIKES
RALEIGH
REDLINE
co-op CYCLES
RETÜL
RIFTBOX
ROADMASTER
ROCKSHOX
RUDY
SALSA
SANTA CRUZ
Santini
SCHWINN
SCOTT
Selle Royal
SENA
SERIAL 1
SGS
SHIMANO
SHINOLA DETROIT
SPORTS UNITED
SKS
SMARTETHELOS
SMITH
SNAFU
SockGuy
SP CONNECT
SPECIALIZED
SRAM
STILE
STROMER
Sun
sundays insurance
SUNLITE
SUNSEEKER
SURLY
syncros
TERAVAIL
tern
the bike cooperative
TPC
thousand
TIFOSI
TIME
TPG
TREK
Troy Lee Designs
TRP
TRUVATIV
U-Q
UL Solutions
UNIVEGA
URBAN ARROW
velocio
VELOTRIC
VELOtron
Bentonville
VOLT
WABI CYCLES
wahoo
Walmart
WHEELS MFG
WHISKY
WILD RYE
WINTERSTEIGER
woom
WORKMAN CYCLES
WTB
XPRIT
YAKIMA
YAMAHA
YETI
YFYJUPITER
YUBA
ZESTRON
ZIPP
ZWIFT

peopleforbikes

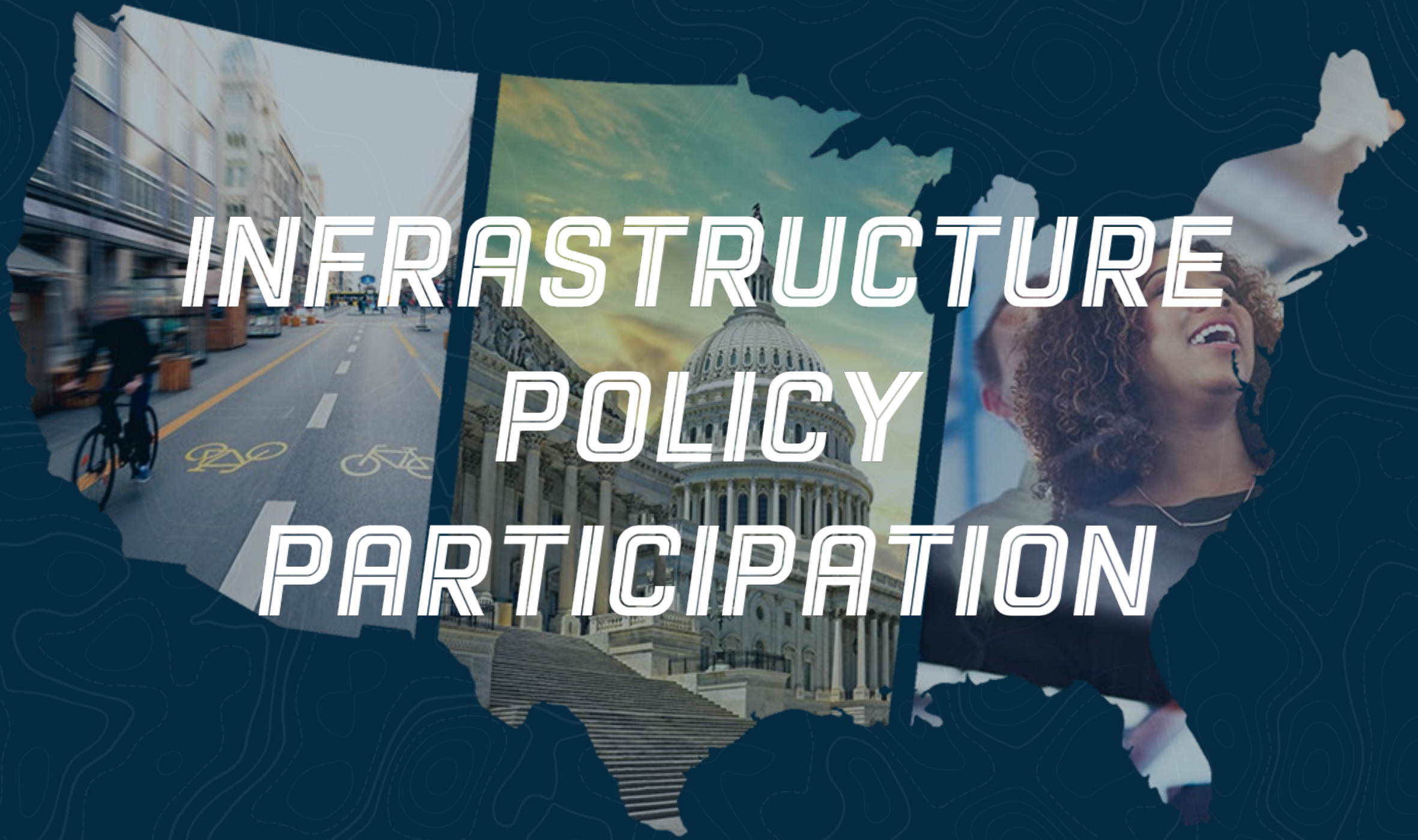
325
Coalition Members

1.4
Million Supporters

50
States

1,500
City Ratings Cities

1,300
Bike Projects Nationally


INFRASTRUCTURE
POLICY
PARTICIPATION


FASTEST GROWING
BIKE CATEGORY


= 2022 =
1 MILLION E-BIKES SOLD


= 38 MILLION =
AMERICANS RODE AN
E-BIKE LAST YEAR

E-BIKE COMPONENTS

E-BIKE CLASSES:

Class 1: pedal assist, max assisted speed of 20mph

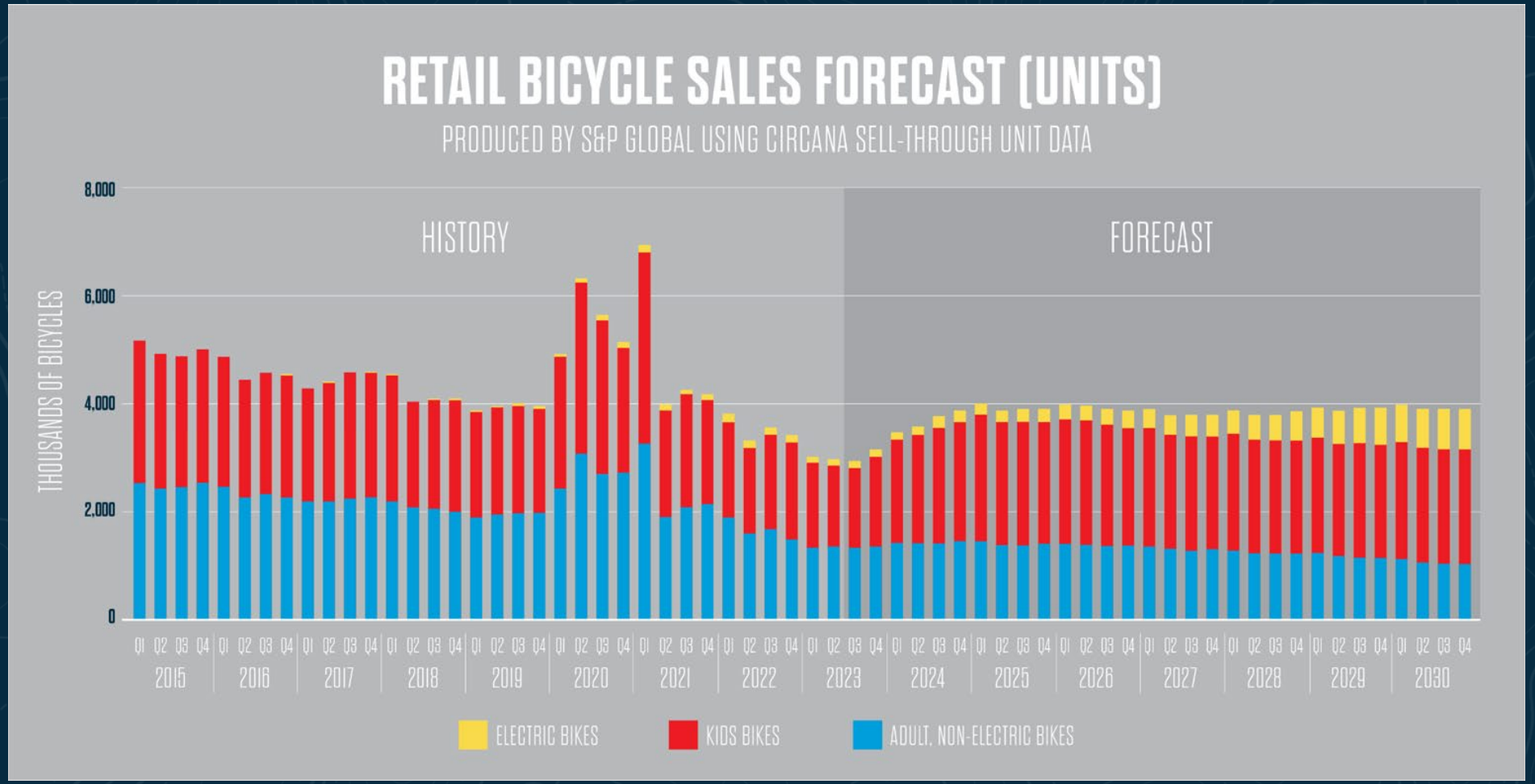
Class 2: throttle assist, max assisted speed of 20mph

Class 3: pedal assist, max assisted speed of 28mph

Maximum wattage 750w

peopleforbikes

Electric Bicycle Sales Forecast



Who is interested?

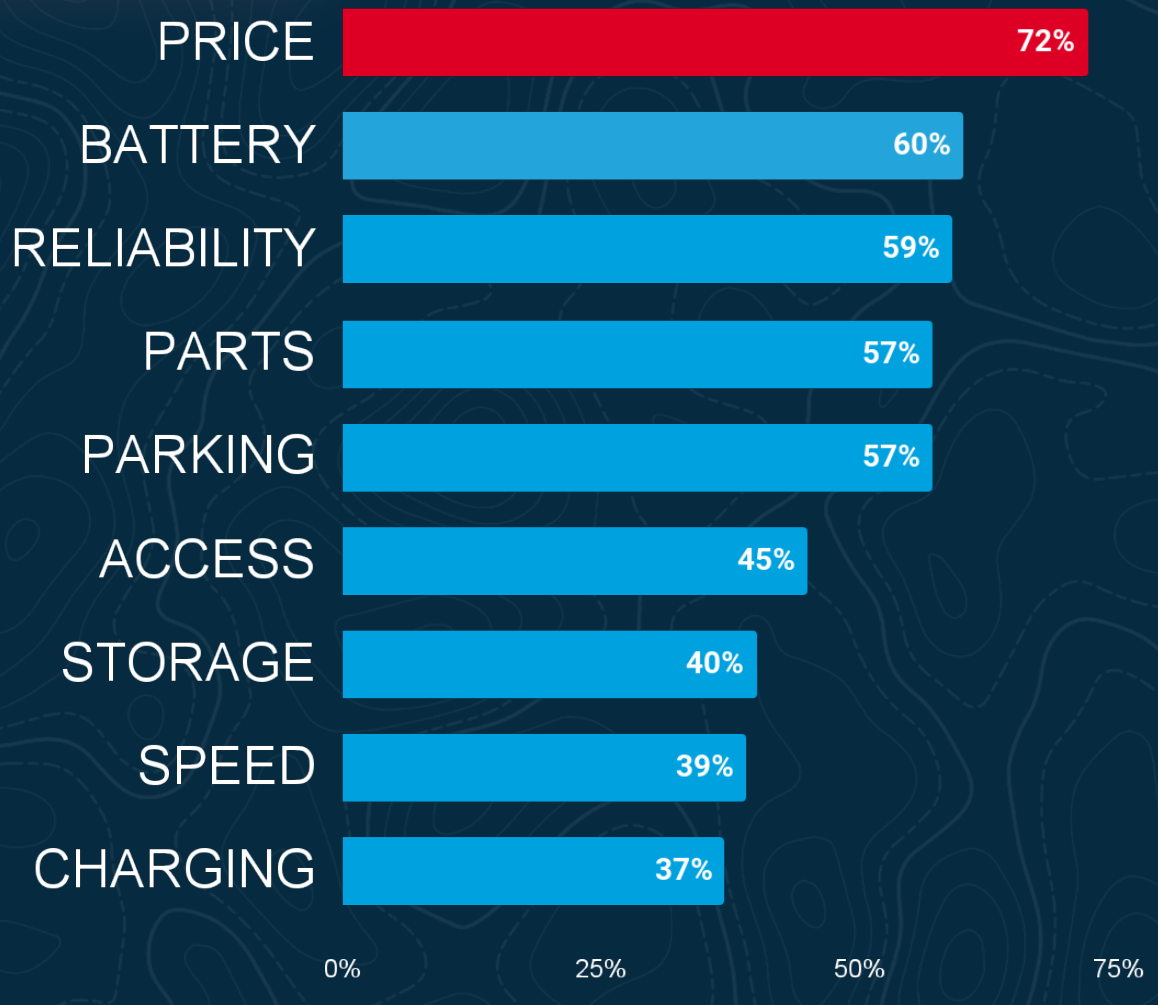
- Household Income < $100k
- 18-24, or 65+ years old
- ¾ own a non-electric bike, and ½ ride weekly+
- Don’t consider themselves natural athletes
- Love nature, adventure, and healthy lifestyles

Why are they interested?

- Transportation (70%)
  - Car replacement
  - Efficiency
  - FUN!
- Recreation (90%)
  - Ride more often, longer
  - Ride with less effort
  - More time outdoors

Why have they not purchased?

Affordability



NPR

https://www.npr.org › 2023/03/11 › e-bike-scooter-lithiu...

What's driving the battery fires with e-bikes and scooters?

Mar 11, 2023 — Officials said that a faulty lithium-ion **battery** in the scooter had suddenly burst into flame, as captured on surveillance video. The resulting ...

AP

http[illegible] › article › e[illegible]

As e-bikes proliferate, so do deadly fires blamed on ...

[illegible]2 — Federal officials a[illegible] [illegible] lithium-ion **batteries** that power hoverboards, robots and motorized bicycles ...

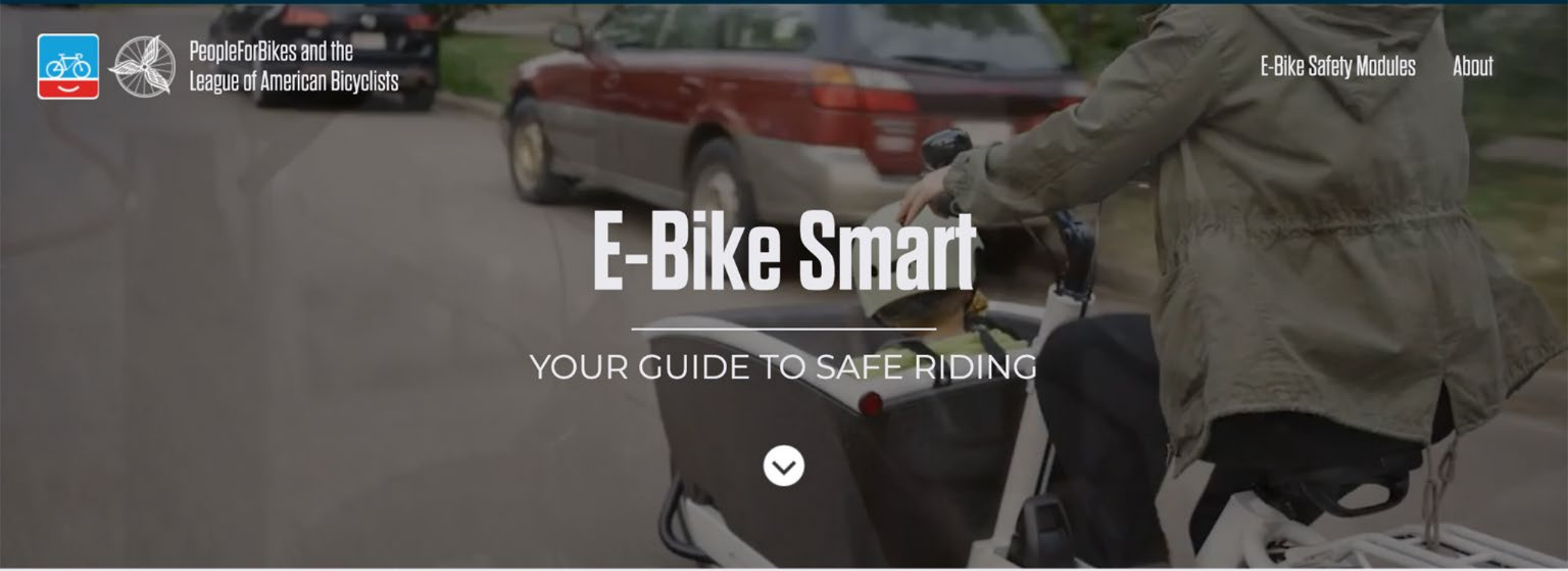
BATTERY SAFETY + RECYCLING

TechCrunch

https://techcrunch.com › 2023/07/11 › everything-yo...

Everything you need to know about e-bike battery fires

Jul 11, 2023 — We go over why **e-bike** lithium-ion **battery fires** happen, how you can stay safe, and what policies are in the works to minimize risks.



PeopleForBikes and the League of American Bicyclists

E-Bike Smart

YOUR GUIDE TO SAFE RIDING

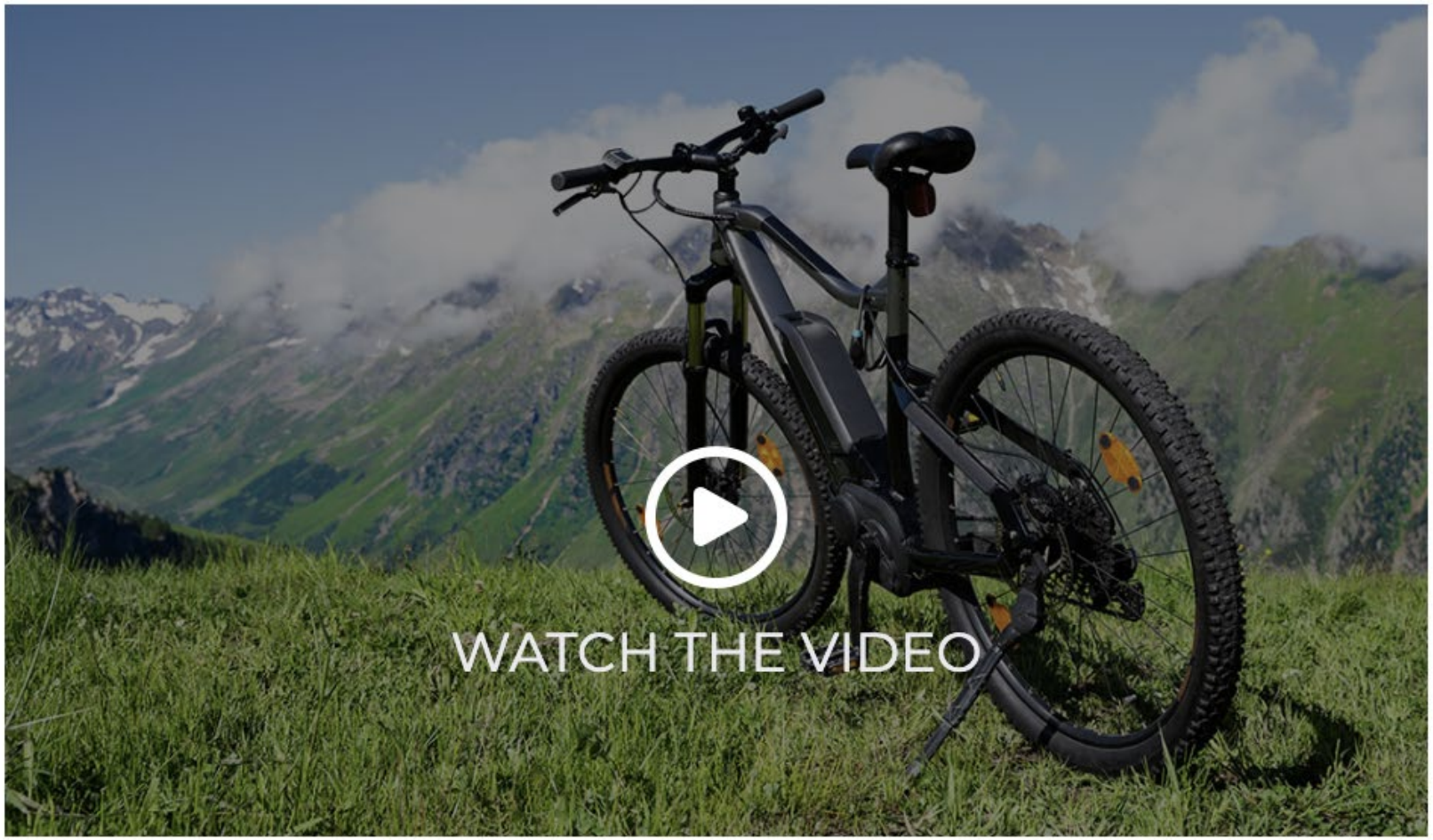
Electric bicycles (e-bikes) are a fun, healthy, and safe way to explore the great outdoors and make short trips more enjoyable. With more people discovering the many joys and benefits of riding an e-bike, we created E-Bike Smart to share the basics of maintaining your e-bike, handling and charging your e-bike battery, and riding safely while out on the road or trail. Whether you're new to riding or just need a refresher, everyone can learn and benefit from this course.

Participating Brands

ALTA CYCLING GROUP
BEND BIKES
BIRD
BOSCH Invented for life
BULLS
DIAMONDBACK
FEEDBACK SPORTS
FOX
ROYAL DUTCH Gazelle
GIANT
IZIP
LECTRIC eBIKES
Panasonic
PEDEGO ELECTRIC BIKES
PIVOT CYCLES
QUIETKAT ALL TERRAIN | ALL ELECTRIC
RAD POWER BIKES™
FLYER BY RADIO FLYER
REDLINE
SHIMANO
SRAM
TREK WATERLOO, WISCONSIN | SINCE 1976
URBAN ARROW
VELOTRIC
V VOLT
YAMAHA
YUBA BIKES THAT CARRY MORE

Supporting Organizations

AKERS DIGITAL
AlaBike
CAZB
PEDAL POWER bac BICYCLE ADVISORY COMMITTEE
Bicycle Garage Indy
CALBIKE CALIFORNIA BICYCLE COALITION
BIKE CLEVELAND
bike colorado springs
Bike Fitchburg
Bike Florida
FLORIDA BICYCLE ASSOCIATION
GEORGIA BIKES!
HAWAII BICYCLING LEAGUE HBL.org
ride ILLINOIS
MCBC
MassBike
LEAGUE OF MICHIGAN BICYCLISTS
bikeMN BICYCLE ALLIANCE OF MINNESOTA
MISSOURI BICYCLE & PEDESTRIAN FEDERATION
Bike & Walk Montclair
NAPA COUNTY BICYCLE COALITION
NEW JERSEY BIKE & WALK COALITION
BikeWalk NC
OBF OHIO BICYCLE FEDERATION SINCE 1980
PALMETTO CYCLING COALITION
PENNSYLVANIA Downtown Center
BIKE PGH!
BICYCLE COALITION OF GREATER PHILADELPHIA
SILICON VALLEY BICYCLE COALITION
THE STREET TRUST
BIKE WALK TENNESSEE
WABA WASHINGTON AREA BICYCLIST ASSOCIATION
YOUGO BIKE
ZeroW.org



What is an Electric Bicycle?

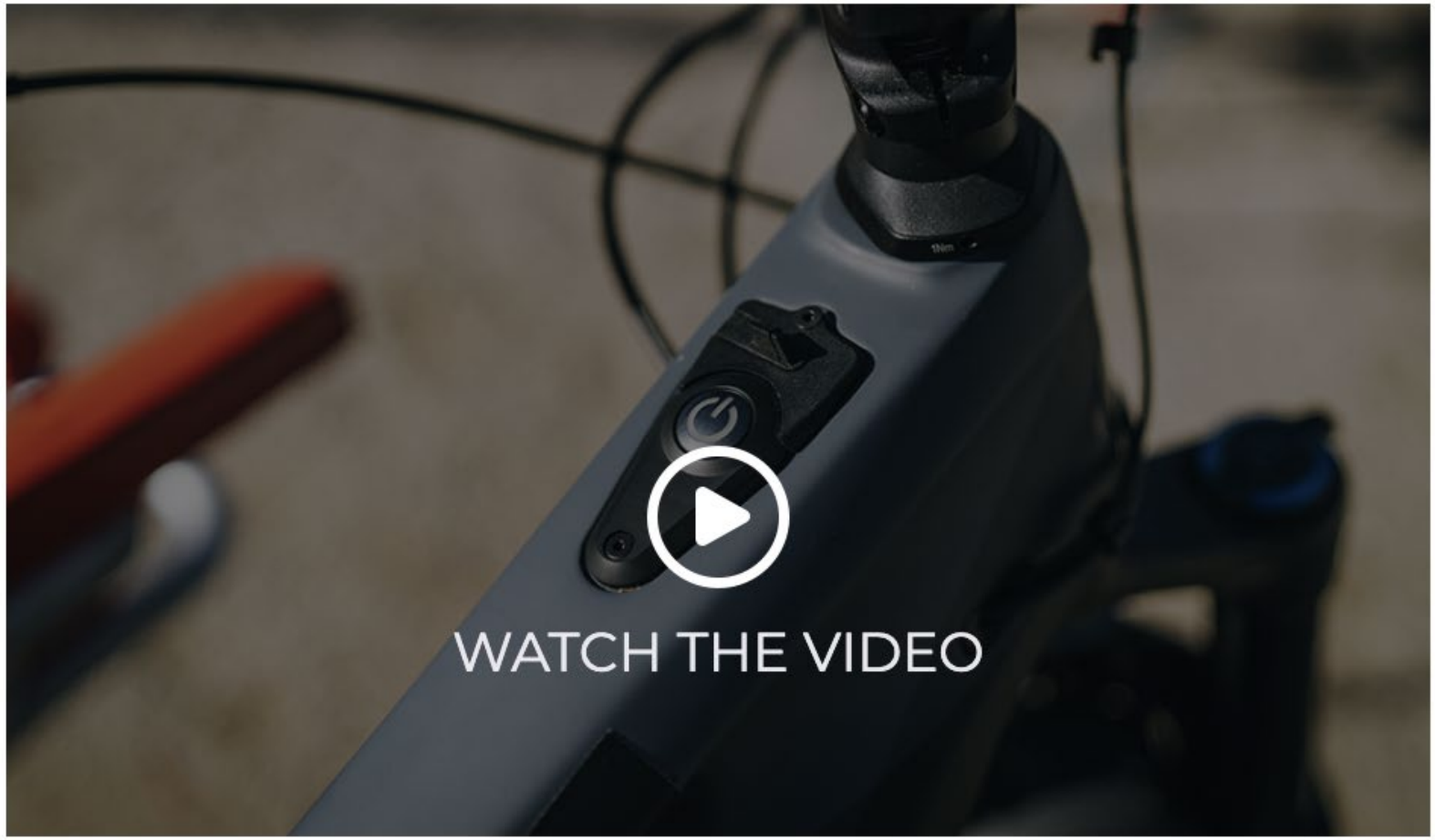
TAKE THE QUIZ

Electric bicycles (e-bikes) are a lot like regular bikes, but they differ in a few key ways. This quick video will cover the different classes of e-bikes and where you can ride them.

E-Bike Battery Safety

TAKE THE QUIZ

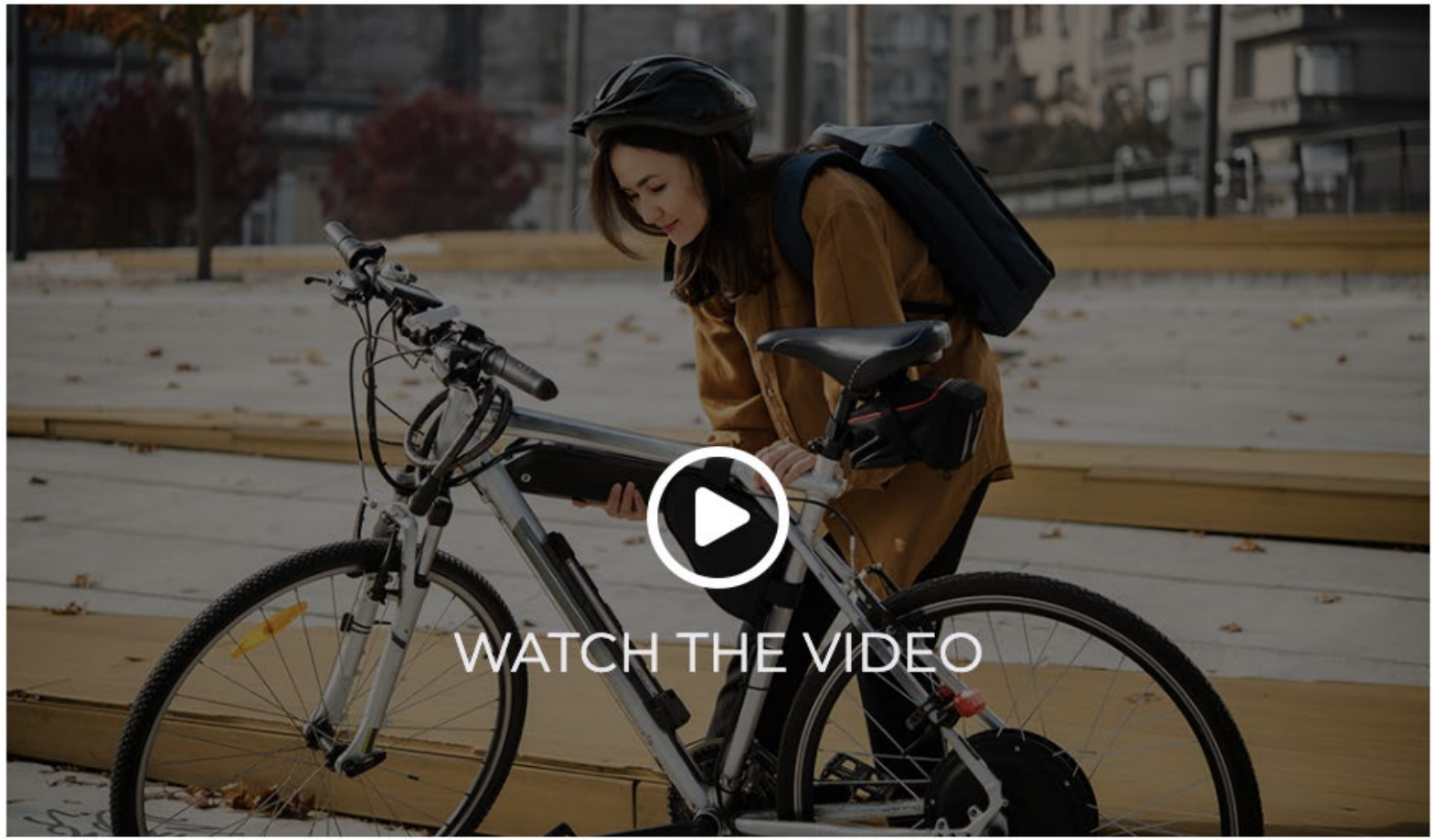
All electric bicycles use lithium ion batteries to give you an extra boost. These batteries are generally reliable and safe, and they're even safer when you know how to properly charge, handle, and store them. Learn more about how to keep your battery happy and healthy in this video.



Before You Ride

TAKE THE QUIZ

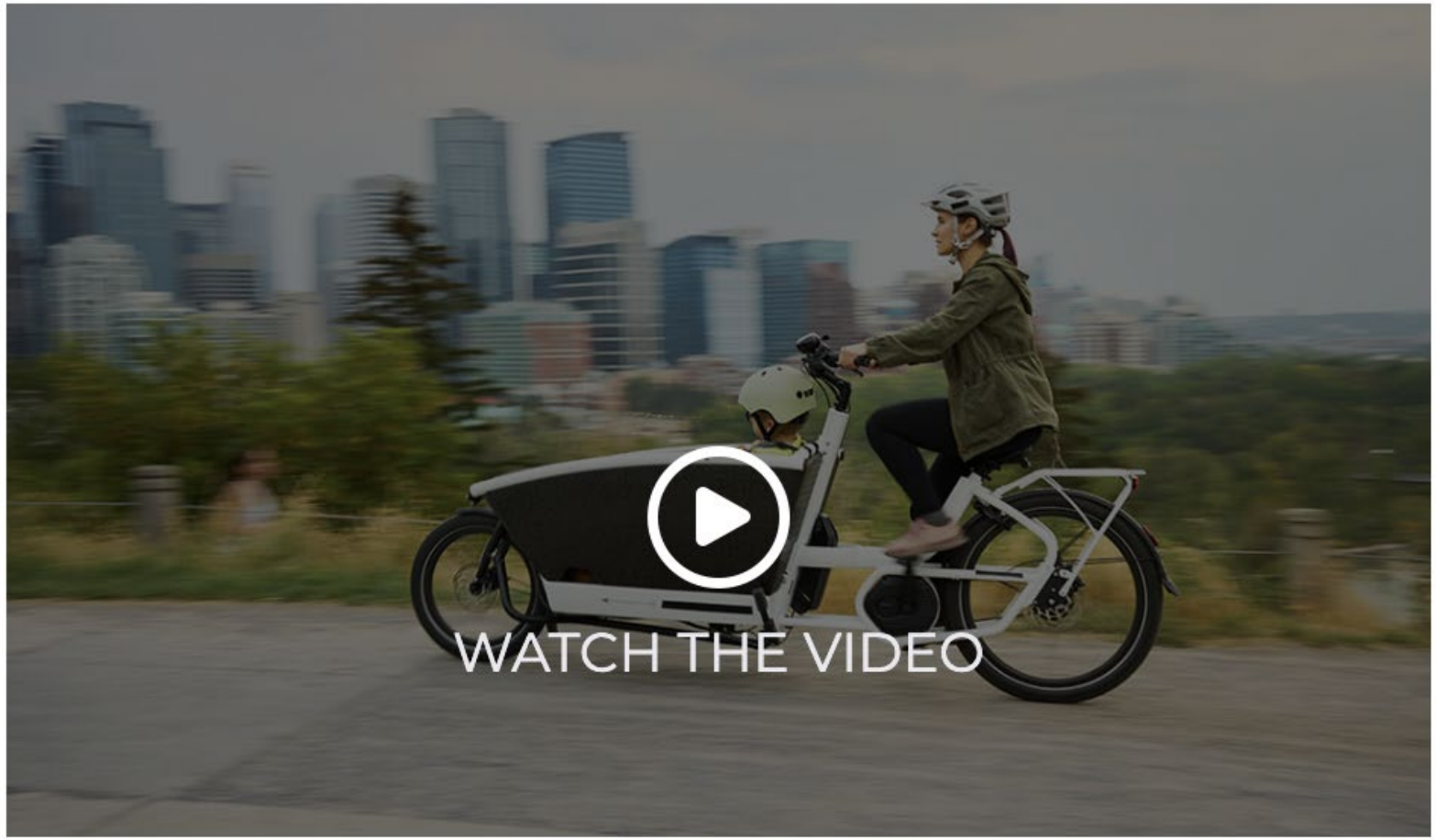
Before you head out on a ride, there's a few things to learn about how e-bikes handle differently from traditional bikes. This video also includes a pre-ride checklist to make sure your e-bike is ready to hit the road or trail.



Rider Safety

TAKE THE QUIZ

Welcome to the joy of riding an e-bike! This video shares best practices regarding rules of the road; how to ride with traffic; how to start, stop, and shift; and general tips for ensuring a safe ride on your e-bike.



Collision Awareness + Rider Etiquette

TAKE THE QUIZ

Beware of the door zone! Check out this video for tips on avoiding collision scenarios and following common trail etiquette to lead to safer riding for you and everyone you see on the road or trail.


THANK YOU

E-BIKES ARE PART OF A SAFE AND SUSTAINABLE TRANSPORTATION FUTURE

KENDRA RAMSEY, AICP
EXECUTIVE DIRECTOR
CALIFORNIA BICYCLE COALITION

CALIFORNIA BICYCLE COALITION

CALIFORNIA BICYCLE COALITION

- Founded in 1994, CalBike advocates for equitable, inclusive, and prosperous communities where bicycling helps to enable all Californians to lead healthy and joyful lives.
- Our pillars:
  - Streets for Everyone
  - Healthy Climate
  - Transportation Justice
  - Stronger Movement

CALIFORNIA BICYCLE COALITION

E-BIKES ARE BIKES

- The California vehicle code defines e-bikes as: “[A] bicycle equipped with fully operable pedals and an electric motor of less than 750 watts.”
- A person riding a bicycle upon a highway has all the rights and is subject to all the provisions applicable to the driver of a vehicle.
- All riders under 18 must wear a helmet on any type of bike, motorized or not.
- No age restrictions on Class 1 and 2 e-bikes. Riders must be at least 16 to operate a Class 3 e-bike, and all Class 3 riders must wear helmets.

CALIFORNIA BICYCLE COALITION

BUT NOT EVERYTHING IS AN E-BIKE

MOTORIZED BICYCLES/ MOPEDS/SMALL MOTORCYCLES

- A motorized bicycle or moped is “a two or three-wheeled device, capable of no more than 30 miles per hour (mph) on level ground.”
- A motor-driven cycle is “a motorcycle with less than a 150 cc motor size.”

REGISTRATION/LICENSURE

- Registration/licensure for e-bikes and their riders is not required
- Both motor-driven cycles and mopeds must be registered with the DMV, and riders need a motorcycle license to operate them.

CALIFORNIA BICYCLE COALITION

ACCESSIBILITY AND MOBILITY

E-BIKES HELP GET MORE PEOPLE ON BIKES

- Give an extra boost to those who need it
- Help people with mobility impairments
- Make longer trips and hills less challenging
- Easier to transport family and cargo

CALIFORNIA BICYCLE COALITION

ACCESSIBILITY AND MOBILITY

MORE PEOPLE ON BIKES = SAFETY IN NUMBERS

- Car drivers expect to see people on bikes
- Culture shift, where bicycling is “mainstream”
- Increased ridership = demand for improved infrastructure

CALIFORNIA BICYCLE COALITION

HOW TO SAFELY RIDE AN E-BIKE

RULES OF THE ROAD

- Safety is everyone's responsibility
- Drivers of cars must give 3 feet to pass and move to another lane if available
- Go with the flow of traffic
- Learn how to use bike infrastructure: bike boxes, bike signals, bikeways
- Our roadway network prioritizes motor vehicles

COMMON SENSE

- Watch out for pedestrians in shared spaces (yield)
- Be cautious of the speed differential (with people walking and with cars)
- Anticipate and report unsafe conditions
- If you have to ride on the sidewalk, be very careful at driveways

CALIFORNIA BICYCLE COALITION

TOOL TO FIGHT CLIMATE CHANGE

- Transportation is a leading source of greenhouse gas emissions
- Mode shift from driving to bicycling, walking, and taking transit is a critical component to achieving the state's GHG emissions reductions goals
- E-bikes open up bicycling as a viable mode for more people, for more types of trips

People won't choose to bicycle for everyday trips until they feel safe doing so.

Just like the interstate highway network tool coordinated investment, increasing bicycling will require an intentional investment in bicycle infrastructure.

- Serious injuries and deaths of people on bikes are unacceptable
- Our infrastructure should reduce likelihood of human error and reduce the consequences of error
- Infrastructure for people riding bikes is insufficient/unsafe in many parts of the state
- Serious injuries and fatalities of people on bikes are on the rise, and car drivers exceeding the posted speed limit are a major factor

SAFETY REQUIRES SYSTEMIC CHANGE

Often crashes involving people riding e-bikes are sensationalized. Be a savvy media consumer and ask:

Was the physical infrastructure appropriate for safe bicycle travel?

Was the involved motor vehicle driver speeding or otherwise not contributing to a safe roadway?

EQUITY AND SAFE SYSTEMS

- BIPOC communities and low-income communities often have poor infrastructure due to disinvestment
- High injury road networks disproportionately burden these areas
- Focusing safety improvements in these areas is critical to ensuring that our transportation system is equitable

Engaging historically disinvested communities meaningfully in the process to upgrade road safety is critical to creating safe multimodal facilities that people will use

Kendra Ramsey, AICP

Executive Director, California Bicycle Coalition

kendra@calbike.org

CALIFORNIA BICYCLE COALITION

CALIFORNIA HIGHWAY PATROL

ELECTRIC BICYCLE SAFETY AND TRAINING

AGPA Victoria Hunt

ASSEMBLY BILL 1946

- Authored by Assembly Member Tasha Boerner
- Signed into law by Governor Gavin Newson on August 15, 2022

Required the California Highway Patrol to:

- Develop a statewide safety and training program based on evidence-based practices for users of e-bikes
- Work with relevant stakeholders
- Post the training to the Department website

- California Department of Transportation
- California Air Resources Board
- California State Parks
- MOVE Santa Barbara County
- Santa Barbara County Association of Governments
- City of Newport Beach
- San Diego Bicycle Coalition
- Hospital Injury Prevention Coordinators from:
  - Scripps La Jolla Trauma Center
  - Stanford Health Care
  - Scripps Mercy Hospital San Diego
  - UCSF Benioff Children's Hospital

REQUIRED TOPICS

- General e-bike riding safety
- Emergency maneuver skills
- Rules of the road
- Laws pertaining to e-bikes

LESSON TOPICS

- Introduction
- Definition
- Considerations
- Fitting Your E-Bike
- Proper Equipment and Gear
- Ready to Ride
- Rules of the Road and Bicycle Laws
- Bicycle Crashes in California
- Hazards and How to Avoid Them
- Best Practices
- Conclusion

The mission of the California Highway Patrol is to provide the highest level of Safety, Service, and Security.

California Highway Patrol Programs & Services

Our motto is "Safety, Service, and Security." Read about how we provide those features to Californians here - through active programs, community outreach, and communication. We take a pro-active stance against crime, trying not only to protect our public, but by showing the public how to protect themselves. We promote safe driving for all ages, we have programs designed to teach kids about the dangers of drugs and alcohol, and we provide support to victims of crimes. Help us keep our roads and highways safe. Do your part by driving safely, and reminding others of their responsibilities on the road. Volunteer for one of our Community Outreach programs. Or be a mentor for young adults. California's safety is everyone's responsibility.

11-99 Foundation

Avoiding Vehicle Theft

Fleet Auction

Cannabis Tax Fund Grant Program

Office of Special Representative

Vulnerable Road Users

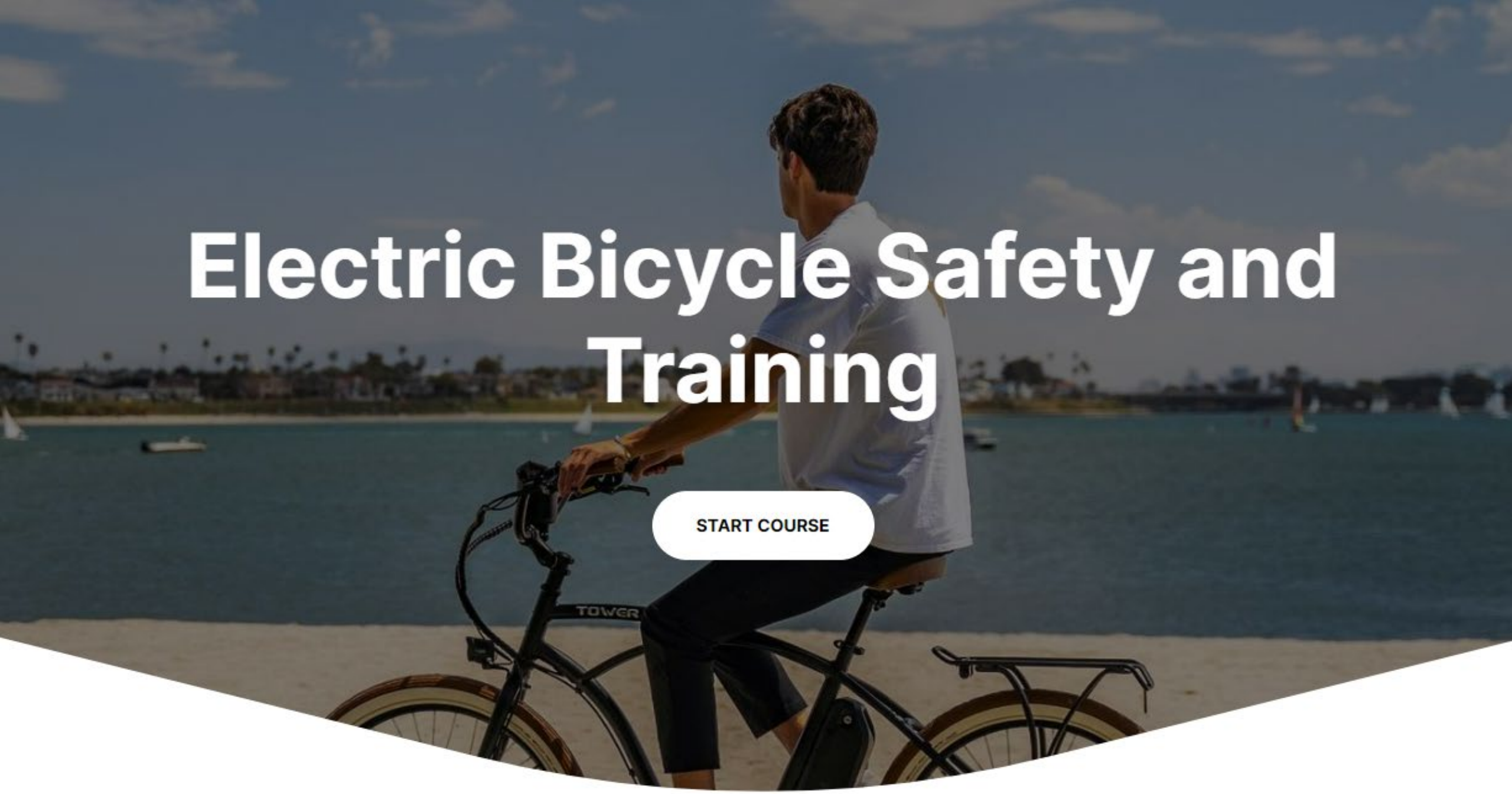
Vulnerable Road Users

Electric Bicycle Training and Safety

Electric Bicycles (E-Bikes) are a growing trend that allow riders to bike at higher speeds and travel greater distances. With the increase in E-Bike popularity, the need for safety education and training is essential. Click on the link to take the E-Bike training under the "Electric Bicycle Training and Safety" title.

Programs & Services
Services / Information
Vulnerable Road Users
Community Service Survey

Bicycle and Pedestrian Safety is a Shared Responsibility.

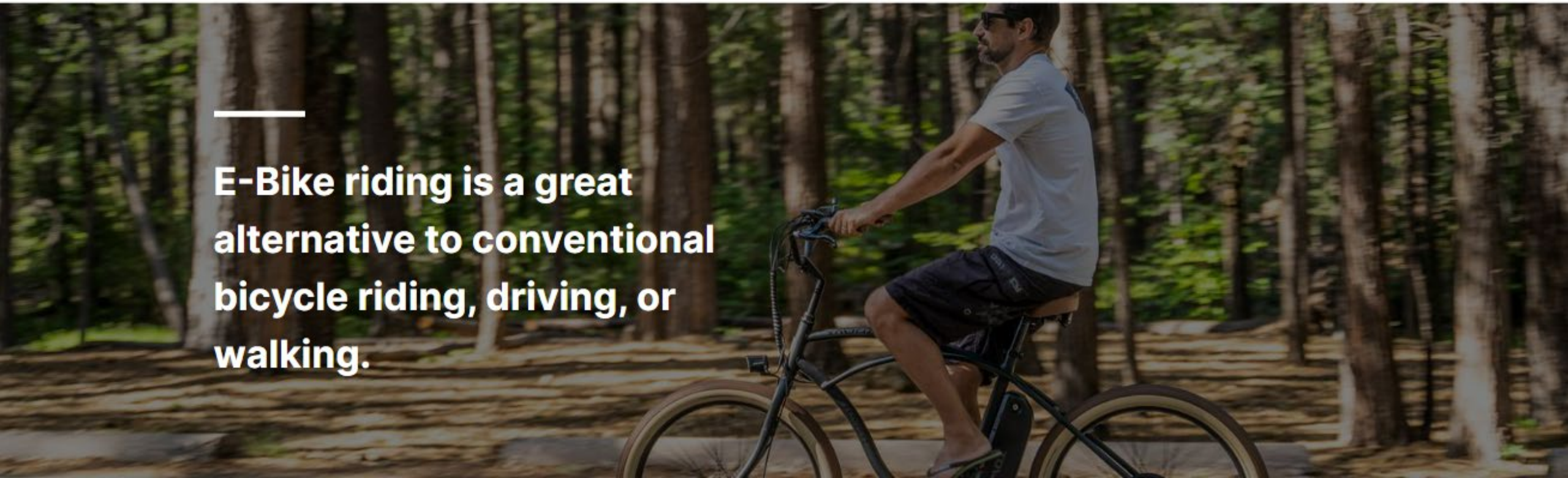


Electric Bicycle Safety and Training

START COURSE

Electric Bicycle Safety and Training

On August 15, 2022, Governor Gavin Newsom signed Assembly Bill (AB) 1946 into law. Authored by Assembly Member Tasha Boerner, AB 1946 requires the California Highway Patrol to develop statewide safety and training programs based on evidence-based practices for users of electric bicycles (E-Bikes), including, but not limited to, general E-Bike riding safety, emergency maneuver skills, rules of the road, and laws pertaining to E-Bikes.



California Law has identified three classifications of E-Bikes. We will discuss these classifications below. Once finished with the classification review continue to scroll down.

Electric Bicycle (E-Bike) Classifications

California Law has identified three classifications of E-Bikes. Click the start button below to learn more about each classification.

START >

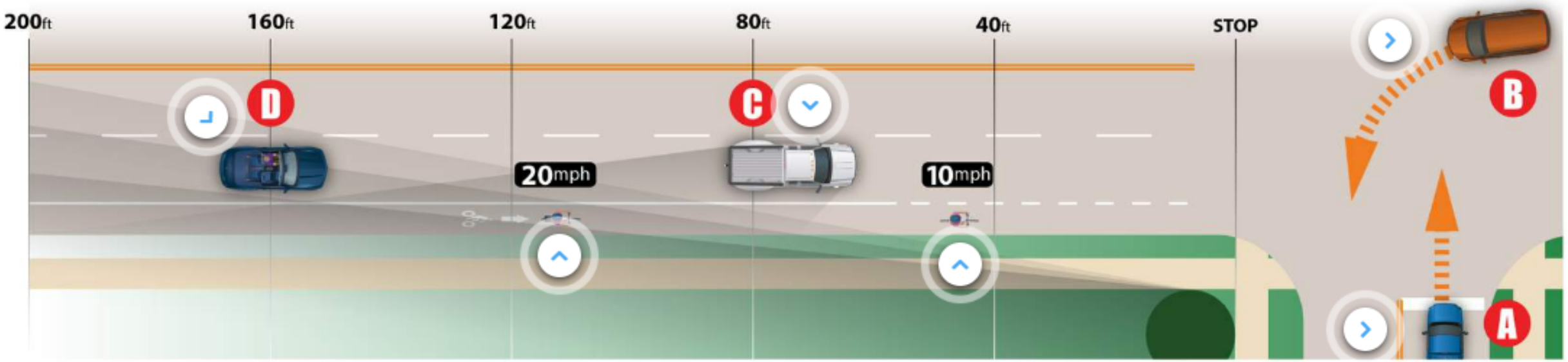
Parental Considerations

Be aware that while something may look like an E-Bike, there are many electric vehicles that do not meet the requirements to be classified as an E-Bike. These may not be street legal and can be dangerous for children. Additionally, some may require a driver license to operate.

It's important to know your child's riding ability, ensure they know the rules of the road, and have taken a bicycle skills and safety training course.

Young riders may not have a driver license or know the rules of the road, but they may be operating an E-Bike on public roads.

When riding on a public roadway, you must remain vigilant, anticipate other roadway users movements, and prepare to avoid a crash. Click on the arrows below to discuss each motorist and bicyclist, their actions, how they are communicating their intentions, and what their view may be hindered by.



Distance needed to perceive, react and brake to a full stop at 10 vs 20 mph.
Perception & reaction time = 2.5 seconds. Braking distance based on median skill level.

Illustration courtesy of the American Bicycling Education Association

Conclusion

LESSON 11 OF 11

Summary

E-Bikes are fun, exciting, and provide a variety of benefits. Although there are numerous benefits to owning an E-Bike, the higher speeds and heavier bikes can bring unique safety considerations. Remember, ride READY and be safe!

Congratulations!

You completed the training. Click the link for your certificate of completion for this training.

CERTIFICATE LINK

GET MOVING
WITH AN ELECTRIC BICYCLE

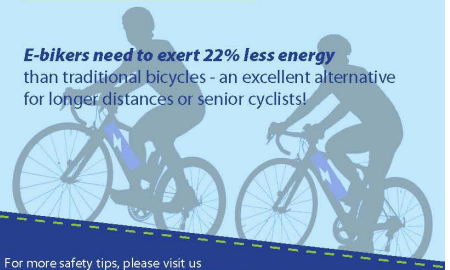
E-bikes are fun to ride and allow you to go farther and faster with less physical effort.

Riding an e-bike instead of using a car can reduce your carbon impact.

E-Bikes allow people of all ages and physical abilities to experience the joy of cycling & exercise.

Health Benefits of Riding

- Improved Cardiovascular Health
- Improved Aerobic Capacity
- Blood Sugar Control
- Burn Calories & Increase Strength
- Boost Immunity



E-bikers need to exert 22% less energy than traditional bicycles - an excellent alternative for longer distances or senior cyclists!

For more safety tips, please visit us online at ***www.chp.ca.gov/Bike-and-Ped-Safety***

Or scan our QR code

OTS CALIFORNIA OFFICE OF TRAFFIC SAFETY

E-Bike CLASSIFICATIONS

CLASS 1

PEDAL ASSIST
<20 MPH

A class 1 electric bicycle," or "lowspeed pedal-assisted electric bicycle," is a bicycle equipped with a motor that provides assistance only when the rider is pedaling, and that ceases to provide assistance when the bicycle reaches the speed of 20 miles per hour.

CLASS 2

THROTTLE ASSIST
<20 MPH

A class 2 electric bicycle," or "lowspeed throttle-assisted electric bicycle,"is a bicycle equipped with a motor that may be used exclusively to propel the bicycle, and that is not capable of providing assistance when the bicycle reaches the speed of 20 miles per hour.

CLASS 3

PEDAL ASSIST
<28 MPH

A class 3 electric bicycle," or "speed pedal-assisted electric bicycle," is a bicycle equipped with a motor that provides assistance only when the rider is pedaling, and that ceases to provide assistance when the bicycle reaches the speed of 28 miles per hour, and equipped with a speedometer.

Additionally, to operate a Class 3 E-Bike you must:
- Be 16 years of age or older
- Wear a helmet, regardless of age

No driver's license is required. Per California Vehicle Code Section 21212, **riders under the age of 18 must wear a helmet, regardless of bicycle type.**

Any purchased or modified E-Bike that can travel at speeds above 28 miles per hour is no longer considered an E-Bike, and is considered an "out of class electric vehicle" which is illegal to operate on public roadways.

Tampering with or modifying your E-bike battery or speed settings could result in an illegal modification leading to potential injury or death.

GSU00793

RIDE READY

Ride Predictably
- Ride in a straight line to minimize weaving in traffic
- Signal before making a turn
- Check behind you before making a turn or changing lanes

Embrace the Rules of the Road
- Obey all traffic signals and signs
- Ride in the rightmost lane or bicycle lane in the same direction as traffic

Always Think Ahead
- Make sure your bike is good to go with an ABC-E Quick Check
- Carry tools and supplies for your ride
- Watch for turning vehicles and car doors
- Brake sooner on an e-bike. You will need to slow down sooner because e-bikes have more power, speed, and weight than conventional bicycles

Do Be Seen and Be Safe
- Ride where people can see you
- Wear bright clothing
- Use a front white light, rear red light and reflectors if riding during times of darkness

You Control Your Safety
- Always wear a helmet
- Ride at a safe speed that is appropriate for where you are riding
- Think for yourself on group rides. While riding in a group is fun, it is crucial that you rely on your own judgement rather than someone else's

E-Bike
SAFE CYCLING TIPS

Bicycle Safety Check is as easy as A.B.C.E. Quick Check

ABC-E Quick Check

Air – check tires for air
Brakes – check brakes for wear
Chain & Cassette – check for excessive wear/dirt
Electric – check battery and electric components
Quick – check quick releases
Check – check the bike for any potential issues

Safety Tips when Riding

Be Safe:
Wear a helmet
Identify hazards and be ready to react

Be Visible:
Dress for safety and be seen
Wear reflective clothing to be seen at night

Be Aware:
Think ahead. Pay attention to vehicles, bicyclists, and pedestrians
Follow rules and road signs. Follow traffic direction of travel

Be Predictable:
Ride in a safe and consistent manner
Communicate your intentions with hand and arm signals

For more safety tips, please visit us online at ***www.chp.ca.gov/Bike-and-Ped-Safety***
Or scan our QR code

OTS CALIFORNIA OFFICE OF TRAFFIC SAFETY

GSU00793

Questions?

California Highway Patrol
Enforcement Planning Division
Research and Planning Section
916-843-3340

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E-BIKE & BICYCLE INJURY DATA

Colin Chew, MPH, MS

California Department of Public Health

Crash Medical Outcomes Data Project

April 3, 2024

INTRODUCTION TO E-BIKE & BICYCLE INJURY DATA

- The Crash Medical Outcomes Data (CMOD) staff analyzed E-Bike injuries by using the following source data: 2022 Emergency Department (ED) Data and the 2022 Patient Discharge Data (PDD). We receive the ED and PDD from the California Department of Health Care Access Information (HCAI).

- According to the Centers for Medicare & Medicaid Services, the International Classification of Diseases Clinical Modification (ICD-10-CM) is a "morbidity classification published by the U.S. for classifying diagnoses and the reasons for visits in all health care settings".[1]

- CMOD used ICD-10-CM injury codes to identify E-Bike and Bicycle related injuries (Emergency Department injuries and hospitalizations) from the source data.

California Department of PublicHealth

INTRODUCTION TO E-BIKE & BICYCLE INJURY DATA (CONT.)

- The ICD-10-CM E-Bike injury codes were recently introduced, so CMOD staff was only able to compile 3 months of E-Bike injury data (October – December 2022).
- Inclusion criteria: non-fatal injuries, resident of California
- ED injuries include service dates from 10/1/2022 – 12/31/2022, and Hospitalizations include discharge dates from 10/1/2022 – 12/31/2022.

California Department of PublicHealth

E-Bike & Bicycle Injuries Treated in Emergency Department and Hospital (Oct. – Dec. 2022)

Treated in Emergency Department or Hospital	E-Bike Injuries	%	Bicycle Injuries	%
Emergency Department	481	80.0%	7,720	88.2%
Hospital	120	20.0%	1,032	11.8%
Total	601	100.0%	8,752	100.0%

- The table above displays that E-Bike related injuries were 4 times more likely to be treated in the ED than in the Hospital and that Bicycle related injuries were slightly under 7.5 times more likely to be treated in the ED than in the hospital.

- Based on the data available, Bicycle related injuries were more likely to be treated in the ED compared to E-Bike related injuries. Conversely, E-Bike related injuries were more likely to be treated in the Hospital compared to Bicycle related injuries.

California Department of PublicHealth

Top 5 ICD-10-CM Code Descriptions Involving E-Bike Injuries (Oct. – Dec. 2022)

ICD-10-CM Code Description	E-Bike Injuries	%
Electric (assisted) bicycle driver injured in noncollision transport accident in traffic accident	148	24.6%
Electric (assisted) bicycle driver injured in noncollision transport accident in nontraffic accident	102	17.0%
Electric (assisted) bicycle driver injured in collision with car, pick-up truck or van in traffic accident	98	16.3%
Electric (assisted) bicycle rider (driver) (passenger) injured in unspecified traffic accident	88	14.6%
Electric (assisted) bicycle (driver) (passenger) injured in unspecified nontraffic accident	29	4.8%

For the purposes of the analysis in this presentation, injuries are the sum of ED Visits and Hospitalizations. The table above reveals the top 5 E-Bike related injuries sorted by ICD-10-CM Code Description.

California Department of PublicHealth

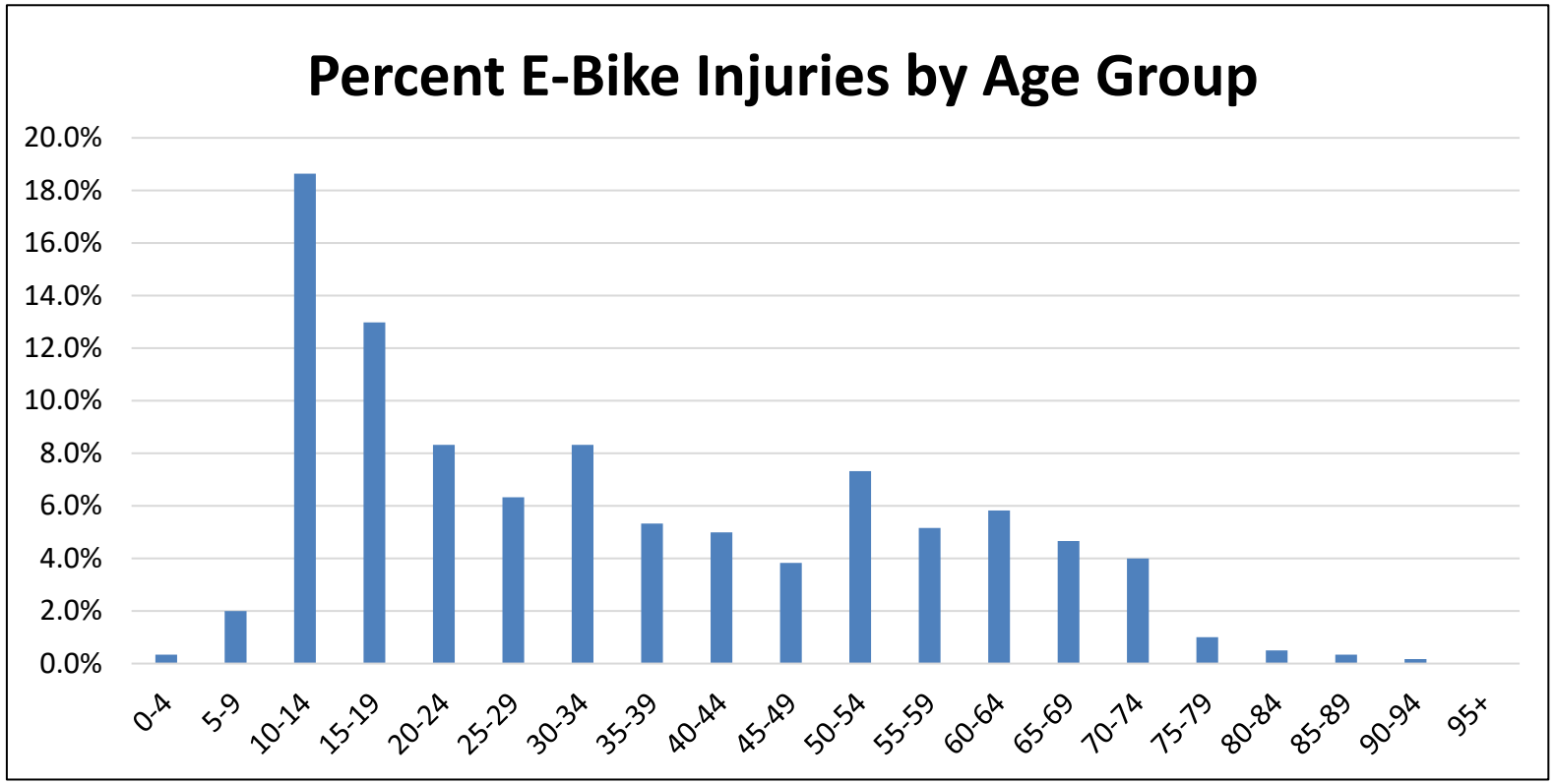
E-Bike & Bicycle Injuries by Sex (Oct. – Dec. 2022)

Sex	E-Bike Injuries	%	Bicycle Injuries	%
Male	454	75.5%	6,973	79.7%
Female	147	24.5%	1,779	20.3%
Total	601	100.0%	8,752	100.0%

- The data in the table above reveal there were slightly over 3 times as many males compared to females who sustained an E-Bike related injury and slightly under 4 times as many males compared to females who sustained a Bicycle related injury.

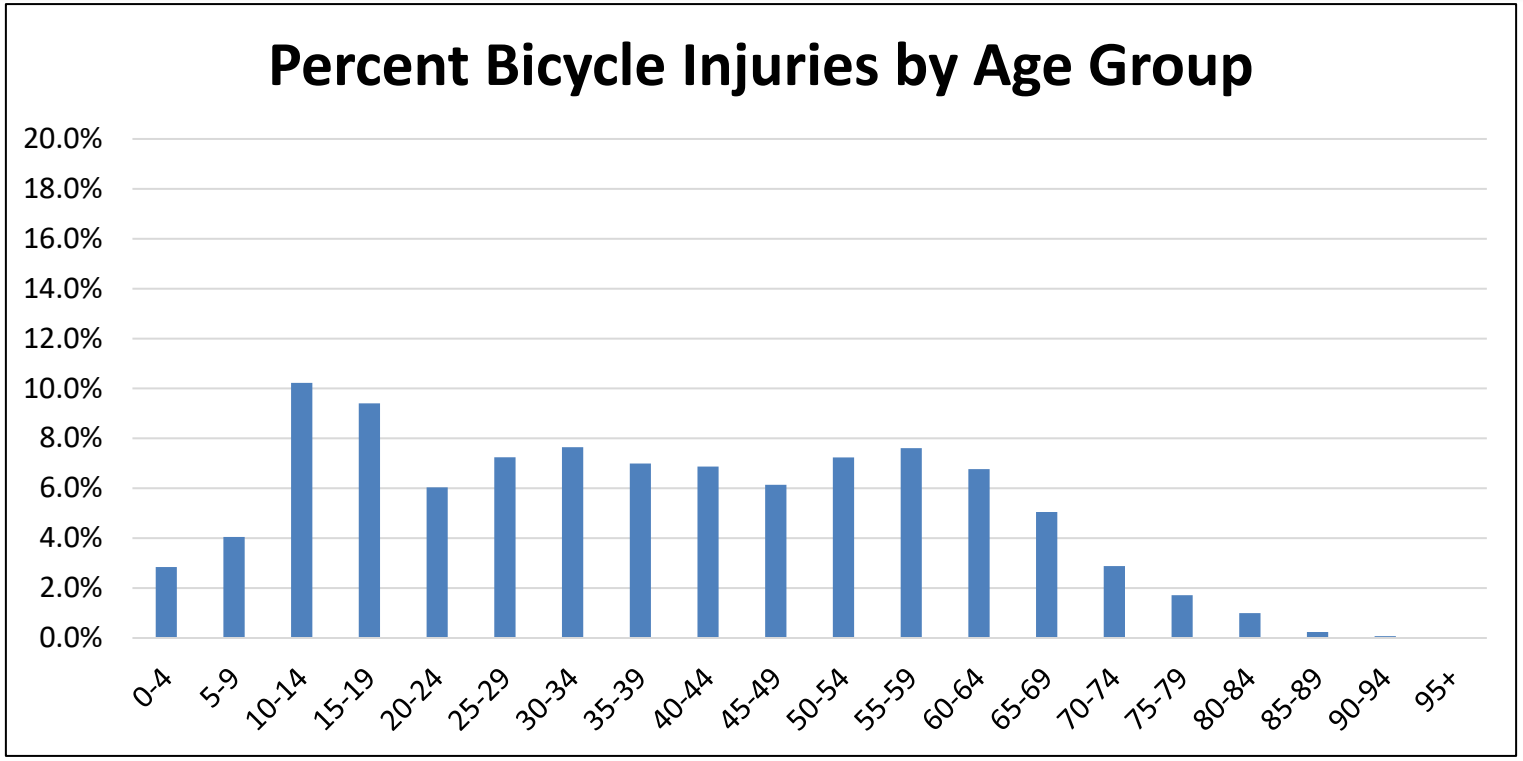
- With the data available, a greater proportion of females sustained E-Bike related injuries compared to those who sustained Bicycle related injuries. A greater proportion of males sustained Bicycle related injuries compared to those who sustained E-Bike related injuries.

California Department of PublicHealth



The graph above displays that E-Bike related injuries begin in the 0-4 age group, increase in the 5-9 age group, and peak in the 10-14 age group. The 15-19 age group has a large percentage of E-Bike related injuries as well.

California Department of PublicHealth



The graph above displays that Bicycle related injuries begin in the 0-4 age group, increase in the 5-9 age group, and peak in the 10-14 age group. The 15-19 age group has a large percentage of Bicycle related injuries as well. Within the 20-64 age group, the percentage of Bicycle related injuries hover between 6.1% and 7.6%.

California Department of PublicHealth

Injuries Involving E-Bikes & Bicycles by Race (Oct. – Dec. 2022)

Race	E-Bike Injuries	%	Bicycle Injuries	%
White	309	51.4%	3,978	45.5%
Black	32	5.3%	565	6.5%
Hispanic	162	27.0%	2,797	32.0%
Asian	37	6.2%	652	7.4%
Pacific Islander	1	0.2%	34	0.4%
American Indian/Alaskan Native	1	0.2%	25	0.3%
Multiracial	9	1.5%	133	1.5%
Other/Unknown	50	8.3%	568	6.5%
Total	601	100.0%	8,752	100.0%

The data in the table above reveal the White and Hispanic racial categories composed the majority of E-Bike and Bicycle related injuries. The proportion of White individuals who sustained E-Bike related injuries was 5.9% greater than those who sustained Bicycle related injuries. Meanwhile, the proportion of Hispanic individuals who sustained E-Bike related injuries was 5% less than those who sustained Bicycle related injuries.

California Department of PublicHealth

Injuries Involving E-Bikes & Bicycles by Top 5 Counties of Patient Residence (Oct. – Dec. 2022)

Hospital Patient County	E-Bike Injuries	%	Hospital Patient County	Bicycle Injuries	%
Orange	152	25.6%	Los Angeles	1,683	20.3%
Los Angeles	103	17.3%	Orange	670	8.1%
San Diego	79	13.3%	San Diego	559	6.7%
Riverside	40	6.7%	Santa Clara	515	6.2%
San Bernardino	25	4.2%	Alameda	471	5.7%

- The table above reveals Orange, Los Angeles, and San Diego Counties were among the top 3 counties of patient residence for both E-Bike and Bicycle related injuries.

- The percentage of E-Bike related injuries in Orange County is 17.5% higher than that of Bicycle related injuries in the same county. The percentage of E-Bike related injuries in Los Angeles County is 3% lower than that of Bicycle related injuries in the same county.

California Department of PublicHealth

CONCLUSIONS

- Males and the 10-14 and 15-19 age groups are at risk for E-Bike related injuries. Orange, Los Angeles, and San Diego Counties were among the top 3 counties of patient residence for E-Bike and Bicycle related injuries.
- E-Bike related injuries have a slightly greater proportion of females and Californians who are White, and they have a greater proportion of patients treated in the hospital compared to those treated in the hospital for Bicycle related injuries. E-Bike related injuries have a sharper peak around ages 10-19 and are more concentrated in Orange, Los Angeles, and San Diego Counties. These three counties accounted for 56.2% of E-Bike related injuries compared to 35.1% of Bicycle related injuries.
- Limitations: Because E-Bike ICD-10-CM codes were recently released, there were only 3 months of available data within the 2022 ED and Hospitalization data.
- Next steps: CMOD will continue analyzing more data as they become available. CMOD's goal is to link ED and Hospitalization injury data to the California Highway Patrol's (CHP's) Statewide Integrated Traffic Records System (SWITRS) data to learn more about crash circumstances, as they pertain to traffic injuries.

California Department of PublicHealth

REFERENCE

[1] Centers for Medicare & Medicaid Services. (2022, April 1). *ICD-10-CM Official Guidelines for Coding and Reporting*. https://www.cms.gov/files/document/fy-2022-icd-10-cm-coding-guidelines-updated-02012022.pdf

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California Department of PublicHealth

E-Bike Injuries Reported in Emergency Room Records

Preliminary Results

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Kevin Fang, PhD
Amelia Le

Active Transportation Resource Center Webinar (Caltrans/CDPH)

April 3, 2024

Acknowledgements

This analysis is a small part of a larger study about e-bike safety policy funded by MTI and required by CA Senate Bill 381 (Min - 2023)

MINETA TRANSPORTATION INSTITUTE

The research questions presented today

1. What personal characteristics and incident circumstances were associated with e-bike injuries reported in the NEISS in 2022?
2. How reliable is NEISS data on e-bike injuries?

Overview of presentation

- Study method: Coding and analyzing NEISS case data
- Findings about personal and behavioral characteristics associated with e-bike incidents
- Findings about the reliability of the NEISS data for e-bike analysis
- Conclusions

About the NEISS incident records

NEISS = National Electronic Injury Surveillance System (details)

- A dataset from the US Consumer Product Safety Commission that tracks emergency room visits associated with “unintentional consumer product-related injuries and deaths”
- Hospital staff code patient case reports to create the NEISS cases
- Extensive list of consumer products documented - from eggbeaters to end tables to e-bikes (but excludes “motor vehicles”)
- A nationally representative probability sample of 96 hospitals with 24-hour emergency rooms

Source: *NEISS Coding Manual*, January 2024

Data in each NEISS case

Numerically coded data, including age, gender, diagnosis/es, body part(s), product(s), location (includes “street or highway”)

“Comment” of 400 characters max that is supposed to include:

- Details about the incident – who, what, why, when, where, and how
- Information given about product brand, manufacturer, and model

Sample:

31YOM PRESENTS 1 WK W/ RT RIB PAIN WAS RIDING ELECTRIC BIKE WAS STRUCK ON LT SIDE CAUSING HIM TO FALL AND LAND ON RT SIDE DX: CHEST WALL PAIN

MTI process to code NEISS cases

Reviewed case comments to add additional codes for each case:

- **Device type**: e-bike, moped, other
- **Patient's activity when incident occurred**: operator traveling on device, passenger traveling on device, bystander, etc.
- **Immediate cause of injury**: collides with a motor vehicle, pedestrian, stationary object; falls (without a collision), etc.
- **Additional factors leading to injury**: swerving to avoid collision, travel surface, device failure, etc.
- **Helmet use**: yes, no, unknown

Findings: Who Is Injured

Identifying e-bike cases

- Injury cases in the NEISS are organized by product codes
- In 2022, e-bike injuries are supposed to be coded as product type 3215: “Mopeds or power-assisted cycles”
- We reviewed the comment for each case to identify the e-bike cases

We identified 519 cases that clearly involved an e-bike out of the 1,426 cases coded as 3215

Patient sex and age

Sex	Share of cases
Male	76%
Female	24%
Other*	0%

Age	Share of cases
0-17	16%
18-50	56%
51-64	17%
65+	11%

* Includes cases where gender was not recorded and NEISS code “Intersex, Non-Binary, or Another Classification”

Preliminary results

Circumstances of Injury

What was patient doing when injury occurred?

Circumstance	Share of cases
Operator traveling on e-bike	91%
Passenger traveling on e-ike	2%
Non-travel by e-bike owner/user	2%
Bystander (not using e-bike)	3%
None of the above OR cannot tell	2%

Preliminary results

Immediate cause of injury

Circumstance	Share of cases
Falls off e-bike	53%
E-bike rider collides with vehicle	29%
E-bike rider hits stationary object	7%
Other/unknown	11%

Preliminary results

Primary body part & diagnosis

Body part	Share of cases
Head	19%
Face	12%
Knee	11%
Trunk (upper)	8%
Shoulder	7%
Trunk (lower)	6%
Other	37%

Diagnosis	Share of cases
Fracture	25%
Contusions and abrasions	20%
Lacerations	13%
Internal organ injury	13%
Strain or sprain	7%
Concussion	2%
Other	20%

Preliminary results

Findings:

Reliability of NEISS data

MANY opportunities for errors with NEISS data

1. Patient (or person accompanying the patient) describes what happened
    - Patient/friend may not know at all (e.g., patient was unconscious), misremember, or choose not to describe event accurately (e.g., to hide embarrassing behavior)
2. ER staff writes up case notes
    - Person writing notes may misunderstand the patient, fail to collect all pertinent data, be working off an inaccurate AI transcript prepared from the treating medical professional's notes, or make careless errors
3. NEISS coder reviews ER case notes and writes up a NEISS case
    - NEISS coder may misinterpret the notes, omit information relevant to e-bike researchers (e.g., detailed location of incident), or make careless errors
4. MTI coder reviews comments to code factors of interest, such as device type
    - MTI coder misinterprets the NEISS case notes or makes careless errors

It is unlikely that persons 1,2, and 3 care about the details that e-bike researchers care about

Conclusion

Most common patient characteristics and circumstances

Demographics: male (76%) and adult (84%)

Circumstances

- Location: street or highway (48%), unknown (38%)
- Activity at time of injury: traveling on e-bike (91%)
- Immediate cause of injury: falls off e-bike (53%)

Medical details

- Primary body part: head (19%), face (12%), or knee (11%)
- Diagnosis: fracture (25%), contusion/abrasion (20%), laceration (13%), or internal organ injury (13%)
- Disposition: treated and released (82%)

Things we CANNOT know from NEISS data

1. NEISS not designed to capture critical details such as:
    - Whether the patient or drivers of other vehicles involved were acting recklessly
    - The type of infrastructure where the injury occurred

2. The rate at which ER-reported injuries occur (e.g., injuries per trip taken or per mile traveled)

3. The total number of e-bike injuries nationally
    - NEISS misses injuries where patient did not visit an ER
    - NEISS e-bike sample is too small to generalize to the full US population

What we CAN learn from the findings

1. Identify e-bike injury issues of concern that warrant further study
    - What types of injuries are common?
    - What transportation systems factors appear frequently?

2. Explore whether certain types of injuries are correlated with specific patient demographics or incident characteristics

3. Compare the number & circumstances of ER-reported e-bike injuries to injuries on similar devices such as pedal bicycles, mopeds, and e-scooters

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QUESTIONS?

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