

Bus Route Changes Impact on the Poor and Elderly

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Abstract

This analysis of the Greater Baltimore Bus Initiative (GBBI) uses Geographical Information Systems (GIS) as a tool to incorporate data from the Maryland Transportation Administration, the U.S. Census Bureau and data compiled at the Institute for Urban Research in order to understand the relationship of changes in the bus stops and the population that the lost bus stops serves. Three different views of the geographical areas are portrayed in this analysis. One uses the transportation analysis zone (TAZ) to understand where the bus routes take passengers compared to where jobs are located. The second analysis uses U.S. Census 2000 tract data to understand the relationship of populations over 65 years old and the bus stops before and after changes in bus stops. The third analysis uses the neighborhood statistical areas (NSA) to understand the loss of rides created by GBBI in neighborhoods where 25% of their workers use the transit system.

Introduction

This analysis of the Greater Baltimore Bus Initiative (GBBI) uses Geographical Information Systems (GIS) as a tool to incorporate data from the Maryland Transportation Administration¹, the U.S. Census Bureau, and data compiled at the Institute for Urban Research and the National Transportation at Morgan State University in order to understand the relationship of changes in the bus stops and the population the lost bus stops serves. Three different views of the geographical areas are portrayed in this analysis to help understand how the poor and/or elderly may be impacted by public transportation. The first one uses the transportation analysis zone (TAZ) as the geographical boundaries to understand where the bus routes take passengers compared to where jobs are and where they are forecasted to be in twenty-five years (2030). The second analysis uses U.S. Census 2000 tract data to understand the relationship of populations over 65 years old and bus stops before GBBI. The third analysis uses the neighborhood statistical areas (NSA) data compiled for the city of Baltimore to understand the loss of rides² created by GBBI in neighborhoods where over 25% of those working use the transit system. These NSAs are the unique city-defined³ neighborhood boundaries.

¹ Shapefiles for bus routes were obtained from MTA as part of an environmental justice study done by the National Transportation Center and the Institute for Urban Research at Morgan State University.

² Loss of rides refers to bus stops that are removed by the GBBI and to riders who have greater than one-third of a mile to find another bus stop. This calculation was done by Glenn Robinson from the National Transportation Center at Morgan State University.

³ The City of Baltimore is a city of neighborhoods; however, the city defines neighborhood boundaries that may not be consistent with boundaries and names of neighborhoods defined by residents. The data is US Census 2000 block level aggregated to the neighborhood level.

Background

The Maryland Transit Administration (MTA) introduced a plan to restructure the bus system in the Baltimore region to be implemented by the fall of 2005⁴. This was an effort many felt long past due, as no comprehensive restructuring of Baltimore-area bus routes had been attempted in over 30 years. This plan called the Greater Baltimore Bus Initiative (GBBI) was based on a study conducted by MTA and was to expand service for cross-town and core routes while eliminating or reducing local routes serving outer areas. It included changes to 50 of its 54 local route, by simplifying routes, increasing frequency of service, providing improved connections to other modes of mass transit, and decreasing travel time for more of its users.

MTA's plan for bus service improvement includes these specific goals:

- Simplify routes
- Improve frequency and connections to other bus routes and rail services
- Determine where bus riders need to go and get them there efficiently
- Place bus stops strategically for a balance between accessibility and travel time
- Improve the schedule so travel time is more reliable

It also planned to have a fleet of new safety-enhanced, low floor buses equipped with state-of-the-art fare boxes under GBBI. These goals were prepared and then MTA took steps to have seven public hearings and it did a massive public outreach campaign so riders would “be on board” for the implementation.

⁴Message from Robert L. Flanagan, Secretary, Maryland Department of Transportation:
http://www.mtmaryland.com/MTA_GBBI.cfm

However, before GBBI was implemented, the state announced that it would not go forward as originally proposed and revised the scope of its plan, in response to the public hearing from the community. A study by the Baltimore Metropolitan Council⁵ (BMC) estimated that the original GBBI plan would have decreased the daily ridership by approximately nine percent, and that it would have eliminated service to a large number of suburban employment centers. MTA, in the Phase I of its proposal, made some changes to their original plan in hope that it would be less controversial and while still serving its main objectives. Phase I, which did not include cuts in service to a large portion of regional employment centers or eliminate any of the existing peak commuter express services, did go into effect in October of 2005.

MTA attempted to make approximately 20 more changes to routes that would be implemented in June 2006. They decided not seek public input, therefore holding no public hearings while maintaining the original implementation date.

The General Assembly of the State of Maryland passed a law prohibiting the MTA to continue with GBBI until October 2006. This setback caused the MTA to push back their timeframe for implementation until some time in 2007. Even though entities such as BMC have done studies on how GBBI can impact the public, no studies have been done specifically on how it affects the poor and elderly.

Methodology

GIS provides an avenue whereby we can understand the location of bus stops in terms of the community the routes serve. We join bus route data from MTA for the region of Baltimore along with data from the U.S. Census Bureau to ask:

⁵ This report can be found on the website: <http://www.baltometro.org/mambo/content/view/670/0/>

1. Do the new routes carry passengers to areas that are projected to have greater demands for employment?
2. Are bus stops lost or gained near senior citizens dwellings such as retirement homes and or apartments?
3. Do neighborhoods where greater numbers of the population use public transportation lose or gain convenient bus stops?

A list of senior citizen retirement homes and apartments with addresses was obtained from the telephone directory which helped prepare the data for geocoding. Once these were geocoded, the bus route Shapefiles and census tract data are overlaid to do an analysis of attributes found in the tracts that have senior housing facilities. All three questions used the bus route data and U.S. Census data either defined by TAZ, census tract or neighborhood boundaries. Baltimore City is a city of neighborhoods and therefore having census data by that geographical boundary gives the story of bus route changes more meaning for those who live in the city and who are more attuned to the neighborhood delineations.

Transportation Analysis Zones

The unemployment rate of 7.1%⁶ in the city of Baltimore is the highest in the state. New jobs could help put many people back to work, thus helping to reduce the number of unemployed and the poor populations⁷. To have public transportation to areas where new jobs are possible could be beneficial to employers and employees. Using

⁶ Data obtained from the Bureau of Labor Statistics:
<http://data.bls.gov/map/servlet/map.servlet.MapToolServlet?state=24&datatype=unemployment&year=2005&period=M13&survey=la&map=county&seasonal=u>

⁷ The American Community Survey for 2004 estimates 19.3% of families are below poverty in Baltimore.
http://factfinder.census.gov/servlet/ACSSAFFacts?_event=Search&_lang=en&_sse=on&geo_id=05000US24510&_county=Baltimore%20city

Transportation analysis zones (TAZ) we can help answer the question of the proposed bus routes servicing areas that are projected to have higher employment needs. TAZ present geographical boundaries that are traditionally used for land use and travel analysis purposes. This analysis, however, uses these zones to overlay the bus stop routes that are lost by the Greater Baltimore Bus Initiative (GBBI). The lost bus stops are joined to the TAZ to calculate which areas have growth/no growth and at least one lost bus stop. These TAZ use data from the U.S. Census Bureau that projects job growth by the year 2030 (see Map 1). Relying on that data we can surmise that 36% of the TAZ in the Baltimore Metropolitan Area are expected to have at least a 10% increase in jobs by 2030, but they will lose 7% of its bus stops. In the City of Baltimore, 18% of the TAZ are expected to have at least a 10% increase in employment opportunities by 2030, but these TAZ will lose 21% of the bus stops that are presently serving those areas. It is known that new train lines are being developed so that larger areas are served with public transportation. Details of those lines are not yet completed and therefore they are not presented in this analysis. Projecting into the future, it would help the area if bus stops were added rather than lost. The aspect of the rising gasoline prices and parking constraints, should guide the logic in planning for ideal bus stops.

U.S. Census Tracts

There are two vulnerable populations that rely on public transportation, the elderly, and those that cannot afford private means of transportation. In Maryland, particularly in the Baltimore area, it is the African American population that heavily relies on the buses as their method of transportation. In this analysis we use U.S. Census

tract data and join selected places of work⁸. The bus stops are also overlaid so that one can easily see the relationship of the current bus stops and some of the major places to work. What is unique about this analysis is that it also shows census tracts by race and age. Tracts were distinguished by having an African American population greater than the average of 31% and a population over 65 years old that was greater than the average of 13% (see Map 2). Census tracts that were categorized as both high in percentages of African Americans and populations of those over 65 are of interest to this analysis.

Excluding the City of Baltimore, the Baltimore Metropolitan Region has only 3% of its tracts that have a population greater than 31% African American and 13% over 65. However, for the City of Baltimore, 28% of the census tracts have higher percentages of African Americans and older populations. It appears that most of the tracts of interest in the city have bus stops for places of work. Within the surrounding metropolitan region, some of the major places of work are not served by the bus system. If these major places of work extend their employment opportunities, public transportation could serve a need.

Another way, to understand how the elderly might be impacted with public transportation, is to understand their accessibility to it. We geocoded⁹ all known senior housing facilities and overlaid census data. Out of the 136 facilities, 12 were not within 500 feet of a bus stop as shown in Map 3. However, over half of these fell into areas where the median income is less than the average¹⁰ for the area. When the percent of households without wage or salary income is examined, we find that on the average 38% of these particular areas has no wage or salary income. This indeed reflects the low-income of the area and the need for public transportation.

⁸ Selected places of work include health care facilities, malls, industrial parks, and universities.

⁹ Geocoding was done to the centerline of street files.

¹⁰ The average income for Baltimore City is \$30282.

Neighborhood Statistical Areas (NSA)

To further understand the impact of the changes in bus stops that GBBI brought forth, it is worthwhile to consider an analysis of frequent usage of public transportation along with the loss of bus stops. Profiles of neighborhoods, with select socioeconomic status variables along with select household variables where greater than 25% of the workers use public transportation *and* where at least one of the bus stops is removed, are shown in Tables 1 and 2. Map 4 shows these neighborhoods in relation to the percent of African Americans in the area. If an area met only one or none of these criteria, it was not considered in this analysis.

The majority of these particular neighborhoods are at least 90% African American with approximately one-third of the families below the poverty level. Mid-Town Belvedere is the exception. Fifty-four percent of its population is white and only 13 % of its families are below the poverty level. Almost 33% of its population uses public transportation which is close to the average 36% usage, and it lost two bus stops while the average loss of bus stop is about 5. Almost a quarter of its population has at least a bachelor's degree and only 17% of its population has a graduate or professional degree.

For this group of neighborhoods that have lost bus stops, on the average, 6.3% of its population has at least a bachelor's degree and 31% of its families fall below the poverty level. The average median household income is \$22,363 with a high of \$34,667 and a low of \$7,295 (See Table 3). The mean percentage of households in these areas receiving public assistance is 12% with a range from 1.2% to 21.7% while unemployment ranges from 1.74% to 13.2% with the average being 8.6%. West Forest Park neighborhood is added to the tables because under GBBI, it will lose 28 bus stops,

but only 23% of its population uses public transportation. Its profile, nonetheless, is similar to that of most of the other neighborhoods shown in the tables.

Map 4 underscores the relationship of these areas of interest with their surrounding neighborhoods that are designated by the percent African Americans. As noted, most of the neighborhoods that have 25% of their populations using public transportation and had a loss of a bus stop due to GBBI are surrounded by other neighborhoods that are at least 65% African American. It could be surmised that many African Americans use public transportation.

Conclusion

Multiple spatial dimensions for analyzing the impact of GBBI on the Baltimore Metropolitan Region give us more insight on how vulnerable populations who might rely on public transportation for a way of life will fare. The predicted jobs by 2030 that are shown in the TAZ analysis do indicate there will be many more jobs in the areas surrounding Baltimore city and that there is a younger population in those areas. Most of the losses of bus stops in Baltimore are within areas that expect to have no growth in jobs. However, the city of Baltimore does have a need for public transportation based on its poorer and older population. There appears to be greater job growth in the areas surrounding Baltimore City, but GBBI does not seem to place much emphasis on having bus routes to all the growth areas. With the shortage of fuel facing our economy, consideration for public transportation to high growth areas is warranted.

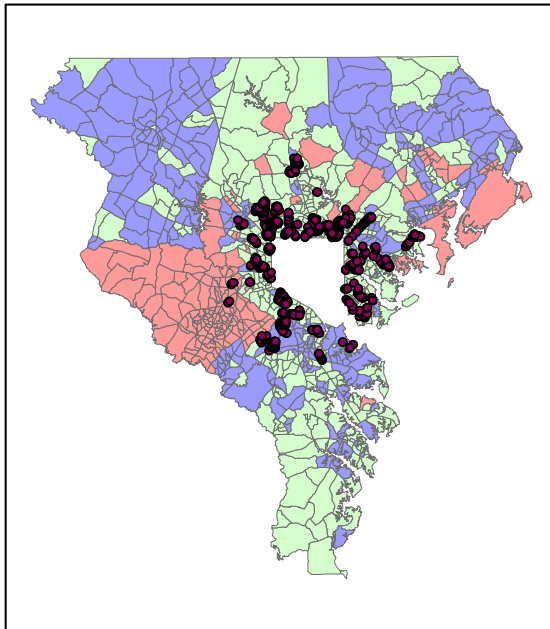
By considering SES as in the NSA analysis, we can easily see that areas that require more from a public transit system may not receive more. African Americans who rely on public transportation may have to walk farther to catch a bus. This may not

necessarily be a bad decision to have to walk farther, but when disabilities and age are factored into this, having to walk farther may not be a wise decision when the bus stops could simply stay and not be eliminated. Of course, not all seniors live in senior housing facilities, but for those who do, it would serve that population well if even more bus stops could be made.

When agencies such as Maryland Transit Authority have to make changes, it should indeed provide public hearings so the public can voice its opinion. However, without advocates for their concerns, many poor and minority populations will not have a voice in the choices that may affect their lifestyles. It can be argued that it is the fault of the group for not participating in decision making of standards that will affect them, but as with the responsibility and right for voting, only a few end up participating. Many, who could voice their opinions, end up not doing so. There is a host of complex reasons that this study will not address as to why this occurs.

This study began in the summer of 2005, since that time, GBBI will not be put into full implementation. This is due in part to the fact that many influences from advocates of the poor and minority populations have caused MTA to reconsider its plans, even though some of its plan has been implemented. The lost bus stops that were shown may not be lost after all. Before the next plan for completion of ideas set forth in GBBI occur, MTA will hold other public hearings. The picture we see presented in this paper by the GBBI may not be the final outcome for the Baltimore region and its citizens. More deliberations and considerations for vulnerable populations will take place.

Map 1: Loss of Rides by Expected Job Growth in 2030



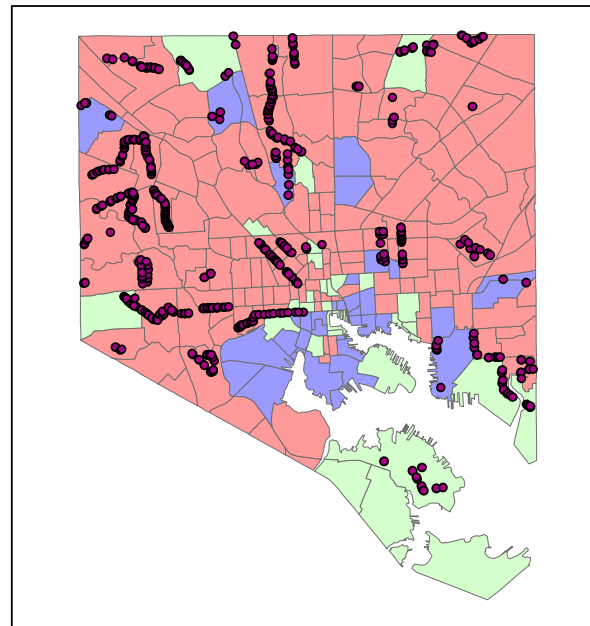
Legend

- Loss of Rides

Baltimore Metropolitan Area

Expected Job Growth 2030

- No growth in jobs
- At least 10% growth in jobs
- Over 10% increase in jobs



Legend

- Loss of Rides

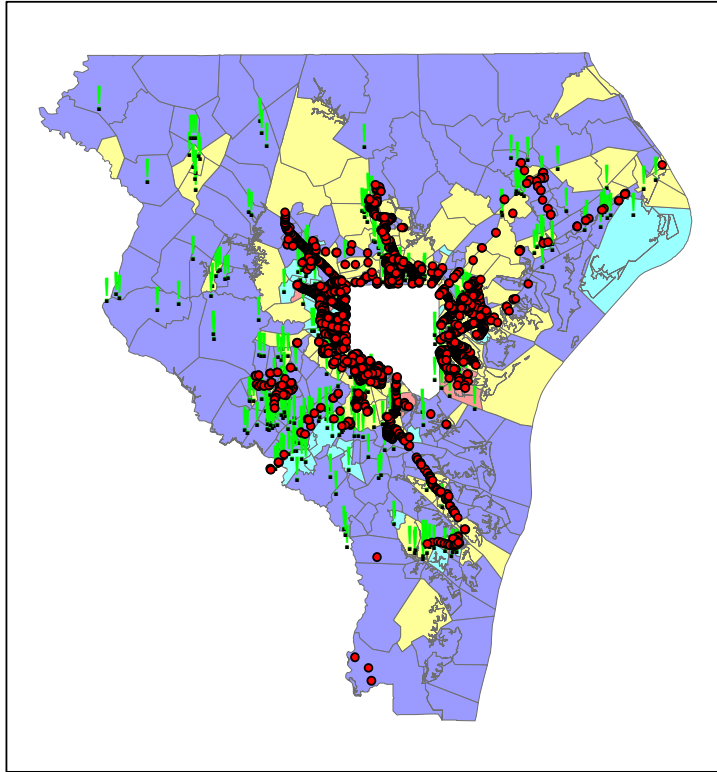
Baltimore City

Expected Job Growth 2030

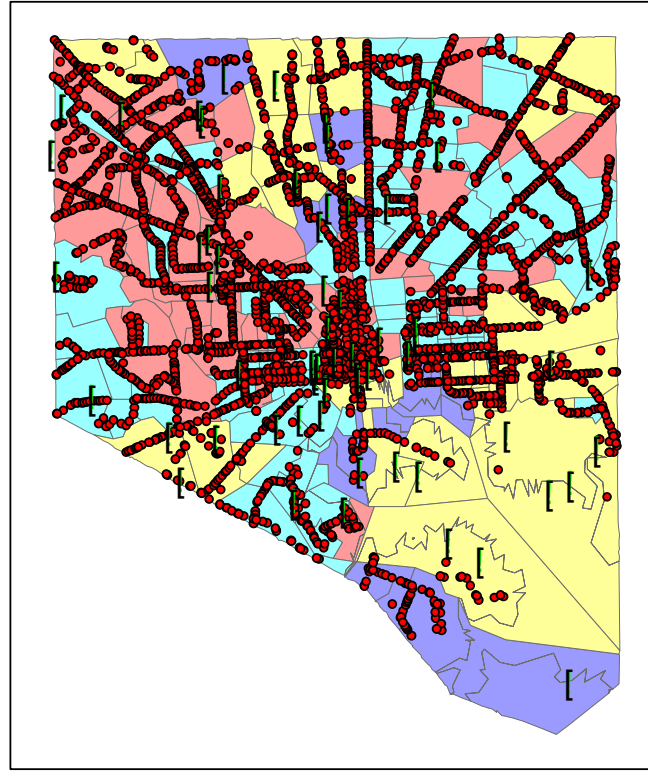
- No growth in job
- At least 10% growth in jobs
- Over 10% increase in jobs

Map 2: Race and Age Crosstabulation by Census Tract

Baltimore Metropolitan Region Census Tracts



Baltimore City Census Tracts



- Black Population > Average; Over 65 Population > Average
- Black Population < Average; Over 65 Population > Average
- Black Population > Average; Over 65 Population < Average
- Black Population < Average; Over 65 Population < Average
- Places of Work
- Bus stops

**Map 3:
Senior Housing Facilities
and
Their Relationship to Bus Stops**

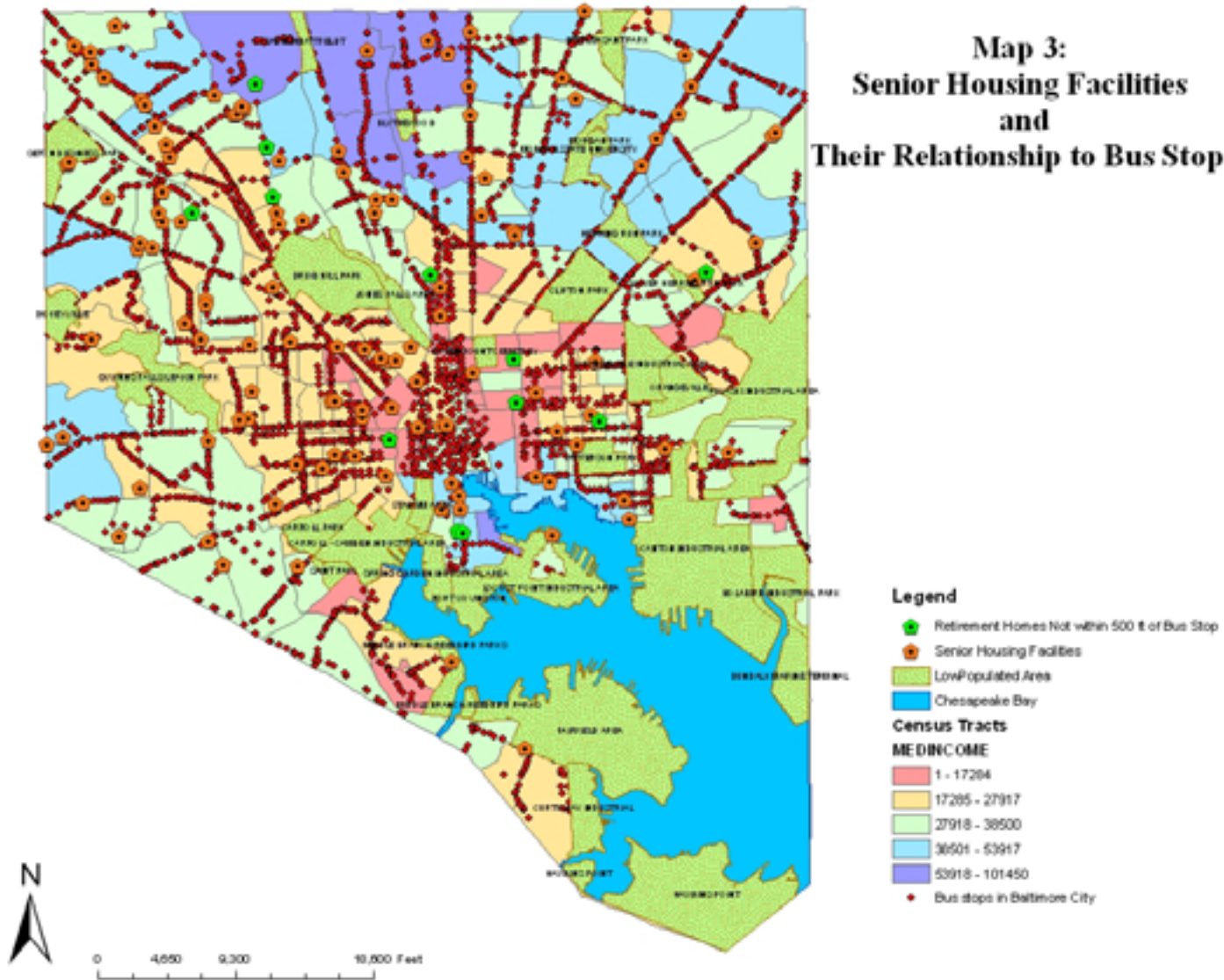


Table 1: Select Socioeconomic Status Variables in Neighborhood Statistical Area of Baltimore City

Neighborhood Statistical Area	Total Population	Percent White	Percent African American	Percent High School Graduate	Percent high school graduate or higher	Percent Bachelor's degree	Percent Graduate or professional degree	Percent of Families below Poverty Level
Berea	4525	0.77	98.34	30.03	53.8	4.62	1.98	17.4
Biddle Street	1474	0.27	98.64	38.71	58.5	1.61	4.84	26.8
Booth-Boyd	986	1.02	97.97	30.83	55.5	0.00	0.67	40.5
Broadway East	6836	0.80	98.17	32.88	49.4	2.48	1.12	38.5
Cameron Village	1593	4.39	91.22	26.80	72.6	9.79	5.67	13.2
Carrollton Ridge	4825	44.97	48.91	27.90	38.8	0.91	0.36	35.0
Charles North	998	15.50	64.50	15.38	40.8	5.49	4.40	45.0
Dolfield	2243	0.67	98.00	45.30	74.8	5.23	2.44	26.7
Druid Heights	1899	1.58	95.79	23.60	45.4	4.40	1.20	32.0
Forest Park	1707	1.47	96.48	40.76	75.7	10.50	5.04	20.3
Hanlon-Longwood	2689	0.37	98.33	36.98	73.3	7.69	5.92	20.4
Heritage Crossing	400	1.00	98.75	33.33	54	6.67	0.00	63.2
Madison Park	2140	9.58	86.92	27.41	70.4	15.06	6.18	46.1
Mid-Town Belvedere	3194	53.68	35.52	21.23	86.3	23.81	17.06	13.0
Middle East	5418	2.95	94.37	31.59	53.6	4.92	1.11	43.7
Mosher	2009	0.20	99.00	43.89	65.3	3.82	1.91	22.7
Mount Holly	1660	0.60	97.59	32.98	67.1	5.32	3.72	15.9
Saint Josephs	2269	1.76	96.70	26.52	65.7	6.09	1.43	18.2
Shipley Hill	2454	4.07	95.11	27.24	43.9	3.10	0.69	35.9
Uplands	2523	1.98	96.83	33.23	66.1	5.48	1.94	34.1
Upton	6321	0.55	98.02	29.67	50.5	5.23	2.61	45.2
West Forest Park*	2532	3.56	94.86	28.22	75.5	8.28	7.67	22.2

*Neighborhood with the most lost rides but only 23% of its population use public transportation which is slightly less than the 25% cutoff.

Table 2: Select Household Income Variables and Percentage of Transit Users with Number of Lost Rides

Neighborhood Statistical Area	Total Households	Median Household Income	Percent of Household with Public Assistance	Percent of Households Receiving Retirement Income	Percent of Adults in the Labor Force	Percent Unemployed	Percent Public Transit Users	Lost Bus Stops
Berea	1550	\$28,172	8.4	33.5	43.9	6.71	26.8	10
Biddle Street	600	\$20,772	21.7	17.5	42.6	8.86	29.0	2
Booth-Boyd	315	\$23,690	9.5	9.5	60.8	13.51	42.3	2
Broadway East	2240	\$19,653	18.3	16.3	40.9	8.19	45.4	5
Cameron Village	660	\$30,231	7.6	16.7	72.6	1.74	37.2	2
Carrollton Ridge	1690	\$20,631	14.5	8.9	45.6	8.80	27.6	5
Charles North	805	\$7,275	5.0	5.0	29.1	2.55	58.3	1
Dolfield	820	\$26,857	10.4	26.8	52.7	5.33	30.6	7
Druid Heights	730	\$16,827	18.5	15.8	44.3	7.32	38.0	3
Forest Park	655	\$32,054	7.6	22.9	51.5	5.19	25.8	8
Hanlon-Longwood	980	\$34,667	10.2	22.4	60.3	5.98	33.6	12
Heritage Crossing	150	\$8,125	20.0	2.7	55.8	25.58	78.6	2
Madison Park	1125	\$17,855	10.2	9.8	56.6	5.87	35.4	3
Mid-Town Belvedere	2155	\$27,727	1.2	12.1	64.8	3.77	32.6	2
Middle East	1960	\$15,493	13.5	13.3	46.8	11.01	42.0	5
Mosher	690	\$24,667	10.9	18.8	55.1	9.97	30.6	2
Mount Holly	595	\$29,327	15.1	15.1	62.4	7.86	28.9	5
Saint Josephs	740	\$33,203	5.4	31.1	53.6	8.79	26.1	10
Shipley Hill	780	\$21,591	14.7	17.3	56.7	13.20	29.7	9
Uplands	1185	\$17,774	13.5	14.8	63.8	8.17	32.6	8
Upton	2755	\$13,051	16.9	15.2	45.6	11.58	34.4	14
West Forest Park*	1070	\$26,179	4.7	20.6	55.3	4.67	23.1	28

Map 4: Public Transit Users in Relationship to Lost Rides

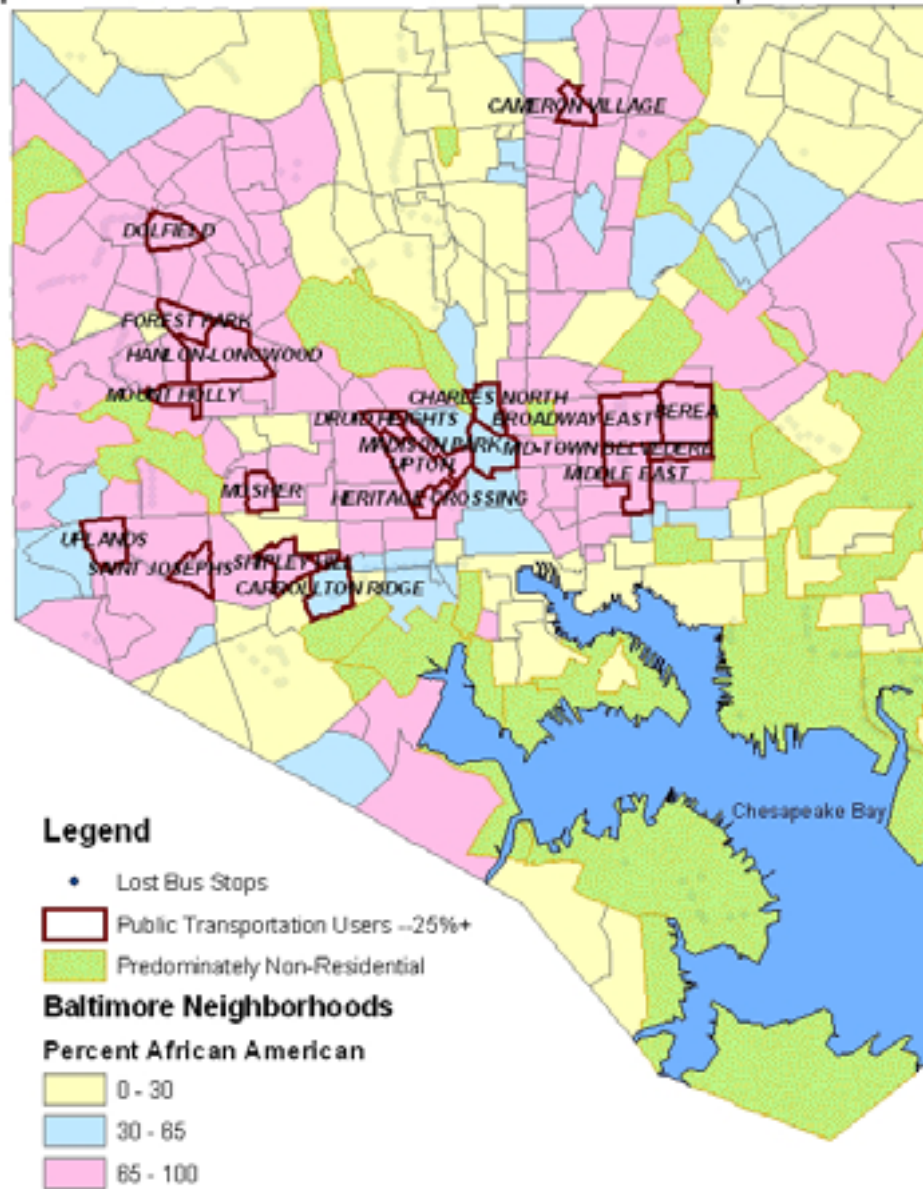


Table 3: Descriptive Statistics of Neighborhood Characteristic

<u>Characteristic</u>	<u>Obs</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Min</u>	<u>Max</u>
Total Population	21	2770	1780.93	400	6836
Percent White	21	7	14.58	0	54
Percent African American	21	90	17.63	36	99
Percent High School Graduate	21	31	7.24	15	45
Percent high school graduate or higher	21	60	13.00	39	86
Bachelor's degree	21	6	5.24	0	24
Percent Graduate or professional degree	21	3	3.70	0	17
Percent of Families below Poverty Level	21	31	13.36	13	63
Total Households	21	1104	692.16	150	2755
Median Household Income	21	\$22,364	\$7,787	\$7,275	\$34,667
Percent of Household with Public Assistance	21	12	5.33	1	22
Percent of Households Receiving Retirement Income	21	16	7.75	3	34
Percent of Adults in the Labor Force	21	53	10.03	29	73
Percent Unemployed	21	9	5.00	2	26
Percent Public Transit Users	21	36	12.38	26	79
Lost Rides	21	6	3.80	1	14