Intersection of Public Health and Transportation

National Summit on Rural Road Safety

Savannah, GA
December 6, 2018
What we’ll cover today:

- Rural Health and Transportation Challenges
- Improving Access to Health Services
- Increasing Opportunities for Active Transportation
Rural Health and Transportation Challenges
Challenges in Rural Communities

While rural places vary considerably in geographic scale and character, there are common issues that prevail:

Source: Small Town and Rural Multimodal Networks Guide, FHWA
Health in Rural Communities

• Those living in rural areas are more likely to die from the five leading causes of death than their urban counterparts (CDC) –
  • Heart Disease
  • Cancer
  • Unintentional Injury
  • Chronic Lower Respiratory Disease
  • Stroke

• A higher percentage of these deaths were considered preventable in rural areas than in urban areas

Source: Press Release - Rural Americans at higher risk of death from five leading causes (CDC, 2017)
Age in Rural Communities

Data above presented as percent of total population in rural non-core areas, rural micropolitan areas, and the nation as a whole

Source: Rural Health Information Hub; Data from American Communities Survey 2012-2016
Loneliness and Isolation

• Loneliness and isolation is a “predictor of functional decline and death”
• Nearly half of midlife and older adults with annual incomes of less than $25,000 report being lonely.

Sources: Loneliness and Social Connections: A National Survey of Adults 45 and Older (AARP)
Loneliness in Older Persons: A predictor of functional decline and death (Perissono et al, 2015)
Dependence on Alternate Modes of Transportation

• “no one walks or bikes here” is a common sentiment

• Not difficult to find evidence of demand for safe and comfortable places to walk and bike

• Many rely on walking, biking and transit out of necessity, even in rural areas
Funding and Coordination Challenges

• Rural transportation projects (especially those supporting multimodal transportation) don’t receive the level of funding they do in urban areas.

• Projects can be more complex, with multiple jurisdictions and agencies involved (e.g. County Public Works, Federal Lands, Tribal Governments, etc.)
What health/transportation challenges have you observed in rural areas?
Improving Access to Health Services
Increasing
Opportunities for
Active Transportation
Expanding our Definition of “Rural”

Source: Active Transportation Beyond Urban Centers (Rails to Trails Conservancy)
How do we address this disconnect?

Source: Bipartisan Policy Center; Data from the Boston Foundation and the New England Healthcare Institute
Health + Active Transportation

Bicycling and walking are associated with numerous positive health outcomes, such as...

1. Reduced risk of cardiovascular diseases
2. Reduced risk of several types of cancer
3. Reduced risk of Type 2 diabetes
4. Improved mental health
5. Lower medical expenses

Source: American Public Health Association (APHA)
Agencies Are Prioritizing Active Transportation
Environment Influences Travel Behavior

- Research demonstrates that the following environmental characteristics are associated with levels of active transportation:
  - High density of street networks
  - Network connectivity
  - Street configuration and design

- These environmental characteristics are linked with positive health outcomes
Opportunities in Rural Communities

Though in many rural communities, residents live long distances from services, most small towns provide a compact center well-suited for walking and bicycling trips.

1 MILE WALK = 20 MINUTES (3 MPH)
1 MILE BIKE RIDE = 6 MINUTES (10 MPH)

Source: Small Town and Rural Multimodal Networks Guide, FHWA
Demand for Biking/Walking Facilities

- Smaller towns and villages are seeing tourist and economic interest in downtown areas, and are seeing more walking and bicycling as a result.

- Looking for strategies to improve connections for bicycling and walking, as well as safety measures.
Report from Rails-to-trails Conservancy

- Shares case examples from rural communities and small towns
- Dispels common myths about active transportation in rural communities

www.railstotrails.org
So how do we expand opportunities for bicycling and walking in rural communities?
Focus on Networks

COHESION
How connected is the network in terms of its concentration of destinations and routes?

DIRECTNESS
Does the network provide direct and convenient access to destinations?

ACCESSIBILITY
How well does the network accommodate travel for all users, regardless of age, income level, or ability?

ALTERNATIVES
Are there a number of different route choices available within the network?

SAFETY AND SECURITY
Does the network provide routes that minimize risk of injury, danger, and crime?

COMFORT
Does the network appeal to a broad range of age and ability levels and is consideration given to user amenities?

Source: Small Town and Rural Multimodal Networks Guide, FHWA
Shared Use Path Connections

Source: Small Town and Rural Multimodal Networks Guide, FHWA
## Options for Bicycle/Pedestrian Facilities

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Who are we designing for?
Bicyclists aren’t all the same

**Strong and Fearless**
- Will ride with traffic, regardless of roadway conditions or level of separation

**Enthused and Confident**
- Pretty comfortable with traffic but may prefer some separation

**Interested But Concerned**
- Would like to ride more, but usually stick to greenways or other separated facilities

**No Way, No How**
- Just won’t bike, period

Source: Jennifer Dill, Portland State University
A Breakdown of the Four Types of Cyclists

- **Strong and Fearless**: Geller 2006 (low), Portland 2013 (low), U.S. 2016 (low)
- **Enthused and Confident**: Geller 2006 (high), Portland 2013 (medium), U.S. 2016 (high)
- **Interested But Concerned**: Geller 2006 (low), Portland 2013 (high), U.S. 2016 (low)
- **No Way, No How**: Geller 2006 (very low), Portland 2013 (very low), U.S. 2016 (medium)

Data: Dill & McNeil, 2016
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FHWA Small Town and Rural Multimodal Networks Guide

- Next set of slides walks through three groups of facility types developed by Alta Planning and Design and FHWA in their guide
- Excellent resource with lots of detail on specific treatments and considerations

https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/small_towns/
Mixed Traffic

Yield Roadway

Shared Space
Pedestrians, bicyclists, and motorists all share a slow-speed, low-volume roadway space.

Local Residential Context
Low volumes and familiar users encourage slow speeds and respectful meeting and passing events within a narrow roadway.

Parking/Pull-Out/Furnishings
Multipurpose roadside visually and physically constrains the roadway.

Narrow Two-Way Street
A limited-width paved roadway surface with no center line markings.

Gravel/Turf/Earth Roadside
Limiting paved surfacing encourages natural stormwater management.
Mixed Traffic
Yield Roadway

• Ideal for low volume and low speed conditions
• Simple signage can help, but pavement markings not recommended
• Many neighborhood streets serve this function already
Mixed Traffic

Bicycle Boulevard

Figure 2-5. Bicycle boulevards combine road markings, traffic-calming measures, and crossing improvements designed to enhance the comfort and priority of bicyclists traveling along the route.
Mixed Traffic
Bicycle Boulevard

• Low speed is critical
• Partner with emergency/fire response
• Volumes may be higher, and pedestrians may need additional separation (e.g. sidewalks)
Mixed Traffic

Advisory Shoulder

Advisory shoulders are a new treatment type in the United States and no performance data has yet been collected to compare to a substantial body of international experience. In order to install advisory shoulders, an approved Request to Experiment is required as detailed in Section 1A.10 of the MUTCD. FHWA is also accepting requests for experimentation with a similar treatment called “dashed bicycle lanes.”

Yield to Bicyclists
Motorists must yield to bicyclists and pedestrians if present when vehicles traveling in opposite directions meet.

Contrasting Paving Materials
Visually differentiates the shoulder from the roadway and discourages unnecessary encroachment.

Two-Way Center Travel Lane
Motorists can travel in both directions and share a center lane, encroaching into the advisory shoulders as needed to facilitate passing movements.

Advisory Shoulder
Prioritizes shared space for bicyclists and occasional pedestrian travel.
### Mixed Traffic

#### Advisory Shoulder

<table>
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<th>Two-Way Center Travel Lane Width</th>
<th>Impact on Advisory Shoulder Encroachment When Vehicles Traveling in Opposite Directions Meet</th>
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<tr>
<td>Practical minimum width 10 ft (3.0 m)</td>
<td>Requires vehicle encroachment into the advisory shoulder space when vehicles traveling in opposite directions meet.</td>
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<tr>
<td>Preferred minimum width 13.5 ft (4.5 m)</td>
<td>Two passenger cars are physically able to meet each other within the center lane at very low speed. In practice, vehicles will encroach into the advisory shoulder.</td>
</tr>
<tr>
<td>Preferred maximum width 16 ft (4.9 m)</td>
<td>Permits two passenger cars to pass within the center lane at modest speeds without encroaching into the advisory shoulder.</td>
</tr>
<tr>
<td>Absolute maximum width 18 ft (5.5 m)</td>
<td>This width is equivalent to two 9 ft (2.7 m) travel lanes and regular encroachment into the advisory shoulder space may not be necessary.</td>
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Implementing agencies should be advised that the above dimensional guidance is intended to facilitate implementation on common roadway widths in the U.S. As with most treatments, more overall width is preferable to constrained circumstances.

**Figure 2.12.** Total roadway width affects the number of road users that can meet and pass simultaneously. Wider roadways allow for more simultaneous interactions and can support higher volumes of motor vehicles.
Hanover, New Hampshire

PROJECT DESCRIPTION

COMMUNITY CONTEXT

Hanover, NH, is a town of approximately 11,000 with 8,000 living in the town center. Hanover is home to Dartmouth College with a student population of 6,300. Hanover is located on the Connecticut River and has a dense built-up area surrounded by small suburban neighborhoods that transition quickly to a very rural setting.

KEY DESIGN ELEMENTS

The advisory shoulders project was built on a low-volume, low-speed, residential road. Implementation included pavement markings and signs.
Visually Separated
Paved Shoulder

Enhanced Longitudinal Markings
Wide solid white lines or buffer areas enhance the visual separation.

Contrasting Pavement
As an aesthetic treatment, colored or contrasting pavement increases contrast between the shoulder and the roadway.

Edge Line/Rumble Strips
If used, bicycle-tolerable designs can minimize impacts to bicyclists.

Bicycle Accommodation
Bicyclists travel in the same direction as the adjacent lane.
Visually Separated
Paved Shoulders

- Can be appropriate for walking and bicycling in certain contexts (even higher speed/volume settings)
- Wide paved shoulders can reduce crash risk for motor vehicles as well as other road users
- Ideal for short connections rather than primary walking routes
- Maintenance can impact safety for bicyclists
A Note on Rumble Strips

• Can be effective for reducing roadway departure crashes
• Negative impacts on bicyclists
• If used, prioritize remaining shoulder width (4 feet is the absolute minimum, but more should be considered)
• Incorporate gaps of 10-12 feet every 40-60 feet
• Center-line rumble strips can reduce vehicle passing distance; important to understand impacts on bicyclists
Visually Separated Bicycle Lanes

Bike Lane Marking
- Identifies exclusive use by bicyclists.

Bike Lane Line
- Wide solid line or buffer area separates the bike lane from the roadway. Dotted lines at crossings maintain a clear path for bicyclists.

Signs
- Identify the bike lane and prohibit on-street parking.

Bike Lane
- Bicyclists travel in the same direction as the adjacent lane.
Visually Separated Bicycle Lanes

• Generally sufficient for roads with speeds under 40mph and less than 10K ADT, but many other factors will impact application

• Prioritize transition zones and intersections (bicycle lanes can be “dropped” unexpectedly)

• Buffers can be added to increase safety and comfort
Physically Separated

Separated Bike Lane

Exclusively for Bicyclists
The bike lane provides space to ride, free of encroachment by motor vehicles.

Pedestrian Separation
The separated bike lane should be distinct from the sidewalks, with contrasting materials, a curb, or other detectable edge.

Sidewalk
A sidewalk provides space for pedestrians to walk, outside of the separated bike lane.
Physically Separated
Separated Bike Lane

• Many variations in design; more guidance is forthcoming

• Ideal for separating pedestrians and bicyclists, especially if there are higher-speed recreational or commuter bicyclists (or larger volumes)

• More applicable in rural village or small town setting
Physically Separated

Shared Use Paths and Sidepaths

Roadway Separation
An unsuited separated space from the roadway enhances comfort and promotes visibility at crossings.

Intersection Treatments
Geometric design at intersections allow motorists and prioritized bicyclists and pedestrians.

Benefits
- Completes pedestrian safety barriers
- Maintains a clear observation area
Physically Separated
Shared Use Paths and Sidepaths

• Applicable in many settings; ideal for low-stress connections
• Bi-directional paths need sufficient width for all users to operate
• Provide sufficient buffer separation from traffic
• Prioritize design of crossings, especially midblock and near intersections
Physically Separated
Sidewalks

Roadway Separation
A curb or unpaved separation separates the sidewalk from the roadway.

Sidewalk
Separated pedestrian accommodations may be necessary as roadway speeds and volumes increase.
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Importance of Crosswalk Design

Risk of crashes increases with
- More lanes
- More traffic
- Higher speeds

Drivers may not expect to see pedestrians and bicyclists in rural environments
Improving Safety at Crosswalks

Crossings on high speed rural roads need more than just painted crosswalks.
Guide for Improving Safety at Uncontrolled Locations (FHWA)

1. High-visibility crosswalk markings, parking restrictions on crosswalk approach, adequate nighttime lighting levels, and crossing warning signs
2. Raised crosswalk
3. Advance Yield Here To (Stop Here For) Pedestrians sign and yield (stop) line
4. In-Street Pedestrian Crossing sign
5. Curb extension
6. Pedestrian refuge island
7. Rectangular Rapid-Flashign Beacon (RRFB)**
8. Road Diet
9. Pedestrian Hybrid Beacon (PHB)**
Six-step process helps agencies:

- Collect data on crossings
- Inventory conditions and prioritize
- Analyze safety concerns and factors
- Select countermeasures
- Implement projects
- Evaluate and monitor results

Thank You!

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