MBTA 2022 System-Wide Passenger Survey

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OPMI

Contents

Executive Summary

The Massachusetts Bay Transportation Authority (MBTA) regularly surveys its riders to understand who rides the bus, subway or light rail, commuter rail, and the ferry. The MBTA's Rolling Rider Census represents the diversity of people who ride MBTA services and is an important tool in planning for bus, rail, and ferry services in the Greater Boston region. In 2022, the MBTA kicked off an annual survey to collect information about who is using the transit system and which services they rely on. The MBTA is required to collect this information by the Federal Transit Administration (FTA) to ensure that the changes to our system, service, and fares equally benefit people, regardless of their income levels or race and ethnicity. In addition to ensuring equity in transit, the MBTA uses results from the Rolling Rider Census to understand how people move through the system to better plan improvements.

Data is collected annually from spring through late fall, and data will typically be available mid-spring of the following year. The documentation included on this page represents data collected in calendar year 2022, and provides context and guidance to understand and use the Rolling Rider Census Data. The chapters in this document may assist those who are looking to more deeply understand the data calculation and aggregation process. The data is [available for download](#) on the MBTA Open Data Portal.

Survey Background

Pursuant to Title VI of the Civil Rights Act of 1964, and in line with guidance from the [Federal Transit Administration (FTA) circular FTA C 4702.1B](#) the MBTA must conduct a triennial (every three years) evaluation of its system to ensure equity across income levels and race and ethnicity demographics. Additionally, major changes in service or fares must be evaluated to ensure they do not disproportionately impact minority riders, or disparately burden lower income riders (see the [MBTA Disparate Impact/Disproportionate Burden Policy](#) for details).

Previous versions of the Rider Census, conducted once every five years, reflected point-in-time snapshots of rider demographics; the last survey was conducted in 2016. As of 2022, the MBTA conducts an ongoing, or "rolling," Rider Census, which collects data annually from a smaller sample of riders across the T. This shift to more frequent data collection allows a consistently fresher, more accurate understanding of who travels on bus, rail, and ferry services. For example, a rolling survey format allows riders of new services to be counted sooner, which enables the MBTA to include riders of new services – like the SL3 to Chelsea (opened 2018) or the Green Line Extension (opened 2022) – in its planning and analysis, rather than having to wait up to five years to survey riders of new services.

In addition to Title VI equity analyses, the results of the Rider Census are used across the T in capital planning, service planning, fare policy, and public outreach planning. Among other benefits, this continual survey model means that pilots can be evaluated using demographic data collected through a methodologically consistent effort.

Methods: Data

To ensure that the MBTA surveyors talk to a sample of transit riders that accurately reflects the people riding specific services and traveling between specific stops or stations, the Rolling Rider Census research team developed a sampling plan that allows for accurate representation of the system every five years. This means that, during the first five years of the new Rolling Rider Census data may be summarized at a more aggregate level than that of previous system-wide surveys. With each additional year of data collection, the MBTA will be able to share more granular data, specific to individual routes and stations.

Detailed information about the Rolling Rider Census sampling plan and response weighting may be found in Chapters 2 and 3 of this document, respectively.

The Rolling Rider Census sampling plan was constructed to allow reporting at a similar level of aggregation to 2015-17 by the end of the first five years of data collection. This means that the collection of Rolling Rider Census data collected through calendar year 2026 will provide data aggregated at a similar level as the 2016 Rider Census data release.

Prior to the 2026 data release, survey data will be publicly available at a higher level of aggregation than in years past. Specifically aggregation by service mode is as follows[1]:

- Heavy rail will generally be reported by station or small group of stations
- Light rail reporting will be at the branch level, except for downtown Green Line stations, which will be reported individually or in pairs, and the Green Line E Branch, which will be split into two reporting groups comprised of stations on either side of downtown
- Bus will be reported individually or in small groups for high-ridership routes and in larger geographic groups for moderate and low-ridership routes
- Ferry data will be reported in one group, consisting of all routes
- Commuter rail reporting is aggregated to the individual line

Responses to the Rolling Rider Census survey are weighted by both ridership (how many people ride that particular service) and transfer rate (how many people make similar transfers as reported in the survey). This ensures that conclusions drawn from survey data are as representative as possible of overall MBTA ridership.

It is important to note that all survey research and data collection is exposed to some level of bias and error. The MBTA acknowledges that sampling bias may have been introduced by a series of factors, including but not limited to:

- Weekday only surveying
- The need to survey high-ridership locations in order to meet minimum response requirements for statistical validity of reporting
- Limited range of languages available
- Survey respondents' potential lack of awareness of available languages

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1   Definitions of the Service Modes can be found in the Appendix

Survey Findings

Conducted six years after the last Rider Census, and two years after the onset of the COVID-19 pandemic dramatically altered how people travel, data from the 2022 Rolling Rider Census shows significant changes in the demographics of MBTA ridership. The percentage of transit riders who self-identified as a minority, as defined by the FTA Title VI analysis guidelines, increased from 34% of system riders in 2016 to 58% of riders in 2022. The percentage of riders from households earning less than 60% of the Boston area's median income also increased, from comprising 29% of transit riders in 2016, to 48% of riders in 2022.

The Rolling Rider Census is available in twelve languages. The MBTA received at least one transit rider's response in each available language. Ninety-five percent of surveys were taken in English, 3.6% in Spanish, 0.4% in Portuguese, 0.2% in Chinese, and less than 0.1% were taken in each of the other available languages: French, Haitian Creole, Russian, Vietnamese, Arabic, Italian, and Cape Verdean Creole. This reflects an increase in responses in a language other than English from the last Rider Census; 0.7% responses to the 2015-2017 survey were in a language other than English. Relatedly, 32.0% of respondents (unweighted) indicated that they speak a language other than English at home.

Detailed information about rider demographics may be found in Chapter 4 of this document or the interactive web tool.

Next Steps

We expect to repeat this data collection and release cycle on an annual basis. Rider surveying for calendar year 2023 will result in a public data release in spring 2024. If you have any questions or comments, please reach out at opmi@mbta.com.

Chapter 1 - Background

1.1 - Objectives and Reasons for Conducting the Passenger Survey

The [Federal Transit Administration (FTA) Title VI Circular (C 4702.1B)](#) requires large transit providers to collect demographic, travel, and fare payment data about their riders using passenger surveys at least every five years. In addition, results of past MBTA passenger surveys have provided essential data to many different users, including the MBTA, Central Transportation Planning Staff (CTPS), consultants, other transportation agencies, academic researchers, and members of the public. The results of the Rider Census will be used not just in Title VI analysis (as mandated by the Federal Transit Administration), but across the T in capital planning, service planning, fare policy, and public outreach planning. This survey also tends to be our largest sample size survey effort that spans every single fixed-route mode, so questions beyond demography are included to be used in analysis across the T, for example to understand station access or to assess differences in fare product useage across modes. The most recent comparable survey to this 2022 system-wide survey is the 2015-2017 survey of riders on MBTA rail rapid transit, bus, Commuter Rail, and ferry services

1.2 - Changes to the Methodology

The MBTA made the move from a once in five years survey to a rolling census for multiple reasons. Title VI equity analyses, required by the FTA, necessitate an understanding of rider demographics within the T system. Traditionally, the MBTA conducted a system-wide sampled survey every five years; however, by running a rolling rider census rather than discrete surveys, the T will have a consistently fresher, more accurate understanding of who uses its system. The sampling and publishing plan, developed throughout 2022, allows for publication of meaningful results in early 2023. Importantly, it will allow for more responsiveness in our survey methods; if a new service comes online, or if significant changes are made to an existing service, the survey team can adjust the sampling plan to collect demographic data that reflects these changes. With a traditional census, it would take up to 5 years for data to reflect these changes, which limits understanding of rider makeup. Similarly, pilots can be evaluated using demographic data collected through a methodologically consistent effort.

1.3 Survey Content

The survey forms distributed on all modes – rail, bus, Commuter Rail, and ferry – included the same set of questions pertaining to a respondent's demographic information and most recent trip on the MBTA.

The survey was designed to obtain the following kinds of information:

- Demographic characteristics, including: race, ethnicity, English proficiency, gender, age, and household income

- Non-English languages used at work or home
- Number of usable vehicles in household and vehicles per capita in household
- Trip purpose
- Origin/destination locations
- Modes of access and egress
- Fare and fare payment method
- Frequency of making the reported trip using the MBTA
- Other characteristics, as required for federal reporting

The survey was primarily distributed via an intercept-based tablet survey. In addition to English, survey forms were available in Arabic, traditional Chinese, simplified Chinese, Cape Verdean Creole, French, Italian, Haitian Creole, Portuguese, Russian, Spanish, and Vietnamese. A paper version of the survey in English, Spanish, and simplified Chinese was available upon request. 4.4% percent of surveys were completed in the non-English versions.

The tablet-based distribution method enabled translation into more languages than a paper-based method. It also allowed for respondents who did not feel comfortable taking the survey digitally to have a surveyor input their responses, provided the respondent spoke English or another language spoken by a surveyor on-site.

Chapter 2 - Sampling Plan

This section describes the MBTA's data collection in preparation for the calendar year 2022 (CY22) System-Wide Passenger Survey (Rider Census) demographic data release. The first-year data release will cover the entire system, but at a more aggregate level than the 2015-2017 System-Wide Passenger Survey. This document summarizes the reporting groups for the CY22 release, the initial sampling plan, and changes to the sampling plan made in response to events impacting response collection, including the Orange Line shutdown.

2.1 - Reporting Groups

The five-year reporting groups (i.e., groups for which data will be available after 2026) for all modes were constructed to be comparable to reporting groups from the previous Rider Census (2015-2017). The purpose of creating these groups prior to data collection was to ensure that sufficient data is collected each year to eventually meet independent reporting response requirements.

Stations (for the rail system) or routes (for the bus and ferry systems) were grouped into three ridership categories for purposes of creating five-year and one-year reporting groups. These ridership categories were initially developed based on 2021 ridership values but are subject to change based on observed overall changes in MBTA ridership. Services were classified as low-ridership if they had fewer than 800 average weekday boardings, moderate-ridership if they had between 800 and 3,500 average weekday boardings, and high-ridership if they had over 3,500 average weekday boardings.

The sampling plan was constructed in order to report high-ridership services independently after the first year of data collection and moderate- and high-ridership services independently after the fifth year of data collection. Low- and moderate-ridership services were placed into groups for the first-year data release. Each first-year data reporting group is constructed from five-year reporting groups.

The exact method for construction of these groups depends on mode. Definitions of bus groupings used fare transaction data to calculate the proportion of riders on each route who also used other routes in the system and grouped routes likely to be used by the same riders. Light rail groupings used historical demographics to minimize demographic variation within each reporting group.

2.2 - Initial Sampling Plan

Using the reporting groups as defined above, response targets, or the number of required survey responses were set for each station and route in order to collect enough data to report demographics for a single reporting group. These response targets were then translated to survey location targets, or the number of responses needed at a specific survey site. This process was done slightly differently for each mode. For the heavy rail system, ridership is high enough to allow for first-year reporting at the station level, so the response target for each station matched the survey location target. Due to relatively low ridership at outlying Commuter Rail and light rail

stations, survey efforts were focused on downtown stations for these modes. Locating survey-ors downtown allowed for efficient response collection, including from riders traveling between outlying and downtown stations.

The process of translating total response targets to site-specific surveying targets was most complex for bus services. Stop-level ridership was evaluated in conjunction with the proportion of riders traveling somewhere other than a station busway (to prioritize riders that were unlikely to be encountered during surveying of other modes), stop amenities, and whether a stop was likely to have riders that differ significantly from other stops being surveyed.

Route-level targets were then proportionally assigned to stops selected by this process. Then, this selection process was iterated, considering factors like the number of locations selected for each route (more locations per route leads to a more balanced sample, but there is an upper limit for number of locations that are reasonable to survey).

2.3 - Changes to Sampling Plan

Detailed sampling plans for light rail, bus, Commuter Rail, and ferry were created after the heavy rail system had been surveyed. Accordingly, response targets for these modes were adjusted downwards based on the number of responses on these modes that had been collected during the heavy rail survey effort.

Student ridership during the summer months is different from that during the school year for certain routes and stops in the City of Boston, reflecting lower overall travel and travel more evenly spread throughout the day, day of week, and geographic location within the system. Therefore, a restriction was placed on sampling at heavy rail, light rail, and bus locations in the City of Boston during the summer months.

The Orange Line complete shutdown and Green Line partial shutdown from mid-August to mid-September also impacted survey collection. While survey collection for the Orange Line itself had been completed at this point, light rail and bus survey efforts had not been completed. Many bus routes intersect with the Orange Line (or otherwise have high rates of transfer to the Orange Line), so efforts were made to limit the amount of data collected on these routes and instead focus efforts on routes that were less impacted by the shutdown. This was determined by looking at the percent of riders on each bus route (based on fare transaction data) that also took the Orange Line over a given time period. Routes and bus stops with lower proportions of Orange Line riders were prioritized during the shutdown.

After visiting each survey location for the originally planned number of surveyor-days, the Rider Census team began making weekly schedules based on gaps in the initial round of data collec-tion. These schedules were based on the number of responses that had been collected initially and the quality of those responses. In certain cases, new survey locations were identified when the initial survey locations were not sufficient to meet targets on a given route. For example, the relatively low ridership on the Fairmount Line meant that collecting sufficient responses at South Station was difficult. In response, several outlying stations on the Fairmount Line were selected for additional sampling, enabling the survey target to be successfully achieved. The MBTA chose to conduct its Rider Census mode by mode to allow surveyors to start survey-

ing at heavy rail stations, which helped ensure adequate shelter from the weather for surveyors over the winter. This allowed us to use the data collected at heavy rail stops to adjust the bus targets, to account for the fact that some data from bus riders had already been collected (e.g. a rider intercepted at Wellington who took the 110 to get to the station counts towards the survey targets for both the 110 and Wellington).

Chapter 3 - Survey Weighting

3.1 - Introduction and Reasons for Weighting

Survey responses were weighted to ensure that reported values are as representative as possible. Riders of certain services were intercepted at different rates than riders of other services. To reach a statistically valid sample size for a high-ridership service, it is not necessary to intercept the same proportion of riders as would be necessary on a lower ridership service. In addition, variation in response rate between services results in different numbers of responses, even given the same number of surveyor-days spent at a particular location. These reasons necessitate weighting the survey responses by ridership, which enables the calculation of mode- and system-wide demographics in addition to the calculation of specific reporting group demographics.

The survey distribution has an unavoidable bias towards interacting with transferring riders. This is because riders of a particular service might be intercepted while at a boarding location not associated with that service. For example, riders of the 1 bus were specifically targeted at several boarding locations for that service, including Nubian Square, Hynes Convention Center, and Central Square. However, those riders might also be intercepted while at a location not directly served by the 1 bus. A rider who boarded the 1 bus at Central Square, transferred to the Orange Line at Massachusetts Avenue, then transferred to the Blue Line at State might be intercepted at Central Square, Massachusetts Avenue, or the Blue or Orange Line platforms at State. However, a similar rider that made a one segment trip from Central Square to Washington Street could only be intercepted by a surveyor who happened to be at those locations. For this reason, survey responses were also weighted by the transfer rate on each service.

Each survey response contained information on a recent trip taken by the respondent. This information was used to assign respondents to one or more MBTA services. Each respondents' reported trip was reversed in order to assign their demographics to both boarding and exit stations for the rail system. Then ridership and transfer weights were assigned to each reported or reversed segment. Following that, weighted counts for each measure were summed to the reporting group level. Then, these reporting group totals were summed to report demographics at the mode and system-wide levels.

3.2 - Calculation of Ridership Weights

Surveys were conducted on weekdays. A small proportion of trips (approximately 1%) were self-reported as weekend trips. These weekend trips were included in calculations, but due to their relative infrequency, values were weighted using average weekday unlinked passenger trips for 2022 as the measure of ridership. Values should therefore be interpreted as corresponding to weekday demographics. Data source varies by mode depending on what is most reliable and available for the given mode. Certain time periods are excluded from the calculations for all modes; this was done if service was different enough from typically operated service that either: 1) ridership patterns were sufficiently disrupted across modes; or 2) automated data collection was not generally reliable for that time period. Certain time periods were excluded for individual modes if service was disrupted on that mode but unlikely to affect typical behavior on

other modes.

The aggregation levels are as follows:

Table 1: Aggregation Levels

Mode	Aggregation Level	Examples
Heavy Rail	Line - Station	Red Line - Downtown Crossing; Orange Line - Stony Brook
Light Rail	Line - Stop	Mattapan Trolley - Capen Street; Green Line - Arlington
Silver Line	Route	SL1
Bus	Route	111
Commuter Rail	Line	Haverhill Line
Ferry	Route	Charlestown Ferry

Calculation of Heavy Rail and Green Line Ridership

Heavy rail and Green Line data came from the MBTA's Origin-Destination-Transfer (ODX) model outputs. This model processes many of the MBTA's automated data feeds including Automated Fare Collection (AFC), Automatic Passenger Counters (APC), and Automatic Vehicle Location (AVL) data. Using these sources, the model estimates passenger transfers within the transit system. Summaries of these movements provide counts of total boardings at specific locations on specific routes.

Boarding values at each heavy rail and Green Line station were averaged across weekdays in 2022, excluding dates on which significant disruptions affected ridership or the automated data collection process. Green Line boardings were assigned to stations, rather than assigned to each branch at that station. For example, instead of summarizing Green Line B, C, D, and E boardings at Arlington separately, all Arlington Green Line boardings were grouped together.

Calculation of Mattapan Trolley Ridership

Because Mattapan Trolley vehicles are not equipped with APCs, ODX is less reliable for calculating ridership on this service. Currently, manual counts provide the best source for ridership on the Mattapan Trolley. Due to data collection limitations during COVID-19, the most recent full counts were conducted in 2018. Partial counts were conducted in Fall 2022 at Ashmont Station. To estimate station-level ridership for 2022, the 2018 counts for specific stations were scaled by the quotient of the boardings at Ashmont in 2022 for a specified time of day over the boardings in 2018 at that same time of day.

Calculation of Bus and Silver Line Ridership

Bus and Silver Line ridership was derived from APC-based weekday average boardings by route. The initial dataset was available at the week level. Weeks during significant service disruptions were excluded and weekday averages were calculated for the year. Data for contracted routes operating in Winthrop (712 and 713) is calculated separately from other routes. These data are also APC-based, but come from a different source. Winthrop route data is only available at the month level, so specific dates for these routes cannot be excluded. However, these routes were

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likely less impacted by the Orange Line shutdown, as they do not provide a direct transfer to that line.

Calculation of Commuter Rail Ridership

Commuter Rail ridership was not available at the stop level. Line-level daily ridership estimates are prepared by Keolis, the MBTA's Commuter Rail operator. Excluding dates covering significant service disruptions, weekday averages were calculated for the year.

Calculation of Ferry Ridership

Monthly Ferry ridership was summarized to create a weekday average count of boardings by line.

3.3 - Calculation of Transfer Weights

Transfer weights were derived from two main sources: ODX data; and the survey results themselves. Because ODX can only be run for modes using the AFC system, it was not possible to calculate transfer rates using ODX for Commuter Rail, ferry, or free bus routes (i.e., the 23, 28, and 29). In addition, ODX-based transfer rates would not account for riders making a transfer from an AFC mode to a non-AFC mode (such as a Red Line to Commuter Rail trip). Therefore, ODX-based transfer rates were calculated when possible, then adjusted to account for the proportion of riders making such transfers. The following section explains how transfer rates were calculated for each mode. It is split by whether the ODX-based transfer rate was used (with adjustments) or if transfer rates were calculated using survey results themselves.

ODX Based Transfer Rate

Transfer rates were calculated using ODX and then adjusted for heavy rail, gated light rail stations, and bus (excluding free routes). First, the percent of boardings that were or were not part of a multiride trip was calculated for each route – stop pair. Second, this daily value was averaged over the year to result in a single weekday average for every route and stop. Two adjustments then needed to be made. First, because ODX is better able to impute trip information for transferring riders, an assessment of the difference between the ODX-based transfer rate and transfer rate based on Rider Census data was conducted for each mode. ODX-based rates differed from Rider Census-based rates for bus. So, a single correction factor was applied to ODX-based rates to adjust for this bias. Second, ODX-based rates do not account for transfers to modes not on the AFC system. A second correction factor was developed at the stop level for rapid transit and the route level for bus. This correction factor added to each stop or routes initial value the percentage of boardings occurring on that route that transferred to a service not in the AFC system and did not also transfer to an AFC service.

Non-ODX Based Transfer Rate

Transfer rates for ungated light rail stations, free bus routes, Commuter Rail, and ferry were not calculable from ODX data. For these services, the transfer rates on reported trips for responses collected at boarding locations specific to the service were used. For example, transferring Franklin Line riders are likely overrepresented in the initial survey because they might be intercepted elsewhere on the system. However, transferring Franklin Line riders that were intercepted at a *Franklin Line boarding location* are not likely to be overrepresented. So, transfer rates were calculated for non-ODX modes based on responses collected at boarding locations specific to those modes.

Chapter 4 - Key Findings

4.1 - Overview

The 2022 System-Wide Passenger Survey generated about 15k completed responses. The complete CY22 data release and an interactive web tool are available on the MBTA Open Data Portal.

4.2 - Demographics

Age

According to the CY22 Rider Census results, 59.2% of MBTA riders are between the ages of 18 and 34 years of age. 17.6% of riders were between 35 and 44 years, and 14.4% were between 45 and 64 years. The Green Line skews younger, with 40.9% between the ages of 18-25. Ferry riders skew older with 65.6% between the ages of 35 and 64. See Table 2 for more information.

Table 2 - Percent of Riders by Age and Service Mode

	Under 18	18 to 25	26 to 34	35 to 44	45 to 64	65 or older
System-Wide	**5.6%**	**29.6%**	**29.6%**	**17.5%**	**14.4%**	**3.3%**
Rapid Transit or Bus Rapid Transit	4.1%	31.9%	30.9%	16.7%	13.4%	2.9%
Blue Line	4%	23.3%	33.5%	22.5%	14.5%	2.1%
Green Line	3.8%	40.9%	28.6%	14%	10%	2.7%
Orange Line	4.9%	30.9%	32%	16%	13.8%	2.4%
Red Line	3.8%	31.3%	30.5%	16%	14.4%	3.9%
Mattapan Trolley	8.4%	22.4%	29.2%	19.1%	18.9%	2.1%
Silver Line BRT	2.9%	28.2%	32.5%	20.7%	14.1%	1.7%
Bus	8.2%	26.6%	28.8%	17.5%	15.2%	3.6%
Commuter Rail	3%	30.7%	26.1%	21%	15.7%	3.5%

Gender

System-wide, 59.6% of riders identify as women, 38.4% as men, and 1.8% as non-binary. These results are very similar to those in the 2015-2017 Rider Census, which reported 59.0% women and 38.7% men.[1] See Table 3 for more information.

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1   The exact wording and answer choices changed between the 2015-2017 and 2022 surveys. The 2015-2017 survey asked "What is your gender?" and provided the following choices: Man, Woman, Other (specify), and Prefer not to say. The 2022 survey asked "How do you self-identify by gender?" and provided the following choices: Man, Woman, Non-Binary, Other (specify), and Prefer not to say.

Table 3 - Percent of Riders by Gender and Service Mode

	Woman	Man	Non-Binary	Other	Prefer not to say
System-Wide	59.6%	38%	1.8%	0.1%	0.6%
Rapid Transit or Bus Rapid Transit	60.6%	36.8%	1.9%	0.1%	0.7%
Blue Line	62.2%	35.7%	0.7%	0.2%	1.1%
Green Line	60.5%	36.6%	2.3%	0%	0.5%
Orange Line	61.9%	35.3%	2%	0%	0.8%
Red Line	60%	37.2%	2.1%	0.1%	0.6%
Mattapan Trolley	49.7%	49.8%	0%	0.5%	0%
Silver Line BRT	57.5%	40.5%	1.5%	0%	0.5%
Bus	59.4%	38.4%	1.7%	0.1%	0.4%
Commuter Rail	55.1%	42.4%	1.7%	0%	0.8%
Ferry	54.9%	43.3%	1.8%	0%	0%

Annual Household Income

Household income brackets used in this survey are calculated as a percentage of Area Median Income (AMI) available through the U.S. Census Bureau's American Community Survey five-year dataset for 2015-2019, the latest available during survey design. The income brackets will be updated each year using the latest available ACS dataset. The MBTA's Disparate Impact/Disproportionate Burden Policy sets the cutoff for a rider to be considered "low-income" at 60% of AMI in the MBTA service area. For the CY22 data release, the low-income threshold is $56,000. The corresponding cutoff was $43,500 in the 2015-2017 survey.

Table 4 shows the total distribution of riders who self-identified as low-income. Overall, 48.4% of the riders were low-income, an increase of 19.6 percentage points from the 2015-2017 survey. At the modal level, the proportion of low-income riders was largest on the Mattapan Trolley at 60.3%, followed by bus at 57.1%, an increase of 15.5 percentage points since 2015-2017 survey.

At 5.1%, Ferry has the smallest share of low-income riders, an increase of 1.4 percentage points since 2015-2017. Commuter Rail, which also had a lower share of low-income riders, has seen an increase of 19.5 percentage points in low-income riders since 2015-2017. More information on the Annual Household Income comparisons between survey editions for key bus routes is included in the Appendix.

Table 4 - Percent of Riders Self-Identifying as Low-Income by Service Mode

	Yes
System-Wide	**48.4%**
Rapid Transit or Bus Rapid Transit	46.1%
Blue Line	50.8%
Green Line	47%
Orange Line	47%
Red Line	43.4%
Mattapan Trolley	60.3%
Silver Line BRT	40.4%
Bus	57.1%
Commuter Rail	26.3%
Ferry	5.1%

Race, Ethnicity, and Minority Classification

The MBTA's Disparate Impact/Disproportionate Burden Policy defines the term "minority individual" as one who self-identifies as a race other than white or who identifies as Hispanic or Latino/Latina. Overall, 57.9% of the respondents were classified as minority based on their responses to questions pertaining to race and ethnicity. This is an increase of 23.6 percentage points since the 2015-2017 survey. At the modal level, minority percentage is highest on the Mattapan Trolley (74.4%). The second highest is bus at 68.2%, which is a 20.1 percentage point increase over the 2015-2017 survey. The percent of Commuter Rail riders who were classified as minority saw an increase of 23.7 percentage points since the 2015-2017 survey. See Table 5.

Overall, 45.6% of respondents identified as a race other than white, and 6.2% of the respondents preferred not to self-identify their race. The top three identified groups were: 26.5% Black or African American; 14.2% Asian; and 2.6% Middle Eastern or North African. The Mattapan Trolley has the highest percentage of Black or African American riders at 67.2%, followed by bus at 37.8% and the Orange Line at 22.9% (closely followed by Red Line at 22.8%). The highest percent of Asian riders were on Green Line at 18.9%, the Red Line at 18.4%, and the Orange Line at 17.3%. See Table 6.

Table 5 - Percent of Riders Self-Identifying as Minority by Service Mode

	Yes
System-Wide	**58%**
Rapid Transit or Bus Rapid Transit	54.8%
Blue Line	56.2%
Green Line	49%
Orange Line	58.6%
Red Line	53.8%
Mattapan Trolley	74.4%
Silver Line BRT	60.7%
Bus	68.2%
Commuter Rail	38.3%
Ferry	14.2%

Table 6 - Proportion of Self-Identified Ethnic Groups by Service Mode

	American Indian or Alaska Native	Asian	Black or African American	Middle Eastern or North African	Native Hawaiian or other Pacific Islander	White	Other	Prefer not to say
System-Wide	**1.5%**	**14.2%**	**26.5%**	**2.6%**	**0.3%**	**48.9%**	**3.4%**	**6.2%**
Rapid Transit or Bus Rapid Transit	1.1%	16.6%	20.3%	2.6%	0.3%	52.1%	3.6%	6.8%
Blue Line	1.6%	8.3%	10.1%	3.9%	0.2%	54.9%	5.8%	18.1%
Green Line	0.9%	18.9%	15.7%	2.8%	0.2%	57.7%	2.9%	4.6%
Orange Line	1.4%	17.3%	22.9%	2.5%	0.4%	48%	3.7%	7.5%
Red Line	1%	18.4%	22.8%	2.3%	0.3%	51.7%	3%	3.9%
Mattapan Trolley	0%	2.1%	67.2%	2.2%	0%	28.1%	1.5%	0.5%
Silver Line BRT	1.3%	16.6%	21.7%	1.5%	1%	51.6%	4.9%	5.3%
Bus	2%	12%	37.8%	2.8%	0.3%	39.3%	3.4%	6.3%
Commuter Rail	1.6%	11%	16.9%	2.4%	0.1%	67%	2.6%	2.9%
Ferry	0.8%	2.8%	4.5%	1.9%	0%	90.1%	0%	1.6%

Vehicles per Household

Overall, 41.2% of survey respondents said their household does not own a vehicle, which is an 11.2 percentage point increase over the 2015-2017 survey. In the 2015-2017 survey, the most common response was owning a single vehicle (39.7%), which decreased to 38.8% in 2022. Respondents saying they were in households with 2 vehicles decreased by 7 percentage points, and households with 3 or more vehicles decreased by 2.6 percentage points.

By service mode, the proportion of zero-vehicles households was largest on bus, the Blue Line, the Green Line, the Silver Line, and the Mattapan Trolley. The proportion of one-vehicle households was largest on Commuter Rail, the Orange Line, the Red Line, and ferry.

Table 7 - Vehicles per Household Percentages by Mode

Vehicle per Household	0	1	2	3 or more
System-Wide	**41.2%**	**38%**	**16.3%**	**4.5%**
Rapid Transit or Bus Rapid Transit	41%	38.8%	16.1%	4.1%
Blue Line	45.9%	38.2%	13.9%	1.9%
Green Line	45.2%	33.3%	17.5%	4%
Orange Line	38%	42.4%	16%	3.7%
Red Line	38.8%	39.9%	15.9%	5.3%
Mattapan Trolley	42.2%	36.7%	20%	1.1%
Silver Line BRT	40.5%	38.9%	16.9%	3.7%
Bus	48.6%	35.7%	13.2%	2.5%
Commuter Rail	15.4%	42.3%	28.6%	13.8%
Ferry	4.9%	54%	32.5%	8.6%

4.3 - Trip Purpose

Trip purpose was determined based on the answers to "Where did this trip start?" and "Where did this trip end?" Trips that started or ended at home were classified as home-based trips, with the trip purpose determined by the type of place at the non-home end of their trip. Trips that neither started nor ended at home were classified as non-home-based trips.

Trip Purpose and Frequency by Service Mode

As in past survey summaries, trips classified as home-based included most trips on every mode surveyed. On the MBTA system overall, 89.6% of trips were home based. The most common trip purpose reported was travel from home to work or work to home; overall 57.2% of trips were for this purpose. Compared to the 2015-2017 survey, there was a 15.7 percentage point decrease in the share of commute trips. The share of trips accounted for by travel between home and work was largest on the ferry (66.9%), the Blue Line (63.7%), and the Orange Line (61.8%). See Table 8 for more information.

Table 9 shows the frequency of trips by service mode. 40.6% of the trips surveyed happened five days a week, 21.1% between three and four days a week, and 12.4% between one and two days a week (Table 2). Across all modes except for ferry, most reported trips occured 5 days per week, with this value being highest on the bus (44.7%), followed by the Blue Line (43.1%) and the Orange Line (42.7%).

Table 8 - Trip Purpose by Service Mode

Trip Purpose	Home-based Work	Home-based School	Home-based Social Activity	Home-based Other	Non-home Based
System-Wide	**54.5%**	**13.1%**	**5.8%**	**15.7%**	**10.9%**
Rapid Transit or Bus Rapid Transit	54.6%	12.6%	5.8%	14.8%	12.1%
Blue Line	60.7%	7.8%	5.2%	16.5%	9.8%
Green Line	47.1%	17.6%	6.9%	15.6%	12.8%
Orange Line	58.7%	12.9%	4.3%	13.8%	10.4%
Red Line	54.1%	12.5%	6.5%	13.5%	13.4%
Mattapan Trolley	54.3%	13.7%	6.7%	19.1%	6.1%
Silver Line BRT	55.4%	2.7%	4%	21.2%	16.7%
Bus	54.8%	13%	5.4%	17%	9.9%
Commuter Rail	52.4%	16.3%	7.4%	15.6%	8.3%
Ferry	64.8%	2.6%	13.8%	10.4%	8.4%

Table 9 - Trip Frequency by Service Mode

Trip frequency	6 to 7 days a week	5 days a week	3 to 4 days a week	1 to 2 days per week	1 to 3 days a month	Less than once per month
System-Wide	**9.8%**	**40.6%**	**21.1%**	**12.4%**	**6.9%**	**9.2%**
Rapid Transit or Bus Rapid Transit	10.2%	40%	20.6%	12%	6.7%	10.5%
Blue Line	12.2%	43.1%	19%	9.9%	5.7%	10.1%
Green Line	8.6%	37%	21.3%	12.9%	9.2%	11%
Orange Line	10.7%	42.7%	20.3%	11.1%	6.2%	9%
Red Line	10.1%	39.9%	20.8%	13.1%	5.8%	10.3%
Mattapan Trolley	7.6%	40.1%	21.6%	16.7%	9.4%	4.8%
Silver Line BRT	10.5%	31.4%	22.2%	8.9%	6.8%	20.2%
Bus	10.9%	44.6%	20.6%	11.7%	6%	6.1%
Commuter Rail	3.8%	28.6%	25%	17.1%	10.9%	14.6%
Ferry	1.9%	27.5%	30.5%	16.7%	5.4%	17.9%

4.4 - Language

Information about language usage of survey respondents was determined through both the languages in which the survey was completed and a question on the survey that asked respondents which language they would prefer to receive information about the MBTA in.

In addition to English, survey forms were available in Spanish, Portuguese, Cape Verdean Creole, traditional and simplified Chinese, French, Arabic, Italian, Russian, Vietnamese, and Haitian Creole. These options were based on US census data on the languages other than English most used in the MBTA service area. Most survey responses were in English (95.58%), followed by Spanish (3.63%) and Portuguese (0.43%). See Table 10 for more information.

Riders who answered the survey in any language were also given the opportunity to state whether they spoke any languages other than English at work or at home. 32.0% of riders stated that they would. Table 11 shows the languages comprised more than 1% of survey responses.

Table 10 - Survey Responses by Language

Language	Number of Survey Responses
English	14,460
Spanish	549
Portuguese	65
Chinese (Simplified)	24
French	14
Haitian Creole	8
Russian	2
Chinese (Traditional)	2
Vietnamese	2
Arabic	1
Italian	1
Cape Verdean Creole	1

Table 11 - Languages Other Than English Spoken at Home or Work

Language	Percent of Unweighted Responses
Spanish	16.3%
Chinese	2.7%
French	2.2%
Portuguese	2.2%
Arabic	1.5%
Haitian Creole	1.3%

4.5 - Alternate Means of Travel

Overall, the majority (83.2%) of MBTA riders surveyed did not indicate the use of alternative modes to make their reported trip. Of riders reporting the use of an alternative mode (16.8%) the most common alternative to the service used on the reported trip was a different MBTA service, reported by 36.4% of those who used any alternative. Driving alone was the second most common alternative, at 24.6%. However, for Commuter Rail riders, driving alone (44.9%) was more common than using a different MBTA service (41.1%). Among Blue Line riders the most common alternative means was also driving alone (28.1%) compared to using a different MBTA service (18.9%). See Table 12 for more information.

Table 12 - Alternate Means of Travel Proportions by Service Mode

Alternate Means of Travel	Different MBTA Service	Drive Alone	Taxi or Rideshare Company	Walk	Drive or Ride in a Carpool	Bike, Scooter, or other Micromobility	Private Shuttle or Other Transit	Other
System-Wide	36.4%	24.6%	22.8%	19.6%	16.8%	8.1%	3%	0.5%
Rapid Transit or Bus Rapid Transit	30.9%	26.6%	24.4%	22.3%	16.8%	9.3%	3.6%	0.3%
Blue Line	18.9%	28.1%	31%	19.2%	23.4%	3.5%	6.8%	0.8%
Green Line	43.6%	25.5%	23.4%	19.5%	13.7%	5.2%	3.4%	0.4%
Orange Line	32.1%	25.5%	22.1%	25.4%	15.4%	9.9%	3.1%	0.4%
Red Line	26.6%	28.1%	22.6%	24.2%	16.8%	13.2%	3%	0.1%
Mattapan Trolley	49.4%	36.3%	15.1%	11.7%	15.8%	4.8%	3.2%	0%
Silver Line BRT	28.4%	17.4%	46.7%	10.4%	22.4%	5.4%	5.1%	0%
Bus	43.4%	16.2%	23.1%	20%	15.2%	8.3%	2.3%	0.7%
Commuter Rail	41.1%	44.9%	12.9%	3.4%	22.7%	1.5%	2.6%	0.9%
Ferry	33%	15.7%	17.2%	15.8%	8.3%	10%	0%	0%

Appendix

Service Mode Definitions

The MBTA's rapid transit system includes its heavy rail and light rail services, described below.

Heavy Rail: The MBTA operates three heavy rail lines—the Red Line, the Blue Line, and the Orange Line—that provide core subway services.

Light Rail: The MBTA's primary light rail system, the Green Line, provides local service in outlying areas via its surface operations and core subway services in and around the Boston city center. In addition, the MBTA operates the Mattapan High Speed Line, which serves as a Red Line extension from Ashmont Station to Mattapan Station via light rail.

Bus: All rubber-tire vehicles regardless of the vehicle's power source.

Commuter Rail: Long-haul, commuter-oriented services that link the outer portions of the region with Downtown Boston.

Ferry: Inner Harbor Ferry services for travel between destinations in Boston, and Commuter Ferry services from the South Shore to Downtown Boston and Logan Airport.

Additional Data Tables

Table A.1 - Fare Type Proportion by Service Mode

Fare Type	Monthly Pass	Pay-as-you-go	7-day Pass	Student Pass (M7)	Semester Pass	1-day Pass	Other
System-Wide	**41.5%**	**31.5%**	**16.2%**	**3.9%**	**2.9%**	**2.6%**	**1.5%**
Rapid Transit or Bus Rapid Transit	41.3%	32.8%	16.4%	3.1%	3.3%	2.2%	0.8%
Blue Line	38.6%	25.5%	29%	2.1%	1.3%	2.9%	0.4%
Green Line	38.6%	34.3%	13.6%	2.7%	7.6%	2.5%	0.6%
Orange Line	39.4%	32.7%	18.7%	4.5%	2.4%	1.4%	1%
Red Line	45.8%	33.7%	12.4%	2.6%	2.6%	2.4%	0.6%
Mattapan Trolley	27.7%	43.6%	15.6%	10.2%	1.6%	0.5%	0.9%
Silver Line BRT	40%	39%	12.5%	1.6%	0.6%	2.6%	3.8%
Bus	45.2%	25.9%	19.3%	5.7%	2.2%	1.1%	0.6%
Commuter Rail	29.5%	44.7%	3.9%	1.4%	3.5%	9.1%	7.9%
Ferry	42.1%	28.1%	10.1%	1.8%	0%	13.3%	4.6%

Table A.2 - Percent of Riders Self-Identifying as Minority for Key Bus Routes by Survey Edition

Line	2022 Percent Minority	2015-2017 Percent Minority	Percentage Point Change
System-Wide	**68.2%**	**48.0%**	**20.2**
1	65.6%	36.7%	28.9
9	34.1%	11.2%	22.9
15	89.1%	75.3%	13.8
16	79.9%	74.0%	5.9
21	85.3%	87.1%	-1.8
22	91.8%	89.6%	2.2
23	89.8%	84.9%	4.9
28 & 29	92.1%	92.6%	-0.5
32	87.1%	75.5%	11.6
34 & 34E	70.5%	41.5%	29
39	59.9%	36.0%	23.9
47	55.8%	32.7%	23.1
57	50.9%	28.5%	22.4
66	66.3%	39.9%	26.4
67 & 77	47.8%	23.9%	23.9
86	52.0%	25.7%	26.3
104	86.6%	55.9%	30.7
111	71.2%	62.6%	8.6
114, 116 & 117	73.0%	59.9%	13.1

Table A.3 - Percent of Riders Self-Identifying as Low-Income for Key Bus Routes by Survey Edition

Line	2022 Percent Low-Income	2015-2017 Percent Low-Income	Percentage Point Change
System-Wide	**57.1%**	**41.5%**	**15.6**
1	54.4%	33.9%	20.5
9	33.6%	15.3%	18.3
15	67.6%	67.2%	0.4
16	68.7%	50.0%	18.7
21	57.1%	48.2%	8.9
22	66.3%	70.0%	-3.7
23	63.1%	59.0%	4.1
28 & 29	67.6%	65.6%	2
32	66.9%	42.7%	24.2
34 & 34E	48.3%	36.9%	11.4
39	54.0%	27.4%	26.6
47	50.9%	26.3%	24.6
57	48.1%	42.7%	5.4
66	59.1%	40.1%	19
67 & 77	39.9%	33.4%	6.5
86	50.8%	35.6%	15.2
104	68.6%	56.1%	12.5
111	53.6%	59.7%	-6.1
114, 116 & 117	69.7%	55.2%	14.5