Demand Responsive Transit Service

What is it?

Demand responsive transit, also known as paratransit, includes services where a transit vehicle does not operate a fixed-route, but picks up and drops off passengers at select locations in response to specific service requests. Demand responsive transit typically serves the general population in low-density and/or rural communities as well as the disabled population. Americans with Disabilities Act (ADA) services are a subgroup of demand responsive transit services designed specifically for persons who, because of a disability, cannot access or ride available fixed-route service.4

Services may vary in the level of flexibility that is provided. Some agencies provide fully demand responsive service that involves call-up service door-to-door between any origin and destination in a given area, while others may offer a more defined route with flexible pick up or drop off points upon request that may deviate from the route. Additionally, service may or may not be offered on a fixed schedule.

Demand responsive transit is most commonly operated by private companies under contract with public transit agencies, but can also be operated by community groups, nonprofit organizations, or the public transit agency directly. Paratransit services typically involve the use of small buses or vans that are equipped with wheelchair lifts or ramps. These services can help make the transportation network more accessible for all residents, including those that live in remote locations, the elderly, and the disabled.

What are the benefits?

- **Accessibility**: Increases the travel options available for accessing everyday goods and services.

- **Equity**: Increases accessibility and the travel options available to specific population groups, (elderly, disabled) and in specific geographic areas (rural).

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1. [http://www.piercetransit.org/jpgs/newvan.jpg](http://www.piercetransit.org/jpgs/newvan.jpg)
3. [http://cherriots.org/sites/default/files/headers/cherrylift.jpg](http://cherriots.org/sites/default/files/headers/cherrylift.jpg)
4. The Americans with Disabilities Act (ADA) requires equal access to public transportation for persons with disabilities.
Where is it being used?

Demand responsive transit is employed in most cities that have public transit service in the United States. These are relevant examples in the Pacific Northwest:

- **TriMet LIFT Paratransit**, Portland, OR
- **Cherriots CherryLift**, Salem-Keizer, OR
- **Canby Area Transit Dial-A-Ride**, Canby, OR
- **Spokane Transit Paratransit**, Spokane County, WA
- **Pierce Transit Shuttle**, Pierce County, WA

How effective is it?

Few attempts have been made to monitor and understand demand responsive transit travel behavior and ridership response compared to fixed-route service, due to the wider variation in services offered and the lack of available databases suitable for study. There is also variability in the eligibility requirements for demand responsive transit service and the stringency with which such routes are applied. Total ridership for demand responsive services is most heavily influenced by the size of the target markets and by the service attributes offered.

Because the primary application of demand responsive service is in situations where the density of patrons is low, due either to low-density land use patterns and/or a limited target market segment (ADA), ridership is typically low and the presence or absence of paratransit service has negligible impacts on automobile use, vehicle miles traveled, energy consumption, or emissions. However, demand responsive transit has important equity and accessibility benefits. Information related to the effectiveness of demand responsive transit service is described below.

- A study of ADA and social service paratransit use in Winston-Salem, North Carolina, found that 57% of trips were for medical purposes, 26% were for education purposes, 6% were for shopping, and 5% were for employment, with all remaining trips in the “other” trip purpose category. Senior citizens accounted for 59% of the passengers, while 61% were on disability and 98% were unemployed.

- In Chicago, Illinois, those who were unable to schedule a trip due to service capacity constraints did not make the trip 55% of the time. Of the 45% who found alternate means, at least 36% (and possibly more) used a private vehicle, 21% took a regular taxi, 7% took a fixed-route service, and the rest took other modes.

- Replacing fixed-route service with general demand responsive service generally leads to increases in ridership. In Columbia, Maryland, (population: ~ 100,000), daily ridership increased from 70 to 240 passengers per day (243% increase) after replacing fixed-route transit service with demand responsive service.

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5 In this summary, the best available data on program effectiveness is used. Whenever possible, information is provided for the referenced examples; however, that was not always available.
• Of the riders that used general demand-responsive service with route deviation in Prince William County, Virginia, 22% formerly drove alone to work, while 19% formerly drove alone to shop.  

How much does it cost to implement?

In general, the cost of implementing demand responsive service depends on the size of vehicles used, hours of operation, character and density of the service area, and ridership levels. The cost of providing federally mandated paratransit service can be 7 to 10 times more expensive per trip than fixed-route passenger trips (often exceeding $20 per trip in 2004 dollars). Often, more than 50% of this cost goes to paying third-party contractors to provide the service. Among 25 public transit agencies in Florida, the cost per hour for paratransit service increased 57% from $23.31 in 2001 to $36.52 in 2005 and increased overall annually from $66,301 in 2001 to $165,524 in 2005. Operating expenses made up 88% of the total expenditures.  

To lower costs, some transit agencies in small cities and low density service areas have opted to consolidate transit service offerings into one general flex service instead of providing separate fixed-route service and ADA paratransit service. Flex service typically allows buses to deviate from fixed-routes to serve ADA eligible riders, but requires regular passengers to board or alight at designated stops. Example case studies and their results are described below.

• In Whatcom County, Washington, annual cost savings of up to $350,000 have been realized from the provision of flex service in rural areas instead of both fixed-route and complementary paratransit service. Route deviations account for 9% of total trips, many for individuals who would be eligible for ADA paratransit. 

• In Prince William County, Virginia, operating flex-route service instead of two separate fixed-route and paratransit services mitigated the need to operate an additional 6 vehicles operating 52 daily service hours. The result was an annual savings of $462,000 relative to the actual annual budget of $688,000. 

• In order to comply with ADA requirements, the entire Wichita Falls, Texas, system was converted to a fixed-route service that allowed for stops anywhere along a route, as well as route deviation, in response to previously arranged passenger service requests. This saved between $750,000 and $1 million a year.
Implementation resources
The following resources may be helpful to transit agencies looking to implement demand responsive transit service:

- [ADA Technical Assistance](#), Federal Transit Administration
- [Topic Guides on ADA Transportation](#), Federal Transit Administration
- [Guidebook to Rural Demand Response Transportation](#), TCRP Report 136
- [Demand-Response Services and the Trip to Work](#), Community Transportation Association of America
- [Resource Guide for Commingling ADA and Non-ADA Paratransit Riders](#), TCRP Report 143