

# Travel and Rider Characteristics

for Metrobus



MIAMI-DADE  
METROPOLITAN  
PLANNING  
ORGANIZATION



Kimley»Horn

# Travel and Rider Characteristics for Metrobus: 2012-2015

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## Overview

The Miami-Dade County Metropolitan Planning Organization (MPO) conducted a series of transit ridership on-board surveys in Miami-Dade County to support the regional transit modeling efforts. Over the last three (3) years, the MPO completed origin-destination surveys for the Miami-Dade Transit (MDT) local and express bus system as part of a comprehensive effort to complete on-board surveys for the entire MDT transit network (Metrorail and Metrobus). The following is a list of the transit on-board surveys completed:

- Miami-Dade Metrorail Transit Survey (2009),
- Origin-Destination Study for the 95 Express (2012),
- Origin-Destination Surveys for Local Bus Service – Northeast Garage (2012),
- Origin-Destination Surveys for Local Bus Service – Central Garage (2013), and
- Origin-Destination Surveys for Local Bus Service – Coral Way (South) Garage (2014/2015).

These transit on-board surveys are intended to obtain more accurate ridership characteristics, such as origin-destination patterns, trip purpose, and mode of access and egress. A survey instrument was developed in consultation with the MPO and MDT to ensure the collection addresses their specific data needs, including information on socioeconomic characteristics (such as household size, household income, and age) and transit travel patterns of current transit riders. The survey questions were targeted to provide insight into trip purpose, modes of travel including transfers between different transit types, origin-destination patterns, modes of payment, and other demographic information. The survey data will be used to update and validate the Southeast Regional Planning Model (SERPM) and will be used in the continued development of the Activity Based Model for the region. The ridership survey data serves to improve regional travel demand model forecasts based upon accurate and useful data on the existing characteristics and travel patterns of transit riders.

The 2012-2015 Origin-Destination Surveys for Local Bus Service consisted of applying a consistent methodology by surveying transit riders on local bus routes for the three (3) MDT Division Garages (Northeast, Central, and Coral Way (South)) through personal interviews and documenting responses on electronic tablets (iPads). While there is an overlap in the coverage area served by each garage, the bus routes typically served a different part of the county (i.e. North, Central, and South). A review and comparison of the combined (2012-2015) datasets was conducted to determine if trends and/or conclusions could be made about certain characteristics of the riders and/or their routes.

## Survey Project Scope

The project scope focused on survey methodology development, survey instrument design, survey implementation, and database development. In addition to compiling the survey results databases, a series of origin and destination maps were prepared with geocoded results by local bus route and provided in the appendix of each of the three (3) summary reports. Data expansion and additional ridership analysis was not included.

## Data Collection Time Period

Transit on-board surveys were conducted for the three (3) MDT Garages, as follows:

- Northeast Garage: April 2012
- Central Garage: April 2013
- Coral Way (South) Garage: October 2014 (and supplemented in April 2015 with additional surveys)

Northeast Garage and Central Garage surveys were conducted in April to account for a broad range of typical riders and included students who used local bus transit during the school year. For the Coral Way (South) Garage, MPO staff had determined that October ridership was comparable to April ridership based on historical ridership patterns, and would be an acceptable month to conduct the surveys. While the majority of the Coral Way (South) Garage surveys were conducted during the month of October, additional surveys were completed in the following April to supplement the survey results for select routes. Surveys were conducted on a typical weekday (Tuesday, Wednesday, or Thursday). Actual dates the surveys were conducted can be found in the individual reports for each garage.

## Local Bus Routes Surveyed

### Northeast Garage

Twenty-two (22) of the 25 routes originating from the Northeast Garage were surveyed. Route 95 (95X), Route 195 (95 Dade Broward Express), and Route 246 (Night Owl) were excluded. While Route 95 (95X) was surveyed as part of the 95 Express surveys (2012), the MPO determined that the other two routes were either atypical of local bus routes or had low ridership and would not be surveyed based on available resources. The combined average weekday ridership for the 22 routes surveyed was 99,533 riders.

### Central Garage

Twenty-two (22) of the 35 routes originating from the Central Garage were surveyed. A limited number of routes could be surveyed due to available financial resources for the data collection, and therefore routes with an average daily ridership of less than 1,000 were excluded with the exception of Route 79 (79 Street MAX) and Route 267 (Ludlam

Limited). The MAX and Limited bus routes were anticipated to have a lower ridership due to the limited number of stops, but ridership characteristics were still desired to be included in the data. Additionally, Route 95 (95X) and Route 119 (S) were excluded as the routes were surveyed in prior years. The combined average weekday ridership for the 35 Central Garage routes was 94,452 riders, and for the 22 routes surveyed was 77,828 riders, which represented approximately 82% of the total ridership from the Central Garage.

### **Coral Way (South) Garage**

Eighteen (18) of the 31 routes originating from the Coral Way (South) Garage were surveyed. A limited number of routes could be surveyed due to available financial resources for the data collection, and therefore routes with an average daily ridership of less than 1,500 were excluded with the exception of Route 288 (Kendall Cruiser) that had an average weekday ridership of 949 but operates as the limited stop service to Route 88. The average weekday ridership for the 35 Coral Way (South) Garage routes was 69,366 riders, and for the 18 routes surveyed was 61,774 riders, which represented approximately 90% of the total ridership from the Coral Way (South) Garage.

## **Survey Instrument**

The survey instrument was consistent for all three (3) MDT Garages and was developed in coordination with the MPO and MDT, and provided to the Florida Department of Transportation (FDOT) for review. The Central and Coral Way (South) Garage surveys were modified slightly from the initial Northeast Garage survey based on comments related to FDOT's ongoing SERPM modeling efforts. The changes included slight modification to the wording of questions, and adjusting the order of a few questions.

The surveys included questions that were intended to provide a comprehensive information base for several different categories:

- Travel patterns (origin and destination)
- Trip purpose
- Mode of access
- Trip characteristics
- Travel behavior
- Frequency of transit use
- Fare payment method
- Household characteristics
- Passenger demographics
- Gender
- Language

Based on past experiences in acquiring quality survey data in Miami-Dade County, the surveys were completed through one-on-one, on-board transit rider interviews by a multilingual survey team using electronic tablets (iPads). The personal interviews were used to improve the response rate, quality and consistency of data, and better survey the diversity of transit riders. The survey team included English, Spanish, and Creole speaking survey staff.

## Survey Implementation

The survey was staffed using multiple on-board survey teams each day. Each survey team was led by a professional from Kimley-Horn and Associates, Inc. (Kimley-Horn) or sub-consultant who served as team leader, and supported by a team of trained temporary staff based on the ridership of the route. The survey team was distinguished by an identification badge and a t-shirt with the MPO logo and labeled with “Survey Crew.”

Surveys were conducted on a Tuesday, Wednesday, or Thursday, typically between 6:00 AM and 7:00 PM. Survey team members typically met at a designated central location (i.e. MDT Garage, bus terminus, or Metrorail Station) before proceeding to and boarding the assigned bus. For the April 2012, April 2013, and October 2014 surveys all teams were on-board and captured riders in transit. For the supplemental April 2015 surveys, a three person team was utilized each day with one surveyor assigned to a specific bus route, one person assigned to a bus transfer station (i.e., Brickell Station, Dadeland North, Dadeland South, or Government Center) to capture riders waiting at multiple bus routes, and the third person was assigned to the bus during the morning hours and the transfer station during the afternoon hours to capture the peak directions of travel.

## Survey Targets

While the Northeast Garage surveys targeted a ten percent (10%) intercept rate for the 99,533 average daily riders for the routes surveyed, the Central Garage surveys targeted an eight percent (8%) intercept rate for the 77,828 average daily riders and the Coral Way (South) Garage surveys targeted a five percent (5%) intercept rate for the 69,366 average daily riders. A higher target rate for the Coral Way (South) Garage surveys was not feasible due to the lower overall ridership and average loads for the Coral Way (South) Garage routes and project funding constraints. For each of the three (3) survey efforts, the intercept rates were developed based on the budget and ability to obtain a statistically significant sample size.

## Survey Results

The total number of transit riders intercepted for the Northeast Garage surveys was 9,795 (9.8% of the average daily ridership for the routes surveyed), 6,045 (7.8%) for the Central Garage surveys, and 5,662 (8.2%) for the Coral Way (South) Garage surveys. The total number of riders approached who agreed to complete the survey for the Northeast Garage was 4,700 (48.0% of

the transit riders intercepted for the survey), 2,475 (40.9%) for the Central Garage surveys, and 2,366 (41.8%) for the Coral Way (South) Garage surveys.

## Data Summary

The following is a comparison of the MDT local bus transit on-board survey data for each garage, and a summary description of trends, observations, or conclusions based on the available data.

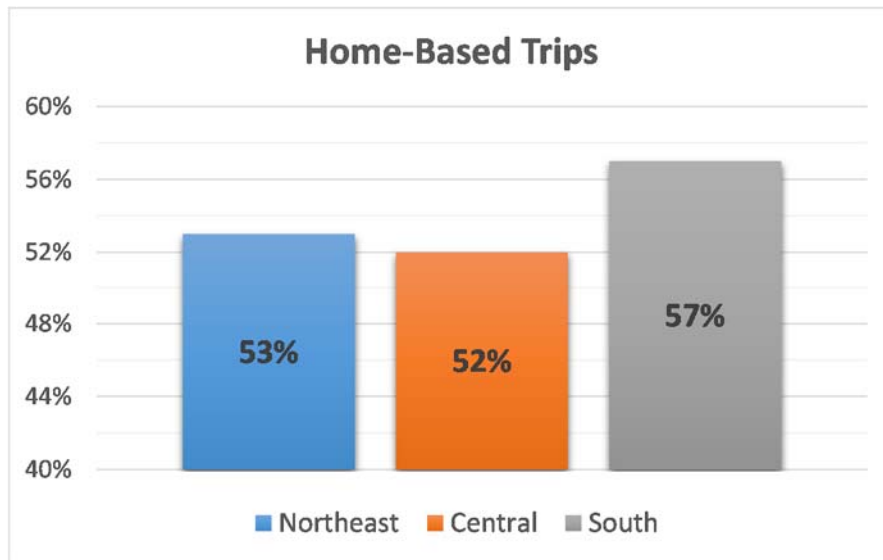


Figure 1: Home-Based Trips Comparison (Percentage)

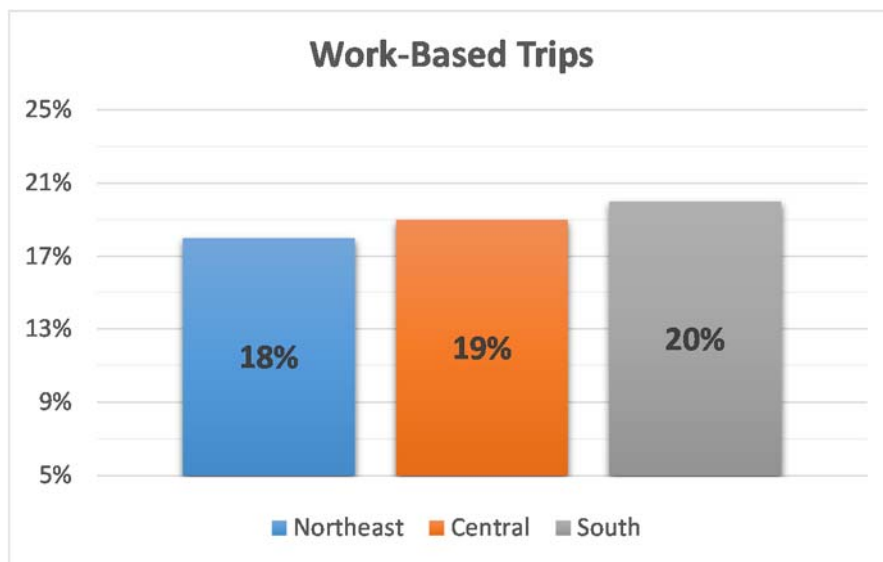


Figure 2: Work-Based Trips Comparison (Percentage)

Home-Based Trips and Work-Based Trips were consistent across the three (3) MDT garages, within five (5) percentage points. The Coral Way (South) Garage surveys had the highest percentage of both Home-Based Trips and Work-Based Trips. It should be noted that the Northeast Garage survey data was collected in 2012, Central Garage surveys in 2013, and Coral Way (South) Garage surveys in 2014 and 2015. Therefore, the slight increase in Work-Based Trips may be attributed to an improving economy.

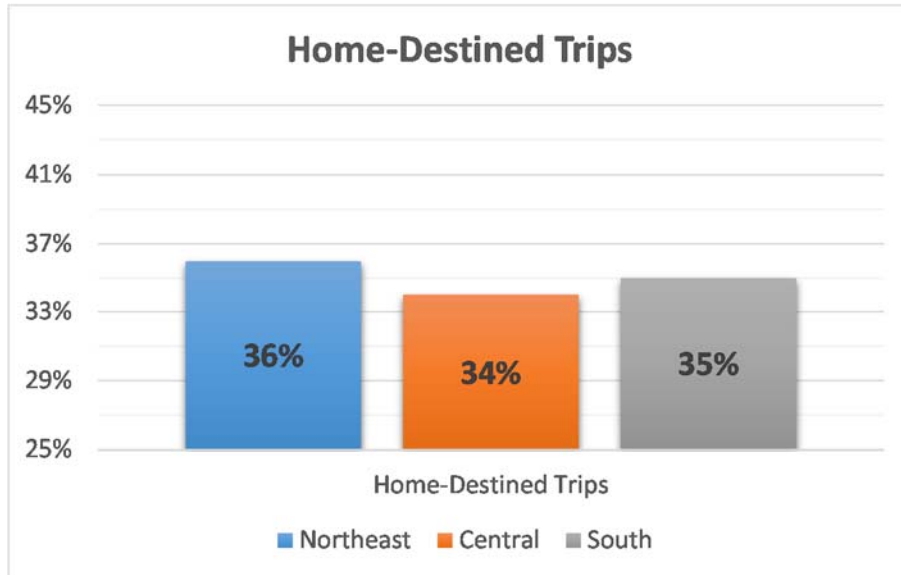


Figure 3: Home-Destined Trips Comparison (Percentage)

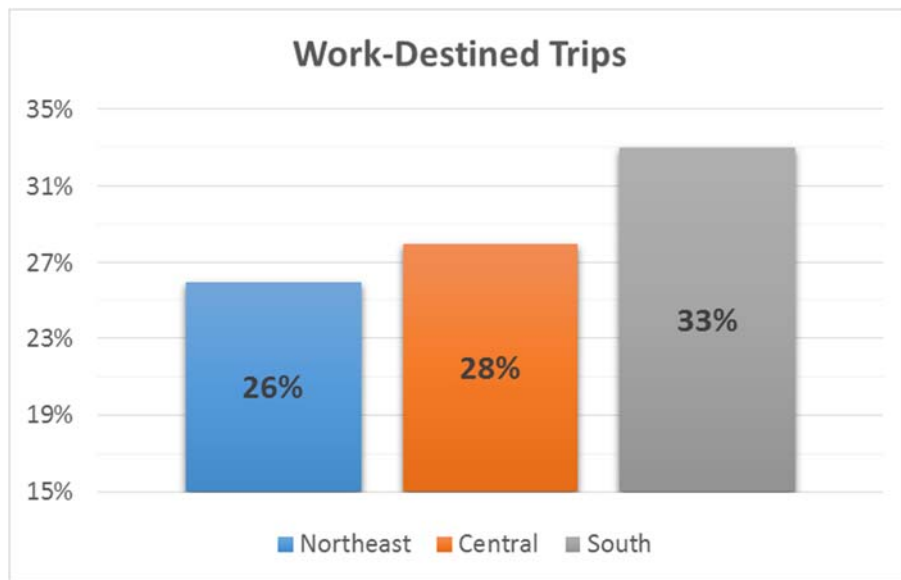


Figure 4: Work-Destined Trips Comparison (Percentage)

Similar to Home-Based trips, the Home-Destined Trips are comparable across the three (3) MDT garages with a total spread of two (2) percentage points. For the Work-Destined Trips, the percentage increased for each subsequent MDT garage surveyed with a total spread of seven (7)

percentage points. As previously noted, the Northeast Garage survey data was collected in 2012, Central Garage surveys in 2013, and Coral Way (South) Garage surveys in 2014 and 2015. The increase in Work-Destined Trips may be attributed to an improving economy.

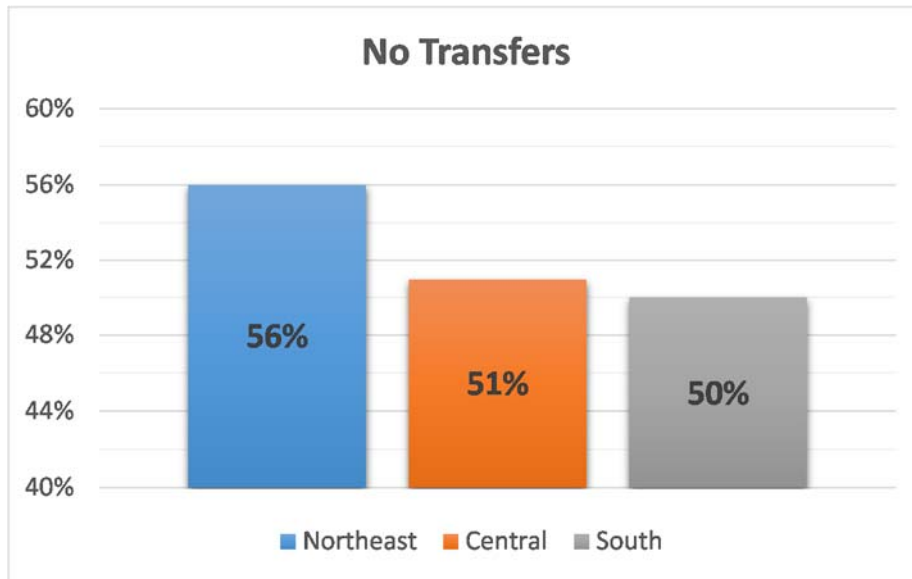


Figure 5: Comparison of Trips with No (0) Transfers (Percentage)

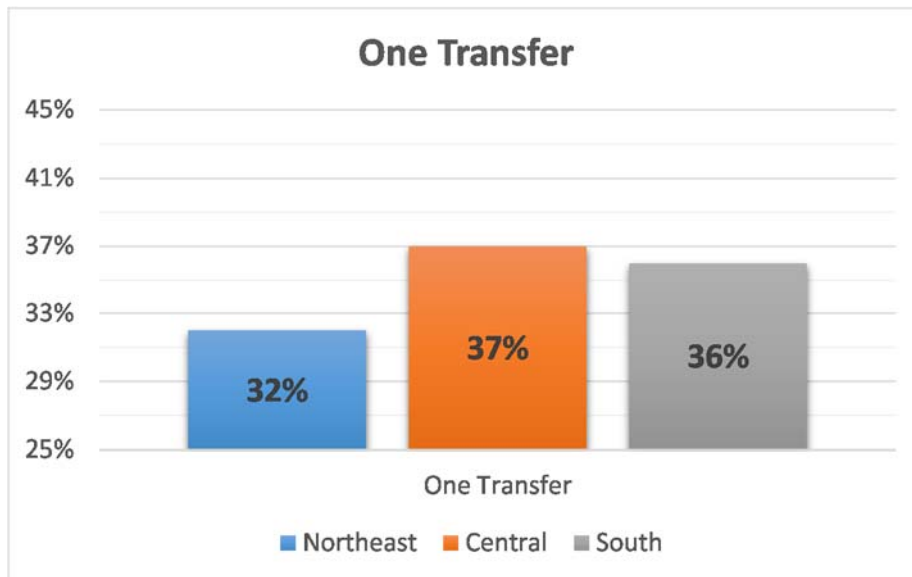


Figure 6: Comparison of Trips with One (1) Transfer (Percentage)

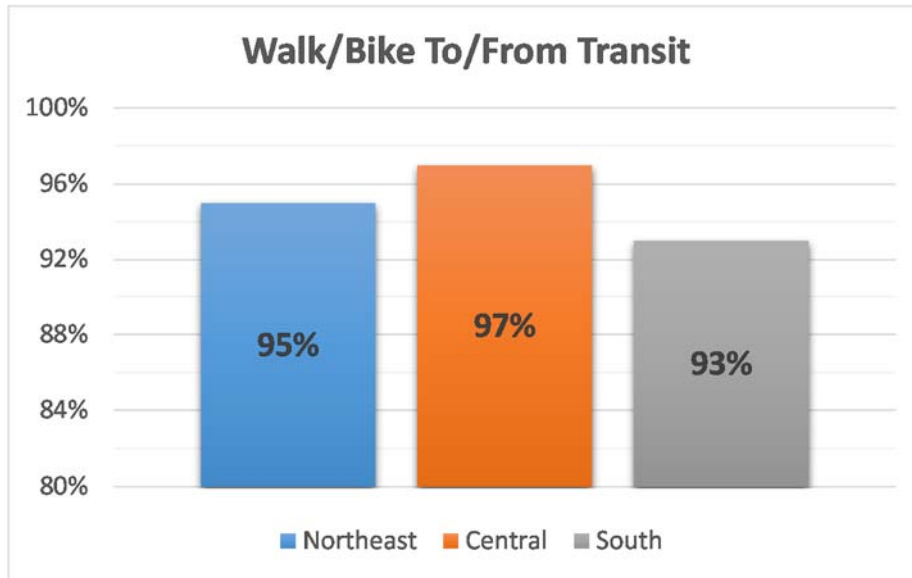
The number of trips with either zero (0) or one (1) transfer was consistent between the Central and Coral Way (South) Garages, separated by only one (1) percentage point. The Northeast Garage surveys; however, had a five (5) percentage point greater amount of “No Transfers” and a four (4) percentage point lower amount of “One Transfer” trips. The number of transfers refers to transfers between different bus routes as well as other forms of transit such as Metrorail, Metromover, and Tri-Rail. There may be several explanations for the difference in percentage of



transfers between the Northeast Garage surveys and the results from the other two (2) MDT garages, including having more direct routes serving the travel markets and a higher incidence of cash fares.

The Northeast Garage routes provides service to about 40% of the total MDT ridership, including some of the highest ridership transit corridors serving downtown Miami and Aventura Mall, which are both major employment and regional activity centers (RACs). While the transit surveys documented the entire transit trip regardless of the amount and type of fare paid, the trip patterns may reflect more direct, one-seat bus rides in the northern part of the county serving the trip purposes.

While MDT allows for free transfers using EASY Card fares within certain conditions, transit riders who use Cash Fares are required to provide an additional fare payment every time they board a transit vehicle or make a transfer. In Figure 11 on page 12, the Northeast Garage surveys reveal a greater percentage of riders (eight (8) percentage points greater than Central Garage and 13 percentage points greater than Coral Way (South) Garage surveys) who used a Cash Fare.

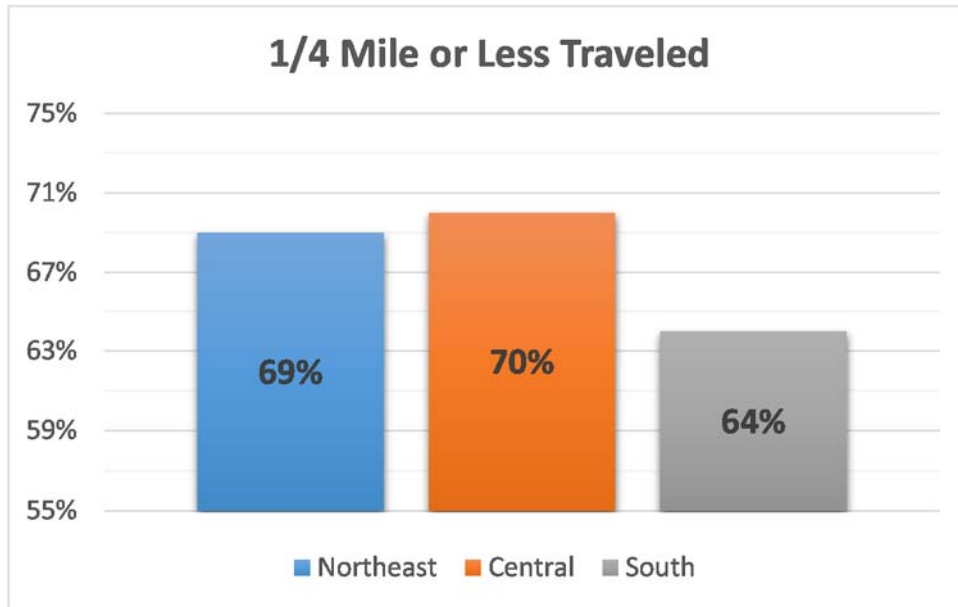


**Figure 7: Access to Transit by Walking or Biking Comparison (Percentage)**

The percentage of riders who accessed their first or last transit stop by either walking or biking is comparable across the three (3) MDT garages surveyed with only a four (4) percentage point difference. It should be noted that the Central Garage surveys had the highest percentage of riders accessing transit by walking or biking. Several factors may contribute to the results, including the density and proximity of housing and employment centers to transit routes, land use conditions, and the propensity for transit usage.

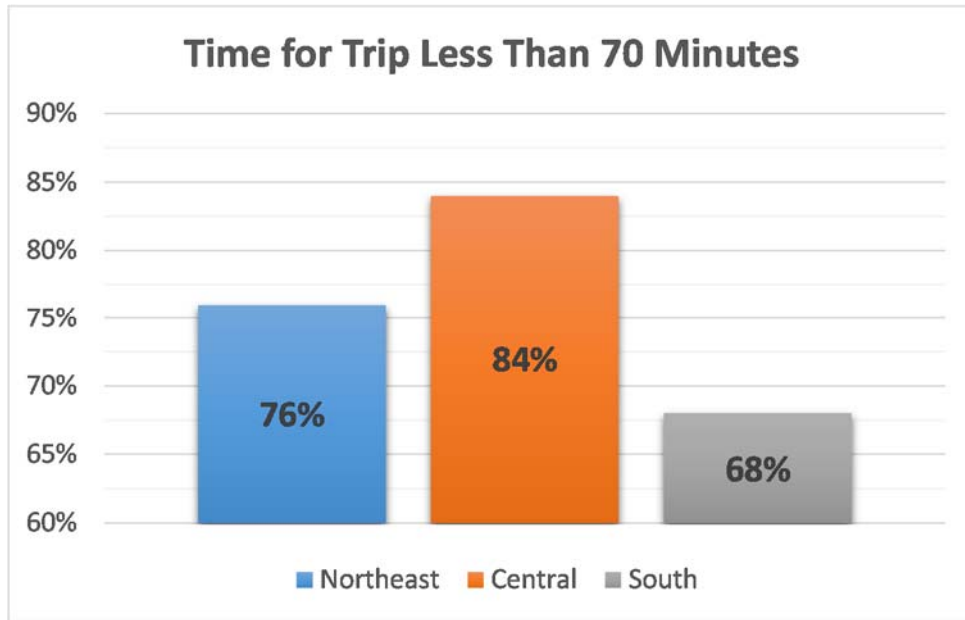
While denser urban environments with frequent transit service likely correspond to shorter distances traveled to a transit stop, suburban areas may require transit riders to have longer walk distances, or to travel by car to/from the first/last transit stop and either parking at a park-and-ride location or being dropped off/picked up by another person. In Figure 9 on page 11, the Central Garage surveys reveal a greater percentage of riders (eight (8) percentage points greater than Northeast Garage and 16 percentage points greater than Coral Way (South) Garage surveys) with overall travel times less than 70 minutes in duration. These results indicate that Central Garage trip destinations are likely closer together and provide some correlation to transit riders primarily using a walking mode of access.

The Central Garage routes surveyed include some of the county’s denser urban development areas surrounding downtown Miami and the neighborhoods immediately to the west. The population served by the Central Garage routes tend to have higher amount of riders who depend on transit to provide their travel needs. In Figure 14 on page 15, the Central Garage surveys reveal a greater percentage of riders (eight (8) percentage points greater than Northeast Garage and 18 percentage points greater than Coral Way (South) Garage surveys) who live in households without a registered vehicle.



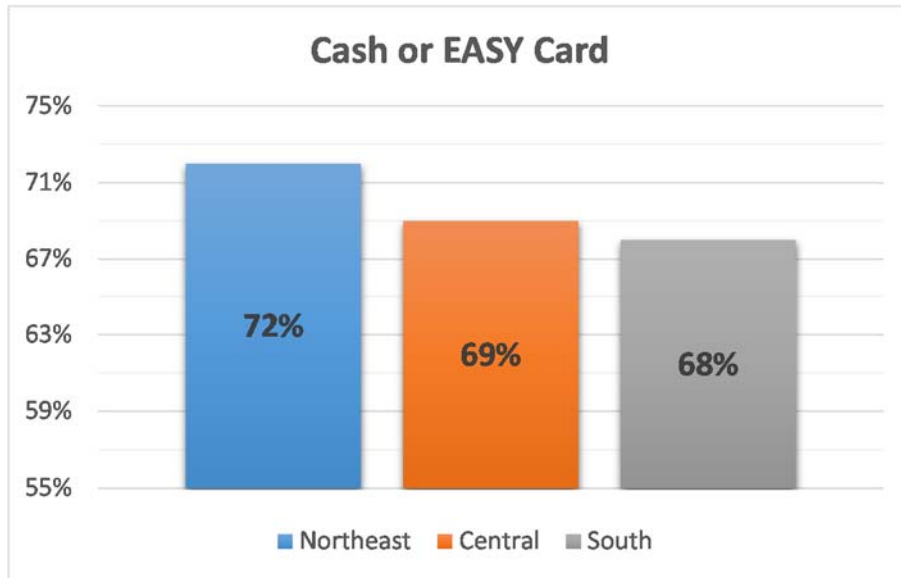
**Figure 8: Distance Travelled To/From Transit Stop by Riders Walking/Biking Comparison (Percentage)**

The percentage of riders who walked or biked one-quarter (1/4) of a mile of less to their first/last transit stop is comparable between the Northeast and Central Garage survey results within one (1) percentage point, but the Coral Way (South) Garage survey results are five (5) percentage points lower than the Northeast Garage. As previously discussed, the increased walk distance likely correlates to the overall transit accessibility and development patterns.



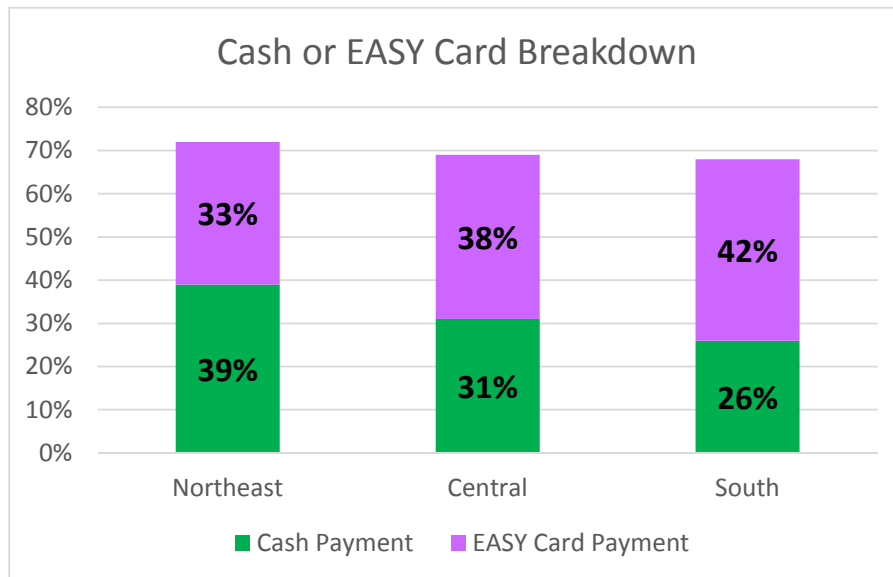
**Figure 9: Comparison of Trip Times Less than 70 minutes (Percentage)**

The Trip Time includes the full travel time from the moment a rider leaves their house, travels to a transit station, wait time for transit, all time travelling on transit including transfers, and travel time to the final destination. It provided one of the more noticeable distinctions between the MDT garages with a 16 percentage point difference. The Central Garage surveys had 84% of trips that took less than 70 minutes, and is likely influenced by transit service availability and frequency serving the destinations within the dense urban areas in the central part of the county, including downtown Miami. The Coral Way (South) Garage surveys revealed the lowest percentage (68%) of trips below 70 minutes, which corresponds to the number of routes that served areas located a greater distance the major activity centers, including Homestead and Florida City.



**Figure 10: Comparison of Cash/EASY Card as Payment Type (Percentage)**

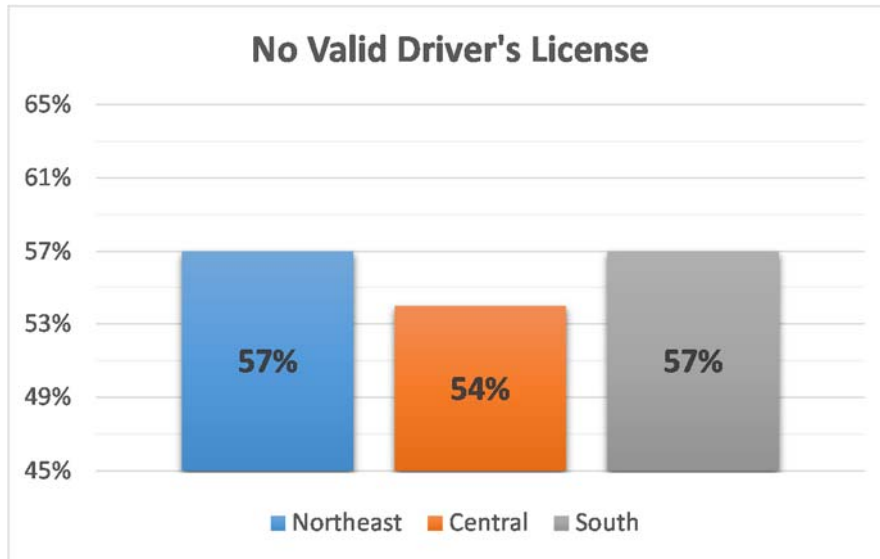
Over two-thirds of transit riders either paid by cash or EASY Card (cash equivalent). The results were comparable between the Central Garage and Coral Way (South) Garage surveys, but the Northeast Garage results were slightly higher by three (3) to four (4) percentage points.



**Figure 11: Comparison of Cash vs. EZ Card as Payment Type (Percentage)**

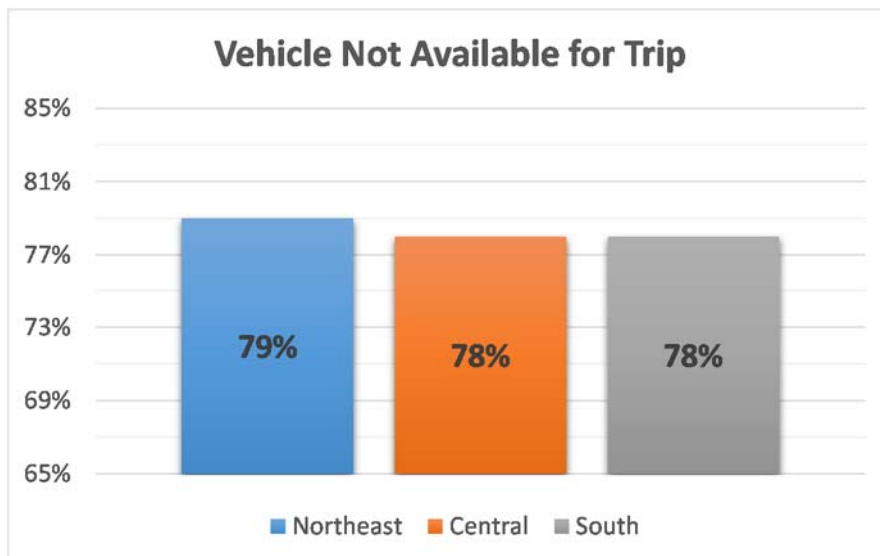
A further analysis of the Cash and EASY Card payment types reveal that the percentage of EASY Card use was greatest at 42 percent (42%) for the Coral Way (South) Garage surveys compared to 38 percent (38%) for the Central Garage surveys and 33 percent (33%) for Northeast Garage surveys. While the EASY Card usage could be attributed to the improved adoption of the fare card media during subsequent years and an improved economy, it is likely a better reflection of the transit riders and their trip patterns that may require transfers, especially since transfers are

free for EASY Card fares but require an additional fare payment when using cash. In Figure 6 on page 7, both Central Garage and Coral Way (South) Garage surveys indicate a similar, higher percent of trips requiring transfers than the Northeast Garage surveys, and corresponds to a higher percentage of EASY Card use. Additionally, the percent of transit rider surveys who indicated that they were employed full-time (see Figure 21 on Page 20) was similar for both Central Garage and Coral Way (South) Garage surveys, and greater than the results for Northeast Garage surveys.



**Figure 12: No Valid Driver’s License Comparison (Percentage)**

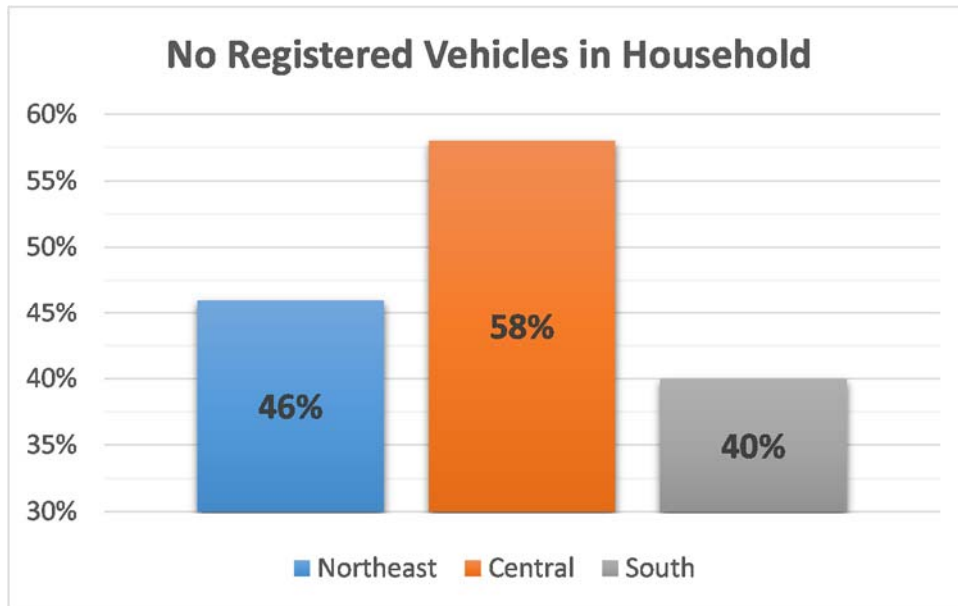
The percentage of riders without a valid driver’s license was comparable across the three (3) MDT garages surveyed; however, the Central Garage surveys was three (3) percentage points lower than both the Northeast Garage surveys and the Coral Way (South) Garage surveys. Transit riders who do not have a valid driver’s license could be considered a transit dependent rider and include transit riders who did not possess any type of driver’s license or possessed a suspended driver’s license. Additionally, as shown in Figure 14 on page 15, the Central Garage had the highest percentage of surveys with no registered vehicles in the household which corresponds to less transit riders having/needing a valid driver’s license.



**Figure 13: Comparison of Riders without a Vehicle Available for the Trip (Percentage)**

The percentage of riders without a vehicle available for the trip was comparable across the three (3) MDT garages differing by only one (1) percentage point. Transit riders without a vehicle

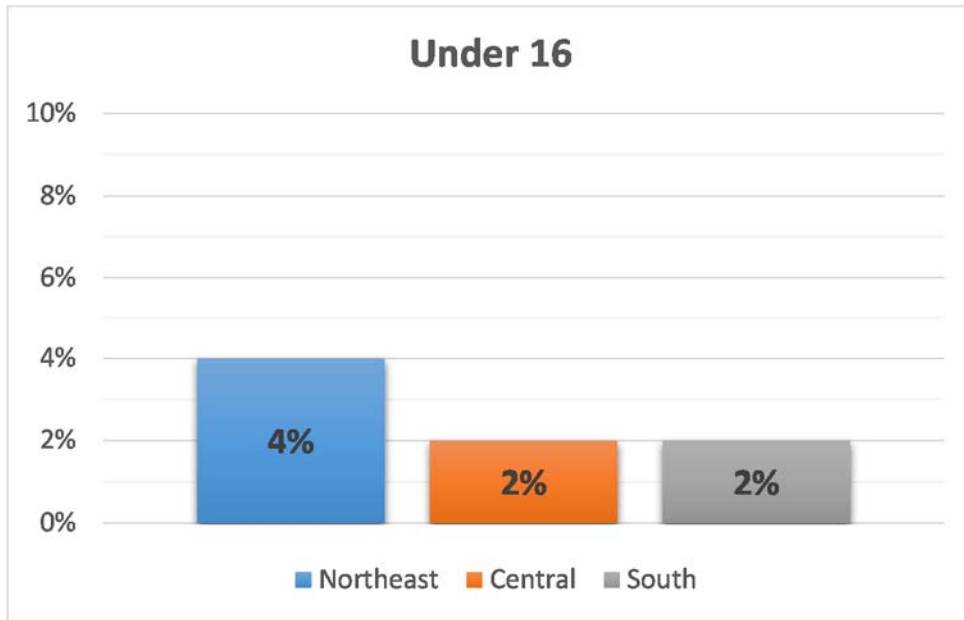
available for the trip could be considered a transit dependent rider and included riders who may not have owned a vehicle at all, shared a vehicle and did not have it available that day, or owned a vehicle but it was not operational that day (i.e., at the mechanic).



**Figure 14: Comparison of Riders Without a Registered Vehicle in Their Household (Percentage)**

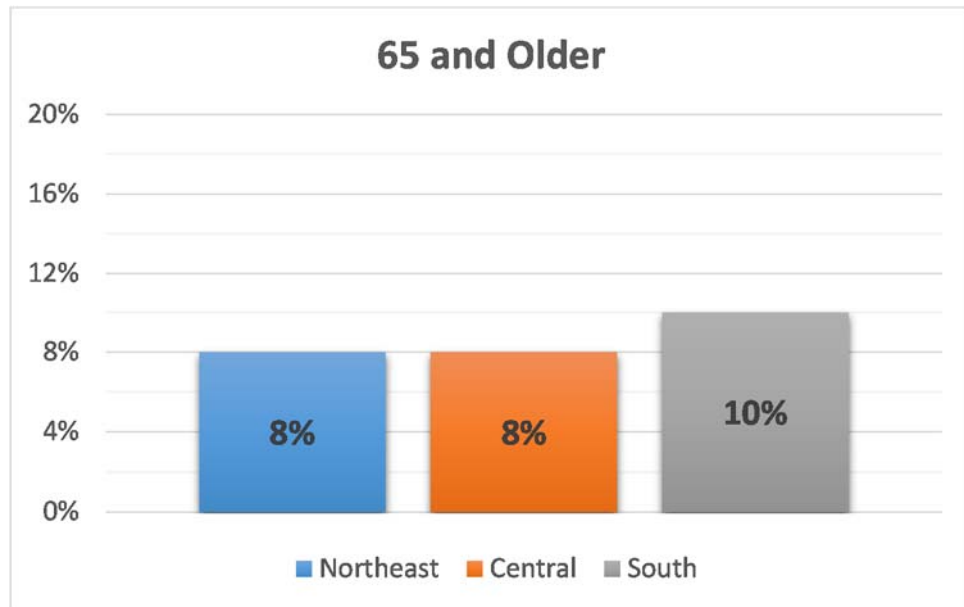
The percentage of transit riders without a registered vehicle in their household varied greatly. The Northeast Garage and Coral Way (South) Garage surveys each represented less than 50 percent (50%) of households having no registered vehicles, while 58 percent (58%) of Central Garage households did not have a vehicle. The higher percentage for the Central Garage surveys could be a result of the amount of transit options, including the number and frequency of bus routes, Metrorail, Metromover, and ability to walk or bike in the dense urban areas within the Central Garage service area. Transit riders without a registered vehicle in the household could be considered a transit dependent rider.





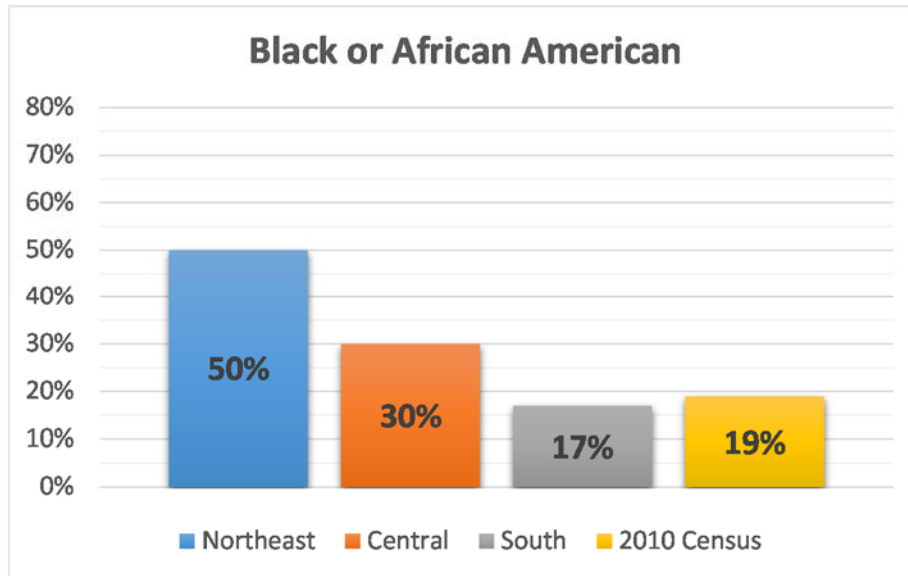
**Figure 15: Comparison of Riders Under 16 (Percentage)**

The percentage of riders under 16 was comparable across the three (3) MDT garages, although the Northeast Garage surveys was two (2) percentage points higher than the other MDT garages. Riders under 16 could be considered a transit dependent rider as they are not old enough to possess a driver’s license.



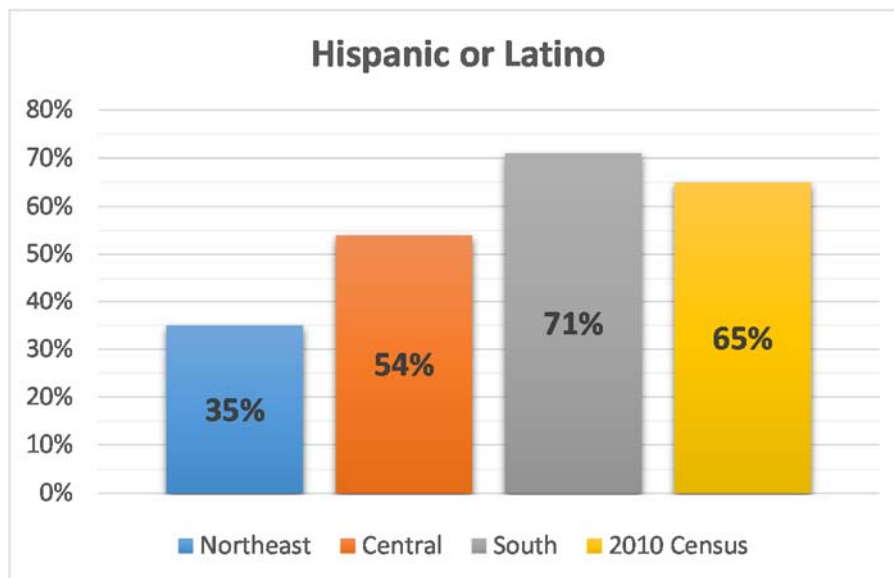
**Figure 16: Comparison of Riders 65 and older (Percentage)**

The percentage of riders 65 and older was comparable across the three (3) MDT garages, although the Coral Way (South) Garage surveys was two (2) percentage points higher than the other MDT garages. Transit riders 65 and older could be considered a transit dependent rider as they may not have driving options.



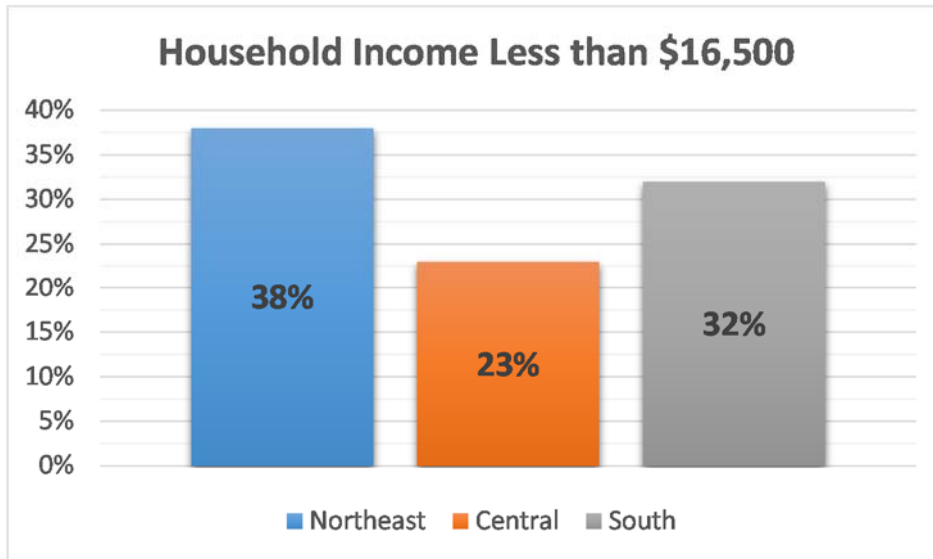
**Figure 17: Comparison of Black or African American Riders (Percentage)**

A larger percentage of Black / African American transit riders was represented with the Northeast Garage surveys at 50 percent (50%) when compared to thirty percent (30%) for the Central Garage surveys and 17 percent (17%) for the Coral Way (South) Garage surveys. The Coral Way (South) Garage surveys was the most similar to the 2010 Census countywide average of nineteen percent (19%).



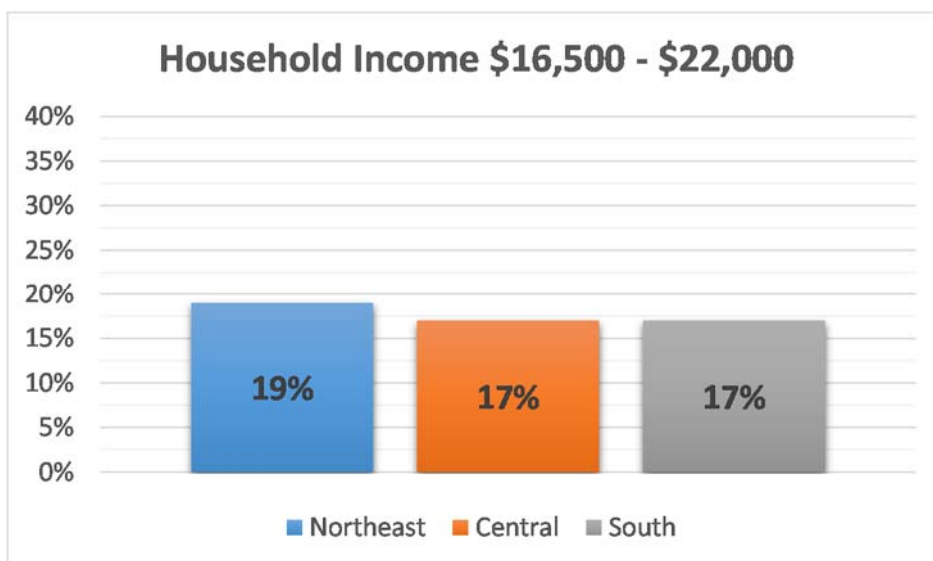
**Figure 18: Comparison of Hispanic or Latino Riders (Percentage)**

While the largest percentage of Hispanic / Latino transit riders was reflected with the Coral Way (South) Garage surveys at 71 percent (71%), the most similar to the 2010 US Census countywide average of 65 percent (65%), the Central Garage surveys had 54 percent (54%) and Northeast Garage surveys had 35 percent (35%), respectively.



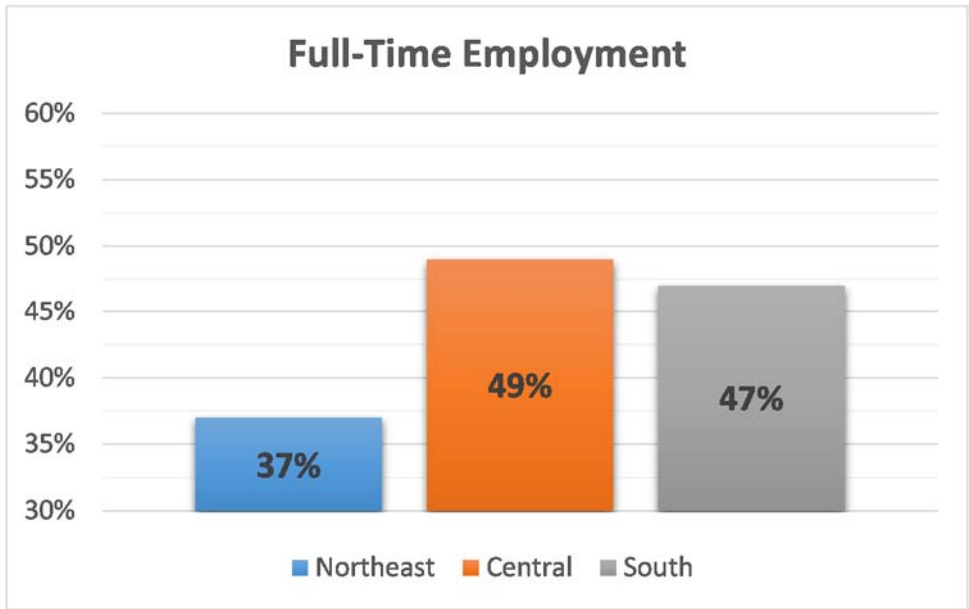
**Figure 19: Comparison of Households with Income Less than \$16,500 (Percentage)**

While the percentage of riders with a household income less than \$16,500 varied between the three (3) MDT garages, both the Northeast Garage and Coral Way (South) Garages had over 30% of transit riders select the lowest income bracket on the survey, and the amount of Northeast Garage surveys was 15 percentage points greater than for the Central Garage surveys. The Coral Way (South) Garage surveys was 32 percent (32%). The U.S. Department of Health and Human Services lists the Federal Poverty Level as low as \$14,350 for a single person household. Therefore, more riders within the northern part of the county may be living at or below the Federal Poverty Level. Though variations in the Northeast, Central Garage, and the Coral Way (South) Garage surveys results may be attributable to the economic conditions when the surveys were collected in 2012, 2013, and 2014/2015 respectively, the variations are likely a better reflection of the locations of the lowest income transit riders served by MDT transit buses.



**Figure 20: Comparison of Households with Income \$16,500 - \$22,000 (Percentage)**

The percentage of riders with a household income between \$16,500 and \$22,000 was comparable for the three (3) MDT garages. Similar to Figure 19 on page 18, the Northeast Garage contained the slightly higher percentage. The U.S. Department of Health and Human Services lists the Federal Poverty Level as \$19,530 for a three (3) person household and \$23,550 for a four (4) person household. Therefore, more riders within the northern part of the county may be living at or below the Federal Poverty Level, particularly when combined with the percentage of households with an income less than \$16,500 (see Figure 19).



**Figure 21: Comparison of Riders with Full-Time Employment (Percentage)**

The percentage of riders with full-time employment was comparable for the Central Garage and Coral Way (South) Garage surveys, but was 10 percentage points lower for the Northeast Garage surveys. As previously stated, the Northeast Garage surveys were conducted in 2012, the Central Garage surveys collected in 2013, and the Coral Way (South) Garage surveys collected in 2014/15; therefore, the increase in percentage of riders with full-time employment may be attributable to an improving economy.

## Conclusions

Over a three (3) year period (April 2012 – April 2015) surveys were conducted for the MDT Northeast Garage (2012), Central Garage (2013), and Coral Way (South) Garage (2014/15) serving a total average weekday ridership of over 240,000 riders. Sixty-two (62) of the total 91 routes were surveyed based on the available resources and criteria used by the MPO to select the routes. Over the course of the three (3) survey periods 21,502 riders were intercepted, equivalent to nine percent (9%) of the average daily ridership, and of which 9,541 riders completed a survey, equivalent to 44 percent (44%) of transit riders intercepted and nearly four percent (4%) of the average daily ridership for all the routes surveyed.

Upon evaluation of the survey results for the three MDT garages, there are both consistent observations and some variations in the transit rider demographics, and trip characteristics for the areas served by each of the three MDT garages. Some similarities include the survey results for Home-Based trips, Home-Destined trips, cash or EASY Card payment, riders without a valid driver's license, riders without a vehicle available for the trip, and ages of riders (Under 16 and 65 and older). The following are some highlights:

- Transit riders depend on Metrobus to travel throughout the county:
  - Nearly 80% of all transit riders did not have a transit vehicle available for their trips
  - Nearly 60% of all transit riders did not have a driver's license
  - About 50% of transit rider households did not own a car
- Transit serves a high percentage of minority and low income populations:
  - For the two largest minority populations (Black/African American and Hispanic/Latino) the combined percentage of surveyed ridership is comparable to the overall Miami-Dade County averages (85% for Northeast Garage, 84% for Central Garage, and 89% for Coral Way (South) Garage vs. 84% Miami-Dade County average) although the percentages of each minority group differed by garage.
  - About one-half of the transit riders households surveyed may be living at or below the poverty level, earning less than \$22,000 per year: Northeast Garage (57%), Central Garage (40%), Coral Way (South) Garage (49%)
  - Less than 50% of all transit riders were employed full-time
- Transit trips serve a wide range of purposes, but are primarily related to work or home:
  - Between 20-30% of all transit trips are work-based/destined
  - Between 35-55% of all transit trips are home-based/destined
- Transit service availability and fare policies affect travel patterns:
  - About 95% access transit by foot or bike
  - Over 50% have a single-seat transit trip (i.e. no transfers) and about one-third have one transfer

- About 75% of all transit riders complete their trip in less than 70 minutes  
 Table 1 below provides a combined percentage for all three (3) MDT garages (Northeast, Central, and Coral Way (South)) for each of the survey questions summarized in Figures 1 through 21. The combined percentage for all three (3) garages uses a weighted average based on the total number of riders for each garage. The total ridership for all three (3) garages is 246,727 riders. Broken down by garage the totals are Northeast Garage 99,533 riders (38%), Central Garage 77,828 riders (36%), and Coral Way (South) Garage 69,366 riders (26%). It should be noted that the data was collected over a three (3) year period; therefore, certain trip and/or rider characteristics could have changed over time and may not be fully attributable to the garage.

**Table 1: Combined Survey Data for Northeast, Central, and Coral Way (South) Garages (Percentage)**

<b>Survey Result</b>	<b>Percentage</b>
Home-Based Trips	54%
Work-Based Trips	19%
Home-Destined Trips	35%
Work-Destined Trips	29%
Trips with No Transfers	53%
Trips with One Transfer	35%
Walk/Bike To/From Transit	95%
Walk/Bike 1/4 Mile or Less	68%
Time For Trip Less Than 70 Minutes	77%
Cash or EASY Card as Payment	70%
Cash Payment	33%
EASY Card Payment	37%
No Valid Driver's License	56%
Vehicle Not Available for Trip	78%
No Registered Vehicles in Household	49%
Age: 16 and under	3%
Age: 65 and older	9%
Black or African American	34%
Hispanic or Latino	51%
Household Income: Less than \$16,500	31%
Household Income: \$16,500 - \$22,000	18%
Full-Time Employment	44%