How can paratransit users become attracted to fixed-route bus services?

A case study on Accessibility to Transit in Chapel Hill and Carrboro

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Outline

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1. Introduction: Recall from the last conference

- **Americans with Disabilities Act**: Elimination of discrimination and assurance of equality
  - Improve accessibility to public transportation
  - Implementation of complementary paratransit service

- **Relevance of research topic**:
  - Disadvantages continue to exist
  - Growth of disabled and elderly population
  - Public transportation essential for mobility and social inclusion

- **Challenges facing transit for the disabled and elderly**:
  - Paratransit: high subsidies, limited capacities, unreliability, eligibility rules, social exclusion
  - Fixed-route: physical barriers on bus stops and environment
1. Introduction: Recall from the last conference

- Focus on Chapel Hill and Carrboro, North Carolina
- Observation: Many people use paratransit instead of fixed-route transit because of physical barriers in the infrastructure

\[\text{Chapel Hill Transit wants to attract paratransit users to fixed-route services in order to reduce paratransit trips}\]

- Instruments already adopted in other cities:
  - Train new bus riders how to ride a bus
  - Improving access to bus stops and their surrounding infrastructure
  - Universal Design
2. Research Questions:

a) How should accessible bus stops and surroundings look like?

b) What is the current state of accessibility to transit?

c) What is the current potential to attract paratransit users to fixed-route services?

d) Which improvements are necessary to increase this potential in the future? Which are the most urgent and/or the most effective ones?
3. Methodology

**Literature research** (ADA, other guidelines, examples of best practice)

**Experiences of persons with disabilities**

**Evaluation of all bus stops in Chapel Hill and Carrboro**

- Accessibility
- Convenience
- Safety

**Rating**

**Analysis of accessibility to transit for paratransit users with ArcGIS**

- Bus Stop rating
- Addresses of paratransit users
- Data about existing infrastructure: Sidewalks, street network, driveways

**Identification of „Hot Spots“, priority list of improvement**
3. Methodology: Evaluation of bus stops

1. Bus stop accessibility: 5 key elements
3.1 Bus Stop Accessibility:  
5 Key Elements

2. Sidewalk: at least 3 feet wide, not in bad condition, no other barriers or problems

3. Connection between Sidewalk and Boarding Area

1. Boarding/Alighting Area:  
   - Stable surface
   - No barriers or other problems

4. Path to Trip Generator or Street Intersection

5. "Accessible" Crosswalk

Source: ADA Standards for Transportation Facilities, modified
3. Methodology: Evaluation of bus stops

1. Bus stop accessibility: 5 key elements
2. Safety: Lighting, traffic hazards, police call boxes…
3. Convenience: Availability of shelters, benches, schedules, real-time info…

Rating:
- Bus stop with full accessibility
- Bus stop with limited accessibility (1 or 2 key elements missing)
- Bus stop not accessible
4. Results: Current state of access to transit

Bus Stop Accessibility in Carrboro and Chapel Hill

Percentage of all bus stops (636)

- 238 = 37.4%
- 249 = 39.2%
- 149 = 23.5%

not accessible  limited accessibility  full accessibility
4. Potential to attract paratransit users: Levels of access to transit

Level 1: Residence not within ¼ mile linear distance of a bus stop = 245 users
→ currently no access to transit, not focus of further analysis

Level 2: Residence has a path less than ¼ mile long to a fully accessible bus stop = 228 users
→ currently full access to transit

Level 3: Residence
a) has no path to a bus stop and/or
b) has no accessible bus stop in vicinity or
  c) path is longer than ¼ mile
= 1316 users
→ currently no access to transit, access could be gained through improvements

Goal: Increase the percentage of paratransit users with Level 3 accessibility
4. Increase Accessibility: Suggestions for improvements

Suggestions for improvements

1. Bus Stop and immediate Environment
   Target Group: Paratransit Users whose residences are connected to sidewalks, but no stop within ¼ mile is accessible
   557 Users

2. Pedestrian Infrastructure
   Target Group: Paratransit Users whose residences are not connected to sidewalks
   759 Users
4. Suggestions for improvements: Bus stops and immediate surrounding

It is not feasible to make every bus stop accessible
→ Focus on inaccessible bus stops with proximity to 3 and more residences

Result:

By improving **42 of 487** Bus Stops (=8.6%) with no and limited accessibility, more than half of the users in this target group (309 of 557 =55%) get access to fixed-route transit.

Some improvements are very simple:

1. Addition of crosswalks
2. Addition of stable boarding pads
3. Removal of barriers
4. Suggestions for improvements: Pedestrian Infrastructure

In this analysis the street network can be used to “pretend” the existence of sidewalks:

Results:
→ 75% of users in target group would have a bus stop in walking distance
→ ca. 15% of users have bus stop in immediate proximity (0 – 330 feet), but have no access to these because of missing sidewalks
→ Ca. 17% would have an accessible bus stop in walking distance
4. Effect of bus stop improvements on Accessibility Levels

Before improvement

Level 1: 245 = 14%
Level 2: 228 = 13%
Level 3: 1316 = 73%

After the improvement of 42 Bus Stops

Level 1: 245 = 14%
Level 2: 228 = 13%
Level 3: 1316 = 73%

1007 = 56%
537 = 30%
5. Conclusion

- **Current state of accessibility:**
  - Only 25% of all bus stops are accessible
  - 40% of bus stops need minor improvements to make them fully accessible

- **Current Potential to attract paratransit users to fixed-route busses:**
  - Potential is very limited, only 15% of all users have access to a fully accessible bus stop in walking distance

- **Future Potential:**
  - Little effort is needed to double the number of paratransit users who have access to transit

- „**Hot Spots“ of improvement action:**
  - Bus stops in vicinity of apartment complexes and homes for the elderly
  - Areas with single-family residences with suburban character
5. Concerns and Outlook

- No differentiation between the paratransit users` impairments in this analysis
- Finally focus on people with walking impairments, because facilities for visually impaired persons do not exist
- Upgrading the built environment is **only one component** in the process of attracting paratransit users to fixed-route services.

Other aspects:
- review of eligibility process
- attitude of disabled and elderly community towards changes in mobility patterns
- Cooperation between authorities and disability organisations
- Cooperation between transit authority and local and state government

**Bus stop improvements and upgrades in the pedestrian infrastructure can only reduce the demand for paratransit trips, but cannot replace the paratransit service in the near future**
Questions and concerns?

Thank you!
6. References

6. References (continued)

- Sapper, D. et al. (2009): Impacts of more rigorous ADA paratransit eligibility assessments on riders with disabilities. Tampa, FL: Center for Urban Transportation Research, University of South Florida.