

Traffic Information in NYC

What We Know,
What We Need to Know



Prepared for
Transportation Alternatives

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Part I. Traffic Information Needs and Availability

Traffic information needs

Traffic planning has traditionally focused on ensuring an acceptable “level of service” (LOS) for motor vehicles passing through intersections, with the objective of maintaining acceptable levels of vehicular delay at each intersection. LOS analyses are most visible in environmental impact statements for major development projects. Data on traffic volumes, turning movements and physical and operational characteristics of a study area are fed into a computer traffic model to estimate current levels of service and the impacts of proposed development.

While LOS remains a mainstay of traffic analysis, traffic and pedestrian densities in large urban areas may prevent adjustments to traffic signal timings, re-design of roads and intersections and other measures from achieving acceptable LOS levels. Modern traffic planning has thus recognized the need for broader analytic tools that focus on users rather than vehicles and that encompass all modes. Traffic planners have begun to give priority to high-capacity modes such as buses and to focus on overall performance of the street in moving people rather than vehicular-oriented LOS measures.

This broader, multimodal perspective has been widely embraced. An assessment of future directions for transportation in the new millennium, prepared by standing committees of the federally chartered Transportation Research Board, stated that “it has become important to expand the analysis area ... toward a single, integrated multimodal transportation system.”¹ Traffic signal systems must change from “primarily *servicing the needs of automobile drivers* to *servicing broader transportation needs based on priorities of various users*” (emphasis in original).²

These priorities have also been embraced by city and state governments in New York. In a recent speech, the City’s transportation commissioner called for “challenging the old paradigms” and announced plans to “carefully consider a wide range of strategies to shift travel away from the automobile and onto transit.”³ Recent studies ranging from New York City Department of Transportation’s (DOT) downtown Brooklyn traffic calming study to the State DOT’s recent Staten Island Expressway bus lane/priority lane study emphasized goals ranging from minimizing the impact of traffic on local communities,⁴

¹ Transportation Research Board, Committee on Highway Capacity and Quality of Service, “Highway Capacity and Quality of Service,” in *Transportation in the New Millennium: State of the Art and Future Directions*, Transportation Research Board, January 2000.

² Transportation Research Board, Committee on Traffic Signal Systems, “Traffic Signal Systems: Addressing Diverse Technologies and Complex User Needs,” in *Transportation in the New Millennium: State of the Art and Future Directions*, Transportation Research Board, January 2000.

³ Iris Weinshall, speech at Borough President Scott Stringer’s Transportation Forum, October 12, 2006, available at: <http://www.nyc.gov/html/dot/pdf/transforum.pdf>

⁴ New York City Department of Transportation, “Downtown Brooklyn Traffic Calming Project,” May 2004.

to “carrying more people in fewer vehicles” and increasing the attractiveness of transit use and carpooling.¹

This broader focus raises several key questions that must be considered in the planning process:

- How many people are traveling by each mode (auto, bus, cycling and pedestrian)? What are the modal shares?
- What is the relative attractiveness of different modes, measured in terms of speed of travel, reliability of travel times, cost, and comfort and convenience – the key factors affecting travelers’ choice of mode.
- How can the street system be used to more efficiently move people and goods?
- Which streets are moving people efficiently and which are not?
- Are conditions improving or getting worse?

These questions should be examined in terms of current conditions, trendlines, and in a comparative framework. In this way, current street performance and opportunities to improve the speed, efficiency and comfort of travel can be evaluated.

A broader, multimodal focus necessitates a different set of metrics for assessing traffic flow. While LOS focuses on traffic volumes and motor vehicle delay, additional indicators need to be considered in a broader analysis. These include:

- Total number of persons traveling, including both motorized and nonmotorized modes.
- Total person hours of delay, as opposed to vehicular hours of delay. Delay for buses with 40 or more passengers should be given more weight in the analysis than delays for car with one to four occupants.
- Safety of drivers, vehicle occupants, pedestrians, bicyclists and others.
- Impact of traffic on residents and businesses.

¹ New York City Department of Transportation, “Staten Island Expressway Bus Lane / Priority Lane Study,” October 2006.

Traffic information currently available

In New York City, data collection currently focuses on traffic counts and counts of public transportation passengers. Specifically, the following information is collected and published by transportation agencies on an annual basis:

- Vehicle volumes at selected cordons (Manhattan central business district, the Queens/Brooklyn, Queens/Nassau and Bronx/Westchester borders, and bridges and tunnels throughout the city). These counts are in some cases available going back to 1948. Source: New York City Department of Transportation (NYCDOT).
- Subway ridership at the citywide, borough and route level. These counts are available going back to the construction of each subway line. Source: New York City Transit (NYCT).
- Bus ridership at the citywide, borough and route level. These data are available historically at the citywide level, but only since 1998 at the borough and route level. Source: New York City Transit.
- Auto/taxi/truck, subway, bus and commuter rail vehicle and passenger entries to the Manhattan central business district (CBD). The hub bound data are to some extent available back to 1948. Source: New York Metropolitan Transportation Council (NYMTC), based on data collected by NYCDOT, NYCT and other operating agencies.
- Motor vehicle fatalities and crashes. Source: New York State Department of Motor Vehicles.

Part II of this report mines these data sources to show trends at the citywide and borough level and for travel into and out of the Manhattan CBD. The purpose is to provide an overview of travel trends and illustrate how the available data – albeit limited – is useful in understanding changes in traffic and transit usage and the relative attractiveness of different modes. Part II also presents mode shares at the borough level, based on the regional travel model developed for NYMTC.

Certain limitations in these data should be noted. The traffic volumes for non-CBD travel are based on a limited number of cordons and bridges and may not be representative of borough-wide traffic trends. The hub bound auto/taxi/truck person travel data are based on vehicle classification and vehicle occupancy data from the 1980s and 1990s, which may have changed since they were collected. Cordon data for all modes are collected on a limited number of days. They do not take account of seasonal variations in travel and do not capture day-to-day fluctuations in travel volumes, speed or delay.

The NYMTC mode share data are snapshot data for 2002; no trendline mode share data are available. Modes shares are output from the travel model, which has been calibrated to field observations but are subject to error based on limitations of baseline data and the modeling process.

Gaps in traffic information

The available traffic and travel information sources, listed above and reported in Part II, leave large gaps in traffic information:

- No citywide or borough-wide traffic volumes, except for NYMTC travel model estimates.
- No trendline traffic volume data.
- No traffic volumes for congested corridors outside Manhattan, except as collected for ad hoc studies.
- No traffic speeds, except as collected for ad hoc studies.
- No traffic delay data, except as collected for ad hoc studies.
- No vehicle classification data.
- No mode share data except for Manhattan CBD entries and exits.
- No trendline mode share data, except for the Manhattan CBD.
- No data on the reliability of travel times.
- No travel cost data.
- No indicators of comfort, convenience or overall attractiveness of alternative modes.

Although there are gaps in traffic information citywide, the gaps are particularly pronounced outside Manhattan. Data comparable to the hub bound traffic counts are not available for any other cordon in the city, nor for any of the city's major streets or arterials. The information available for non-CBD areas is either limited to area-specific and corridor-specific studies that are conducted from time to time, or simply nonexistent. While this might have been appropriate when travel and congestion was focused on the Manhattan CBD, this is no longer the case.

Even for hub bound traffic, data collection activities do not capture traffic speeds, vehicle or person delay, reliability of travel time, cost or comfort. Thus, even for CBD travel, it can not be determined whether changes in traffic levels or mode share are due to changes in traffic speeds, reliability, cost, etc., or other external factors.

The paucity of comprehensive traffic data contrasts with New York City Transit's program of collecting detailed route-specific ridership and travel time data for buses and subways in all five boroughs and for tracking on-time performance of buses and trains. NYCT has established performance standards and regularly evaluates itself in light of these standards. New York City lacks a comparable system for traffic information and management.

Intro 199

Council bill, Intro 199, mandates that NYCDOT set performance objectives and performance measures to “inform comprehensive policy solutions to problems such as traffic congestion and pollution.”¹ Performance targets and indicators would be developed at the citywide and boroughwide levels. Objectives of the bill include reducing commute times and increasing the proportion of persons walking, biking and using mass transit to the central business districts.

While Intro 199 does not define the specific performance targets and indicators to be developed, the following areas for indicator development can be identified.

At the citywide and borough level:

- Person and vehicle travel volumes. Should include vehicle classifications and occupancy rates. Would most likely be based on a statistically representative sample of locations throughout the five boroughs.
- Mode shares.
- Motor vehicle crashes.

Plans to reduce auto use and attract greater use of public transportation and nonmotorized modes should then be developed for key corridors throughout the city and at cordons for downtown Brooklyn, Jamaica, Flushing, Long Island City, etc. Data needed for development of these plans includes:

- Person and vehicle volumes, mode shares and crashes (comparable to the citywide and borough data)
- Travel times by mode.
- Reliability of travel time by mode.
- Travel cost.
- Comfort and convenience indicators.

These data would form the basis for evaluating the current performance of the street system, setting performance targets and developing strategies and plans to reduce traffic, promote the use of public transportation, accommodate growth in population and employment, improve air quality, reduce noise and congestion, and increase the safety of pedestrians, cyclist, motorists and other users of the public streets.

¹ Intro 199, Section 1.

Part II. Traffic and Mode Shares – Overview by Borough

This section mines available data sources to show trends in traffic and transit use as well as motor vehicle crashes at the borough and citywide levels, and for travel into and out of the Manhattan CBD. Mode shares at the borough level, based on the regional travel model developed for NYMTC, are also presented.

The purpose is to provide an overview of travel trends and illustrate the importance of traffic and travel information to understanding changes in traffic and transit usage and the relative attractiveness of different modes.

As discussed earlier, limitations in these data should be noted:

- The traffic volumes for non-CBD travel based on a limited number of cordons and bridges and may not be representative of borough-wide traffic trends.
- The hub bound traffic data are based on vehicle classification (auto, taxi, truck, van, bus) and vehicle occupancy data from the 1980s and 1990s.
- Cordon data for all modes are collected on a limited number of days. They do not take account of seasonal variations in travel and do not capture day-to-day fluctuations in travel volumes, speed or delay.
- The NYMTC mode share data are snapshot data for 2002; no trendline data are available.

While bearing these caveats in mind, the data suggest that a mode shift from auto to transit took place for travel within and between the Bronx, Brooklyn and Queens in the 1990s and has continued into the new century.

The picture for the Manhattan CBD is surprisingly different. While mode shift from auto to transit is seen at the 60 Street cordon, Brooklyn has seen stable mode shares and Queens has seen mode shift in the reverse direction – from transit to auto.

These intriguing results leave many questions unanswered. Is mode shift to transit actually taking place outside the Manhattan CBD? What is the source of that shift? What are the implications for use of the street system?

Why would auto be growing more quickly than subway and bus for trips between Queens and the Manhattan CBD and at the same pace for trips between Brooklyn and the CBD? How are these trends affecting traffic in neighborhoods just to the east of Manhattan? Why is mode shift favoring transit occurring elsewhere but not for CBD-bound travel from Queens and Brooklyn?

These preliminary results thus illustrate the need for a better understanding of traffic and travel trends and the implications of these trends for traffic management in the city.

Bronx

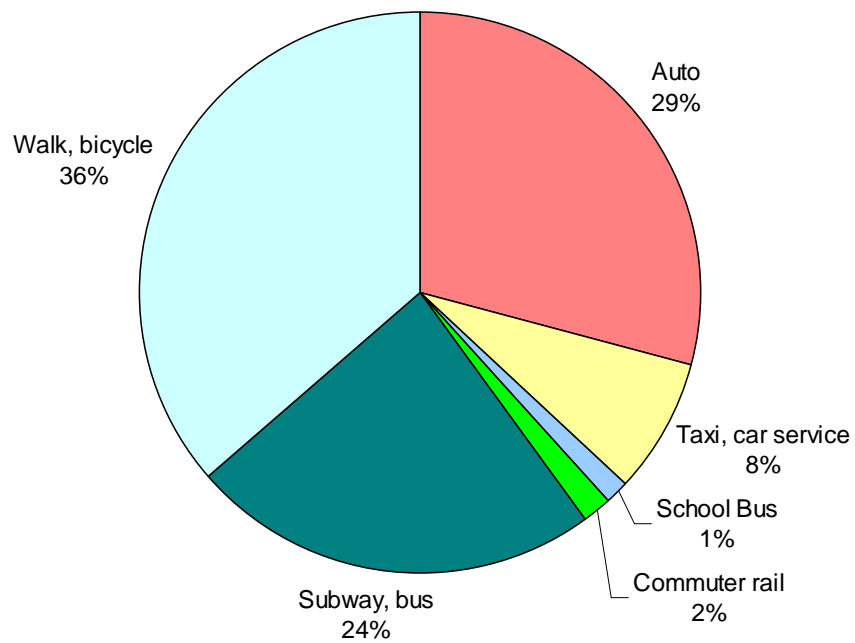
Overall results:

- Three-fifths of Bronx-based trips are by public transportation, walking or other nonmotorized modes.
- Bronx shows a continuing mode shift from auto to public transportation.
- Traffic volumes (based on available traffic counts) have almost leveled off in the last 5 years.
- As in the rest of the city, motor vehicle crashes declined since 2000, but only after increasing significantly in the late 1990s.

Detailed results:

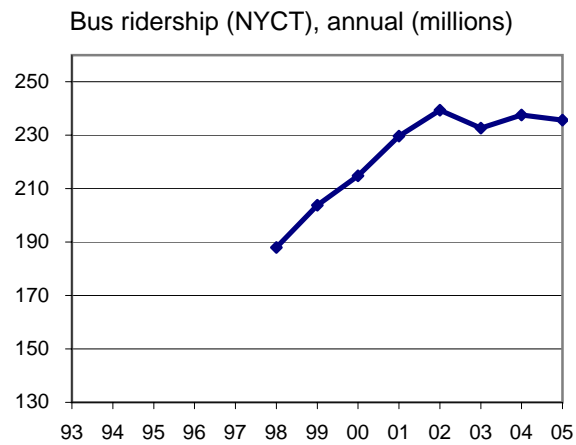
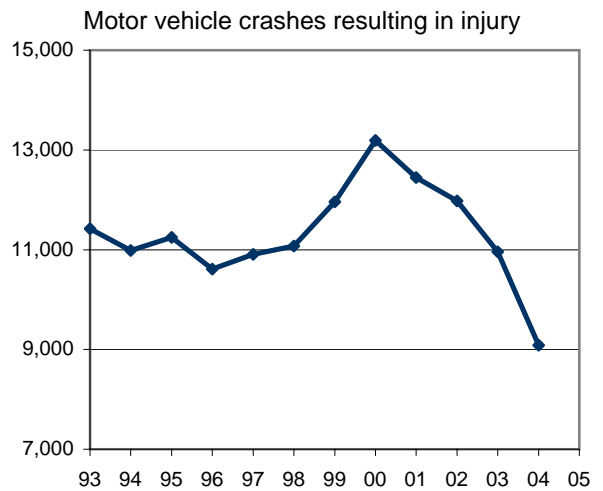
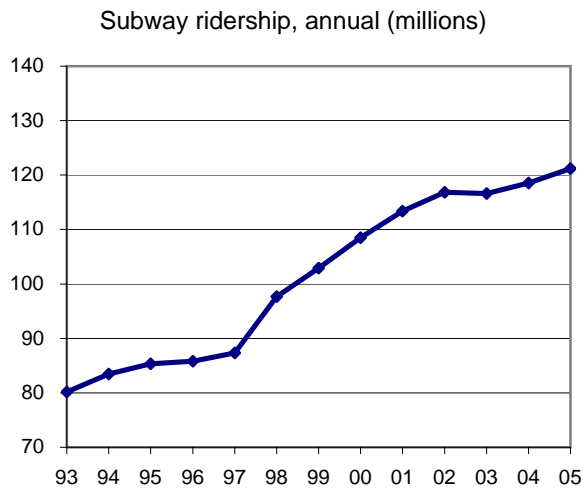
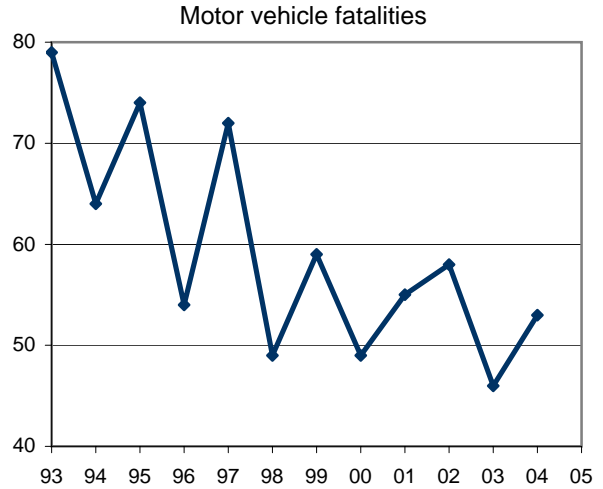
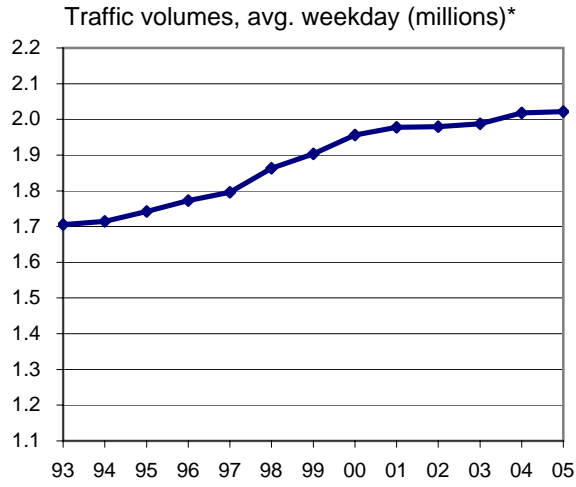
- Between 2001 and 2005, traffic volumes (based on available traffic counts) increased by 2%.
- Over the same period, bus and subway patronage grew by 7% and 3%, respectively.
- These trends are a continuation of trends in the 1990s, when public transportation ridership increased much more quickly than traffic volumes.

2002 Mode Shares for Bronx-based trips



Source: Best Practice travel model data provided by New York Metropolitan Transportation Council. Data are based on "journeys" with home-base of the Bronx. Mode shares are model outputs calibrated by ground counts.

Bronx Borough-Wide Indicators



Borough-level bus ridership not available prior to 1998

*Traffic volume based on Bronx/Westchester cordon count, Harlem River crossings, Whitestone and Throgs Neck bridges, Triboro Bridge Bronx Plaza, and NYCDOT bridges within the borough of the Bronx.

Sources: New York Metropolitan Transportation Council, "2004 Regional Transportation Statistical Report"; NYC DOT; NYC Transit

Brooklyn

Overall results:

- Two-thirds of Brooklyn-based trips are by public transportation, walking or other nonmotorized modes.
- Brooklyn shows a continuing mode shift from auto to public transportation for trips not involving the Manhattan CBD, although at a slower rate since 2001.
- For travel between Brooklyn and Manhattan, however, traffic volumes and subway ridership grew at about the same pace both in the 1990s and in recent years.
- Motor vehicle crashes and fatalities have dropped sharply since 2000.

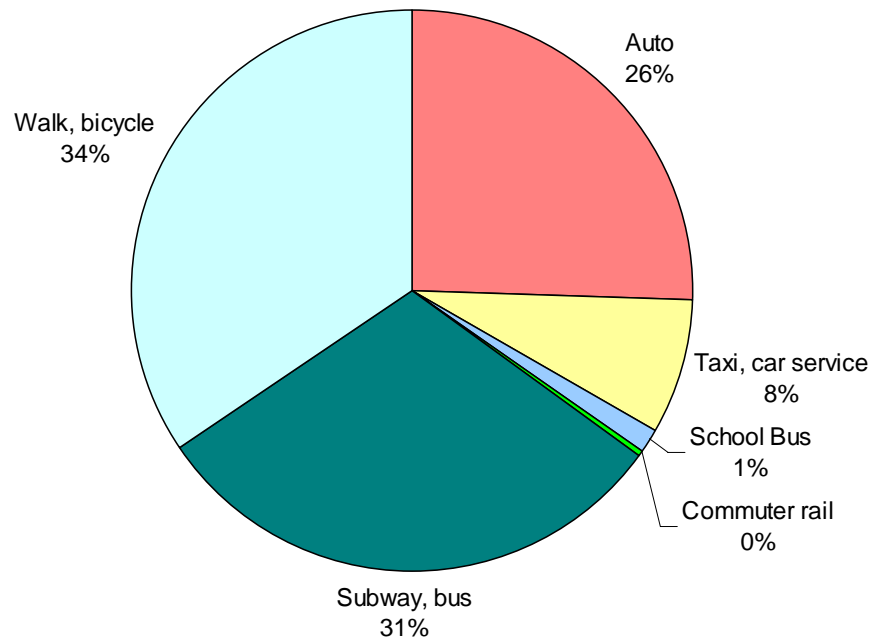
Intra-Brooklyn and other non-CBD travel:

- Between 2001 and 2005, traffic volumes (based on available traffic counts) decreased by 2%.
- Over the same period, subway patronage grew by 3% and bus ridership was flat.
- These trends are a flattening of trends in the 1990s, when public transportation ridership increased far more rapidly than traffic volumes, even though traffic showed a substantial growth of 15% between 1993 and 2001.

Brooklyn/Manhattan travel:

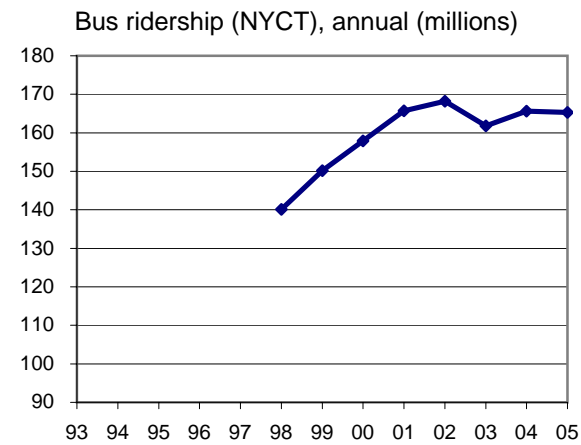
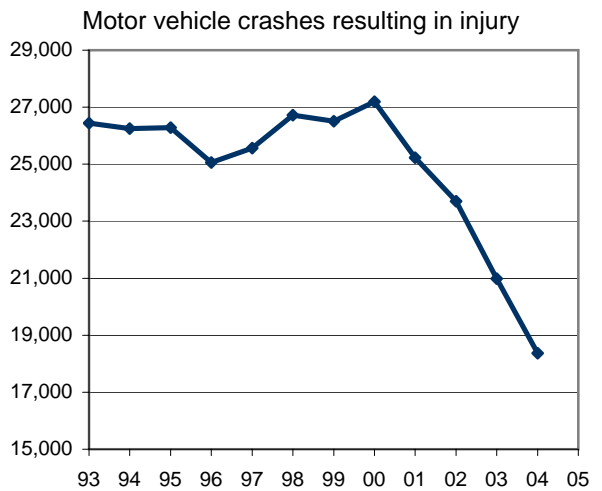
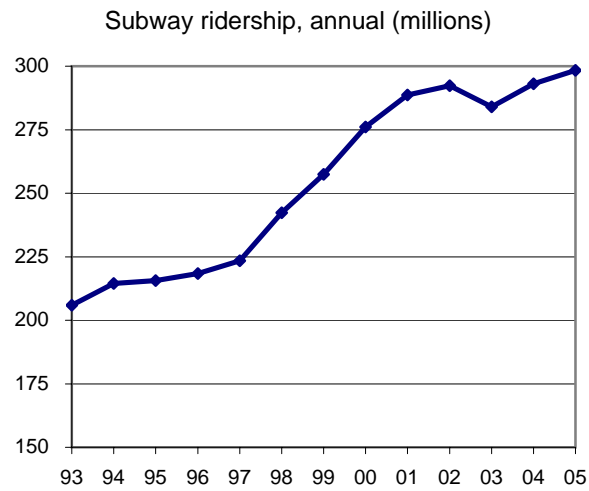
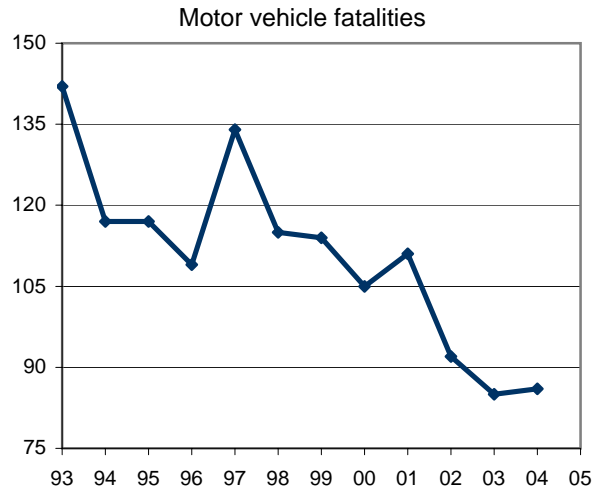
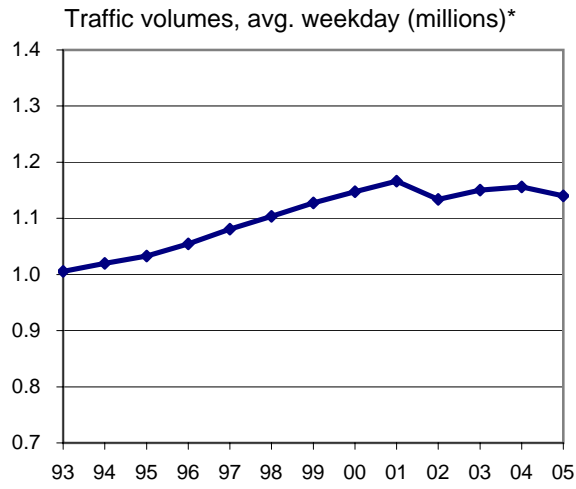
- Traffic volumes between Brooklyn and Manhattan dipped sharply after 9/11 due to traffic restrictions and remains 7% below the 2000 level.
- Subway ridership also fell starting in 2001 and remains 5% below the peak in 2000.
- Traffic volumes between Brooklyn and Manhattan increased by 12% and subway ridership by 13% between 1993 and 2000.
- Bus ridership between Brooklyn and Manhattan, although relatively small, increased modestly in the past several years after rapid growth in the 1990s.

2002 Mode Shares for Brooklyn-based trips



Source: Best Practice travel model data provided by New York Metropolitan Transportation Council. Data are based on "journeys" with home-base of Brooklyn. Mode shares are model outputs calibrated by ground counts.

Brooklyn Borough-Wide Indicators



Borough-level bus ridership not available prior to 1998

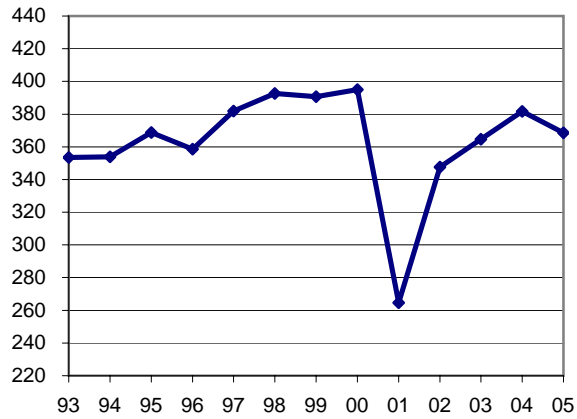
*Traffic volume based on Brooklyn/Queens cordon counts, Verrazano-Narrows Bridge and NYCDOT bridges within the borough of Brooklyn

Sources: New York Metropolitan Transportation Council, "2004 Regional Transportation Statistical Report"; NYC DOT; NYC Transit

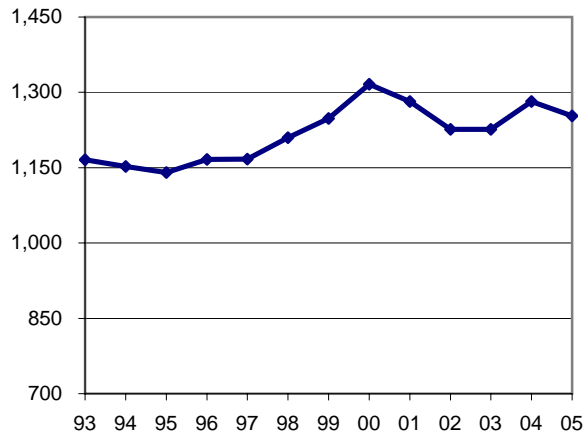
Brooklyn to the Manhattan CBD

Traffic volumes and transit ridership between Brooklyn and the Manhattan CBD (below 60 St.)

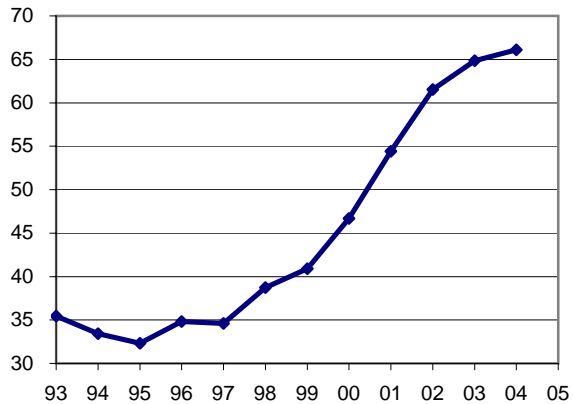
Traffic volumes, avg. weekday (thousands)



Subway ridership, avg weekday (thousands)



Bus ridership, avg weekday (thousands)



Data include travel to and from the Manhattan CBD.

Sources: New York Metropolitan Transportation Council, "Hubbound Travel"; NYC DOT; NYC Transit

Manhattan

Overall results:

- Five out of seven Manhattan-based trips are by public transportation, walking or other nonmotorized modes.
- Mode shares have not changed significantly in Manhattan since 2001, a sharp break from the 1990s when public transportation ridership growth far outpaced auto usage (based on available traffic counts).

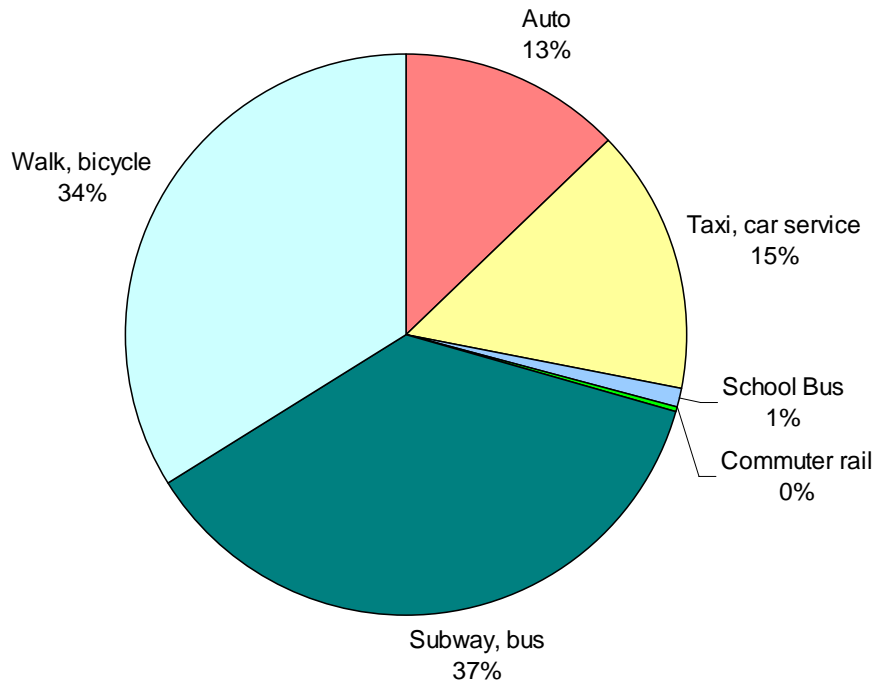
Borough-wide indicators:

- Between 2001 and 2005, traffic volumes at upper Manhattan river crossings and 60 Street decreased by 3%.
- Over the same period, subway patronage grew by 3% while bus ridership declined by 2%.
- By contrast, from 1993 to 2001 subway ridership at Manhattan stations grew by 35% while traffic volumes (at upper Manhattan river crossings and 60 Street) increased by 10%.

Travel into and out of the CBD (below 60 Street):

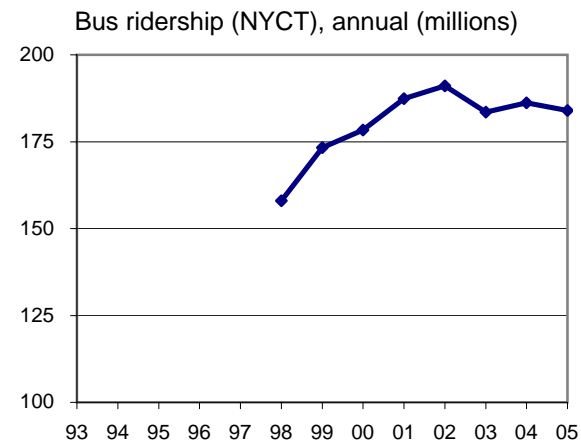
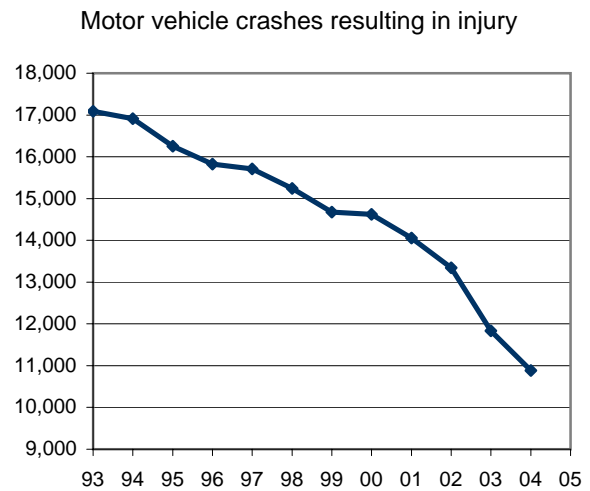
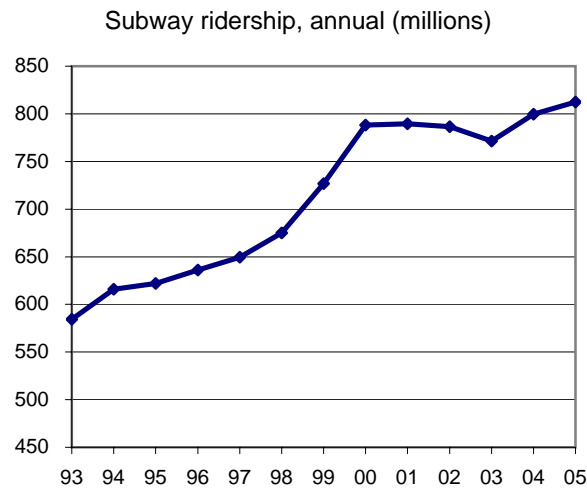
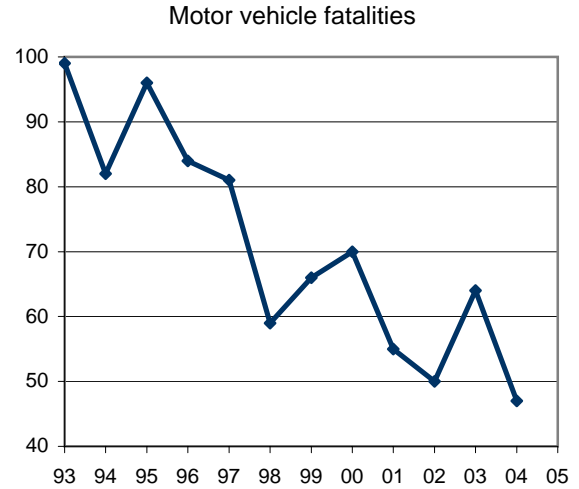
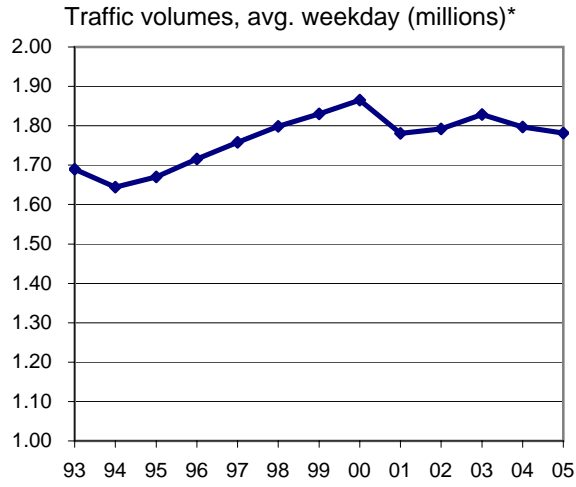
- Since the 2000 peak, traffic volumes and subway ridership into and out of the CBD both fell by 5%.
- Bus ridership into and out of the CBD, by contrast, increased 18% since 2000.
- Prior to 2000, subway ridership into and out of the CBD was increasing more quickly (16% from 1993 to 2000) than either traffic volumes (11% increase) or bus ridership (5% increase).
- Commuter rail/Amtrak ridership fell sharply after 2002 but is still above mid-90s ridership levels.

2002 Mode Shares for Manhattan-based trips



Source: Best Practice travel model data provided by New York Metropolitan Transportation Council. Data are based on "journeys" with home-base of Manhattan. Mode shares are model outputs calibrated by ground counts.

Manhattan Borough-Wide Indicators



Borough-level bus ridership not available prior to 1998

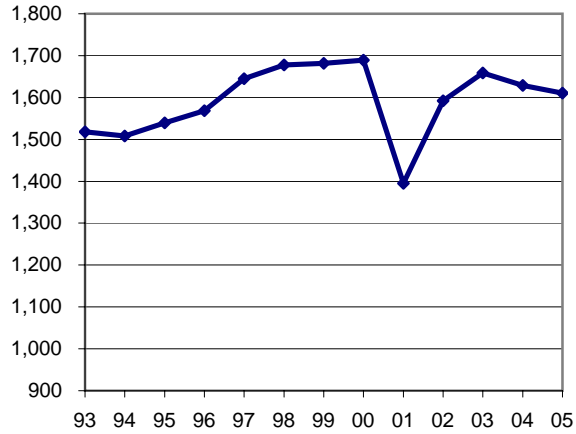
*Traffic volume based on Harlem River crossings, GW Bridge, Triborough Bridge Manhattan Plaza, and 60th Street cordon counts.

Sources: New York Metropolitan Transportation Council, "2004 Regional Transportation Statistical Report"; NYC DOT; NYC Transit

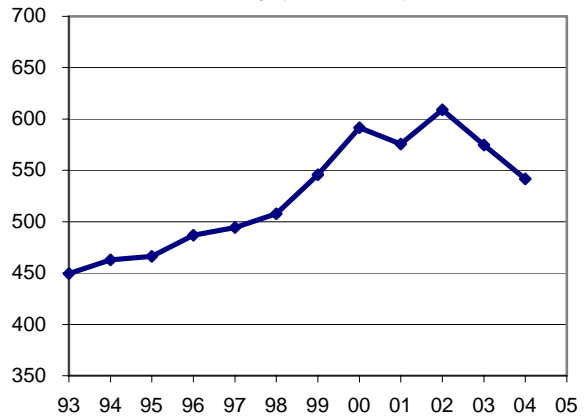
Manhattan CBD

Traffic volumes and transit ridership into and out of the Manhattan CBD (below 60 St.)

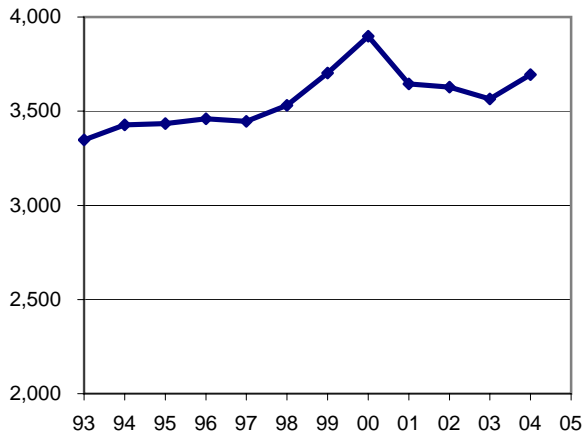
Traffic volumes, avg. weekday (millions)



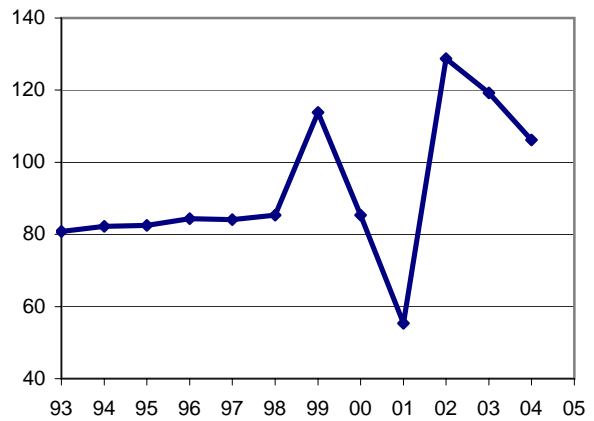
Commuter rail & Amtrak ridership, avg. weekday (thousands)



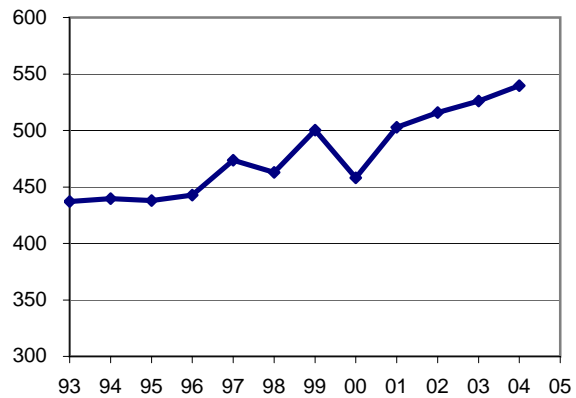
Subway ridership, avg weekday (thousands)



Ferry (thousands)



Bus ridership, avg weekday (thousands)



Data include travel to and from the Manhattan CBD.

Sources: New York Metropolitan Transportation Council, "Hubbound Travel"; NYC DOT; NYC Transit

Queens

Overall results:

- Three-fifths of Queens-based trips are by public transportation, walking or other nonmotorized modes.
- For travel within Queens and other non-CBD travel, mode shares have not changed since 2000-01, halting a mode shift from auto to transit in the 1990s.
- For travel between Queens and the Manhattan CBD, mode shift has gone in the opposite direction – toward the auto – since 2000 as well as in the 1990s.

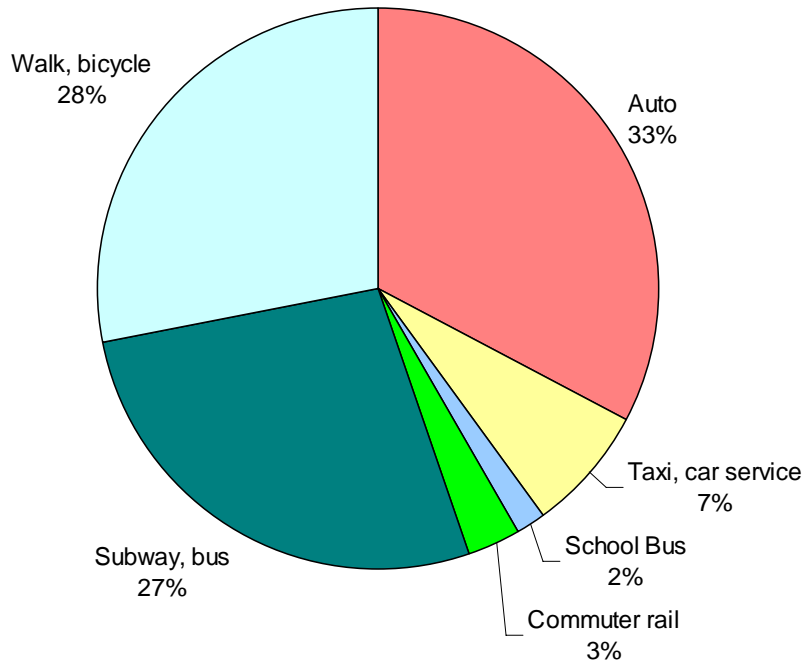
Intra-Queens and other non-CBD travel:

- Traffic volumes (based on available traffic counts), subway and bus ridership has not changed significantly since early in the decade.
- From 1993 to 2000, Queens subway ridership grew by 36% compared to 12% growth in traffic volumes. Bus ridership also increased more rapidly than traffic, by 23% in the shorter period for which data are available (1998-2001).

Queens/Manhattan travel:

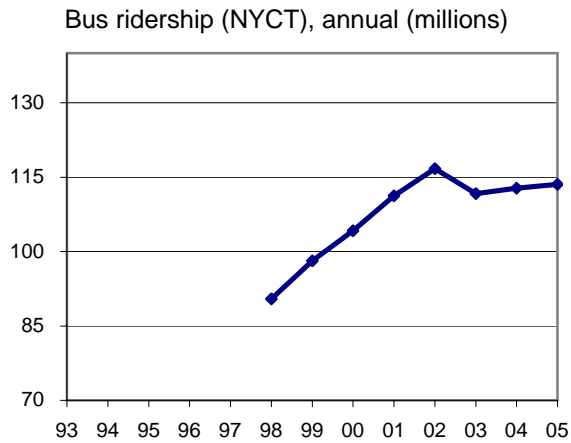
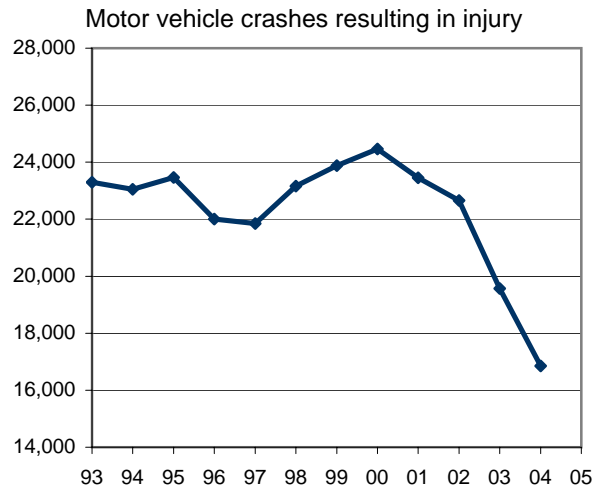
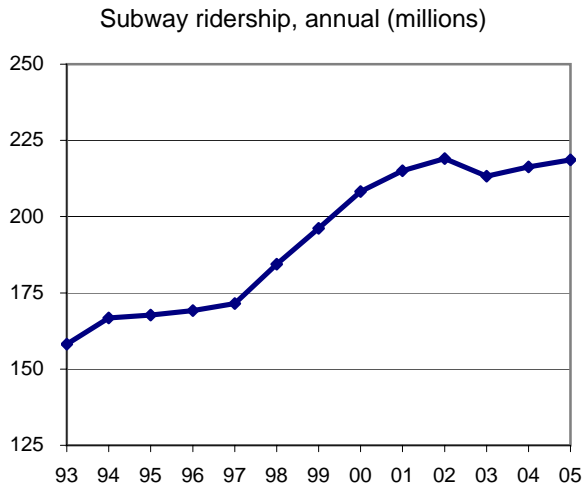
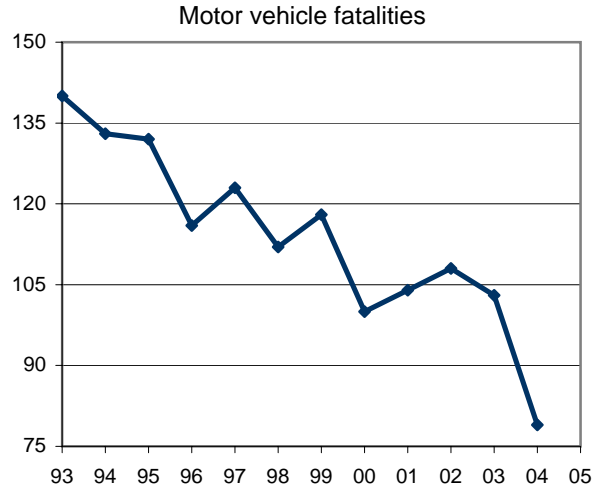
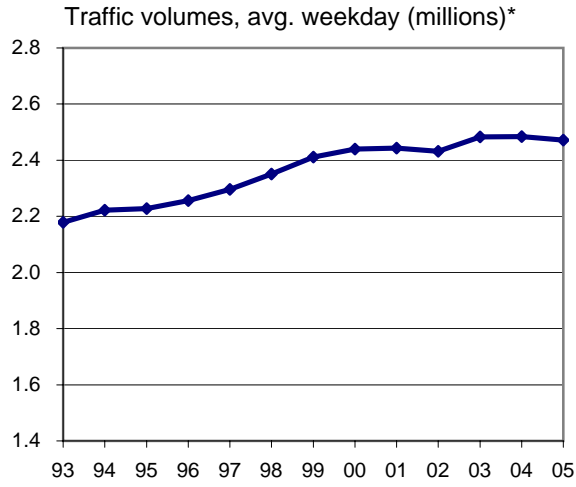
- Traffic volumes between Queens and Manhattan have returned to the 2000 level after dipping sharply in 2001.
- Subway ridership between Queens and Manhattan is 5% below the 2000 peak and bus ridership is down by 7%.
- From 1993 to 2000, traffic volumes between Queens and Manhattan increased by 24% while subway ridership increased at about one-half that rate (13%) and bus ridership by even less (10%).

2002 Mode Shares for Queens-based trips



Source: Best Practice travel model data provided by New York Metropolitan Transportation Council. Data are based on "journeys" with home-base of Queens. Mode shares are model outputs calibrated by ground counts.

Queens Borough-Wide Indicators



Borough-level bus ridership not available prior to 1998

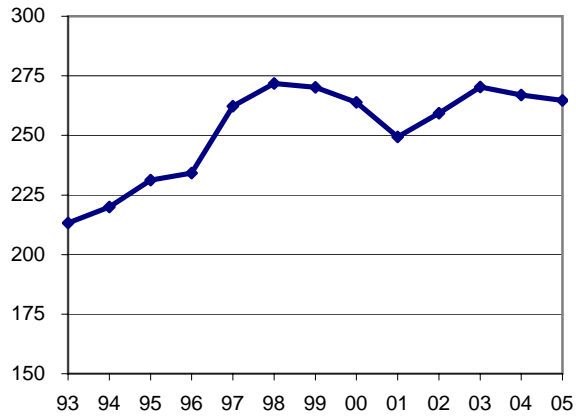
*Traffic volume based on Queens/Nassau and Queens/Brooklyn borders, Whitestone and Throgs Neck Bridges, Triboro Bridge Bronx Plaza, Cross Bay and Marine Parkway Bridges, and free NYCDOT bridges within the borough of Queens

Sources: New York Metropolitan Transportation Council, "2004 Regional Transportation Statistical Report"; NYC DOT; NYC Transit

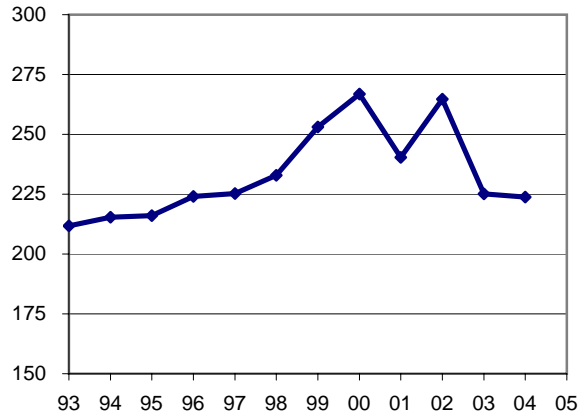
Queens to the Manhattan CBD

Traffic volumes and transit ridership between Queens and the Manhattan CBD (below 60 St.)

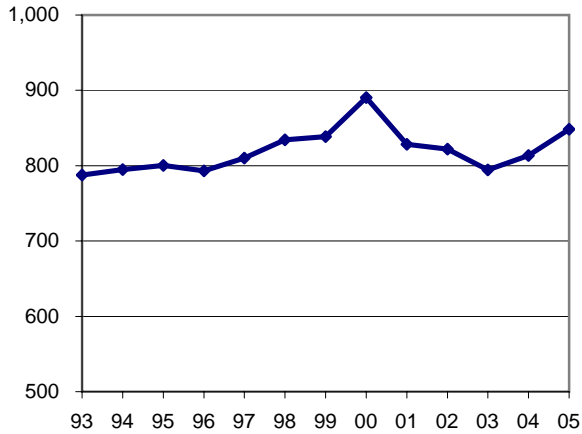
Traffic volumes, avg. weekday (thousands)



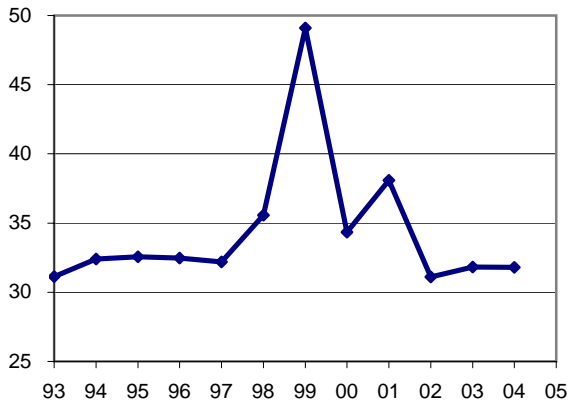
LIRR & Amtrak ridership, avg. weekday (thousands)



Subway ridership, avg weekday (thousands)



Bus ridership, avg weekday (thousands)



Data include travel to and from the Manhattan CBD.

Sources: New York Metropolitan Transportation Council, "Hubbound Travel"; NYC DOT; NYC Transit

Staten Island

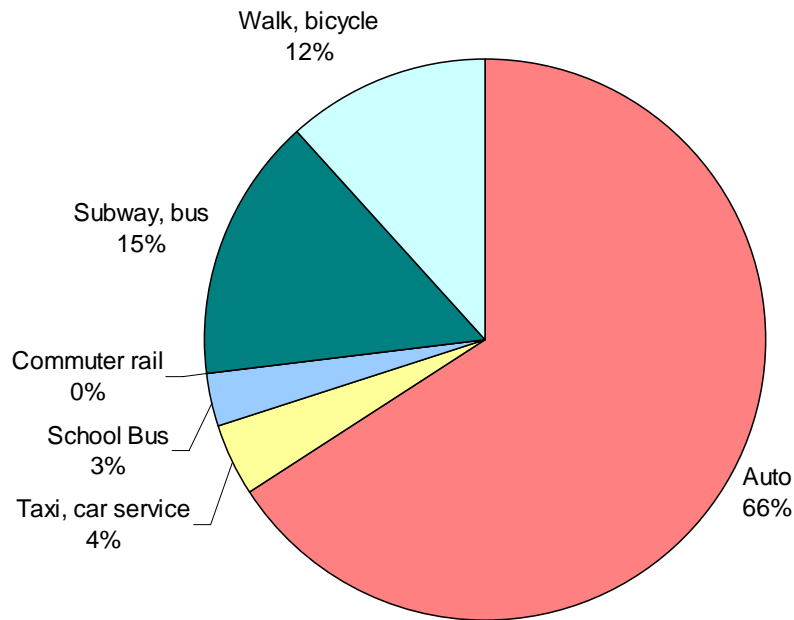
Overall results:

- Two-thirds of Staten Island-based trips are by auto, while bus, SIRR, walking and cycling account for most of non-auto travel.
- Traffic on Staten Island bridges has declined since 2001 after a period of rapid growth. Bus ridership has been flat since 2001 after growing in the 1990s. Ridership on the SIRR is down from both 2001 and 1993.

Detailed results:

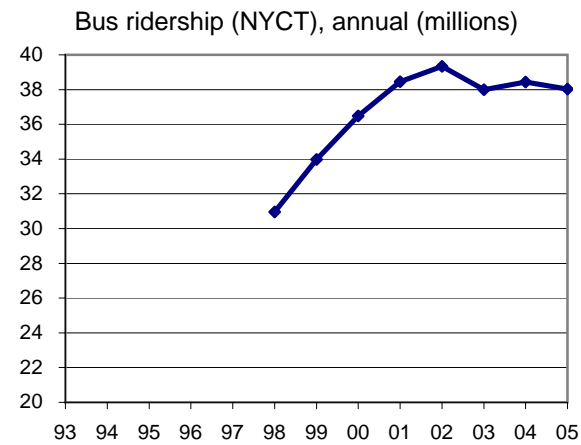
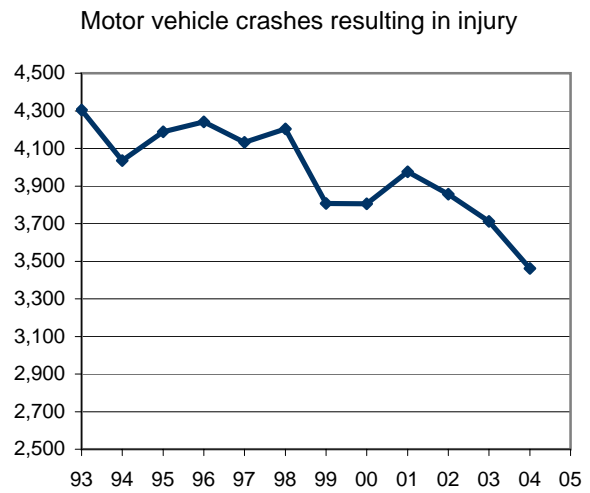
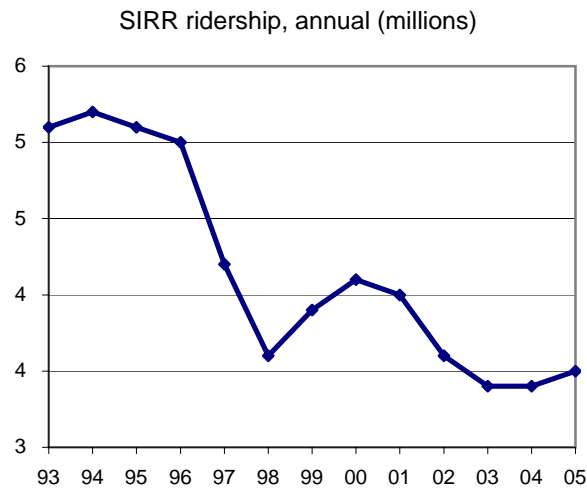
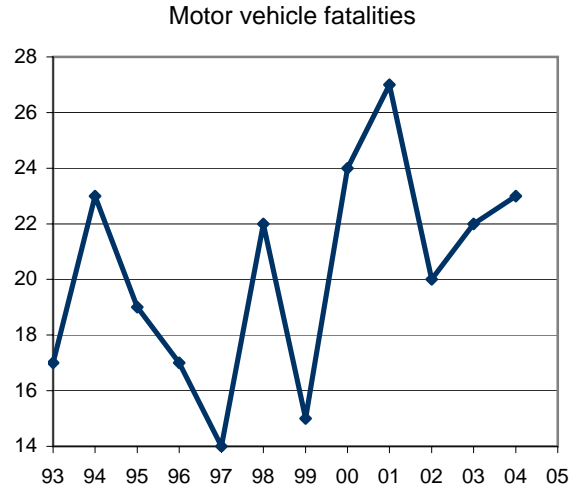
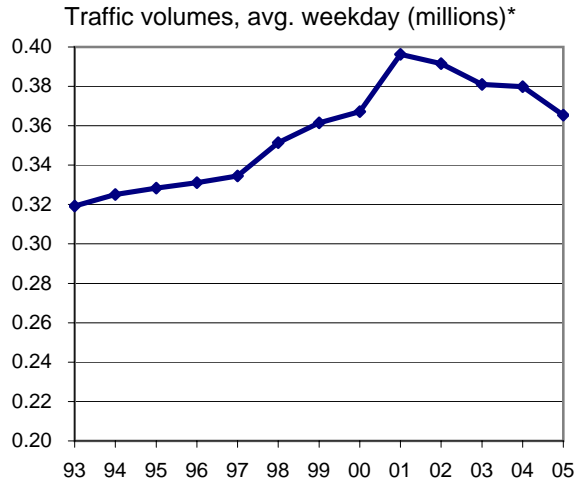
- Since 2001, traffic volumes on bridges connecting Staten Island to New Jersey and Brooklyn have dropped by 8%.
- Public transportation ridership has been stable or declining since 2001: bus ridership down by 1% and ridership on the Staten Island Railroad is down by 13%.
- From 1993 to 2001, bridge traffic grew by 24%. SIRR ridership declined by 22% while bus ridership increased by 24% in a shorter period for which data are available (1998-2001).

2002 Mode Shares for Staten Island-based trips



Source: Best Practice travel model data provided by New York Metropolitan Transportation Council. Data are based on "journeys" with home-base of Staten Island. Mode shares are model outputs calibrated by ground counts.

Staten Island Borough-Wide Indicators

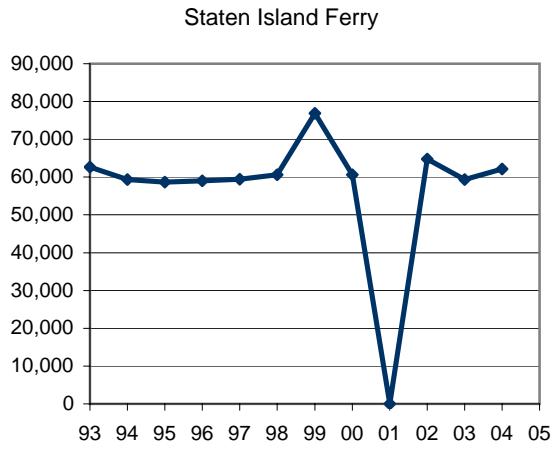


Borough-level bus ridership not available prior to 1998

*Traffic volume based on Verrazano-Narrows Bridge and crossings between Staten Island and New Jersey.

Sources: New York Metropolitan Transportation Council, "2004 Regional Transportation Statistical Report"; NYC DOT; NYC Transit

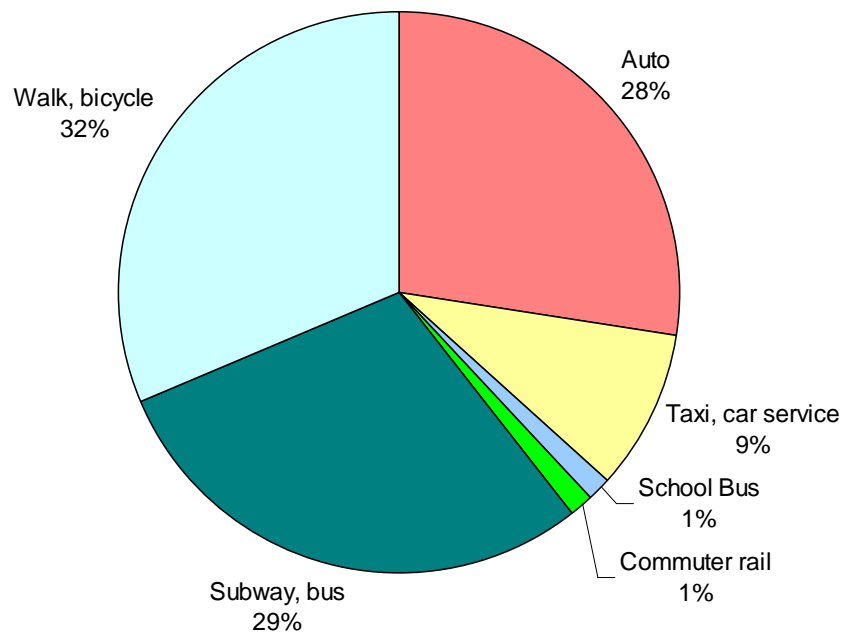
Staten Island to the Manhattan CBD



Source: New York Metropolitan Transportation Council,
"Hubbound Travel"

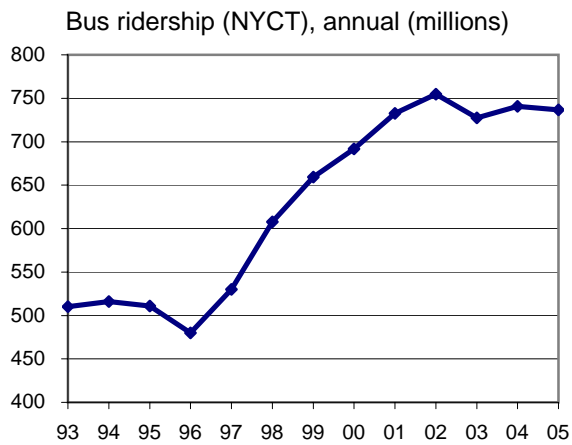
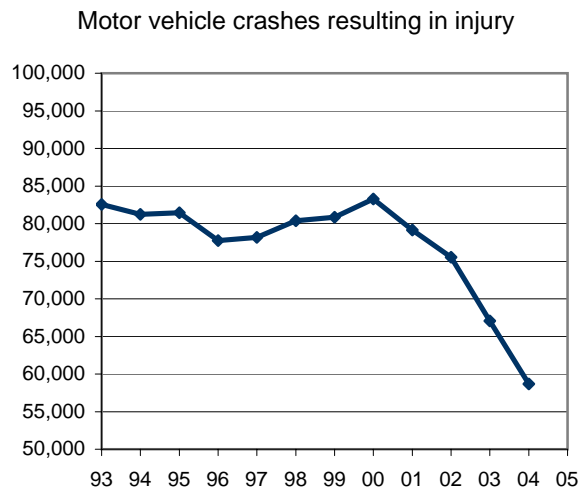
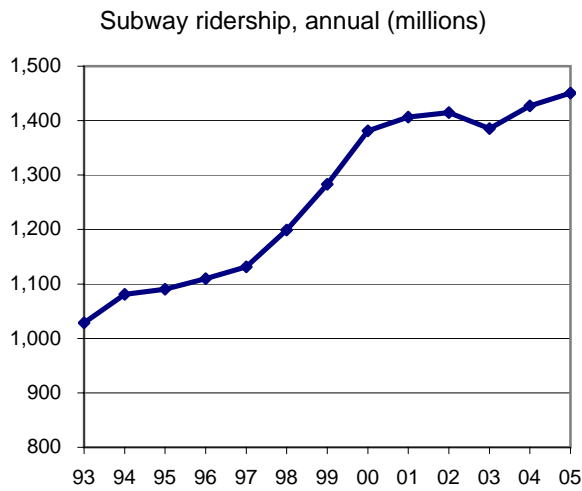
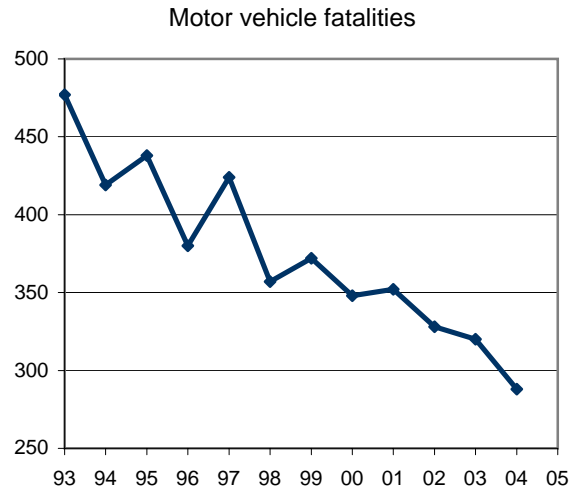
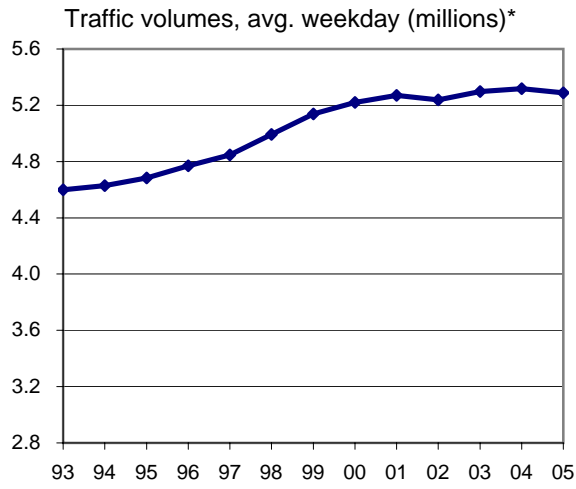
Citywide data

2002 Mode Shares for All New York City-based trips



Source: Best Practice travel model data provided by New York Metropolitan Transportation Council. Mode shares are model outputs calibrated by ground counts.

Citywide Indicators



Borough-level bus ridership not available prior to 1998

*Traffic volume based on cordon counts between boroughs, crossing the City line and on bridges within each borough. Does not include traffic into and out of the Manhattan CBD, which is shown in the Manhattan CBD page.

Sources: New York Metropolitan Transportation Council, "2004 Regional Transportation Statistical Report"; NYC DOT; NYC Transit