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TRANSPORTATION RESEARCH BOARD

A Research Roadmap for Transportation and Public Health

June 29, 2020

@NASEMTRB
#TRBwebinar

PDH Certification Information:

- 1.5 Professional Development Hours (PDH) – see follow-up email for instructions
- You must attend the entire webinar to be eligible to receive PDH credits
- Questions? Contact Reggie Gillum at RGillum@nas.edu

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Learning Objectives

1. Identify how transportation affects health outcomes

2. Identify opportunities to integrate health into transportation practices

#TRBwebinar

A Research Roadmap for Transportation and Public Health

Overview of NCHRP 20-112/Report 932

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June 29, 2020

Project team

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Research Roadmap available at:

http://www.trb.org/Main/Blurbs/179959.aspx

Project scope

- Objectives:
  - Develop a holistic and strategic research roadmap
  - Identify evidence to support practical and useful information, and implementable tools, for state DOTs and partners

- Research products:
  - 10-year strategic roadmap
    - Six specific Research Problem Statements
    - Communications/implementation plan
  - PowerPoint slides
  - Technical report
  - Excel file of studies reviewed (*bonus*)

Guiding questions

- How is health defined within the transportation community?
- How does transportation impact health, and vice versa?
- In what ways are transportation agencies considering health in current practices?
- What research, tools, and guidance are lacking or needed to improve practice?

Iterative literature review + stakeholder engagement

- 300+ research articles referenced in Final Report
- 42+ Institutional and agency reports and strategic plans
  - Including committee/task force reports
  - State of practice/case studies and other gray literature
- 42+ TRB Research Needs Statements and Research in Progress records
- 22 interviews with federal, state, and local stakeholders
  - Rural and urban states and cities
  - Planning, engineering, transit, maintenance/ops, public health
  - TRB, FHWA, and CDC

What is health, within the context of transportation?

World Health Organization health definition

> *“A state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.”*

What are the ways that transportation impacts health, and is impacted by health?

Transportation and health intersect in so many ways

Image Source: pedbikeinfo.org/ Toole Design Group


Image Source: pedbikeinfo.org

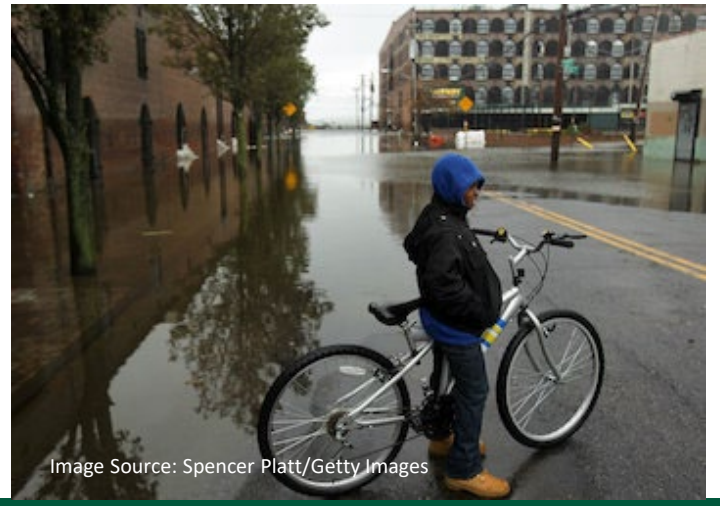


Image Source: Spencer Platt/Getty Images

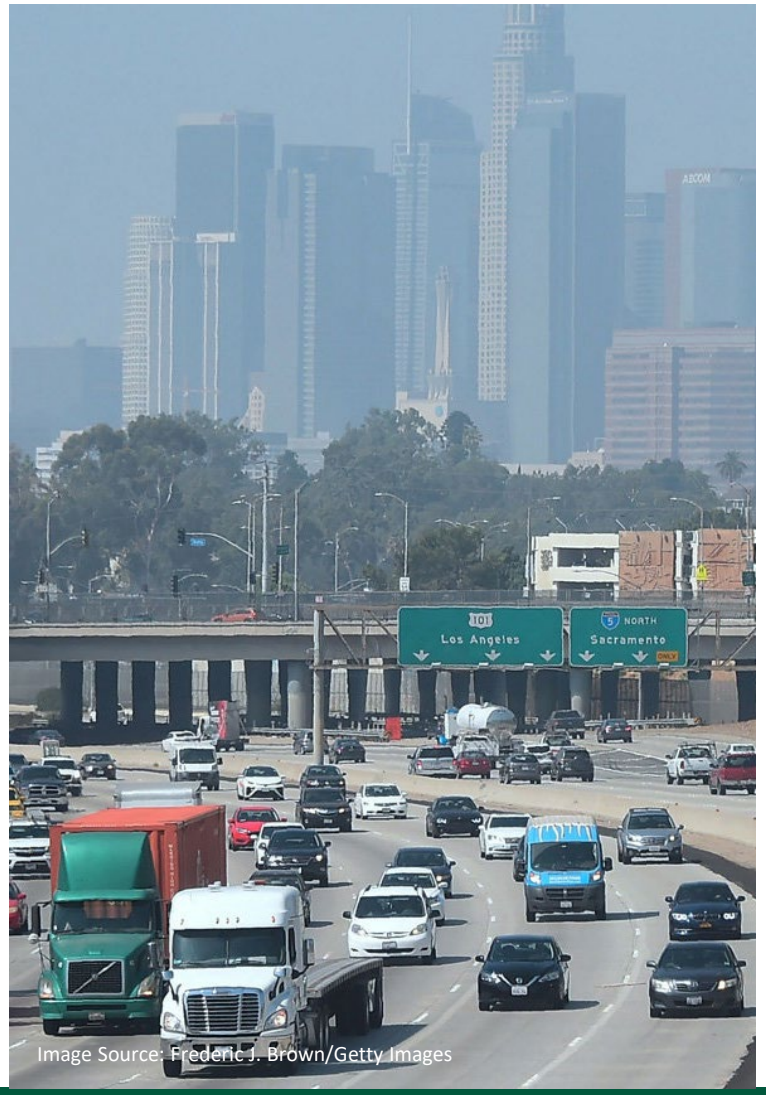
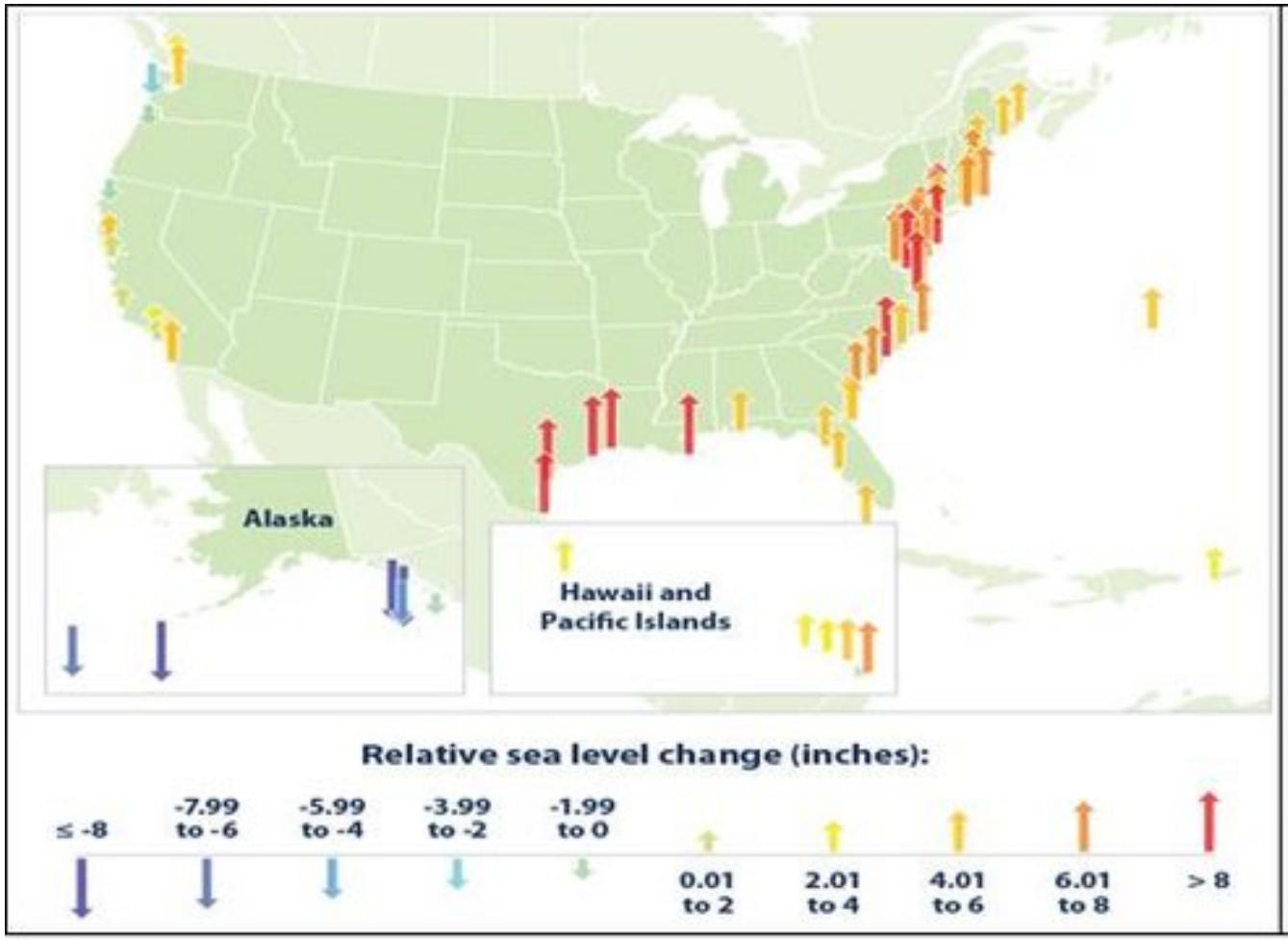


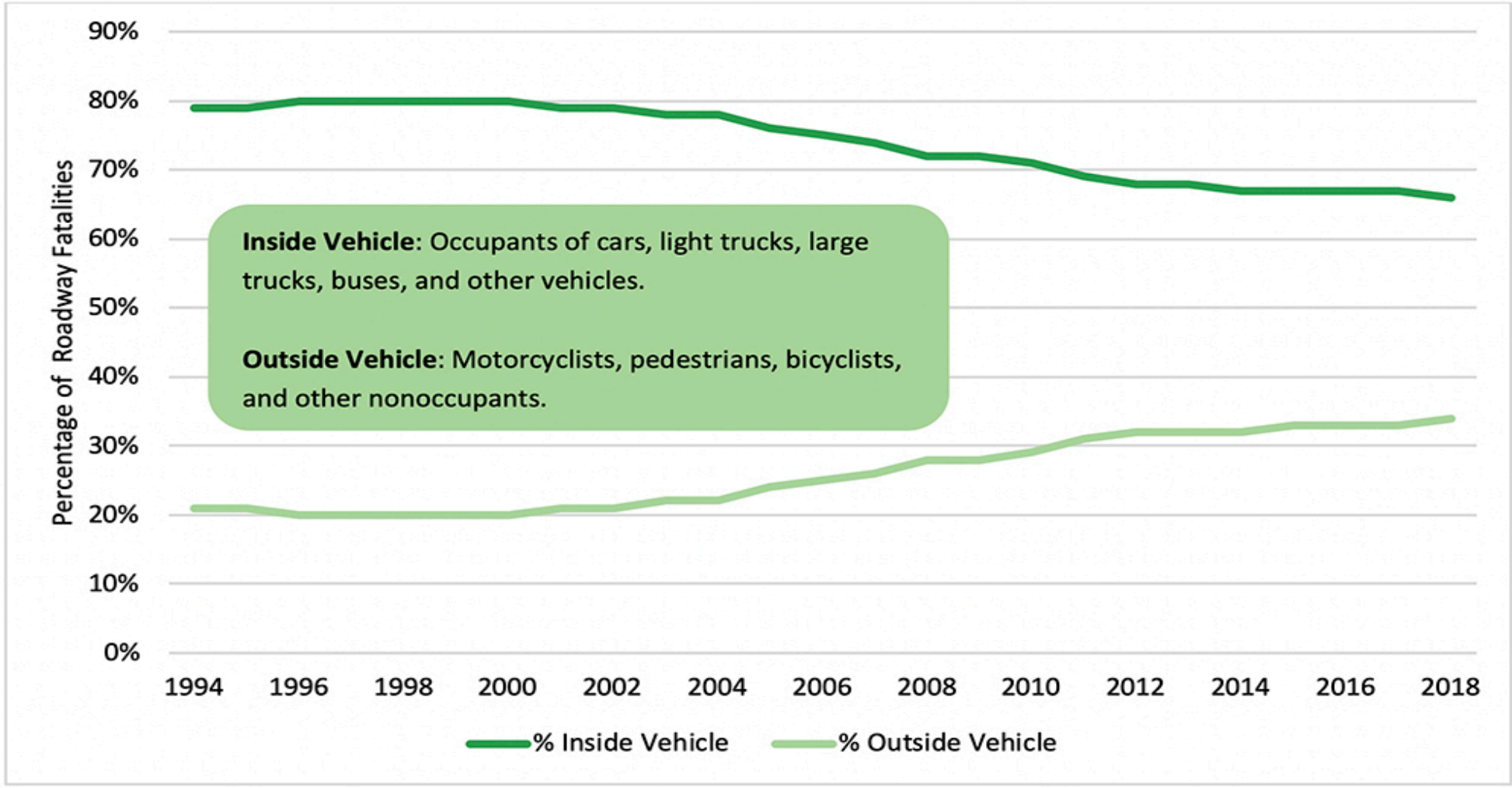
Image Source: Frederic J. Brown/Getty Images

Climate change is a growing health threat



Source: Sanjay Tewari and Wesley Palmer, 2018

Injuries affect health, and health status affects injury outcomes



Source: Pedestrian and Bicycle Information Center (PBIC) with data from Fatality Analysis Reporting System (FARS)

Heart disease remains the top killer of Americans

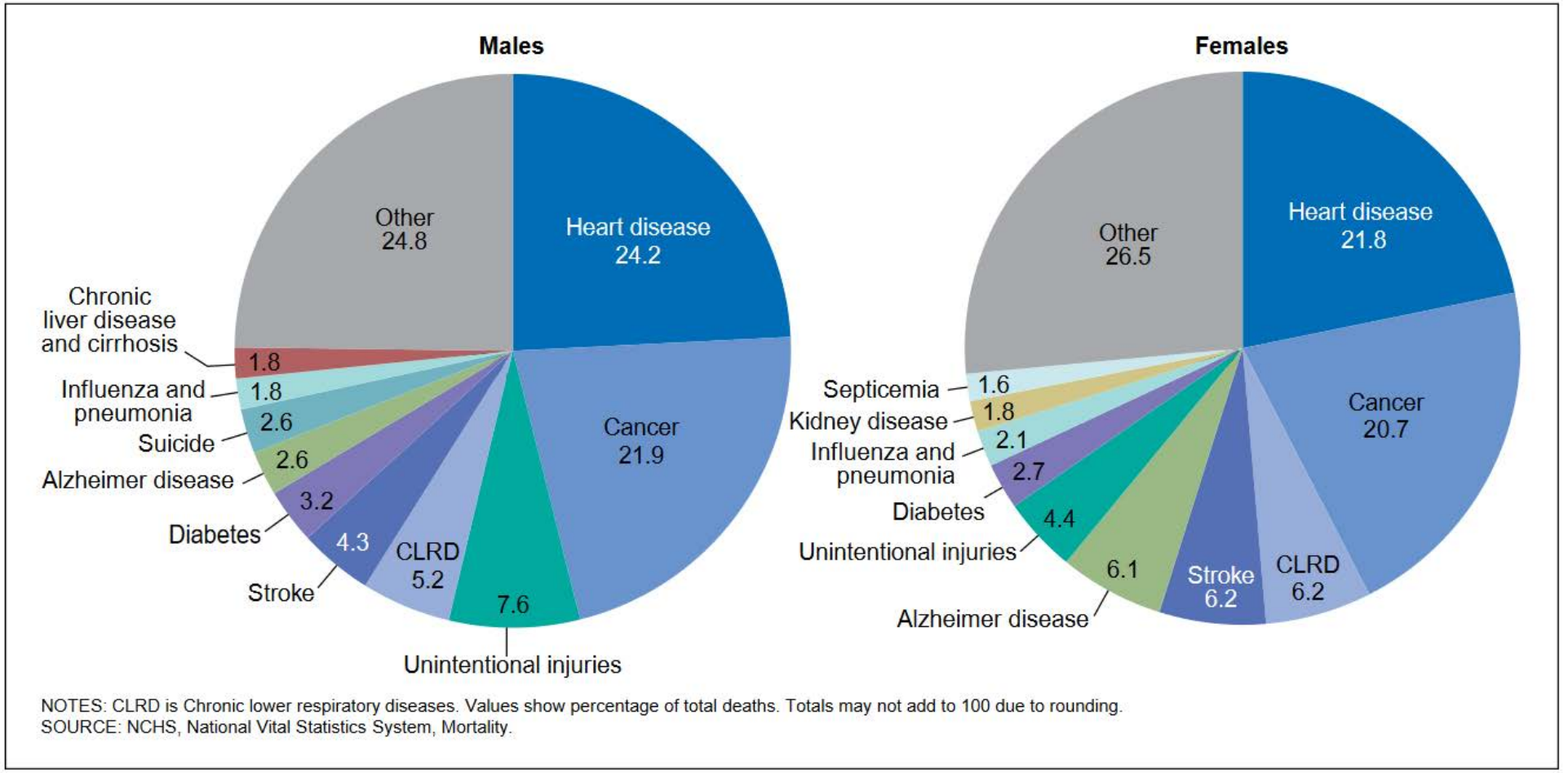
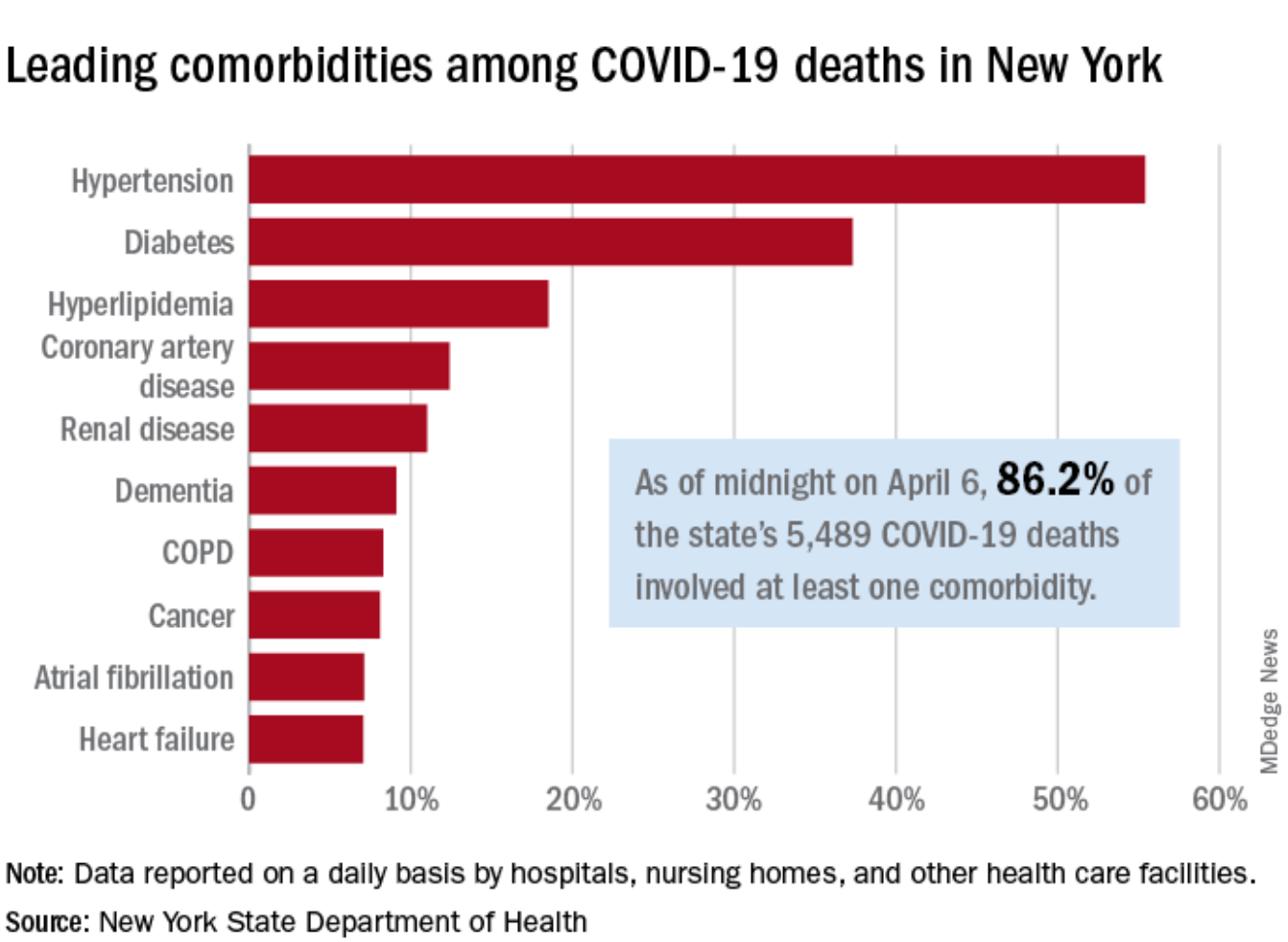


Figure 1. Percent distribution of the 10 leading causes of death, by sex: United States, 2017

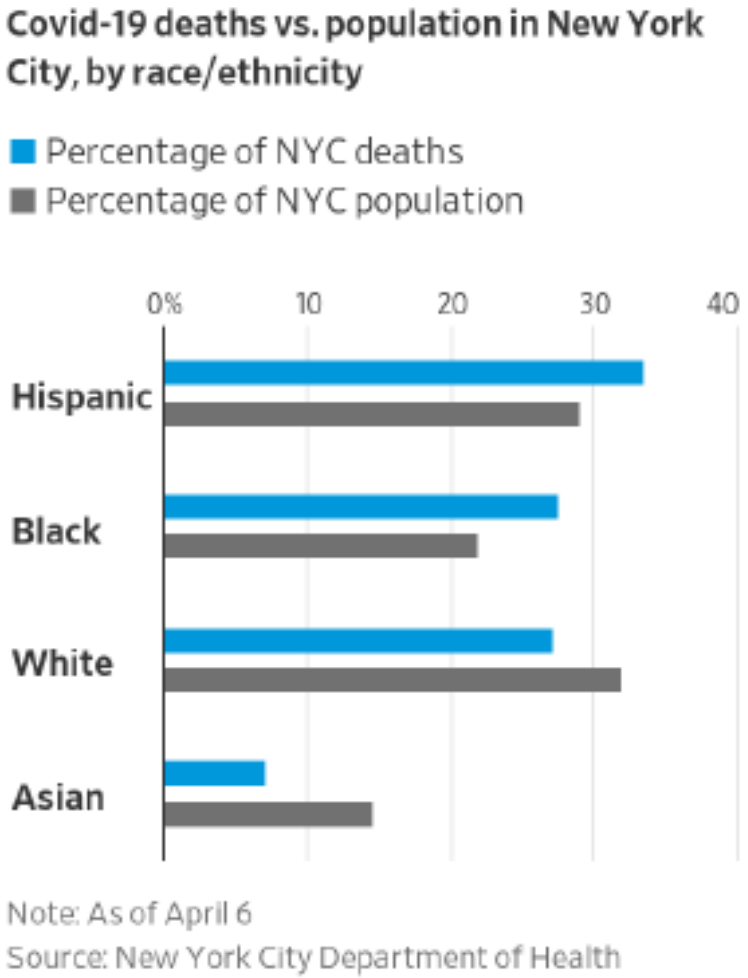
Source: 2019 National vital statistics report, https://www.cdc.gov/nchs/data/nvsr/nvsr68/nvsr68_06-508.pdf

Heart disease is contributing to COVID-19 fatalities



Note: Data reported on a daily basis by hospitals, nursing homes, and other health care facilities.

Source: New York State Department of Health



Note: As of April 6

Source: New York City Department of Health

Source: New York City Department of Health

We have invested trillions of dollars to make active transportation difficult or impossible

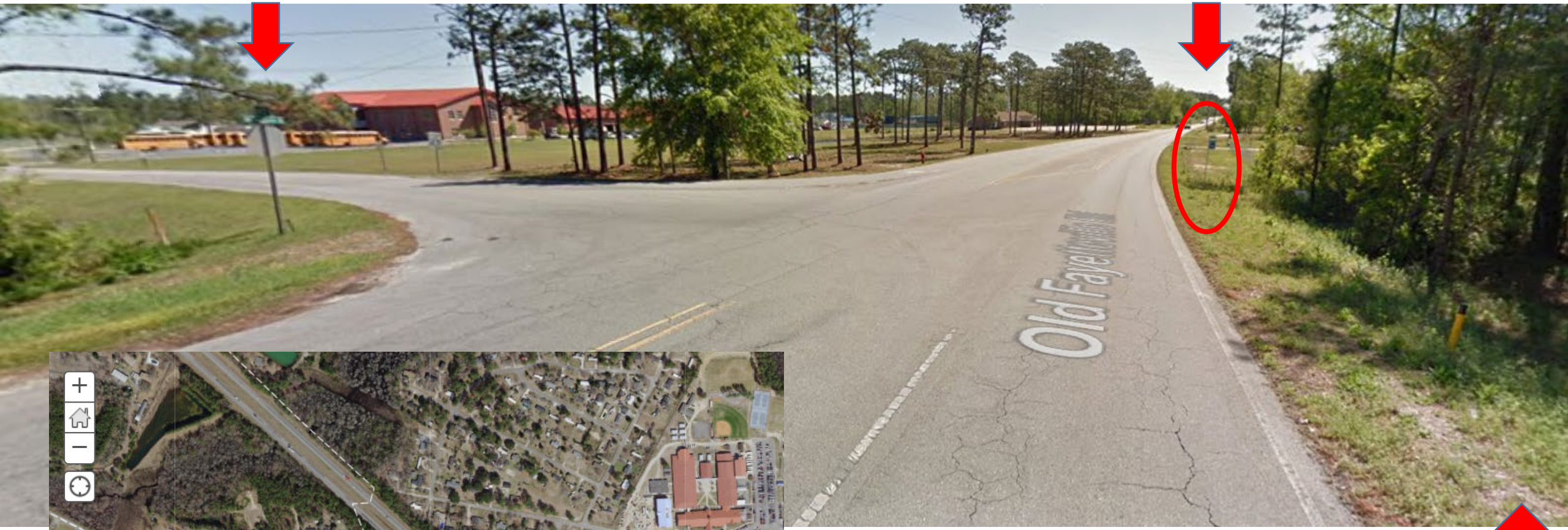
Residential subdivision

Highway interchange

Source: Slide presented by Jim Sallis at the December 2019 CHAT conference

School

Transit stop



Pedestrian facility

Persistent effects of racism in transportation

- Deeply embedded structural racism within transportation systems has contributed to large disparities in transportation access and safety:
  - Redlining practices and legacies
  - Zoning and land use
  - Highway placement
  - Traffic enforcement/policing
  - Transportation planning/engagement practices
  - Allocation of transportation resources

Source: Ward, Ariel. Twitter post. June 5, 2020, 1:35 PM. https://twitter.com/dubonthestreets?lang=en.

Pathways to health

Improving access to opportunities and services

Providing opportunities for physical activity

Mitigating human exposure to environmental risks (air and noise pollution)

Preventing injuries and improving safety

Supporting resiliency to disaster and extreme weather events

Promoting community connectedness and vitality

What current practices are addressing health?

Many DOTS are using innovative approaches to institutionalize health considerations

- Executive or legislative mandates and policy approaches
- Intra-department or agency collaboration and staffing agreements
- Data integration and sharing
- Applying health decision-making tools in various processes
- Setting health performance targets and measuring outcomes
- Pilot-testing new technologies in transit projects
- Health and physical activity data collection, including ped/bike counts and travel surveys as well as qualitative methods

Findings: existing resources and guidance

Many reports and case studies have shown discrete examples of transportation and health agency collaborations, policies, and practices

Findings: existing tools

Table 1

Comparison of Commonly Employed Tools for Assessing the Health Impacts of Transportation Plans

	Integrated Transport and Health Impact Model (ITHIM)	Health Economic Assessment Tool (HEAT)	California Public Health Assessment Model (C-PHAM)/UrbanFootprint public health module	Urban and TranspOrt Planning Health Impact Assessment (UTOPHIA)	Environmental Benefits Mapping and Analysis Program Community Edition (BenMAP-CE)
Typical spatial scale	County/region	Project/plan	150 m gridcell	Census tract	User-specified
Developer/ Sponsor	Medical Research Council, others	World Health Organization	Urban Design 4 Health	Centre for Research in Environmental Epidemiology (CREAL)	US Environmental Protection Agency
Exposure pathways considered	Physical activity from walking and cycling, traffic injuries, air pollution	Physical activity from walking and cycling	Urban form variables (indirectly linked to physical activity), earlier versions included change in injury rates and air pollution	Physical activity, air pollution, noise, heat, access to green space	Air pollution (particulate matter and ozone)
User Input	Changes in travel activity by mode (aspirational, off-model literature-based estimates, or from travel demand model outputs)	Active travel estimates can be input data from various sources (e.g. travel surveys, observed counts, predictive estimates).	Changes in built environment and transportation characteristics via the UrbanFootpring sketch planning tool	Aspirational (compliance with international exposure level recommendations) for all exposure pathways	Changes in air quality (aspirational or based on modeling) Option to modify demographics, baseline health incidence, and to add health and economic relationships.
Built-in data and relationships	Health impacts of physical activity, air pollution (in some calibrations), and collision risks are based on research literature. Region-specific calibrations include baseline health, traffic injury, air quality, and travel behavior data.	Relative risk data are from published studies. Value of a statistical life.	Directly estimated from land use and transportation characteristics, demographics, California Household Travel Survey, California Health Interview Survey	Heath impacts of physical activity, air pollution, noise, heat, and access to green space based on research literature. Includes baseline data drawn from the Barcelona Health Survey (PA), land use regression (air quality), Barcelona strategic noise map, central temperature monitor, Urban Atlas (green space)	Built-in health and economic impacts of air pollution are based on research literature. Region-specific calibrations include baseline health incidence, demographics (via the pop-grid tool), and air quality monitoring data.

Source: National Center for Sustainable Transportation, https://regionalchange.ucdavis.edu/sites/g/files/dgvnsk986/files/inline-files/NCST-TO-033.3-London_ITHIM_Final-Report_OCT-2017.pdf

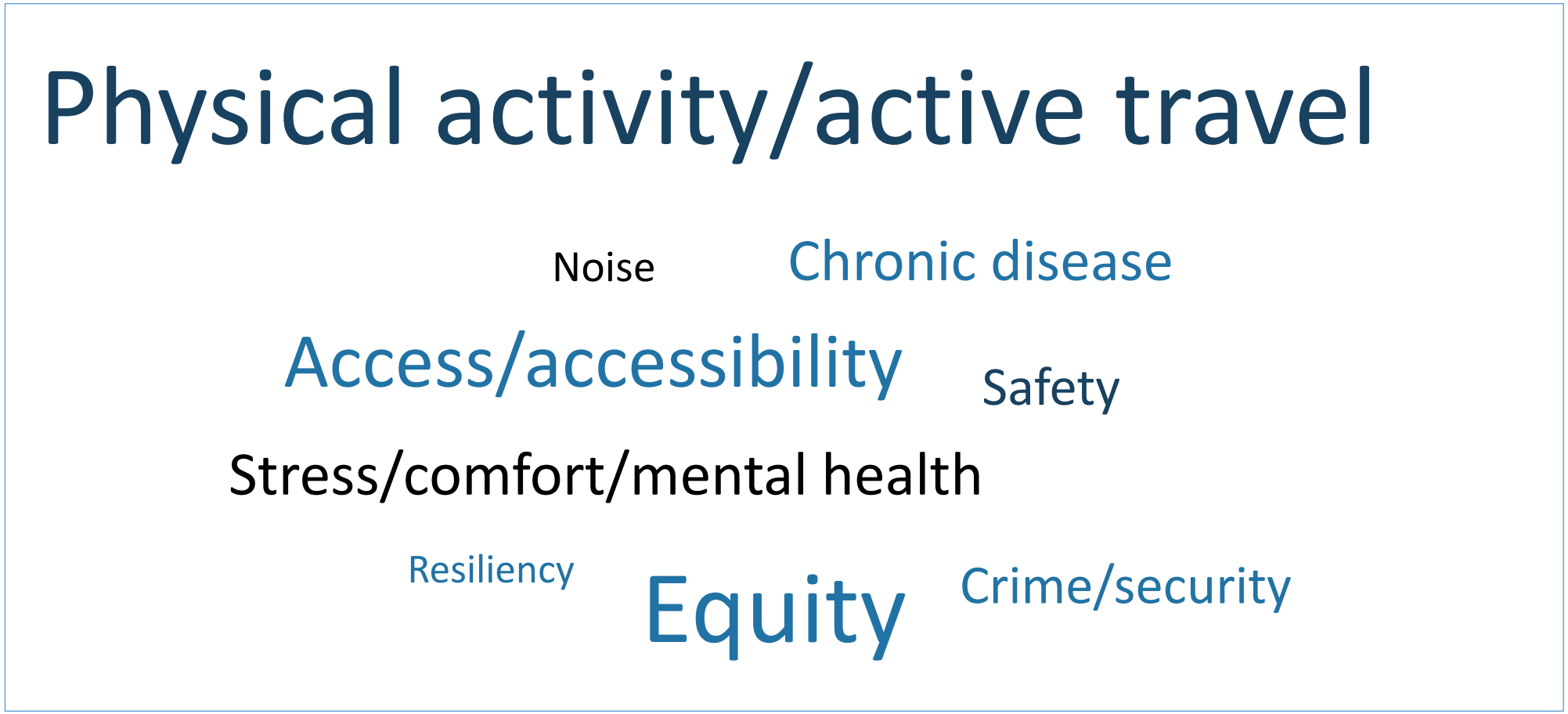
Findings: emerging issues

Less-well documented in the research are issues related to the health impacts and transportation best practices surrounding:

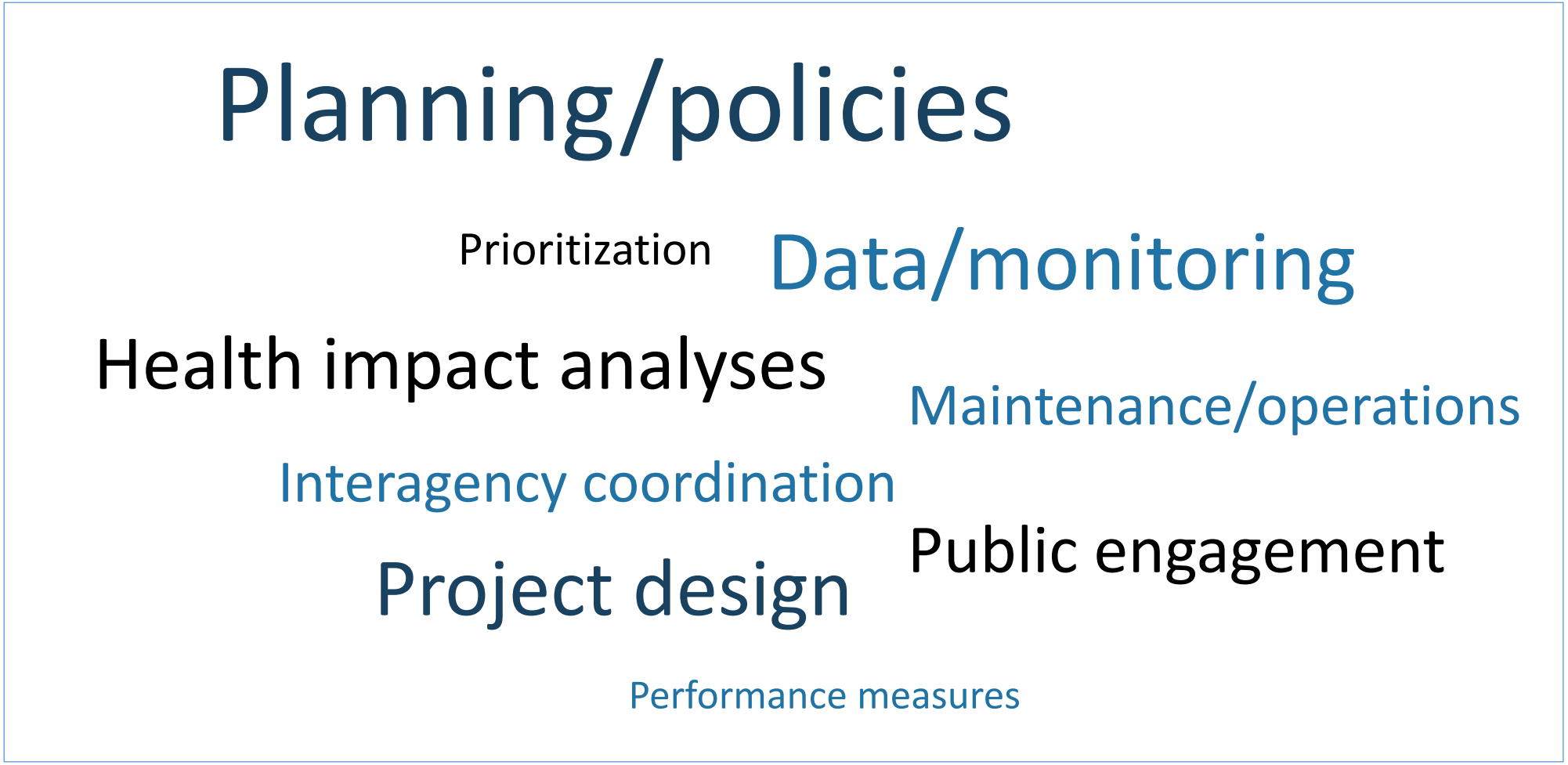
- Micromobility travel modes (e.g., electric kick/standing scooters)
- Highly automated vehicles
- Population-level demographic shifts and related changes in travel behaviors
- Rising incidence of opioid use/abuse and mental health issues
- New technology related to transit and shared mobility services
- Access to healthcare and physical activity opportunities in rural settings
- Big data access, management, and analytics to support decision-making

What research gaps and needs remain?

Literature reviewed in relation to health issues



Literature reviewed in relation to DOT process



Research gaps and needs

- General knowledge and data gaps, such as:
  - Lack of data fundamental for understanding health costs and benefits
- Topic specific gaps, such as:
  - Lack on research on the connection between transportation policies, and mental health, homelessness, and displacement
  - Lack of research to support performance measures related to equity and accessibility
- Research implementation gaps, such as:
  - Lack of knowledge on how states are institutionalizing practices for collection and integration of active travel data
  - Lack of documentation of current practices and examples from diverse contexts (e.g., rural communities)

Research roadmap

Framed around key transportation agency processes and practices

Community Engagement / Data Integration

Public involvement

Coordination with local, regional, and tribal governments

Data Collection

Performance metrics

Policy-making

- Vision and/or Mission
- Statewide multimodal transportation plan
- Agency guidance

Planning

- Long-range plans
- Mode-specific plans
- Corridor studies
- Scenario plans
- Small area plans

Capital programs, projects and implementation

- Project evaluation
- Project selection
- Environmental assessment

Monitoring and Evaluation

- Design review and comparison
- Construction
- Operation
- Maintenance

Research problem statement topic identification

Panel ranked gaps based on urgency and magnitude of the problem

Project team scored specific “needs” to fill gaps based on:

- Practicality
- Innovation
- Scalability
- Centered around equity concerns
- Oriented to “multi-solve” health issues (vs singular issue focus)
- Multimodal (vs mode specific)

High ranking “needs” within priority “gap” areas were selected for development.

Research problem statement topics developed

1. Synthesis of Best Practices for Including Health Outcomes in Transportation Project Prioritization
2. Data Sources for Establishing Health Outcome Performance Measures for Transportation Projects
3. Practices and Recommendations in Reporting and Integrating Pedestrian and Bicycle Non-Fatal Injury Data Systems*
4. A Guidebook for Considering the Public Health Impacts of Public Transportation Decisions
5. Effect of Demographic Change on Travel Behavior and Health
6. Evaluating and Integrating Emerging Data Sources to Support Transportation and Health Planning and Operations

*Selected for funding in NCHRP FY2021 program

Many avenues for research sponsorship

Focus Sectors (Examples)		Implementation Steps
	**AASHTO/NCHRP Research Programs** • National Interest • Data • Planning	Coordinate through TRB committee research leads
	**State DOT Research Programs** • State-Level Interest • Project Development • Operations	Contact State DOT Research Unit
	**State Health Department CDC-Funded Programs** • Policy • Process	Coordinate with state health departments and CDC-approved workplans
	**MPOs/Local Governments** • Data • Performance Measures • Planning • Equity	Coordinate with local plans and regional models

Focus Sectors (Examples)		Implementation Steps
	**Private Organizations and Foundations (i.e. AARP, BCBS, RWJF, AAA)** • Policy • Special Topics • Equity	Apply for grant funding or capacity building
	**Technical Assistance (i.e. USDOT projects)** • Training • Collaboration • Process	Consider USDOT programs supporting technical assistance
	**University Transportation Centers** • Data • Safety • Special Topics	Contact UTC
	**Member Organizations (i.e. APA Plan4 Health)** • Training • Collaboration • Process	Apply for grant funding or technical assistance

Implementation plan: call to action

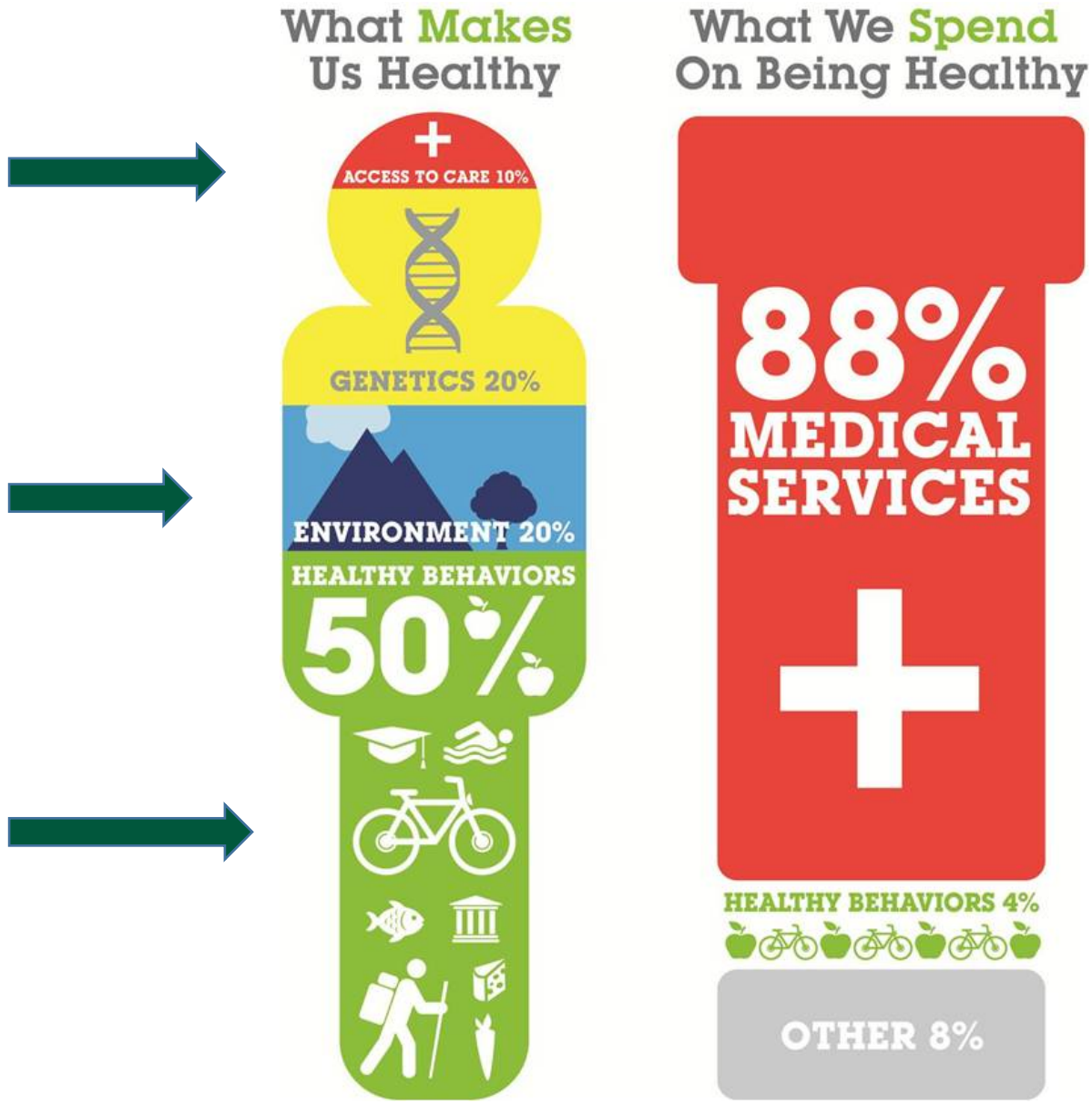
Share project deliverables widely:

- AASHTO committee mid-year meetings
- TRB Executive Committee members
- TRB Health and Transportation Standing Committee
- Related conferences and organizations

Utilize TRB committees (particularly Health and Transportation Committee) to regularly revisit roadmap and advance or update research problem statements

- Identify state-level champions involved with AASHTO committees
- Identify NGO, regional/local, and university-based supporters as well

In conclusion…



Source: Bipartisan Policy Center, https://bipartisanpolicy.org

Thank you!

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For more information, please contact Laura Sandt at sandt@hsrc.unc.edu

Today's Presenters

#TRBWebinar

Laura Sandt, *UNC Highway Research Center*

Andrew Dannenberg, *University of Washington School of Public Health*

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- May provide a path to Standing Committee membership

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