

Agenda

- Individuals with ASD/IDD
- Project overview
- Why's this important?
- What's it mean for street design?
- Action plan overview
- Q&A



Individuals with ASD/IDD



Terms

- ASD – autism spectrum disorder
- ID – intellectual disability
- IDD – intellectual or developmental disability



Individuals with ASD/IDD participating in travel training provided by the New Jersey Travel Independence Program at Rutgers (Credit: Jeff Dennis)



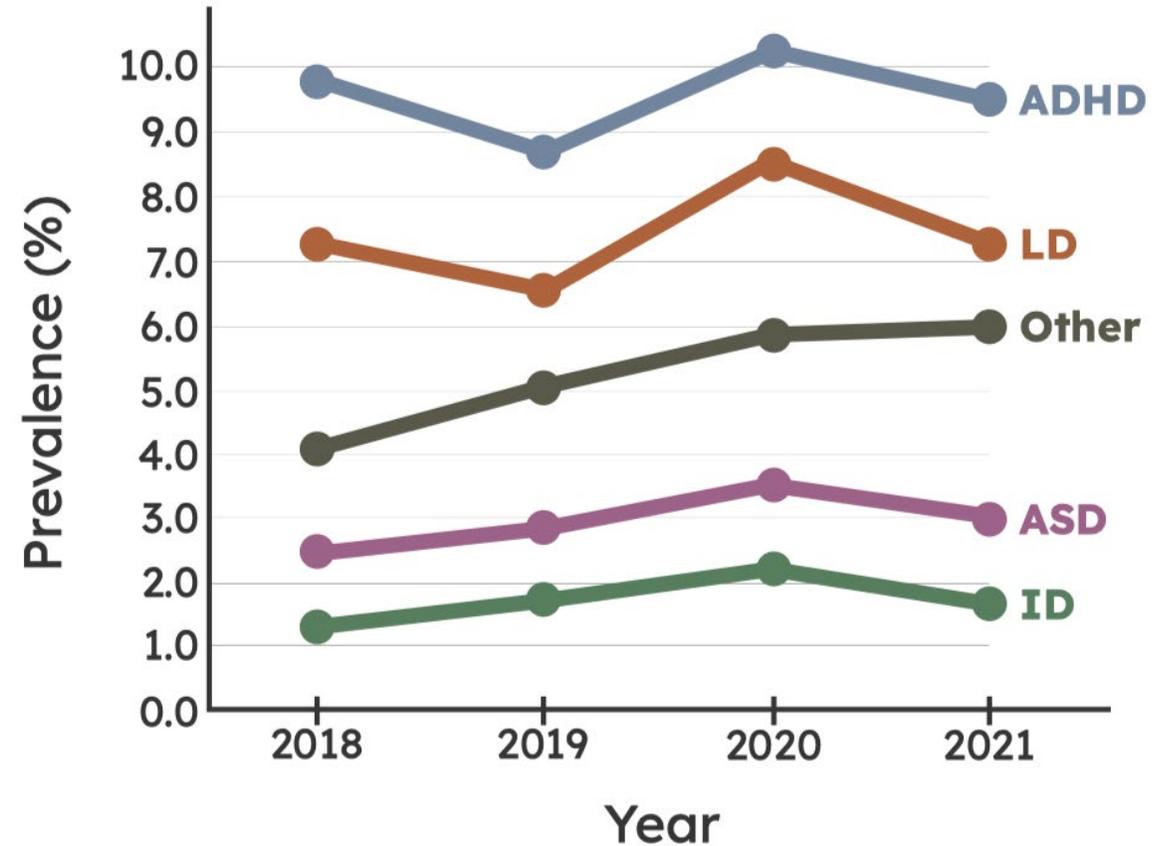
Individuals with ASD/IDD...

- Are a substantial portion of the US population.
- Are part of every community.
- Are more vulnerable to KSI crashes and personal security risks.
- Are less likely to be drivers, more likely to rely on transportation alternatives.
- Characteristics overlap with other groups.
- Are disproportionately impacted when safe, accessible alternatives unavailable.
- Have diverse needs that sometimes conflict.



Substantial portion of the population

- Approx. 18% of U.S. children aged 3-17 years have some type of developmental disability



Trends in the Prevalence of Developmental Disabilities in US Children and Adolescents aged 3-17 years.
(Source: Li et al.)



Substantial portion of the population



1 in 7

New Jersey public school children have developmental and intellectual disabilities.



1 in 10

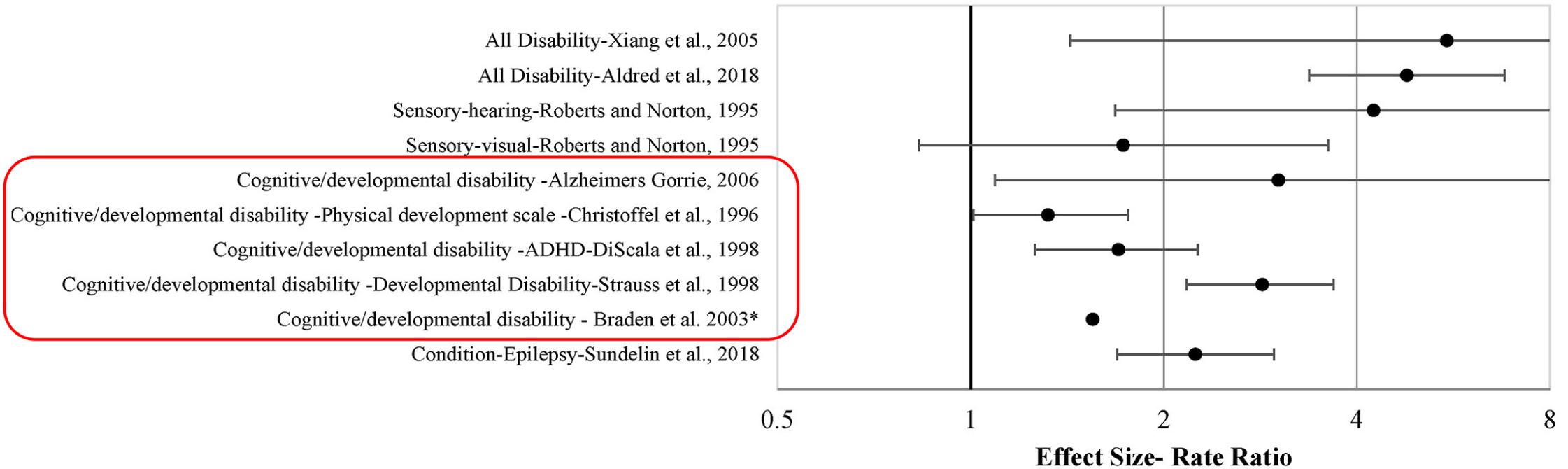
New Jersey adults have a cognitive disability.

Part of every community

- Individuals with ASD/IDD are family members, friends, work colleagues, and neighbors.



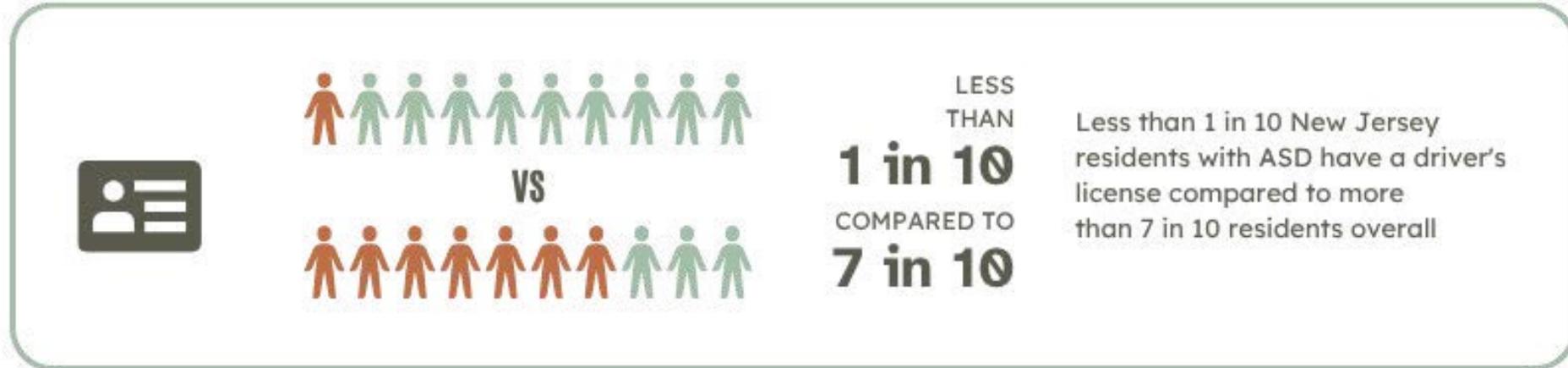
More vulnerable to KSI crashes



Forest Plot: Rate Ratios of Disability Pedestrian Injury Risk by Study (whiskers represent 95% Confidence Intervals).

Source: Naomi Schwartz, Ron Buliung, Arslan Daniel, Linda Rothman, *Disability and pedestrian road traffic injury: A scoping review*, *Health & Place*, Volume 77, 2022.

Less likely to be drivers



Have diverse needs

- **Autism spectrum disorder (ASD)** — Includes diagnoses formerly considered separate, e.g., Asperger’s Syndrome
- **Intellectual and Developmental Disabilities (IDD)** — Umbrella classification that includes an array of diverse diagnoses, e.g.:
 - Cerebral palsy
 - Down syndrome
 - Fragile X syndrome
 - Sensory processing disorder
 - Developmental coordination disorder (DCD) or dyspraxia
 - Attention deficit hyperactivity disorder (ADHD)



ASD/IDD Characteristics

Sensory processing

- Over-reactive to sensory stimuli (hypersensitivity)
- Under-reactive to sensory stimuli (hyposensitivity)
- Difficulty screening out irrelevant sensory stimuli

Cognitive processing

- Difficulty remembering routes
- Difficulty interpreting complex situations/layouts
- Difficulty interpreting the actions of other street users
- Difficulty perceiving safety risks
- Impatience or impulsivity
- Risk-avoidance or rule-boundedness
- Difficulty understanding configurations that do not match expectations/experience

Social & communication

- Difficulty understanding or using non-verbal cues
- Difficulty understanding or using writing or speech

Mobility

- Difficulty with balance
 - Difficulty coordinating physical movements
 - Greater propensity to slip/trip and fall
 - Slower walking speed
 - Tiring more easily
 - Require more personal space or space for a caregiver
-

Characteristics overlap with other groups

- Older adults, children, people with other disability types



Are disproportionately impacted

- Rely on driving alternatives for access to jobs, education, essential services.

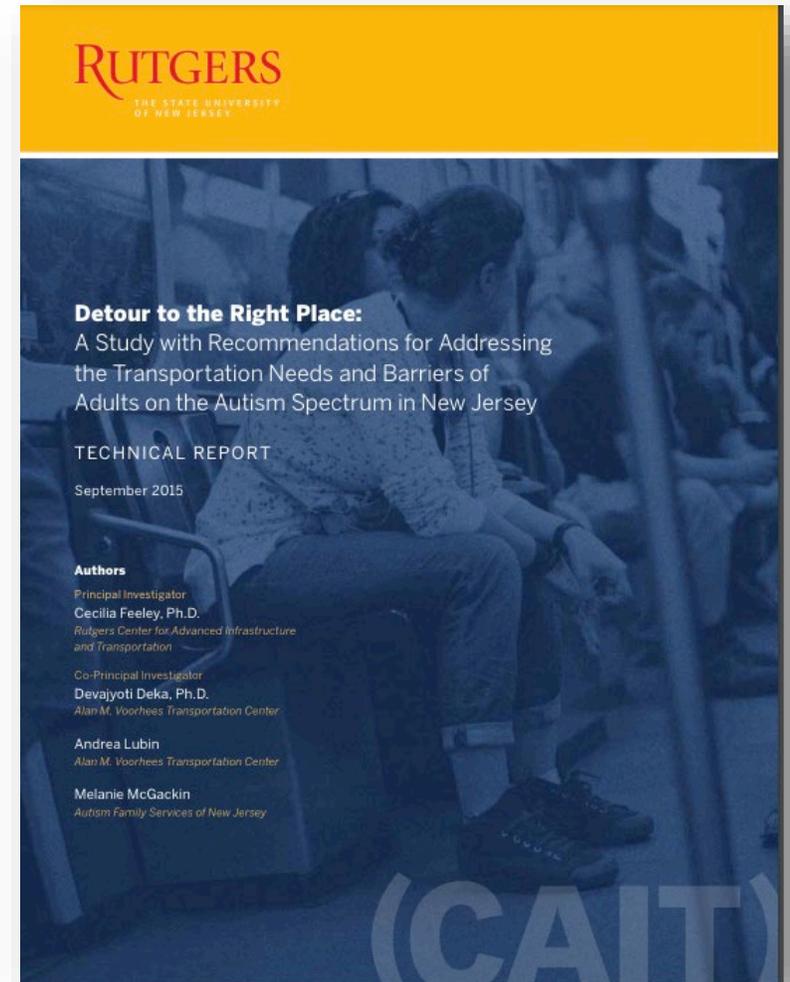


Project Overview



Background

- Responds to S-147, which was signed into law in January 2023
- Preceded by a Rutgers CAIT/VTC study, *Detour to the Right Place*, 2015
- NJDOT's Bicycle and Pedestrian Resource Center at Rutgers completed a Primer on ASD and IDD in December 2024



NV5 Consultant Team

NV5 * Toole Design Group* Civic Eye Collaborative

- NV5
 - Bettina Zimny
 - Collin Rieger
- Toole Design Group
 - Jennifer Toole
 - Jim Elliott
- Civic Eye Collaborative
 - Ranjit Walia
 - Erica Henderson-Smith



Collaborating With

- NJDOT Bicycle and Pedestrian Resource Center/VTC
 - Leigh Ann Von Hagen
 - Sam Rosenthal
 - Andrea Lubin
 - Colin Roche



NJDOT Working Group Participants

- Policy, Legislation, & Regulatory Actions
- Safety Programs
- Complete Streets Implementation
- Statewide Planning
- Bicycle & Pedestrian Planning
- Capital Program Management
- Project Management
- Right of Way
- Roadway Design
- Geometrics
- Traffic Engineering
- Construction & Materials
- Bridge Engineering & Infrastructure
- Operations & Maintenance
- Civil Rights & ADA Coordination





Key Tasks

Task A: Policy and Best Practice Review

- Review of best practice policies and design guidance
- Review of NJDOT policies and design guidance
- Deliverable: technical memo highlighting potential revisions to NJDOT policies and design guidance to better align with best practices

Task B: Working Group

- Three meetings with NJDOT subject matter experts

Task C: Implementation Action Plan

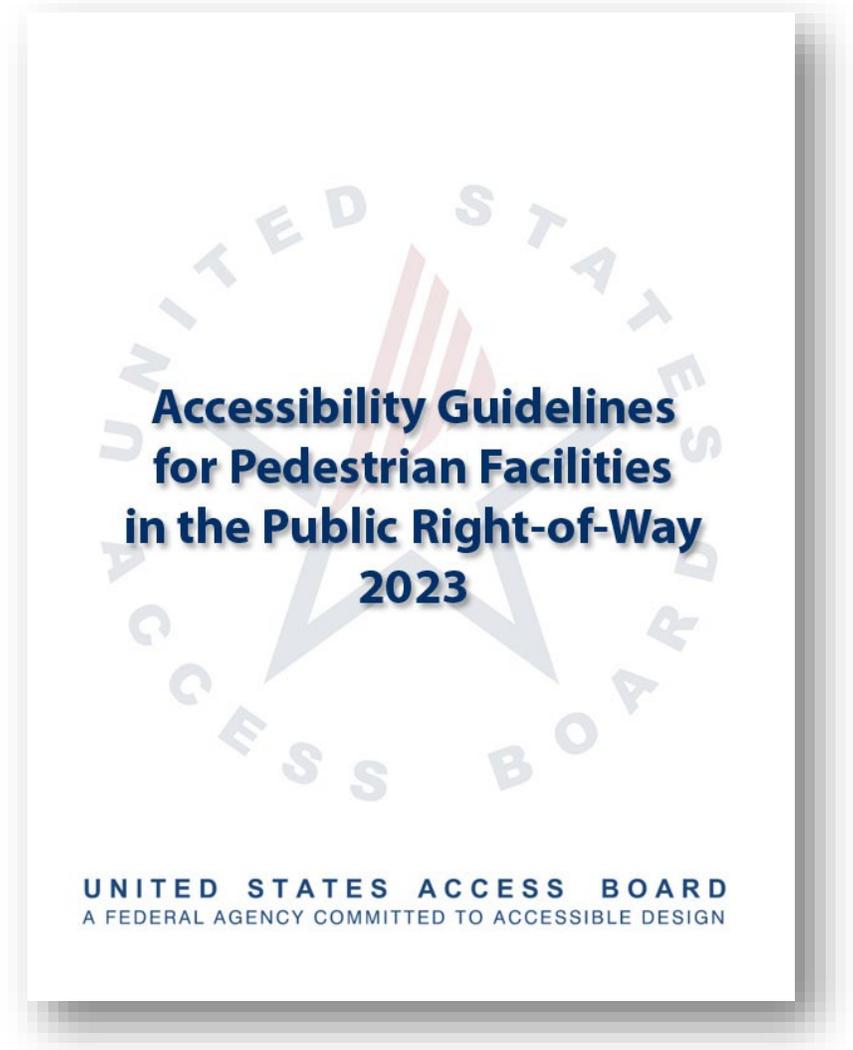
- Outline work needed to develop, disseminate, and incorporate revisions to NJDOT policies and design guidance
- Identify near-term, mid-term, and long-term actions, responsible agencies, and anticipated timelines

What's it mean for street design?



Currently broad mandate, little specific guidance

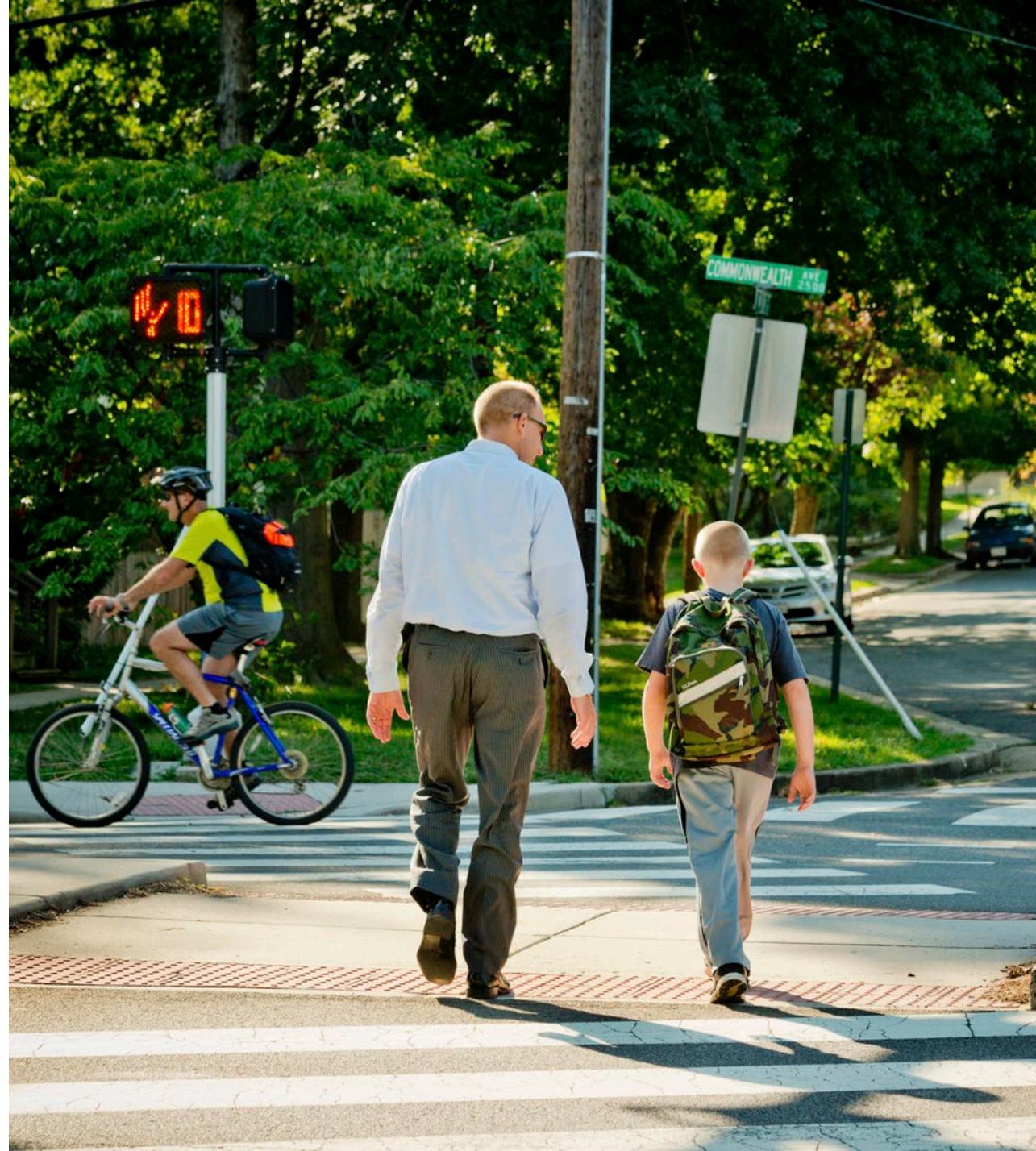
- ADA requires streets to be accessible to people with disabilities
- Little best specific best practice guidance
- Existing research focuses on understanding ASD/IDD needs and/or potential training interventions
- People with these disabilities are a part of every community



2x what works & address distinctive needs

- Prioritize Safe System
- Build Complete Streets and connected networks
- Simplify crossings
- Provide enough time to cross
- Reduce sensory “noise”
- Provide more space
- Perform routine proactive maintenance
- Prioritize personal security

Engage!



Prioritize Safe System

- Individuals with ASD/IDD more likely to make mistakes
- Shouldn't result in death or serious injury
- Best practices:
 - Consider land use context when setting speed limit and design speed
 - Match design speed to target speed/speed limit
 - Expand where traffic calming measures can be used



Build Complete Streets & connected networks

- Standard Complete Streets principles generally benefit individuals with ASD/IDD
- Adjusting them to ASD/IDD needs is often a matter of degree rather than qualitative difference
- Connected networks are critical, including providing clearly defined ped/bike routes across intersections



2017 State of New Jersey Complete Streets Design Guide



Simplify crossings

- Aim for consistency and predictability, e.g., high-viz crosswalk markings at all crosswalks
- Simplify crossing decisions, e.g., ped signal w/APS at all signalized crossings, pedestrian refuge islands at uncontrolled multi-lane crossings
- Reduce or eliminate permissive turns
- Provide smooth crosswalk surface



Provide enough time to cross

Disability or Assistive Device	Mean Walking Speed (ft/s)
Cane or crutch	2.62
Walker	2.07
Wheelchair	3.55
Immobilized knee	3.50
Below-knee amputee	2.46
Above-knee amputee	1.97
Hip arthritis	2.24 to 3.66
Rheumatoid arthritis (knee)	2.46
Intellectual disability	2.02



Sources: FHWA Course on Federal Highway Administration University Course on Bicycle and Pedestrian Transportation, Haynes, Courtney A., and Thurmon E. Lockhart. "Evaluation of Gait and Slip Parameters for Adults with Intellectual Disability." *Journal of Biomechanics*, vol. 45, no. 14, Elsevier BV, Aug. 2012, pp. 2337–41, <https://doi.org/10.1016/j.jbiomech.2012.07.003>. Accessed 11 Jan. 2025.

Reduce sensory “noise”

- Incorporate sidewalk buffers
- Incorporate trees, shrubs, and other softscape elements
- Avoid sign clutter, paving surfaces with complicated patterns or clashing colors
- Provide spaces for rest and respite



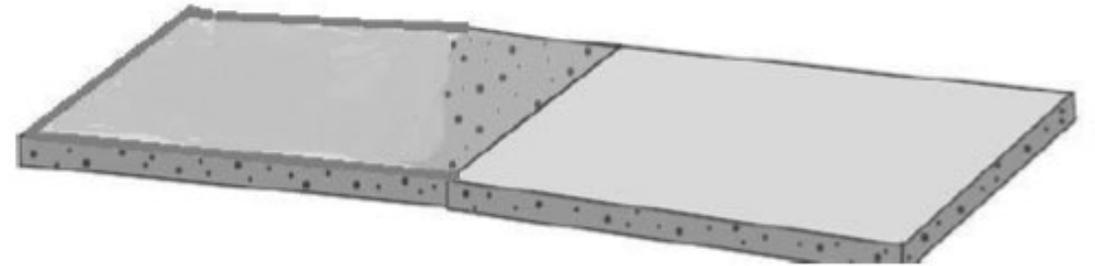
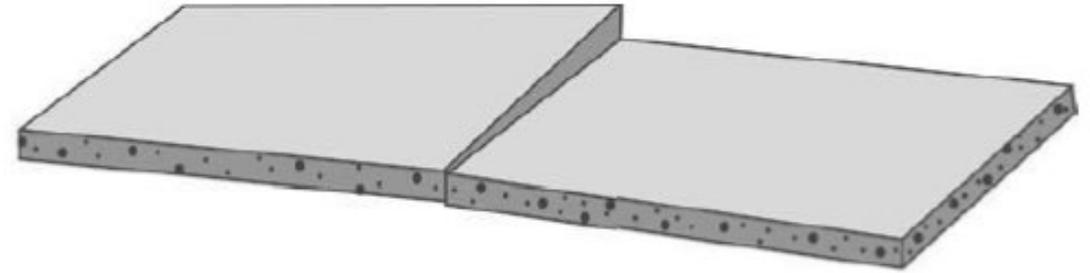
Provide more space

- People with ASD/IDD often travel with caregivers
- Often require more personal space than neurotypical individuals
- Need wider crosswalks and sidewalks



Perform routine proactive maintenance

- Sidewalk, path, and crosswalk surfaces
- Accessible pedestrian pushbuttons
- Crosswalk markings



Source: FHWA



Prioritize Personal Security

- Incorporate CPTED principles, e.g., natural surveillance.
- Provide clear wayfinding
- Provide ways to access help when needed



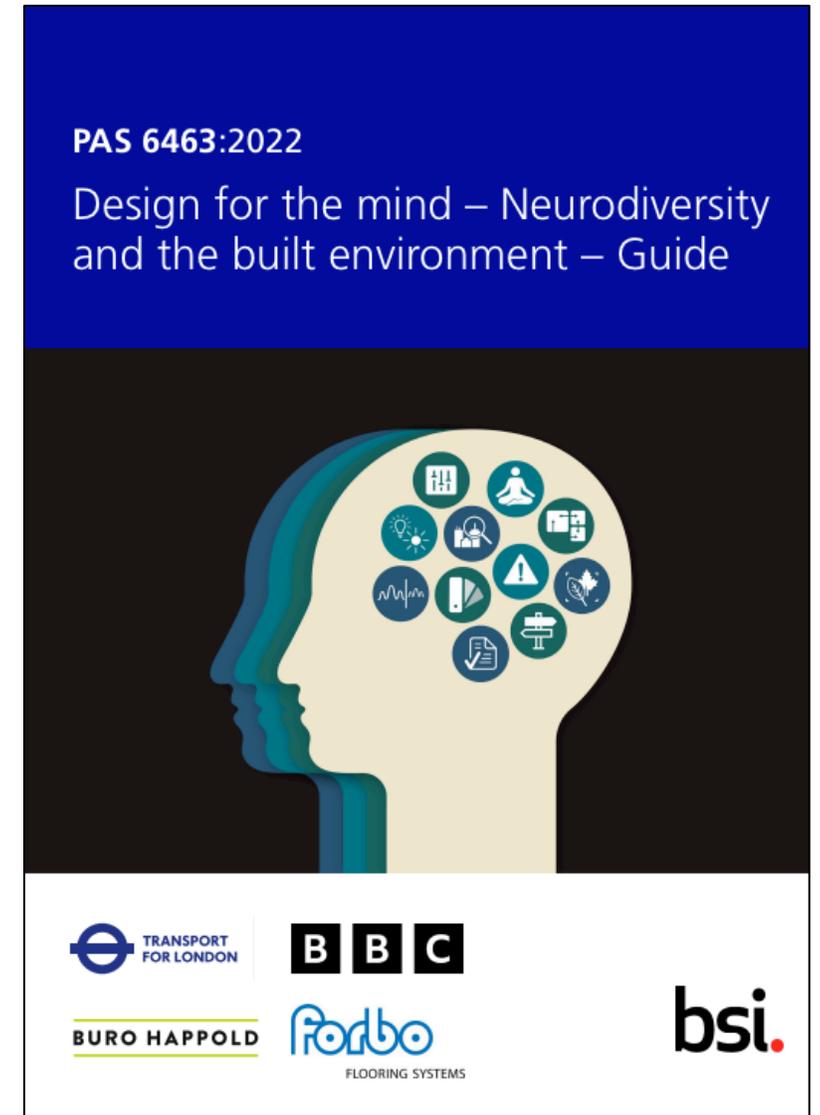
Engage!

- “Nothing about us without us”
- Engagement needed throughout project lifecycle
- Important to include diverse perspectives
- Key stakeholders
 - Individuals with ASD/IDD and their caregivers
 - Travel trainers
 - Groups representing individuals with ASD/IDD
- Provide both in-person and online options



Resources

- [Detour to the Right Place](#)—Rutgers Center for Advanced Infrastructure and Transportation
- [Design for the Mind -Neurodiversity and the Built Environment –Guide](#) — British Standards Institute
- [Built Environment Design and People with Autism Spectrum Disorder \(ASD\): A Scoping Review](#)— Tola, Giulia, et al.
- [Autism Planning and Design Guidelines 1.0](#)— Knowlton School, Ohio State University



Action Plan Overview



Action Plan Overview

- Introduction
- Universal design concepts
- Recommendations
- Proposed dissemination methods
- Phased implementation plan
- Conclusion



Complete Streets for Individuals with ASD/IDD

An Action Plan for Updating NJDOT
Design Guidance and Policies

Introduction

- Overview of legislation
- Project history
- Why is this an issue?
- New Jersey is a leader



New Jersey is a Leader

New Jersey is a national leader in addressing the needs of individuals with ASD/IDD across multiple realms.

Education

- New Jersey's Autism Education Law mandates that schools provide appropriate educational programs for students with autism, including individualized education plans (IEPs) and necessary therapies.

Employment

- New Jersey has enacted employment protections to prevent discrimination against individuals with autism in the workplace, requiring employers to make reasonable accommodations.

Support Services

- The New Jersey Travel Independence Program (NJTIP) provides travel training to individuals with ASD/IDD to enable them to use public transportation safely and independently.
- New Jersey provides funding for services supporting adults with developmental disabilities through the Division of Developmental Disabilities.

Healthcare

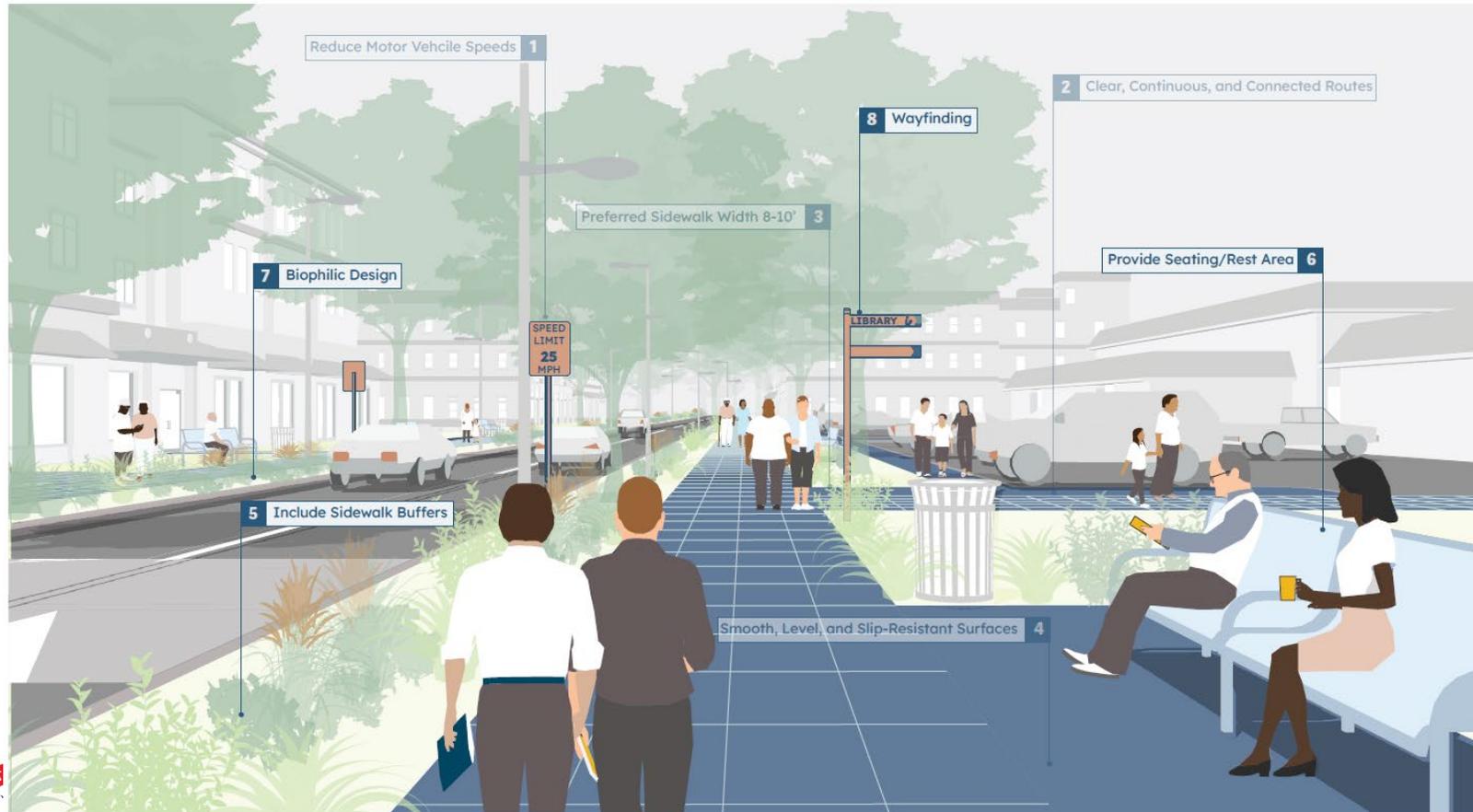
- New Jersey's Autism Mandate requires health insurance providers to cover the diagnosis and treatment of ASD for individuals up to the age of 21, including behavioral health treatment, speech therapy, and occupational therapy.

Research

- NJDOT has collaborated with organizations like Rutgers Center for Advanced Infrastructure and Transportation (CAIT) and VTC to research the travel behavior of adults with ASD.
- The Governor's Council for Medical Research and Treatment of Autism has funded research by Specialized Children's Hospital, Rutgers University Center for Autism Research, Education, and Services (RUCARES), the Kessler Foundation, and Montclair State University.
- The Montclair State University's Center for Autism and Early Childhood Mental Health supports autism research through its role as the coordinating center for the New Jersey Autism Center for Excellence (NJ ACE).
- New Jersey maintains a Statewide Autism Registry to facilitate research and service planning for individuals with autism.

CAIT and VTC co-authored a report titled [Detour to the Right Place: A Study with Recommendations for Addressing the Transportation Needs and Barriers of Adults on the Autism Spectrum in New Jersey](#), a ground-breaking study that was the first of its kind in the United States. The New Jersey Task Force on Transportation, Mobility, and Support Service Needs of Adults with Autism was established in response to this document and produced a [2021 report](#) recommending that the transportation needs of persons with autism be considered when designing Complete Streets. This document was the impetus for S-147.

Universal design concepts



Along the Street



Proposed dissemination methods

- Partnerships
- NJDOT Website
- Webinar Trainings
- Videos
- Brochures
- Conferences



Recommendations

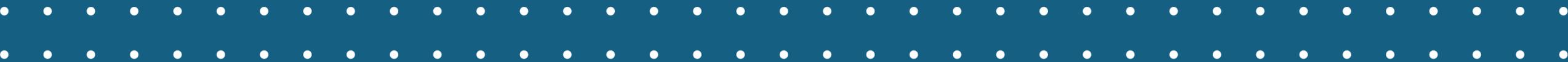
- Adopt additional best practices speed reduction policies.
- Integrate universal design concepts into key NJDOT policy & design documents.
- Update NJDOT procedures for maintaining & repairing ped/bike infrastructure.
- Update ADA Transition Plan to integrate Action Plan recommendations.
- Leverage ADA retrofits to test common Complete Streets features benefitting individuals with ASD/IDD.
- Conduct outreach to New Jersey policymakers, residents, and individuals with ASD/IDD



Phased implementation plan

Task	Key Internal Stakeholders
NT 1. Estimate Plan Implementation Needs	Safety Improvement Programs or Statewide Strategies
NT 2. Update Key Policies and Guides	Listed by subtask below
NT 2.1 Update Complete Streets Policy and Checklists	Safety Improvement Programs, Statewide Strategies, Civil Rights, Bicycle and Pedestrian Programs
NT 2.2 Update Key Design Guides	Listed by subtask below
 NT 2.2.1 Complete Streets Design Guide	Safety Improvement Programs, Statewide Strategies, Civil Rights, Roadway Standards, Environmental Program Resources, Bicycle and Pedestrian Programs
 NT 2.2.2 Complete & Green Streets Model Policy	Safety Improvement Programs, Statewide Strategies, Bicycle and Pedestrian Programs
 NT 2.2.3 Roadway Design Manual	Geometrics, Design, Roadway Standards, Civil Rights, Environmental Program Resources, Bicycle and Pedestrian Programs

Q & A



Thank you!