# The Unprecedented Age Wave and Challenged Fixed-Route and Specialized Transportation Services: The Case of Richmond, Virginia

**Xueming Chen**

## 1 Introduction

The public transit and paratransit operations in Richmond, Virginia urgently need to be reformed in order to better meet sustainable transportation and other legally mandated requirements. This work is becoming critically important since the U.S. has entered the population aging society ("the Age Wave") in the early twenty-first century, which demands a more efficient, equitable, and affordable public transit and paratransit system [1].

This paper focuses on the three key issues faced by the Greater Richmond Transit Company (GRTC): poor regional service coverage; costly and inadequate paratransit services; and ineffective governing structures. Based on this empirical study, it will come up with a list of improvement recommendations.

## 2 GRTC's Facts

### *2.1 History and Governance*

Founded in 1860 and incorporated in 1973, GRTC Transit System is the major transit operator serving the Richmond region. According to the 2011 National Transit Database (NTD), GRTC's service area covers 227 mile$^2$ and 449,572 residents.

GRTC's overall direction is guided by its Board of Directors, with a management team that conducts its day to day operations. The GRTC directors are

X. Chen (✉)
L. Douglas Wilder School of Government and Public Affairs, Virginia Commonwealth University, Richmond, VA, USA
e-mail: xchen2@vcu.edu

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appointed annually, in October, by the Council of the City of Richmond and the Board of Supervisors of the Chesterfield County, acting in their capacity as stockholders.

Regarding the Chesterfield County's involvement in GRTC business, a brief history is introduced here. It began on June 6, 1989, as an initiative to create the regional transportation authority. The GRTC Board of Directors approved amendments to the company's by-laws and a purchase agreement for the sale of five shares of stock to the County of Chesterfield at a price of $10,000 a share. Therefore, the Chesterfield County owned 50 % of GRTC. The Henrico County Board of Supervisors decided not to participate in purchasing GRTC in 1989, even though it initially agreed with the purchase agreement in principles [2].

## 2.2 Budget

In FY 2011, GRTC's total operating revenue was $18,839,778. The agency's most important revenue item was its farebox revenue, especially its fixed-route service (51.45 %), followed by purchased service from the surrounding jurisdictions (29.24 %).

In FY 2011, GRTC had a total operating expense of $43,813,570. The most important expense item was transportation-related expense (47.82 %), followed by administration and general costs (23.26 %).

To cover most of the financial deficits, GRTC received operating contributions from local, state and federal governments. In FY 2011, local government, especially the City of Richmond, provided the most important contribution to support GRTC's transit operations (44.31 %), followed by state (30.50 %) and federal (25.19 %) governments.

## 2.3 Fixed-Route Services

At present, GRTC's fixed-route bus service consists of a fleet of 186 buses travelling over 36 routes within the City of Richmond, Counties of Henrico, Chesterfield, and City of Petersburg.

Figure 1 shows the GRTC local fixed-route service area. It is very clear that most of the GRTC bus services are provided on the north side of James River. As a general rule-of-thumb, public transit customers are willing to walk a ¼ mile to a bus stop. When placing a ¼ mile buffer zone around local GRTC bus routes, the GRTC fixed-route local bus service area covers approximately 64 mile$^2$ and 191,000 potential customers. Of these customers, about 27,000 are elderly, 47,000 have a disability, and 37,000 are at or below poverty.

Table 1 shows the GRTC's system-wide ridership from FY 2006 to FY 2011. The average annual bus ridership is about 10 million passengers.

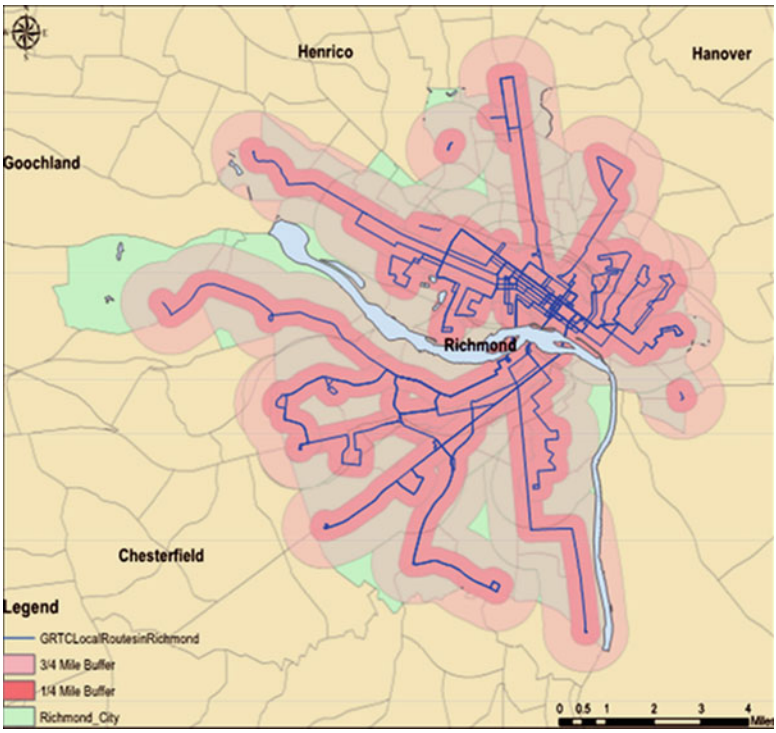


**Fig. 1** GRTC local fixed-route service area

**Table 1** GRTC systemwide ridership

| FY | Systemwide ridership |
|---|---|
| FY 2006 | 10,738,378 |
| FY 2007 | 10,306,201 |
| FY 2008 | 10,280,212 |
| FY 2009 | 10,444,498 |
| FY 2010 | 10,193,867 |
| FY 2011 | 9,887,800 |

Sources: GRTC. Transit system 2011 annual report

## *2.4 Paratransit Services*

The Americans with Disabilities Act of 1990 (ADA) recognizes that some users of public transit, due to the nature of their disability, will be unable to use fixed-route services even with full accessibility. To ensure equal access for these riders under extraordinary circumstances, public transit operators are required to offer a complementary paratransit service.

In terms of its service area, response time, fares, trip purpose, service hours and days, and capacity, GRTC's Community Assisted Ride Enterprise (CARE) service strictly complies with and even exceeds ADA mandates.

**Table 2** Care ridership

| FY | CARE ridership |
|---|---|
| FY 2003 | 200,887 |
| FY 2004 | 202,548 |
| FY 2005 | 197,140 |
| FY 2006 | 208,783 |
| FY 2007 | 210,616 |
| FY 2008 | 232,074 |
| FY 2009 | 242,560 |
| FY 2010 | 237,065 |
| FY 2011 | 258,738 |

Sources: GRTC. Transit system 2011 annual report

GRTC outsources its ADA eligibility certification process to ADARide, the Los Angeles-based firm. Applicants can either mail in application forms or use the online application process. The application process is free for paratransit applicants while GRTC gets charged an average of $70.00 per application coming from this region [3].

CARE currently has 46 vehicles with seating capacities for 8–12 persons/vehicle, providing curb-to-curb paratransit service for physically and mentally disabled riders who are unable to use regular fixed-route transit service. All vehicles are equipped with wheelchair lifts. CARE paratransit operations are currently provided by TecTrans.

Table 2 shows the CARE Ridership from FY 2003 to FY 2011. Except for FY 2005, CARE's annual ridership has been stabilizing between 200,000 and 250,000.

Figure 2 shows GRTC's fixed-route access routes spreading across the city. As stated earlier, the ¼ mile buffer zone is the service area for fixed-route transit service. And the ¾ mile buffer zone was added to the layer to assess the overall service coverage provided by complementary CARE paratransit service. Overall, GRTC's fixed-route ¾ mile buffer zone covers most areas that require the transit agency to provide paratransit services, except the western portion of the City.

As illustrated in Fig. 3, the western portion of the City has high densities of disabled seniors, which suggests the necessity of providing CARE services there even though there are currently no fixed-route services provided yet [4].

## 3 GRTC's Issues

This section examines the three key issues identified in the introduction: poor regional service coverage; costly and inadequate paratransit services; and ineffective governing structures.

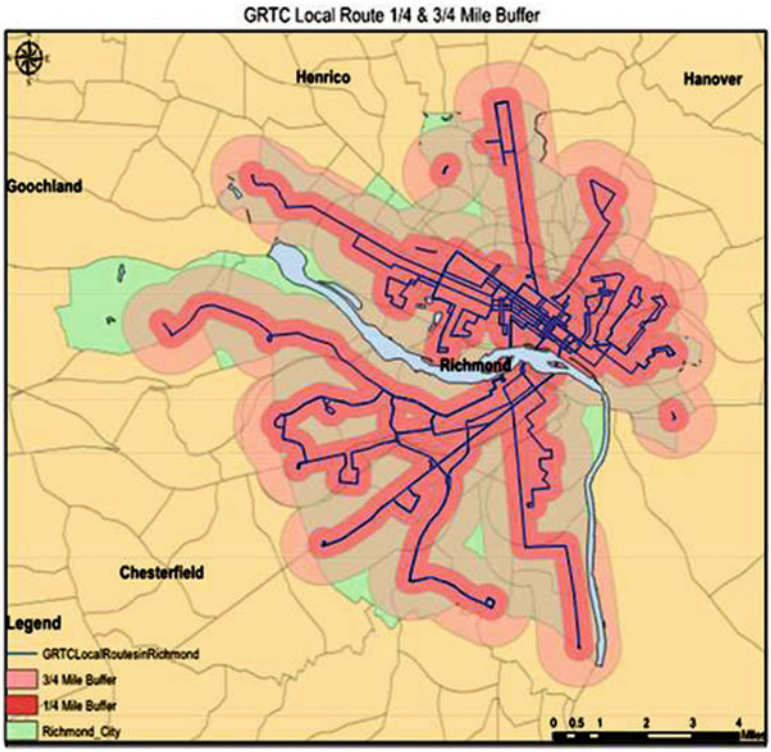


**Fig. 2** GRTC – local route ¼ & ¾ mile buffer service area

## *3.1 Poor Regional Service Coverage*

According to the Brookings Institution study, the Richmond area ranks No. 95 out of the 100 metropolitan areas in the U.S. in terms of the proportion of working-age residents who have access to transit, with only 30.8 % of geographic coverage [5].

For fixed-route bus services, GRTC currently does not provide extensive service coverage in the suburban employment centers of the Richmond region, such as Short Pump/Innsbrook and Midlothian areas. Beyond downtown Richmond, only I-64/Broad Street and Hull Street corridors are adequately served [6]. See Fig. 4 for details. Except for a few express bus services, both Henrico and Chesterfield Counties have virtually no transit services at all. Despite the fact that more suburb-to-suburb trips are taking place in the Richmond region, most GRTC bus routes are downtown-bound, which makes it very difficult if not impossible to make suburb-to-suburb travels by taking public transit.

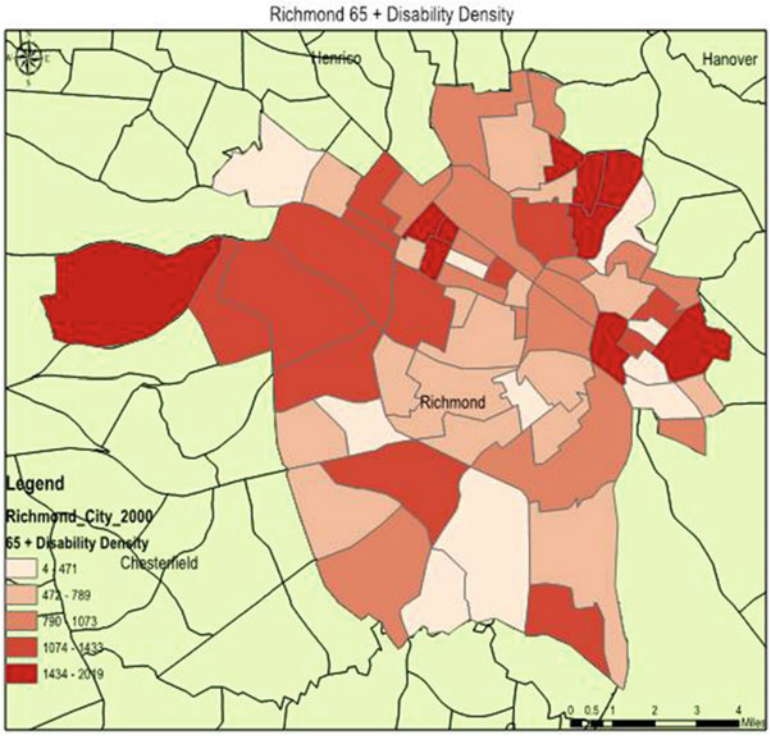


**Fig. 3** Richmond 65+ disability density map

## *3.2 Costly and Inadequate Paratransit Services*

The cost per trip shown in Table 3 is for GRTC's fixed-route service and specialized transportation services (Note: most GRTC specialized transportation services are CARE paratransit services). Specialized transportation services were fairly stable from 2003 to 2007 with cost per trip being about $17 and annual ridership being about 200,000. However, its cost per trip dramatically increased twice: in 2008 and 2011. In 2008, the cost per trip jumped from $16.44 to $23.54. The cost per trip further skyrocketed to $28.00 by the end of 2011, and is projected to reach $30.00 by 2013, which is attributable to the expansion of CARE services throughout the region beyond the ¾ mile buffer zone of the fixed-route service. In contrast, fixed route cost per trip has been more or less steady from 2003 to 2012, costing an average of about $4.00 per trip for GRTC's regular bus service.

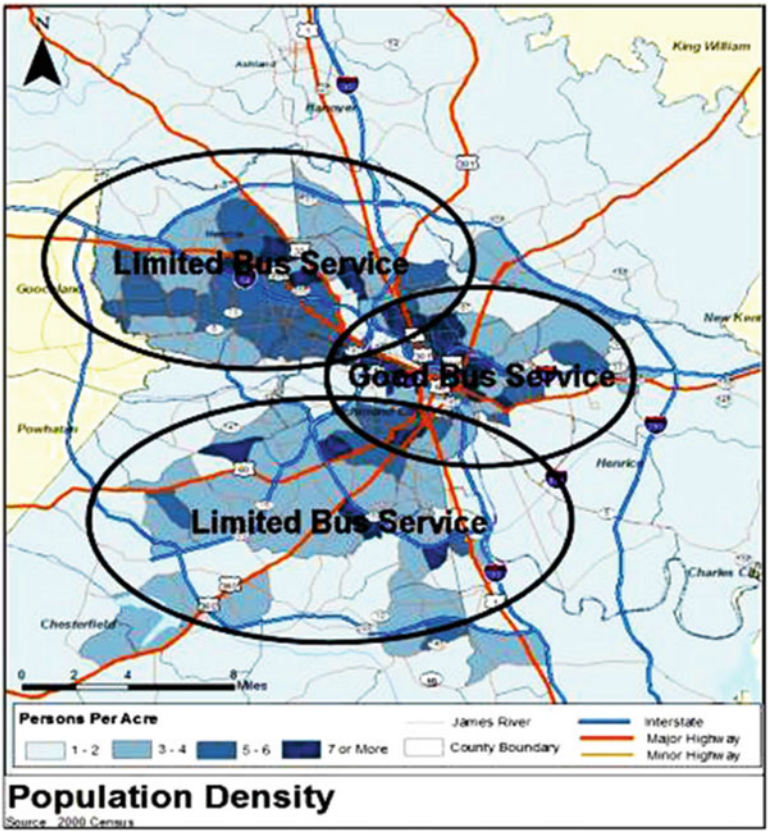


**Fig. 4** Bus service and population density

## *3.3 Ineffective Governing Structures*

Even though the idea of forming a regional transportation authority has been floating around this region for the last two decades and beyond, GRTC is not yet a regional transportation authority and therefore cannot levy taxes, issue bonds, or implement any other innovative financing strategies to increase its revenue base.

The commonly perceived greater Richmond metropolitan region includes the following jurisdictions: Town of Ashland, Charles City County, Chesterfield County, Goochland County, Hanover County, Henrico County, New Kent County, Powhatan County, and the City of Richmond. However, GRTC currently primarily only serves City of Richmond, with very limited transit services provided in Henrico and Chesterfield Counties. Ironically, the representatives of Chesterfield County sitting on the GRTC Board of Directors are not promoting transit in that county, but rather preventing GRTC bus lines from being extended into the county.

**Table 3** Unit cost comparison between fixed route and specialized transportation

| Year | Cost per trip | | Percentage of total budget | | Percentage of actual total | |
|---|---|---|---|---|---|---|
| | Fixed route | Specialized | Fixed route (%) | Specialized (%) | Fixed route (%) | Specialized (%) |
| 2003 | $3.98 | $17.22 | 90 | 10 | 88 | 12 |
| 2004 | $4.11 | $16.83 | 89 | 11 | 89 | 11 |
| 2005 | $4.06 | $17.22 | 89 | 11 | 89 | 11 |
| 2006 | $3.08 | $16.33 | 90 | 10 | 90 | 10 |
| 2007 | $3.55 | $16.44 | 91 | 9 | 91 | 9 |
| 2008 | $3.71 | $23.54 | 84 | 16 | 85 | 15 |
| 2009 | $3.90 | $22.66 | 86 | 14 | 87 | 13 |
| 2010 | $3.92 | $23.10 | 87 | 13 | 86 | 14 |
| 2011 | $4.05 | $27.03 | 87 | 13 | 85 | 15 |
| 2012 | $3.93 | $28.31 | 86 | 14 | 84 | 16 |
| 2013 | $4.23 | $30.12 | 84 | 16 | | |
| Change % from 2003 to 2013 | 6.2 % | 75 % | | | | |

Furthermore, unlike the board members of New York or Los Angeles County Metropolitan Transportation Authority, the existing GRTC board members are not elected officials. They are merely appointees of the Richmond City Council and the Chesterfield County Board of Supervisors. The existing governing structures of GRTC are ineffective in promoting regional interests and completing regionally significant transit projects.

## 4 Improvement Strategies

To address the above three issues, this section proposes ten improvement strategies for potential implementation.

### *4.1 Establish the Richmond Regional Transportation Authority (Political Category)*

This study recommends that the City of Richmond lobby the Virginia General Assembly to authorize the establishment of the Richmond Regional Transportation Authority. The Authority should be governed by the Board of Directors consisting of the city and county elected officials within the Richmond metropolitan region.

The Commonwealth of Virginia should take the lead in this endeavor. To make sure the region is equitably represented, the seats of Board members should be allocated based on the population of each jurisdiction. The City of Richmond and the Counties of Henrico and Chesterfield should have more seats than other smaller jurisdictions. Some smaller jurisdictions may share one seat.

The Authority should be able to levy taxes, issue bonds, establish benefit assessment districts and implement any other innovative financing measures that are deemed necessary to improve and solidify its revenue basis.

Even though this strategy will initially face a strong opposition from the surrounding counties, it will benefit the entire region in the long run.

## *4.2 Coordinate Public Transit and Human Service Transportation (Political Category)*

This study encourages better coordination between GRTC and other human service agencies, such as Adult Care Service, American Red Cross, Bethlehem Community Centers, Inc., Chesterfield Community Service Board, and many others.

In particular, GRTC needs to work with non-profit aging-related service agencies such as Senior Connections, the Capital Area Agency on Aging (SCCAAA). SCCAAA is a private nonprofit organization that has been helping the elderly citizen population of the greater Richmond area to live an improved and healthier lifestyle.

This strategy is feasible for implementation, but it requires lots of coordinating and consensus-building efforts from GRTC and other stakeholders.

## *4.3 Reform Fare System for Care Riders (Economic Category)*

The existing fare per CARE trip for the customer is $2.50 for one-way, but the cost per CARE trip for GRTC is $30.00 for one-way. GRTC has completed a peer review of other localities' paratransit service and determined that GRTC is the only system of those reviewed to both provide non-ADA required service and not charge more for it or have it subject to capacity.

Therefore, this study recommends the distance-based fare structure for the service area outside of the mandated ¾ mile buffer zone to allow GRTC to continue serving CARE eligible riders while generating additional revenue to support this service. For those low-income CARE eligible riders, some types of fare discounts should be provided to foster social equity.

Levine (1997) found that in Ann Arbor, Michigan, the ridership of fixed-route transit by ADA eligible riders is very sensitive to price. Elimination of even a very low fare of $0.35 had dramatic effects during the free months [7].

Therefore, this study also recommends providing fixed route service to CARE eligible riders free of charge. Currently, these CARE eligible riders must pay 75¢ for local service. Providing fixed route service to CARE eligible riders free of charge would induce more CARE riders to use fixed-route services rather than CARE paratransit services. This will reduce CARE demand, thus saving CARE operating cost.

## *4.4 Restructure Existing Bus Routes (Planning Category)*

Based on the 2010 population census data, most recent transit on-board data and other data, GRTC should conduct a new bus restructuring study and thoroughly overhaul the existing fixed-route system to make it more closely aligned with transit origin–destination flows, better serving important employment centers and other attractions.

## *4.5 Public-Private Partnerships (Planning Category)*

Public-private partnerships can be very helpful in countering ridership demand for CARE paratransit service. Taxi services that are accessible to disabled and elderly passengers could offset demand for paratransit services. This can either be done through a public entity or encourage private enterprise to meet the needs of the disabled elderly [8]. Since private contractors providing paratransit services will not be under ADA guidelines, GRTC will have to develop minimum standards and regulations for them to ensure quality of service [9].

## *4.6 Volunteer Driving Programs (Planning Category)*

GRTC currently has no volunteer driving program in place. It is very important for GRTC to work with the faiths-based organizations and others to launch volunteer based driving programs that serve the elderly and disabled.

### 4.7 Travel Training (Planning Category)

Currently, GRTC has no travel-training program for the elderly and disabled population living in Richmond City. Travel training provides a promising approach for moving persons from paratransit to fixed-route transportation services. CARE services have seen high increases in paratransit ridership over the last few years and this can be a great tool in managing demand.

### 4.8 Subscription-Grouping Rides (Planning Category)

GRTC has a subscription-based service for CARE passengers who use the service at least four times a week. These types of service are prescheduled and can let the agency plan ahead, allowing other trip requests to be based on confirmed requests. This can also have a major impact on reducing trip requests and calls to the paratransit operator improving general productivity and efficiency.

### 4.9 Rely on New Technology (Technological Category)

GRTC has acquired and implemented its Advanced Communication Project, which includes Computer Aided Dispatch/Automatic Vehicle Locators (CAD/AVL), advanced vehicle monitoring (AVM), Automatic Passenger Counters, (APC), Voice Annunciation, Internet Visual Signs, and stop level bus arrival signs [10]. This will allow GRTC to increase its operational efficiency and effectiveness through improved trip scheduling and routing.

In addition, vehicle replacement programs are a great way to reduce operating costs and save money in the long run. Quicker conversion of diesel based systems for paratransit systems may bring some relief to operating costs as well in the case of GRTC.

### 4.10 Continue Improving Fixed-Route Transit (Technological Category)

GRTC needs to work with local and state agencies to improve access to bus stops by installing low-floored vehicles, or ramps. Bus stops and sidewalks need to be disability friendly with adequate lighting and benches to support elderly disabled passengers. The success of these programs will result in a reduction in the demand for paratransit services.

## 5 Conclusion

To address Richmond region's severe ADA transit and paratransit issues, this study proposes ten improvement strategies for their potential implementation.

First, GRTC needs to reform its fare structure for ADA paratransit eligible riders. Charging the distance-based CARE fare (adjusted by income level) for the service area outside of the ¾ mile buffer zone of the fixed-route bus service and providing free regular bus service to these riders would bring immediate benefits to GRTC in both revenue generation and cost containment.

Second, a series of planning and technological improvements should be made. In particular, those planning studies and bus restructuring activities should take place first because of their low costs.

Third, it is necessary to establish the regional transportation authority which will provide the ultimate transit solution to the Richmond region. In addition, GRTC should work with human service agencies and other stakeholders to coordinate public transit, paratransit and other human service transportation.

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