

# Cycling in New York: Innovative Policies at the Urban Frontier

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## **Abstract**

New York has made impressive progress at improving cycling conditions and raising cycling levels in recent years, especially in Brooklyn and Manhattan. The number of bike trips has almost doubled since 2000, thanks to vastly expanded cycling infrastructure, including innovative treatments such as cycle tracks, buffered bike lanes, special bike signals, bike boxes at intersections, and bright green lane markings. Cycling safety has improved, with steady or declining numbers of cyclist injuries and fatalities in spite of rapidly rising cycling volumes. Some serious deficiencies remain, however. Integration of bicycling with public transport is almost non-existent. There is not nearly enough bike parking, and virtually no secure bike parking at all. Moreover, the police and courts in New York have failed to enforce the many traffic laws intended to protect cyclists. Comprehensive traffic calming is needed in New York's residential neighborhoods to reduce travel speeds and thus encourage more cycling, in particular, by children, seniors, and women. Cycling has come a long way in New York, but it still has a long way to go before it becomes a mainstream way to get around.

**Keywords:** bicycling, cycle paths, bike lanes, infrastructure, cycling safety, policy, New York City, gender, bike parking, sustainable transport

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New York's size, density, and public transport orientation make it unique among American cities. Moreover, as the media center of the USA—and perhaps of the world as well—New York's influence extends far beyond its borders. Trends often start in New York and spread elsewhere. The recent surge in cycling in New York has drawn widespread media attention, with newspapers around the world running stories about the city's innovative bicycling policies. The fate of bicycling in New York is important because it may influence bicycling in other cities. If bicycling can thrive even under the challenging conditions in New York, it might provide momentum for cycling growth elsewhere.

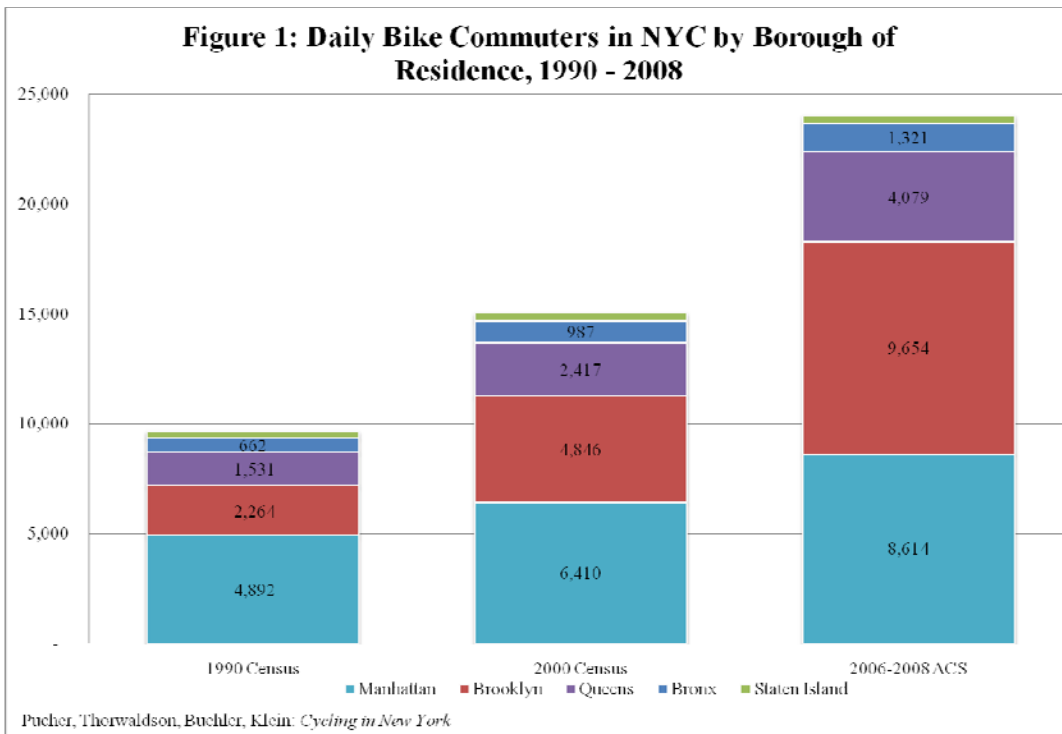
As noted in a previous case study of New York cycling, the city's topography, climate, and land use pattern generally actually favor cycling, and every day New Yorkers make millions of trips short enough to cover by bike (Pucher et al., 1999). Written over a decade ago, the same article lamented the many factors deterring cycling in New York in the 1990s: heavy, dangerous, and stressful traffic; air pollution and noise; torn street pavement and substandard cycling facilities; lack of bike parking; and rampant bike theft. A lot has changed in recent years, but serious obstacles to cycling remain.

This case study of bicycling in New York documents trends in cycling levels and cycling safety over the past two decades and describes the evolution of cycling policies

and programs. Our focus is on the period since 2000, when a rapid expansion of New York’s bikeway network began. Throughout the discussion, we highlight the many innovative strategies implemented in New York in recent years to promote cycling but also point out deficiencies in the city’s overall approach.

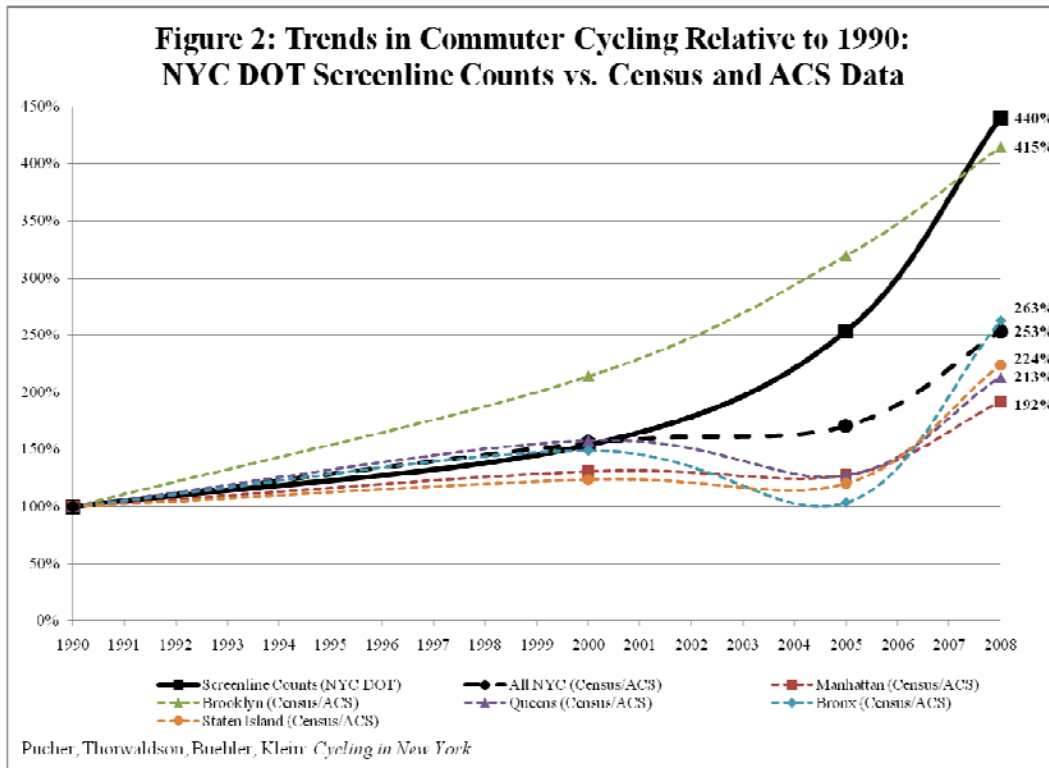
**Trends in Cycling**

The available indices of cycling levels in New York show considerable growth in cycling since 1990. As shown in Figure 1, the journey to work portions of the decennial Census and the annual American Community Survey (ACS) report an increase in daily bike commuters from 9,643 in 1990 to 24,428 in 2006-2008 (averaged) (U.S. Census Bureau, 2010a, b, c). By far the largest increase was in Brooklyn, which quadrupled its number of bike commuters and overtook Manhattan as the borough with the most residents bicycling to work.



Sources: Calculated by the authors from data in U.S. Census Bureau (2010a, 2010b, 2010c)

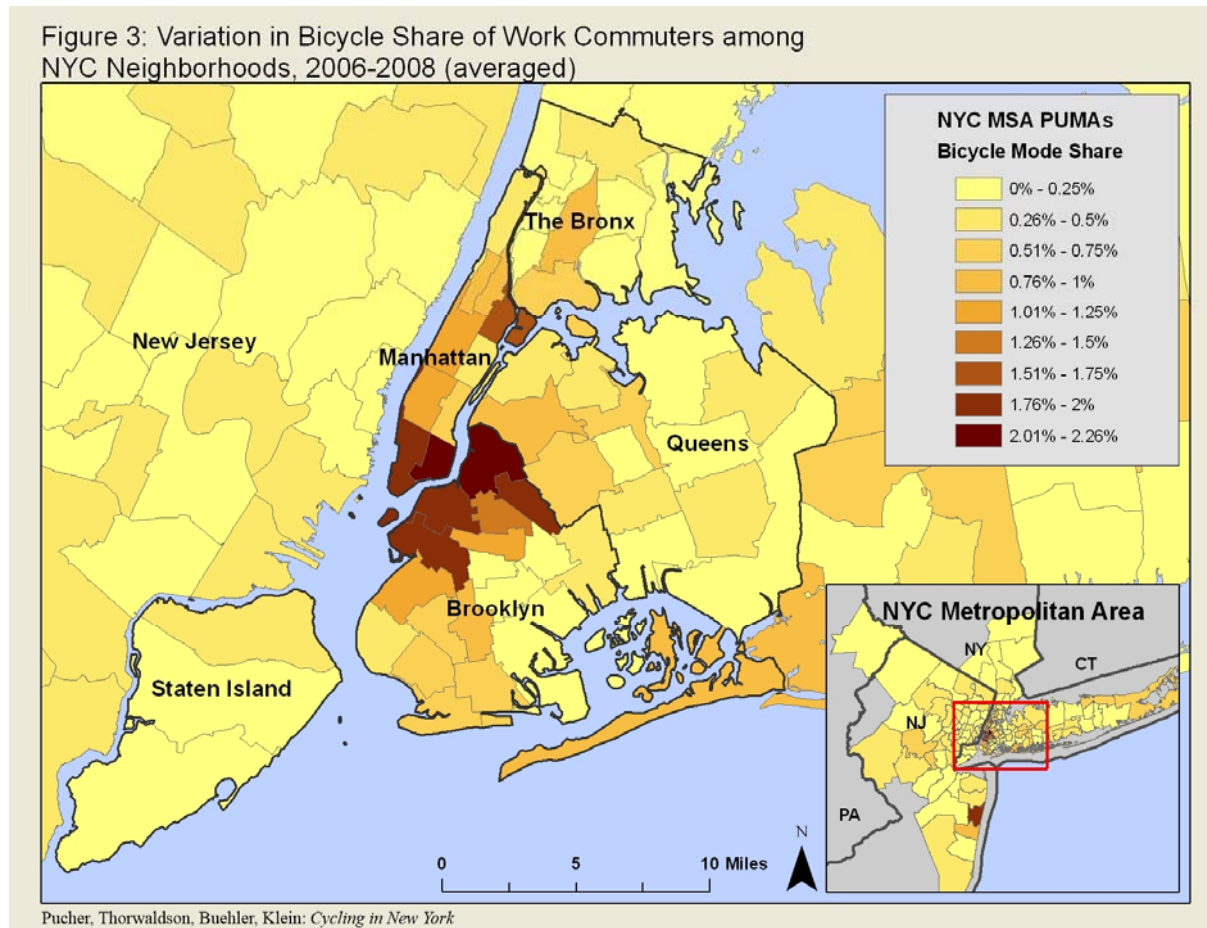
Figure 2 portrays cycling trends as a percentage of 1990 base levels. The U.S. Census Bureau reports a 153% growth in bike commuters between 1990 and 2008 for New York City as a whole, but with large differences between the five boroughs. The fastest growth in cycling was in Brooklyn (315%), followed by Queens (163%). The slowest growth was in Manhattan (92%), albeit from the highest base level in 1990, as shown in Figure 1. The bike share of total work commuters in NYC has doubled over the past two decades, increasing from 0.3% in 1990 to 0.6% in 2008. Although Brooklyn now has the most bike commuters, Manhattan still has the highest mode share of bike commuters (1.0%)—compared to 0.9% in Brooklyn, 0.4% in Queens, 0.3% in the Bronx, and 0.2% in Staten Island (U.S. Census Bureau, 2010c).



Sources: Calculated by authors from data in U.S. Census Bureau (2010a, 2010b, 2010c); NYCDOT (2010b)

Aside from the U.S. Census, the only other source of data on long-term cycling trends in New York is the NYC Commuter Cycling Indicator of the NYC Department of

Transportation (NYCDOT, 2010a). As shown in Figure 2, it reports more than twice as much growth in cycling as the Census over the same period (340% vs. 153%). The two indices are not directly comparable, however. The decennial U.S. Census and annual ACS surveys are representative of the entire City of New York, including the outer portions with the least cycling. The NYC DOT indicator focuses only on trips into and out of the Manhattan CBD on weekdays. The six crossing points surveyed since 2001 have been at the East River Bridges (Brooklyn, Manhattan, Williamsburg, and Queensboro), the Hudson River Greenway at 50<sup>th</sup> Street, and the Staten Island Ferry. Over 70% of the bike trips counted by the DOT screenline indicator in 2008 were across the East River Bridges from Brooklyn and Queens to Manhattan (NYCDOT, 2010a).



Source: GIS map created by the authors from data in U.S. Census Bureau (2010c)

The highest bike commuting rates reported by the U.S. Census Bureau are in Lower Manhattan and northwestern Brooklyn, with about 1.8% to 2.3% of workers commuting by bike (Figure 3). Rates of cycling to work drop off sharply with distance from that core. In southeastern Brooklyn, eastern Queens, most of the Bronx, and all of Staten Island, less than 0.3% of workers commute by bike, roughly the same rates as in the New Jersey suburbs. As documented by the NYC DOT Cycling Indicator, 80% of the increase in bike trips to the Manhattan CBD between 2001 and 2008 came over the four East River bridges from Brooklyn and Queens.

The dramatic growth in bike commuting over the East River bridges is partly due to new and/or improved bike paths on those bridges and on access routes to the bridges. The vastly improved cycling facilities across the East River provided the crucial connections necessary to bike the short distance between northwestern Brooklyn and the Manhattan CBD, which can be covered by bike in half an hour or less.

In addition to improved bicycle facilities, there have been significant demographic and economic changes in northwestern Brooklyn. Over the past four decades, neighborhoods such as Brooklyn Heights, Cobble Hill, Boerum Hill, Carroll Gardens, Park Slope, Williamsburg, and Greenpoint have been experiencing ongoing gentrification which has brought an influx of young professionals, academics, artists, musicians, writers, and ‘hipsters’ (Curran, 2004; Goworowska, 2008; Lees, 2003; Newman and Wyly, 2006; Slater, 2004). In these gentrifying neighborhoods, bicycling has become the fashionable or ‘hip’ way to get around. Many residents view bicycling as more than a utilitarian form of transport: it is also part of their lifestyle and personal identity. All of these factors--improved bicycling facilities, changing neighborhood

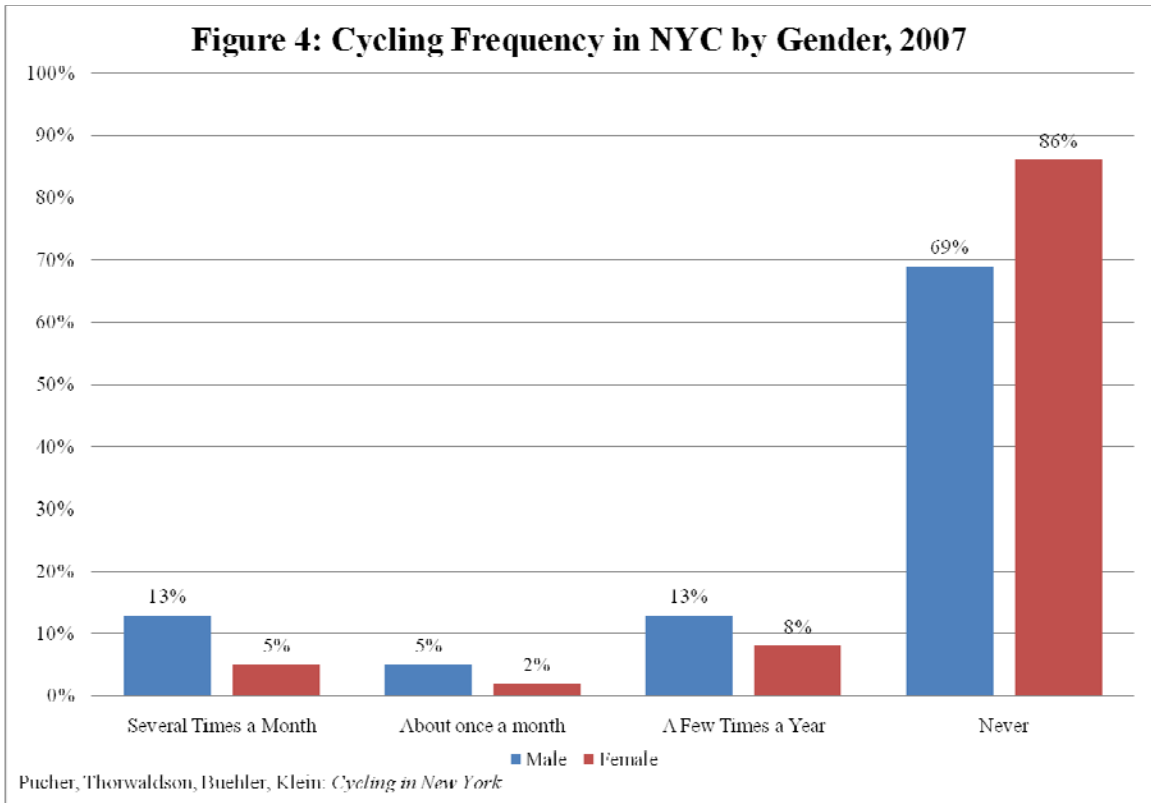
demographics, and the increasingly trendy image of bicycling--help explain the growth in bike commuting in Brooklyn. Similarly, many neighborhoods in Lower Manhattan--especially the Lower East Side--have been gentrifying in similar ways and generating more bicycling for the same reasons.

Since the Census reports work commutation by place of residence, much of the increase in biking to workplaces in Manhattan shows up in the numbers for Brooklyn. Indeed, the Census reports a 315% growth in bike commuters living in Brooklyn—not much less than the 340% growth reported by the screenline counts overall (see Figure 2).

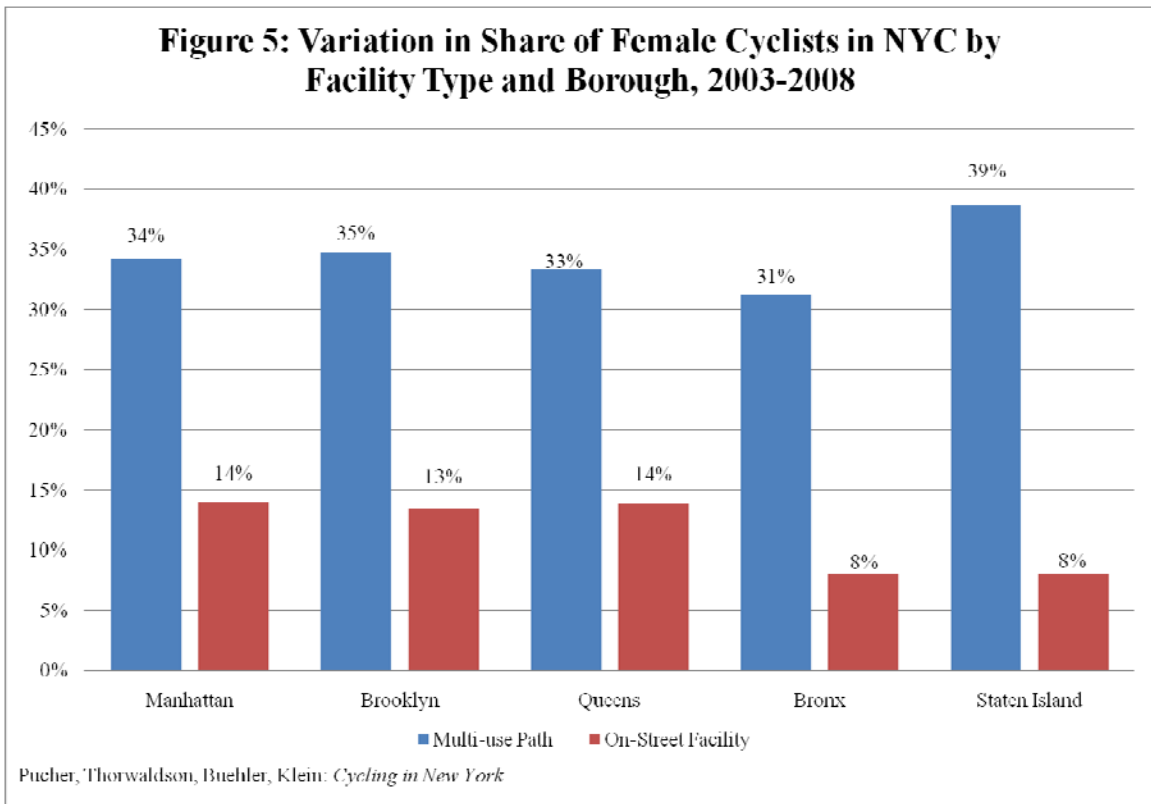
Both the U.S Census data and the NYC DOT indicator show a gradual increase in cycling levels from 1990 to 2000 but accelerated growth after 2000, especially after 2005. As noted later, that spurt in cycling was encouraged by a massive expansion in cycling infrastructure throughout the city but especially in the core areas with the highest cycling levels.

### **Profile of cyclists**

As in the rest of the USA, roughly three-fourths of cyclists in NYC are men (Alliance for Biking and Walking, 2010). The women's share of bike commuters in NYC fell from 25% to 20% from 1990 to 2000 and then rebounded to 24% by 2008 (U.S. Census Bureau, 2010 a, b, c). The predominance of male cyclists is not limited to work commutation but extends to all trip purposes. A 2007 survey of 10,000 New Yorkers by the NYC Department of Health found that men were more than twice as likely to cycle as women (see Figure 4). Only 5% of women cycled several times a month, compared to 13% of men. Conversely, 86% of women never cycled at all, compared to 69% of men (NYCDOH, 2010).



Source: Adapted by the authors from data in NYCDOH (2010)



Source: Calculated by the authors from data in NYMTC (2010)



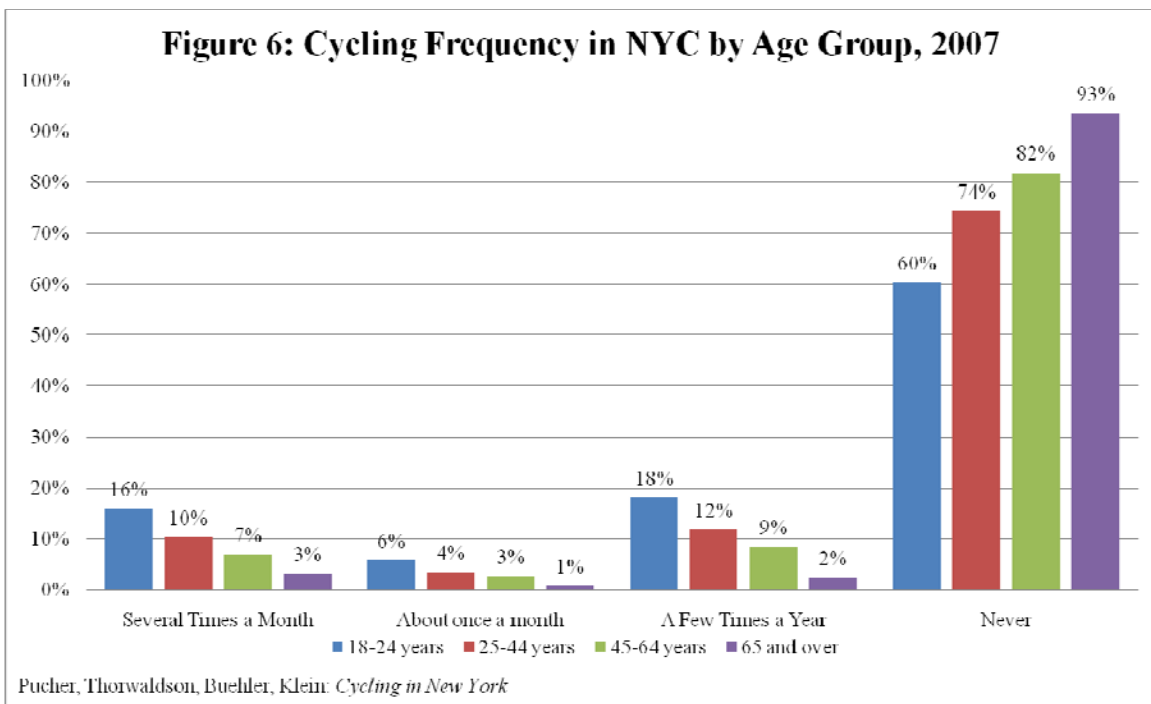
There is considerable variation in women's cycling rates according to the type of cycling facilities that are available. Since 2002, the New York Metropolitan Transportation Council (NYMTC) has conducted an on-going survey of cyclist characteristics at hundreds of sites throughout the five boroughs (NYMTC, 2010). Each surveyed site is designated by NYMTC as either an off-street, multi-use path or an on-street facility. Women in all five boroughs clearly prefer off-street paths. As shown in Figure 5, the average percentage of women cyclists on paths is about three times greater than the percentage of women using on-street facilities such as bike lanes or simply bike routes on shared traffic lanes. The difference is greatest in Staten Island and the Bronx, where the female share of cyclists is roughly four times higher for off-street paths as on streets. Even in Manhattan, Brooklyn, and Queens, the ratio is well over two-to-one.

Although the NYMTC survey does not officially distinguish between different kinds of on-street facilities, the NYMTC website provides several photos of each surveyed site, enabling researchers to determine the specific sort of facility. Upon examination of those photos, we found that most on-street facilities with more than 15% women cyclists were bike lanes and that on-street facilities with the highest share of women cyclists (20% to 25%) were wide bike lanes with diagonally striped buffer zones between the bike lane and the traffic lanes.

In short, the greater the physical separation from motor vehicle traffic, the higher the women's share of cyclists. Several other studies have also found a strong preference of women for physically separated cycling facilities (Garrard et al, 2008; Baker, 2009). That preference might explain the increasing percentage of women bike commuters

between 2000 and 2008, when NYC DOT tripled the extent of the bikeway network, as noted later in this article.

Cycling levels also vary considerably by age. The 2007 DOH survey showed that only 3% of New Yorkers aged 65 or older cycled several times a month, compared to 17% of those aged 18-24 and 10% of those aged 25-44. So clearly, cycling levels fall dramatically with age. Indeed, over 93% of New Yorkers who are 65 or older never cycle at all.



Source: Adapted by the authors from data in NYCDOH (2010)

According to the 2007 DOH survey, there was almost no difference in cycling rates by income class: 9.4% frequent cyclists in the lowest income category vs. 9.8% in the highest income category. Immigrants were slightly less likely to be frequent cyclists than US-born residents: 8.4% vs. 9.3%. White, non-Hispanics had the highest percentage of frequent cyclists: 10.7% vs. 9.5% for Hispanics, 6.2% for Black non-Hispanics, and 6.7% for Asians. College graduates were only slightly less likely to be

frequent cyclists as those without a high school diploma (9.7% vs. 10.6%). Thus, there are no significant differences in cycling rates by income, ethnicity and race, education, and immigrant status.

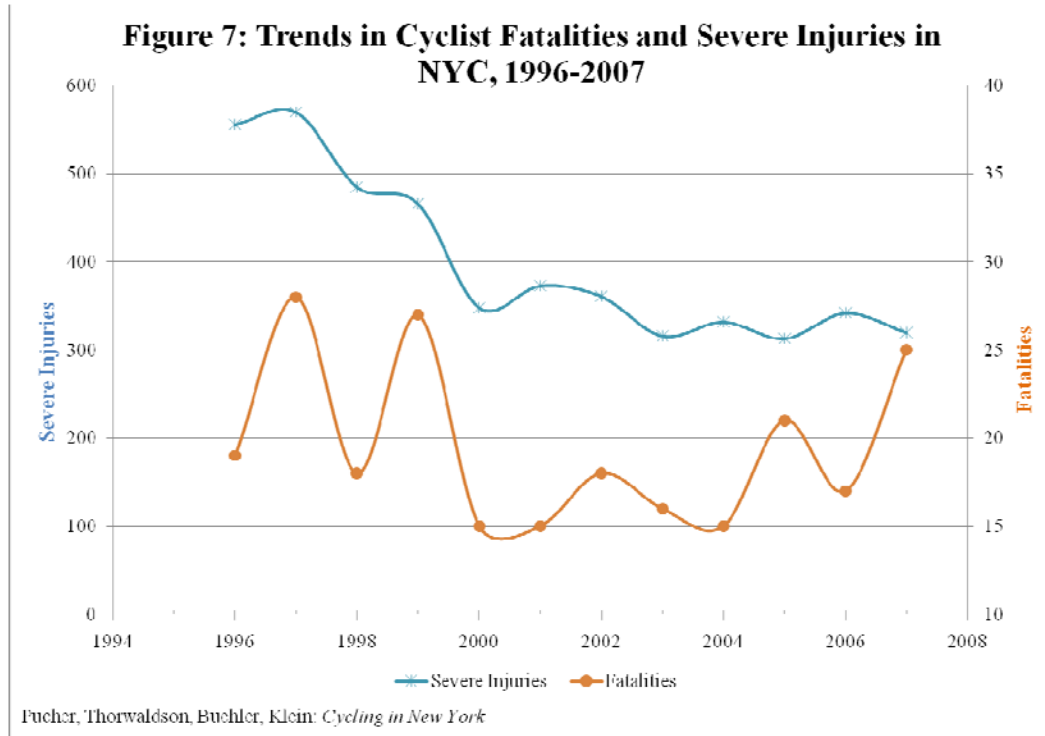
### **Trends in cycling safety**

The available statistics from the New York State Division of Motor Vehicles indicate significant improvement in cycling safety in New York since 1996 (NYSDMV, 2010). NYSDMV defines fatalities as deaths that occur within 30 days following injury from a crash. It defines severe injuries as “skull fractures, internal injuries, broken or distorted limbs, unconsciousness, severe lacerations, and unable to leave the scene without assistance.” As shown in Figure 7, cyclist fatalities have fluctuated between 15 and 28 from 1996 and 2007, generally declining until 2004 and then rising. Severe cyclist injuries fell by almost half from 1996 to 2003, but have leveled off since then at about 320 per year. With rising cycling levels since 2000, the number of cyclist fatalities and injuries relative to the number of bike trips has fallen, indicating considerable improvement in cycling safety.

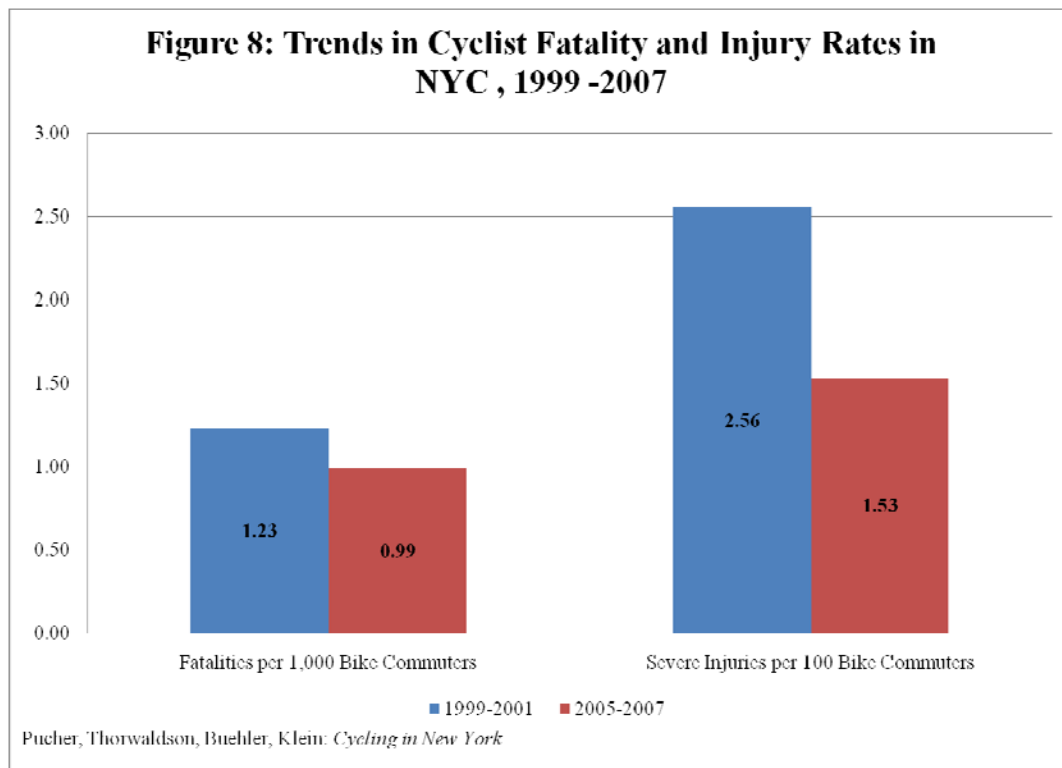
Figure 8 shows our rough approximations of fatality and injury rates over time, calculated as a percentage of NYC bike commuters reported by the U.S. Census and American Community Survey. Three-year averages are used both for injuries and bike commuters to increase sample size, reduce annual fluctuations, and enhance reliability of the estimated rates. As shown in Figure 8, the fatality rate per 1,000 bike commuters fell by 20% over the six-year period between 1999-2001 and 2005-2007. The severe injury rate per bike commuter fell by 44% over the same period. Ideally, one would calculate these rates relative to total bike trips, including all trip purposes, but data on cycling

volumes are only available for work commutation. Whatever their limitations, these rough calculations confirm the impression that cycling has become safer over the past decade. They are also consistent with the findings of an earlier report on bicycling safety produced jointly by four NYC departments.

That joint report analyzed 225 cyclist fatalities and 3,462 serious cyclist injuries (requiring transport to a hospital) during the period 1996 to 2005 (NYCDOT et al., 2006). It documented roughly constant levels of annual fatalities but a 46% decline in serious injuries. Over 95% of cyclist fatalities and three-fourths of serious injuries involved motor vehicles. Most fatalities (53%) occurred on arterials, although they account for only 10% of streets in NYC. Only one cyclist fatality occurred within a marked bike lane, while the rest were in mixed traffic on roadways, confirming the benefits of separating bikes from motor vehicle traffic, especially on arterials. In addition, 89% of fatalities and 70% of serious injuries were at or near intersections, indicating the need for special treatments there.



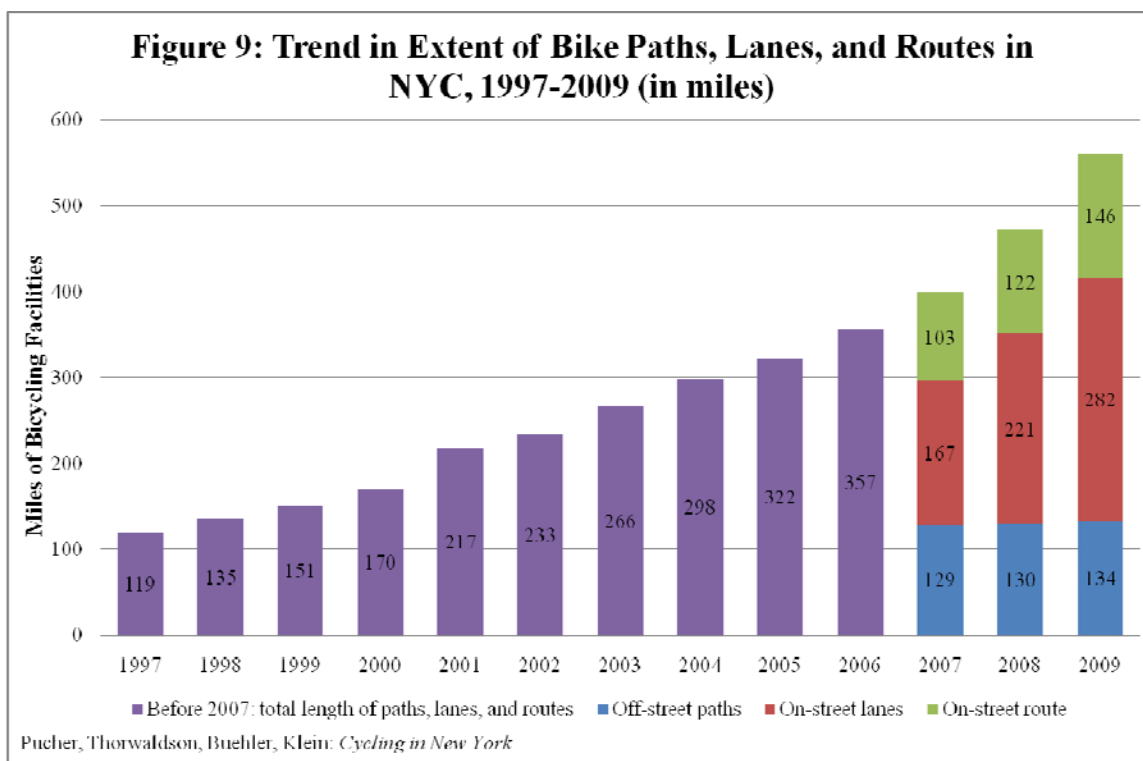
Source: Calculated by the authors from data in NYSDMV (2001-2010)



Sources: Calculated by authors from data in U.S. Census Bureau (2010b, 2010c); NYSDMV (2001-2010)

As described in more detail later in this paper, New York City has responded to these safety problems by greatly expanding and improving the network of bike lanes and paths and by installing special traffic signals and bike boxes (advance stop lines) for cyclists at some intersections. Most studies show that bike lanes and paths are safer for cyclists, especially on heavily traveled arterials (Fietsberaad, 2010; Netherlands Ministry of Transport, 2007; Pucher and Buehler, 2008, 2010; Pucher et al., 2010). Thus, it seems likely that separate cycling facilities have contributed to improved cyclist safety in New York.

To some extent, however, the improvement in cycling safety might have resulted from increased cycling itself. Several studies have demonstrated the principle of “safety in numbers” (Elvik, 2009; Jacobsen, 2003; Jacobsen et al., 2009; Robinson, 2005). Using both time-series and cross-sectional data, they find that cycling safety is greater in countries and cities with higher levels of cycling, and that cyclist injury rates fall as levels of cycling increase. As the number of cyclists grows, they become more visible and more normal to motorists, both of which are crucial factors in moderating driver behavior in ways that reduce dangers to cyclists. Similarly, a higher percentage of motorists are likely to be cyclists themselves, and thus more sensitive to the needs and rights of cyclists. The presence of large numbers of cyclists may also help underpin their legal use of roadways and intersection crossings and generate public and political support for more investment in cycling infrastructure. Obviously, greater cycling safety also encourages more cycling, so causation runs in both directions. All studies agree on the importance of improving traffic safety to encourage more walking and cycling.



Source: Calculated by the authors from data in NYCDOT (2010e)

### **Expansion of cycling facilities**

New York City's efforts to increase cycling and make it safer have focused on expanding and improving cycling facilities such as bike lanes, bike paths, bike boxes, roadway markings, and traffic signals (NYCDCP and NYCDOT, 1997; City of New York, 2007). In 1997, there were 119 miles of bicycling routes in New York, consisting mostly of on-street bike lanes or suggested on-street bike routes without any physical separation from motor vehicles. The bicycling network increased almost 5-fold between 1997 and 2009 (see Figure 9). Of the 561 mile total on July 1, 2009, 134 miles were physically separate facilities such as off-street paths and traffic-protected, on-street bike paths (cycle tracks); 282 miles were on-street bike lanes; and 146 miles were suggested bike routes without any special provisions. The three categories of facilities offer very different levels of riding comfort and safety.



**Figure 10: Separate bike paths such as the Hudson River Greenway facilitate cycling by entire families and are especially important for children**  
(Source: Transportation Alternatives)



**Figure 11: The Hudson River Greenway carries about 4,200 bike trips per weekday and even more on weekends.**  
(Source: Nicholas Klein)

Some of the physically separate facilities are truly first-rate, state-of-the-art bicycling infrastructure. The best and most heavily used facility is the Hudson River Greenway, the initial segments of which opened in 2001. The Greenway is a fully separate, bi-directional bike path along the entire length of Manhattan's western shore,



offering not only safety and speed but also scenic views of the Hudson River and the Manhattan skyline. Recreational cyclists as well as daily commuters go out of their way to take advantage of this facility, which averaged 4,200 cyclists per weekday in 2009 (NYCDOT, 2010). Physically separated bike paths are now available on the Brooklyn, Manhattan, Williamsburg, and Queensboro Bridges over the East River. They provide crucial connections between Manhattan and western Brooklyn and Queens, especially for work commuters. The number of bike trips crossing the four bridges more than quadrupled between 2001 and 2009, increasing from 2,473 to 10,995 (NYCDOT, 2010b).



**Figure 12:** This cycle track along Allen Street leads to the Williamsburg and Manhattan Bridges, as indicated by the green directional signs on the post to the left.  
(Source: Lewis Thorwaldson)



**Figure 13: This bike and pedestrian path on the Williamsburg Bridge is one of four crucial cycling facilities over the East River bridges connecting Brooklyn and Queens to Manhattan.**  
(Source: Transportation Alternatives)

New York has been experimenting with new designs for physically separate facilities, pioneering their introduction in North America. NYC DOT has installed traffic-separated cycle tracks on a few arterial streets. They are similar to on-street bike lanes but have a physical barrier that protects cyclists from motor vehicle traffic. As of 2010, there was a total of 4.9 miles of cycle tracks along short stretches of seven different streets. The most innovative bicycling infrastructure is in Manhattan: the pair of cycle tracks along nearly mile-long segments of 8<sup>th</sup> Avenue (northbound) and 9<sup>th</sup> Avenue (southbound) and on Broadway (southbound) between Central Park (59<sup>th</sup> St.) and Madison Square (23<sup>rd</sup> St.). The cycle tracks provide not only physical separation from moving traffic and parked cars but also traffic-signal protection from turning cars. There are also cycle tracks along short portions of Grand and Allen Streets in Manhattan and Tillary and Sands Streets in downtown Brooklyn. The current 4.9 miles of European-style cycle tracks represent less than one percent of the total bicycling network, but NYC

DOT has plans to build more in the coming years. For example, DOT has committed funding to install almost 9 miles of cycle tracks on First and Second Avenues in Manhattan in 2010. Most of the other 129 miles of physically separated cycling facilities currently in NYC are bike paths in parks, along waterways, and on bridges.



**Figure 14:** This cycle track along Allen Street in Manhattan provides safe, convenient, and pleasant cycling, completely separated from motor vehicle traffic  
(Source: Nicholas Klein)



**Figure 15:** The 9<sup>th</sup> Avenue cycle track in Manhattan is designed to minimize conflicts with left-turning cars, both through lane design and traffic signals  
(Source: Lewis Thorwaldson)





**Figure 16: Special traffic signals along the 9<sup>th</sup> Avenue cycle track protect cyclists from left-turning motor vehicles, while pedestrian crossings are facilitated by median islands.**  
(Source: Ralph Buehler)



**Figure 17: The Sands Street cycle track in Brooklyn, near the Manhattan Bridge, is bi-directional and offers complete separation from motor vehicle traffic.**  
(Source: Nicholas Klein)

On-street bike lanes make up the bulk of cycling facilities in New York, with more than twice the mileage of separate paths and traffic-protected cycle tracks (282 vs. 134 miles). NYC DOT has not only expanded the total mileage of on-street bike lanes in recent years but also improved their quality. About a tenth of the lane network is now

painted bright green to increase visibility to motorists and increase cyclist safety. On some streets, there are buffered bike lanes. Although they do not provide physical barriers from motor vehicles, they offer some additional separation via a diagonally striped lane between the bike and car lanes. The buffer zone varies in design from one location to another and ranges from 2ft to 8ft wide.



**Figure 18: The buffered bi-directional bike lane on Kent Avenue in Williamsburg provides some separation from heavy car and truck traffic on this arterial.**  
(Source: Devin Reitsma)

State-of-the-art cycle tracks, bike paths, and better bike lane design have all contributed to the overall improvement in the cycling infrastructure in New York. Nevertheless, serious problems remain. Many on-street bike lanes are only four feet wide and are located immediately adjacent to parked cars, thus subjecting cyclists to the dooring hazard, a major cause of cyclist injuries (NYCDOT et al., 2006). NYC DOT has been gradually redesigning substandard bike lanes to meet the AASHTO five-foot standard for bike lanes next to parked cars, such as on lower Fifth Avenue. Moreover, all new bike lanes now being constructed are five feet wide, and some come with an extra buffer zone between the bike lane and parked cars.



**Figure 19: The buffered cycle path on Grand Street in lower Manhattan makes cycling safe enough to take kids along on a ride.**  
(Source: Nicholas Klein)



**Figure 20: The diagonally striped buffer zone on the Grand Street bike path enhances cyclist safety by increasing the distance of motor vehicles from cyclists, but it provides no physical barriers.**  
(Source: Nicholas Klein)





**Figure 21: This green bike lane on Bleeker Street in Greenwich Village provides much less protection than a buffered bike lane or cycle track, but at least it is clearly marked.**

(Source: Lewis Thorwaldson)



**Figure 22: Many infrastructure modifications have been made at Madison Square to improve the safety and convenience of both cycling and walking.**

(Source: Nicholas Klein)



**Figure 23: Many intersections in New York have markings to guide cyclists through to facilities on the other side, such as here in Manhattan, where Bleeker Street crosses The Bowery.**

(Source: Lewis Thorwaldson)

By far the most serious problem with bike lanes is double parking. Blockage of lanes by illegally parked or waiting cars and trucks is common throughout New York City. Rarely can a cyclist ride uninterrupted on a bike lane for long before having to veer off into the car lanes to avoid blockages. A recent Hunter College study of 492 randomly selected street blocks in Manhattan found a 60% probability that a cyclist will encounter a motor vehicle blocking the bike lane over an average stretch of 5 to 6 city blocks (Tuckel and Milczarski, 2009). Swerving in and out of moving traffic is extremely dangerous for cyclists. A report by the NYC Department of City Planning confirmed the severity of the problem (NYCDCP, 2006). There is a bike advocacy website for posting photos, license numbers, and other details of motor vehicles blocking lanes (My Bike Lane, 2010). The NYC Department of Transportation also acknowledges the problem of



blocked bike lanes as a justification for building separate cycling facilities such as cycle tracks and bike paths (NYCDOT, 2009c). From our research on bike facilities in other cities in the USA, the problem of bike lane blockages by motor vehicles is worse in NYC than anywhere else in the country.



**Figure 24: Many bike lanes in New York are too narrow and subject cyclists to the dooring hazard because of the proximity to parked cars, as here on 6<sup>th</sup> Avenue in Manhattan.**  
(Source: Ralph Buehler)



**Figure 25: Blockage of bike lanes by motor vehicles is endemic in New York. Here on McDougal Street in Greenwich Village an entire row of motor vehicles is parked on the bike lane, making it totally useless for cyclists.**

(Source: Lewis Thorwaldson)



**Figure 26: Delivery trucks in New York often block bike lanes while unloading, as here on Manhattan Avenue in Greenpoint, Brooklyn**

(Source: Devin Reitsman)



**Figure 27: Roadway construction, potholes, utility covers, drain grates and otherwise uneven pavement make cycling on some lanes dangerous.**

(Source: Lewis Thorwaldson)



**Figure 28: The frequent blockage of bike lanes by motor vehicles in New York forces cyclists to swerve into traffic lanes, as here on Leonard Street in Greenpoint, Brooklyn.**

(Source: Lewis Thorwaldson)



**Figure 29: Some bike lanes end abruptly, such as this one in Greenpoint, Brooklyn, forcing cyclists into dangerous conflicts with on-coming motor vehicles.**

(Source: Lewis Thorwaldson)

The third category of cycling facility offered by the city is on-street bike routes. They are usually designated by ‘sharrows,’ special chevron markings on the street pavement indicating that motorists must share the road with cyclists. Aside from those pavement markings, “share the road” street signs, and bike route directional signs, such on-street bike routes offer no special provisions for cyclists. In many cases, shared lanes with sharrows are NYC DOT’s approach to improving cycling conditions on streets without enough room for full bike lanes. Most of these bike routes are on lightly traveled streets, but some are on roads with heavy car and truck traffic, such as First, Second, and Seventh Avenues in Manhattan and Fifth Avenue in Brooklyn. Most of the “sharrowed” lanes are 12 feet wide, but some (as on Seventh Avenue) are only 10 feet wide, generally considered too narrow for safe sharing of lanes by cars and bikes. The sharrow markings offer some route guidance for cyclists and alert motorists to the presence of cyclists, but they provide no physical protection at all from motor vehicles.





**Figure 30: Where there is not enough room or cycling volume for a full bike lane, sharrows are used to indicate shared-use lanes, such as here on Greenpoint Avenue in Greenpoint, Brooklyn.**  
(Source: Lewis Thorwaldson)

One important category of cycling facility that is almost completely absent in New York as well as most other U.S. cities is traffic-calmed residential neighborhoods. The speed limit on all NYC streets is 30mph unless otherwise posted. By comparison, many northern European cities have reduced speed limits to 19mph (30km/hr) on most residential streets. The slower speed is mainly enforced through a wide range of infrastructure measures such as speed humps, raised intersections and crosswalks, bulbouts, median islands, widening of sidewalks and narrowing of streets, artificial dead-ends, chicanes, and special pavement. The strategic placement of bike and car parking as well as planters and street furniture often forces a winding, circuitous, and thus slow route for motor vehicles through such residential neighborhoods. Not only does such traffic calming slow down traffic, but it discourages through traffic altogether. Many studies have shown that traffic calming dramatically improves pedestrian and cyclist safety and encourages more walking and cycling (Fietsberaad, 2010; Netherlands Ministry of Transport, 2009; Pucher and Dijkstra, 2003; Pucher and Buehler, 2008;

Pucher et al., 2010). Apart from largely car-free Roosevelt Island, no residential neighborhood in New York City is comprehensively traffic-calmed, i.e. in their entirety, as opposed to a few, isolated streets with reduced speed limits or speed humps. Even without any special cycling facilities, traffic-calmed residential streets provide ideal cycling routes, since traffic is light and slow. There is much potential to encourage more cycling as well as walking in New York by traffic calming its residential neighborhoods.



**Figure 31: Most residential neighborhoods in Germany are traffic calmed, with motor vehicle speed limited to 20mph. Some residential streets are super traffic-calmed to 5mph, such as the street above. Traffic calming turns such streets into ideal cycling routes, with no need for special cycling facilities. By comparison, NYC has no comprehensively traffic calmed residential neighborhoods.**  
(Sources: City of Freiburg)

Improving intersection design is crucial for reducing bike conflicts with motor vehicles. As noted above, most cyclist fatalities and injuries occur at or near intersections. The main approach to this problem in NYC has been the installation of bike boxes, which are advance stop lines for cyclists, about 10-15 feet ahead of the stop line for cars. Some of the bike boxes are painted the same bright green as the specially marked bike lanes in order to raise visibility and alert motorists to the presence of cyclists. As of 2010, there were 204 bike boxes installed at key intersections, virtually

always connected to on-street bike lanes. In addition, there are special pavement markings ('chevrons') at many intersections to alert both motorists and cyclists to the presence of a bike route or lane crossing the intersection.

To complement the expanded network of bicycling facilities, NYC DOT has installed almost a thousand directional signs for cyclists. Every year the NYC Department of City Planning updates its map of the bike route network, clearly indicating the various types of cycling facilities on different routes as well as the location of public bike parking. The printed maps are distributed free of charge and are also available for downloading on both the DOT and DCP websites (NYC DCP, 2010; NYC DOT, 2010c). An interactive, online version of the map was developed by Ride the City for individualized bike route planning and is accessible via the DOT website. Users enter the origin and destination of the trip, and the bike trip planner indicates the suggested route on the map. Google Maps also shows bike routes in all five NYC boroughs and provides interactive bike route planning (maps.google.com). Improved signage, mapping, and interactive route planning enhance the overall usefulness of the expanded and improved bike network in the city.

### **Bike parking**

New York City has expanded public bike parking over the past 15 years: from only 600 bike racks in 1996 to 6,100 in 2009. Since 2006, NYC DOT's CityRacks program has been installing about a thousand additional racks each year. Nevertheless, the current supply does not match the rapidly growing demand for bike parking. NYC lags far behind cities such as Chicago, Toronto, and Minneapolis, which are far smaller but have much more bike parking than NYC (Alliance for Biking and Walking, 2010;

Pucher, 2008; Pucher and Buehler, 2009). Of the fifty largest American cities, NYC has one of the lowest rates of bike parking per capita (Alliance for Biking and Walking, 2010). Moreover, there is almost no secure public bike parking in NYC, let alone full-service bike stations such as those in Chicago, Minneapolis, Toronto, Washington, and San Francisco.



**Figure 32: In July 2007, NYC DOT converted 3 car parking spaces into about 30 bicycle parking spaces next to the Bedford Avenue subway station in Williamsburg, Brooklyn. These spaces are usually overflowing with bikes, so that many cyclists have to lock their bikes to posts, parking meters, signs, railings, and fences in the vicinity.**

(Source: Lewis Thorwaldson)



**Figure 33: The CityRacks program has expanded the supply of sidewalk bike parking, but many places suffer from excess demand, such as this rack in Greenpoint, Brooklyn. Theft and vandalism are rampant in many locations.**

(Source: Devin Reitsma)



New York is moving in the right direction by expanding overall parking supply, mainly through its CityRacks program (NYCDOT, 2010a). As part of that program, NYC DOT has installed 20 covered bike rack shelters, holding 8 bikes each. In July 2007, it converted three car parking spaces to bike parking, yielding about ten bike parking spaces for each car parking space, or 30 spaces in total. Those pilot projects are welcome improvements, but their small scale hardly makes a dent in the bike parking needs of a city with over eight million residents who are cycling more each year.

Moreover, the specific placement of the limited supply of bike racks is questionable. For example, scores of racks were installed adjacent to the relatively short 8th and 9th Avenue cycle tracks, but there are virtually no racks located in or near Central Park, a destination for many hundreds of New York City cyclists each day. Similarly, there is almost no bicycle parking at key public transport hubs, such as Grand Central Station, Pennsylvania Station, and the Port Authority Bus Terminal. New York needs much more bike parking, especially sheltered and secure bike parking, located at destinations cyclists most often bike to.

Perhaps the city's most important bike-parking initiative is the revision of zoning and building ordinances to require provision of bike parking or access in private buildings, following the lead of Chicago, San Francisco, Vancouver, and Toronto. In November, 2007, the City Council amended zoning codes to require one bike parking space for every ten car parking space up to 200 spaces in new commercial and community facilities (NYCDCP, 2007). In April, 2009, the City Council adopted an amendment to the zoning code that requires secure bike parking in new and expanded multi-family residential and commercial buildings as well as community facilities

(NYCDCP, 2009a). For example, one bike parking space is required for every two residential units in buildings with ten or more tenants. For commercial buildings, one bike parking space is required per 7,500 sq. ft. of floor area for commercial offices and one bike parking space per 10,000 sq.ft. of floor area for retail and most other commercial uses. Moreover, one bike parking space is required per 10 motor vehicle parking spaces in new and most existing public parking garages. Finally, in August 2009, the City Council passed a law requiring commercial building owners to create a bike access plan that allows tenants to bring bikes into buildings, unless there is no cargo elevator available (NYCDCP, 2009b; NYCDOT, 2010d). It also requires commercial garages and lots holding 100 or more vehicles to establish minimum levels of bicycle parking but permits parking fees to be charged. Most private garages have been charging at least \$5 per day and up to \$15 day, resulting in almost no cyclists parking their bikes there (Goodman, 2010).

### **Bike-transit integration**

With 55% of all work trips by public transport, New York City has, by far, the highest transit mode share of any city in North America. Thus, one might expect substantial coordination of bicycling with public transport. In fact, New York's transit systems have done little to promote bike-transit integration (Pucher and Buehler, 2009). The Metropolitan Transportation Authority (MTA) does not provide bike parking of any kind at the city's 467 subway stations, so the only option for cyclists is to park on nearby sidewalks, such as the CityRacks that NYC DOT has installed near some subway stations. By comparison, the Chicago and San Francisco transit systems each provide over 6,000 bike parking spaces at their rail stations, including sheltered, indoor parking.

Compounding the problem of insufficient bike parking at subway stations, there is no secure bike parking at any public transport terminals in NYC. Train, bus, and ferry terminals do not offer bike lockers, bike stations, or guarded bike parking. There are a few bike racks on sidewalks near some public transport terminals, but there is no parking available within the terminals themselves. The supply of nearby sidewalk racks is so limited that many cyclists resort to locking their bikes to traffic signposts, lampposts, or other stationary objects within a few blocks of the stations. The lack of secure bike parking is a serious problem. Bike theft and vandalism in New York City are rampant, discouraging cyclists from leaving their bikes parked for a long time anywhere.



**Figure 34: Only 16% of New York City subway stations have elevators, and cyclists are prohibited from using escalators. Thus, cyclists must carry their bikes up and down long flights of stairs such as at this subway station in Manhattan. That discourages the integration of cycling with public transport in New York.**

(Source: Alan Rotenberg)

NYC subways are unique among American public transit systems in permitting bikes on board trains at all times, but it is difficult to get bikes to the train platforms. Only 16 percent of New York's subway stations are ADA accessible via elevators or ramps. At the remaining 84 percent of stations, cyclists must carry their bikes up and down long

flights of stairs, as they are prohibited from using escalators in stations where they are available. Bikes are allowed on the MTA's two suburban railroads (MNR and LIRR) except during peak hours in the peak direction, but cyclists must register in advance and purchase \$5 lifetime permits. Folding bikes are allowed at all times.



**Figure 35: None of NYC MTA's 5,929 buses has a bike rack, and non-folding bicycles are not allowed on board. Bus-bike integration is virtually non-existent in New York.**  
(Source: Lewis Thorwaldson)



**Figure 36: These bike racks outside of Pennsylvania Station hardly come close to meeting the bike parking needs at New York's main train terminal, which has no secure bike parking at all.**  
(Source: Lewis Thorwaldson)



**Figure 37: The lack of good bike parking at New York’s public transport terminals and subway stations forces cyclists to improvise by locking their bikes to any stationary object.**  
(Source: Lewis Thorwaldson)

Bike-bus integration is almost non-existent in New York City. Not a single bus in the MTA’s fleet of 5,929 buses has a bike rack. That contrasts sharply with other American cities, which average three-fourths of their buses equipped with bike racks. In nearby New Jersey, by comparison, over half of all buses were equipped with bike racks in 2010, and by 2014, 95% of buses will have racks. Only since spring 2008 have folding bikes been allowed on most MTA buses, while most other cities allowed this years earlier.

As shown in two recent surveys, bike-transit integration in New York City is worse than in any other large city in the country (Pucher and Buehler, 2009; Alliance for Biking and Walking, 2010). It is one of the key shortcomings in New York’s overall program to encourage cycling.

### **Traffic law enforcement and role of police**

The impressive accomplishments of NYC DOT in expanding and improving cycling facilities in New York have been seriously undermined by the failure of the NYC



Police Department to enforce the many traffic laws intended to protect cyclists. The problem of motor vehicles regularly blocking bike lanes is just one example of the police ignoring the needs of cyclists (Tuckel and Milczarski, 2009a). Many cyclists interviewed in the NYC Department of City Planning's "State of Cycling" report criticized the police for not keeping bike lanes clear (NYCDCP, 2006). A more general concern was that the NYPD "aggressively ignores helping cyclists" (NYCDCP, 2006, pg. 12). Similarly, the police were criticized for being "extremely hostile and antagonistic toward bicyclists" (NYCDCP, 2006, pg. 12) and for "police mistreatment, harassment, no response to bike theft, and no support of injured and attacked cyclists" (NYCDCP, 2006, pg. 13).

Both the NYPD and the courts have consistently neglected their responsibility to protect cyclists (NYCDCP, 2006). Most important, they have refused to issue summonses and impose serious penalties on motorists who endanger, injure or kill cyclists, even when the motorists are unquestionably at fault. One study analyzed 1,020 pedestrian and cyclist fatalities in New York City from 1994 to 1997 (Komanoff, 1999). Using police records, the authors found that "drivers were largely or strictly culpable in 74% of cases where sufficient information existed for culpability coding, and were strictly, largely, or partly culpable in 90% of the cases." Yet the police cited motorists for traffic violations in only one-fourth of pedestrian and bicyclist fatalities, although motorists were involved in almost all these fatalities and were unquestionably at fault in at least half. In only 1% of the fatal crashes did the police issue summonses to motorists specifically for violations of pedestrian or cyclist rights of way, such as failing to yield in crosswalks or driving in bike lanes (Komanoff, 1999). In a related study of 71 cyclist fatalities in NYC over the four-year period 1995-1998, Komanoff and Smith (2000)

determined that driver misconduct was the principal cause in 66% of fatal crashes and a contributing factor in 85% of crashes. That contrasts sharply with the NYPD's claim that three-fourths of cyclist fatalities are solely the fault of cyclists (Komanoff and Smith, 2000).

Clearly, the NY Police Department is not enforcing the many laws specifically protecting the rights of cyclists to ride on the roadway and requiring motorists to avoid endangering cyclists. The New York State Vehicle and Traffic Law, Title VII, Article 34, Section 1231, states that "Every person riding a bicycle upon a roadway shall be granted all of the rights and shall be subject to all of the duties applicable to the driver of a vehicle." In addition, Sections 1122, 1129, and 1146 of the same law protect cyclists from unsafe passing, tailgating and lack of due care by drivers. Sections 1146 and 1180(a) require motorists to exercise due care to avoid striking cyclists and to drive at speeds that are reasonable and prudent under the conditions in light of actual and potential hazards.

Compounding their failure to punish motorist endangerment of cyclists, the NYPD and courts do little to ensure that cyclists obey traffic laws, resulting in dangerously illegal cycling. A Hunter College study analyzed the riding behavior of 5,275 cyclists at 45 intersections in Midtown Manhattan, between 1<sup>st</sup> and 10<sup>th</sup> Avenues east-west and between 14<sup>th</sup> Street and 59<sup>th</sup> Street north-south (Tuckel and Milczarski, 2009b). Conducted from April 2-29, 2009, the study found that over a third of cyclists (37%) did not stop for red lights at all, while 29% of cyclists paused briefly and continued through the intersection while the light was still red. Only a third of cyclists (34%) actually came to a full stop and proceeded only when the light turned green.

Running red lights without even stopping is even more frequent during the evening (50%) than during daylight hours (35%).

In summary, the police and courts in New York have contributed to an environment of lawlessness and rampant violations of traffic regulations by both motorists and cyclists. Individual motorists and cyclists should be held responsible for their actions, but police inaction has unquestionably encouraged and enabled their dangerous behavior.

### **Education and training**

One important reason for the dangerous driving and cycling habits of New Yorkers is the lack of comprehensive, rigorous education and training in safe driving and cycling. As discussed in detail elsewhere, driver training and testing for a motor vehicle driver's license in the USA is far less rigorous than in northern Europe and pays much less attention to the need for motorists to avoid endangering non-motorists such as cyclists (Netherlands Ministry of Transport, 2009; Pucher and Dijkstra, 2000). Only a tiny percentage of schoolchildren in the USA receive training in safe cycling, and that is true in New York City as well. Few NYC schools offer bicycling education, and it is not compulsory in any school. By comparison, virtually all German, Dutch, and Danish schoolchildren receive comprehensive education and training in their schools by the 3<sup>rd</sup> or 4<sup>th</sup> grades, usually including on-the-road training and testing by police officers (Pucher and Dijkstra, 2000; Pucher and Buehler, 2008).

In response to the government failure to provide cycling education, various non-governmental organizations have developed voluntary programs. The nonprofit group Bike New York has been offering an increasing number of cycling training courses for

both children and adults. The courses cover a wide range of skill levels, from beginner to advanced rider training. They include commuter cycling skills, bike maintenance, and bike rodeos that teach bike handling skills, road skills, helmet fitting, and bike safety inspections (Bike New York, 2009). The organization also offers train-the-trainer programs which teach how to conduct basic riding courses and bike rodeos and provide training for League of American Bicyclists Cycling Instructor certification. Bike New York's training efforts are still modest in scope but have been increasingly in recent years, quadrupling from 2,129 students and 247 trainees in 2008 to 8,979 students and 438 trainees in 2009. The New York Cycle Club offers a 10-week training program in effective cycling called the Special Interest Group (SIG), which reaches hundreds of riders at various skill levels.

Transportation Alternatives, a walking and cycling advocacy organization, has also promoted cycling safety since the 1980s by publishing safety tips in their regular newsletters and on their website. In 2003, it launched a "Give Respect, Get Respect" campaign to convince cyclists to refrain from the most common forms of illegal cycling. Notably, the campaign was multi-lingual, seeking to educate the Spanish- and Chinese-speaking bicycle delivery workforce. In 2008, Transportation Alternatives launched a broad education and encouragement campaign called "Biking Rules!" This program includes an interactive website ([bikingrules.org](http://bikingrules.org)) and a cycling safety brochure, "Biking Rules: A New Streetcode for NYC Cyclists," which is freely available on the TA website (Transportation Alternatives, 2010).

Finally, the NYC Bicycle Safety Coalition recently began the LOOK campaign, which aims to educate the public about bike safety and encourages sharing the road

(NYCDOT, 2010f). Their ads appear on buses, taxis, bus stop shelters, phone kiosks, posters, and postcards. In June 2009, the Coalition aired ads on television showing injured cyclists being taken to the hospital as a reminder to drivers to watch out for cyclists and avoid endangering them.

These nongovernmental, nonprofit programs to improve cyclist and motorist behavior in NYC are laudable, but they are no substitute for mandatory, comprehensive training of both motorists and cyclists, as in northern Europe, which reaches everyone and not just a handful who volunteer for special courses. Another program New York might consider is Cycling Ambassadors, which sends cycling trainers out into the neighborhoods throughout the city to teach safe cycling skills, give talks promoting cycling, and distribute free helmets and information such as maps and safety guidelines. Chicago, Toronto, and Minneapolis have extensive cycling ambassador programs, which have been very successful at promoting interest in cycling, especially among children.

### **Promotional events and media coverage**

New York City offers a range of bike events. The largest ride is the Five Borough Bike Tour in early May, which is organized by Bike New York and attracts over 30,000 riders. About 6,000 cyclists participate in the New York Century Ride, organized by Transportation Alternatives (TA) and held every September. Other TA rides include the Tour de Brooklyn (2,000 riders), Tour de Bronx (4,000 riders), and Tour de Queens (1,000 riders). The Five Borough Bicycling Club sponsors the Montauk Century Ride (1,000 riders) and numerous smaller rides. The New York Cycle Club and Times Up offer many group rides. There are also various fund-raising rides, such as the annual Multiple-Sclerosis ride in early October, which draws about 2,000 riders.





**Figure 38: Summer Streets in 2008 and 2009 attracted over 100,000 people to the 5 miles of Park Avenue that were closed down for three consecutive Saturdays in August.**

(Source: John Pucher)

The City of New York itself has been sponsoring an increasing number of car-free events, such as Summer Streets, when Park Avenue is closed to motor vehicle traffic on three Saturdays in August (NYCDOT, 2009d). In both 2008 and 2009, over 100,000 pedestrians and cyclists turned out to take advantage of the chance to ride and walk up and down Park Avenue. In addition, there are dozens of street festivals throughout the city where roads are closed to motor vehicle traffic, but most of them are intended for pedestrian use and are so crowded that cycling would be virtually impossible.

NYC DOT has vigorously advertised its accomplishments to garner support for its pro-bike policies. Thanks to its commissioner, who has a background in public relations and communications, DOT employs a full range of electronic outreach media, including its own comprehensive, multi-faceted website. It also promotes its policies and

accomplishments via television clips, press releases, newspaper articles, website links, blogs and social media platforms (NYCDOT, 2010e). DOT has sent its staff to make presentations at hundreds of community meetings, professional conferences, and transport forums around the world to publicize its efforts to promote cycling and to tout NYC as the “nation’s bicycling capital.” The public relations effort has been extraordinarily successful, resulting in newspaper articles in Australia, Canada, and Europe portraying New York as a veritable bicycling paradise and even suggesting that NYC is worth a visit to enjoy the unique experience of cycling in America’s most urban environment.

NYC DOT has orchestrated a masterful public relations campaign to generate political and public support for its pro-bike policies and programs. The massive expansion of cycling facilities in NYC is an impressive political feat considering that less than one percent of trips in New York are by bike. Effective communications through the media has been a key strategy of NYC DOT to promote its policies to increase bicycling. These sorts of public relations efforts are crucial for the implementation of the many policies and programs required to make cycling safer, more convenient, and more pleasant.

### **Conclusions and Policy Recommendations**

Upon completion of over 200 miles of new bicycling facilities between 2006 and 2009, the City of New York officially declared itself to be the “bicycling capital of the nation” (NYCDOT, 2009a). Yet according to the American Community Survey of the U.S. Census, the bike share of work commuters in 2008 was only a tenth as high in New York City as in Portland, Oregon (0.6% vs. 6.0%) and a fourth as high as Washington,

DC (2.3%) (U.S. Census Bureau, 2010). Growth in New York's cycling has been spatially concentrated in the Manhattan CBD and northwestern Brooklyn. Even those most bike-oriented parts of NYC have only 1.8%-2.3% of their workers commuting by bike, only a third as high as the 6.0% bike share for the entire City of Portland.

If one bases New York's ranking on overall cycling policies and conditions, in addition to actual cycling levels, it is obvious that New York City is not #1. The League of American Bicyclists designates New York with the lowest of four levels of cycling status—bronze—compared to 36 cities with silver, gold, and platinum status (LAB, 2010). *Bicycling Magazine* designated Minneapolis, Portland, Seattle, and Boulder as the best cities for bicycling in 2010, and rated New York City as one of the most improved cities for cycling, together with Albuquerque, Long Beach, Cleveland, and Miami (*Bicycling Magazine*, 2010). The bold claim by NYC DOT that New York is already the “nation's bicycling capital” probably reflects New York boosterism in general as well as DOT's ambitious goals for rapidly improving cycling conditions and raising cycling levels. New York may someday become the best cycling city in America, but it does not yet deserve that status.

As noted previously, the NYCDOT screenline counts overstate cycling levels by focusing only on the Manhattan CBD, which has the highest bike rates in the city. The decennial U.S. Census and annual American Community Survey understate cycling levels since they only report journeys to work and thus exclude bike trips for all other purposes. The lack of consistent, comprehensive information on cycling trends highlights the need for New York to implement a regular travel survey that comprises the entire city. Portland, Oregon, for example, conducts an annual survey which provides a

representative indicator of cycling levels over time and across each of the different parts of the city (City of Portland, 2009). Such a survey would provide useful information for planning new cycling facilities in all parts of NYC, responding to the different needs of different neighborhoods. It would also help gauge the changing demand for cycling facilities over time due to evolving demographic and economic trends.

Whatever their limitations, the available data show that New York has made impressive progress at improving cycling conditions and raising cycling levels in recent years. The number of bike trips has almost doubled since 2000, thanks to vastly expanded cycling infrastructure, including innovative treatments such as cycle tracks, buffered bike lanes, special bike signals, bike boxes at intersections, and bright green lane markings. Similarly, the supply of bike parking has risen 10-fold over the past decade. Current NYC DOT plans call for continued expansion and improvement of cycling infrastructure in the coming years.

So far, the best cycling facilities have been limited to Manhattan and northwestern Brooklyn. That is understandable, since it is crucial to establish a successful core bicycling network that is well used and generates public and political support for further expansion. As a matter of social justice and geographic equity, however, attention should be paid to other parts of the city as well. That will provide an increasingly integrated and comprehensive system of bikeways as the mileage of routes grows toward the official NYC DOT goal of 1,800 miles of bike paths, lanes, and routes by 2030 (City of New York, 2007; NYC DOT, 2010a).

Of course, there is still much to be done. The biggest obstacle to raising cycling levels in New York City is heavy car and truck traffic, which makes cycling stressful,

unpleasant, and unsafe. There are several ways that European cities have dealt with this problem: reducing overall motor vehicle speeds, removing car parking, traffic calming residential neighborhood streets, and providing physically separated bike lanes and paths along arterials.

NYC DOT's increasing focus on pedestrian and cyclist needs is a welcome turnaround from the priority given to motor vehicle traffic in previous decades. For example, DOT has also been implementing "road diets" in a few locations to reduce traffic volumes and speeds (NYCDOT, 2010e). That has generally involved the narrowing of roads by transferring some street space from cars to bikes and pedestrians: by creating bike lanes and diagonally striped buffer lanes; by widening pedestrian malls, refuge islands, and sidewalks; and by installing planters, mini-parks, and plazas. Unfortunately, DOT has implemented those sorts of innovative road diets on only a tiny percentage of the city's vast roadway network. For the city as a whole, much more needs to be done to lower the overall speed limit, reduce car parking, and traffic calm neighborhoods. Most bike trips in New York still require cycling on traffic lanes with motor vehicles or on unprotected bike lanes, which are often blocked by motor vehicles.

The NYC Police Department has been one of the biggest obstacles to increased cycling. If the NYPD wanted to, it could immediately enforce rules against motor vehicles in bike lanes and vastly improve cycling conditions in New York overnight. It could also introduce a policy of zero tolerance of motorists who endanger, injure, or kill cyclists, which would greatly enhance cycling safety and encourage more cycling. NYC DOT already plans to further expand its system of cycling infrastructure, but that will take time and might be slowed down by the current fiscal crisis of both the City and State



of New York. By comparison, strict enforcement of laws to protect cyclists could start immediately and produce quick and dramatic results.

Another important strategy to facilitate more and safer cycling in New York would be to reduce the supply of on-street car parking by converting it to bike lanes. That would mitigate the dooring problem as well as the conflict between cyclists and motor vehicles waiting for parking spaces or maneuvering into or out of them. All studies show that the availability and low cost of on-street parking encourage more driving, more air pollution, more congestion, and more energy use (Shoup, 2005).

There are many ways to improve the integration of bicycling with NYC's vast public transit system. Secure, sheltered parking is needed at the city's hundreds of rail stations and especially at major bus, rail, and ferry terminals, where full-service, high-capacity bike stations are the obvious solution. Bike racks should be installed at least on express buses and routes serving outlying portions of the city, where transit stops are farther away from residences and more likely to be beyond walking distance than in the city center.

In short, there are many ways to improve cycling conditions in New York and thus encourage yet further growth in cycling. New York has come a long way over the past decade, but it still has a long way to go before it can legitimately claim to be the nation's bicycling capital.

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### **References**

Alliance for Biking and Walking, 2010. *Bicycling and Walking in the United States: 2010 Benchmarking Report*. Available at [www.peoplepoweredmovement.org/site/index.php/site/memberservices/C529](http://www.peoplepoweredmovement.org/site/index.php/site/memberservices/C529). Accessed January 31, 2010.

Baker, L., 2009. How to get more bicyclists on the road: To boost urban cycling, figure out what women want. *Scientific American* 301 (4), 28-29. Accessible at: <http://www.scientificamerican.com/article.cfm?id=getting-more-bicyclists-on-the-road>

Bicycling Magazine, 2010. America's top 50 bike friendly cities. Accessible at: <http://www.bicycling.com/article/0,6610,s1-3-583-21901-1,00.html>

Bike New York, 2009. *Bike New York Bicycle Education Program*. Website: [www.bikenyork.org/education/index.html](http://www.bikenyork.org/education/index.html).

Bike Portland, 2009. *World Naked Bike Ride*. Accessible at: <http://bikeportland.org/2009/06/08/doing-the-world-naked-bike-ride-this-year-read-this-first/>

Birk, M., 2008. *The Value of the Bicycle-Related Industry in Portland*. Portland, Oregon: Alta Planning and Design. Accessible at: <http://bikeportland.org/wp-content/uploads/2008/09/2008-portland-bicycle-related-economy-report.pdf>

City of New York, 2007. *Transportation Initiatives – promote cycling*. PlaNYC: A greener, greater New York, 87. Accessible at: [www.nyc.gov/html/planyc2030/html/plan/transportation\\_promote-cycling.shtml](http://www.nyc.gov/html/planyc2030/html/plan/transportation_promote-cycling.shtml).

City of Portland, 2009. *Bicycle as Primary and Secondary Commute Vehicle: 2006-2008*. Portland, Oregon: City of Portland, Office of the Auditor.

- Curran, W., 2004. Gentrification and the nature of work: Exploring the links in Williamsburg, Brooklyn. *Environment and Planning A* 36, 1243-1258.
- Eckerson, C., 2007. The Case for Physically Separated Bike Lanes. Accessible at: <http://www.streetfilms.org/physically-separated-bike-lanes/>
- Elvik, R., 2009. The non-linearity of risk and the promotion of environmentally sustainable transport. *Accident Analysis and Prevention* 41, 849-855.
- Fietsberaad, 2010. Continuous and Integral: The Cycling Policies of Groningen and other European Cities. Amsterdam, NL: Dutch Bicycling Council, March, 2010. Available in pdf format at: <http://www.fietsberaad.nl/>
- Fiske, B., 2009. The new best cities for cycling. *Bicycling Magazine*, June 2009. Accessible at: <http://www.bicycling.com/article/0,6610,s1-2-18-17083-1,00.html>
- Garrard, J., Rose, G., Lo, S., 2008. Promoting Transportation Cycling for Women: The Role of Bicycle Infrastructure. *Preventive Medicine* 56, 55-59.
- Goodman, D., 2010. You can park your bike, but at what price? *New York Times*, February 23, 2010. Accessible at: <http://cityroom.blogs.nytimes.com/2010/02/23/you-can-park-your-bike-but-at-what-price/#more-137209>
- Goworowksa, J., 2008. Gentrification, displacement and the ethnic neighborhood of Greenpoint, Brooklyn. Eugene, Orgeon: University of Oregon.
- Jacobsen, P. L., Racioppi, F., Rutter, H., 2009. Who owns the roads? How motorised traffic discourages walking and bicycling. *Injury Prevention*, 15, 369-373.
- Jacobsen, P., 2003. Safety in numbers: more walkers and bicyclists, safer walking and bicycling. *Injury Prevention* 9, 205-209.
- Komanoff, C., 1999. Killed by Automobile: Death in the Streets of New York City, 1994-1997. New York: Rights of Way.
- Komanoff, C., Smith, M., 2000. The Only Good Cyclist: NYC Bicyclist Fatalities—Who's Responsible? New York: Right of Way. Accessible at: <http://www.rightofway.org/research/cyclists.pdf>
- LAB, 2010. *Bicycling Friendly Communities*. Washington, DC: League of American Bicyclists. Accessible at: <http://www.bikeleague.org/programs/bicyclefriendlyamerica/communities/>
- Lees, L., 2003. Super-gentrification: The case of Brooklyn Heights, New York City. *Urban Studies* 40 (12), 2487-2509.

My Bike Lane, 2010. *Bike Lane Violations in New York*. Website for reporting bike lane violations. Accessible at: <http://nyc.mybikelane.com/>

Netherlands Ministry of Transport (2009). *Cycling in the Netherlands*. Rotterdam: Ministry of Transport, Public Works, and Water Management. Accessible at: <http://www.fietsberaad.nl/library/repository/bestanden/CyclingintheNetherlands2009.pdf>

Newman, K., Wyly, E., 2006. The right to stay put, revisited: Gentrification and resistance to displacement in New York City. *Urban Studies* 43 (1), 23-57.

NYCDCP and NYCDOT, 1997. *New York City Bicycle Master Plan*. Accessible at: [www.nyc.gov/html/dcp/html/bike/mp.shtml](http://www.nyc.gov/html/dcp/html/bike/mp.shtml).

NYCDCP, 2005. *The State of Cycling in New York City*. NYC: Department of City Planning. Accessible at: <http://nyc.gov/html/dcp/pdf/transportation/statecyclecomp.pdf>

NYCDCP, 2007. *New York City Bicycle Lane and Trail Inventory*. NYC: Department of City Planning.

NYCDCP, 2007. *Design regulations for commercial and community facility parking lots text amendment*. NYC: Accessible at: [www.nyc.gov/html/dcp/pdf/parking\\_lots/N070509ZRY.pdf](http://www.nyc.gov/html/dcp/pdf/parking_lots/N070509ZRY.pdf)

NYCDCP, 2009a. *Bicycle parking zoning text amendment*. Accessible at: [www.nyc.gov/html/dcp/pdf/bicycle\\_parking/zoning\\_text\\_amendment.pdf](http://www.nyc.gov/html/dcp/pdf/bicycle_parking/zoning_text_amendment.pdf).

NYCDCP, 2009b. *Bike-share opportunities in New York City*. NYC: Department of City Planning. Accessible at: [www.nyc.gov/html/dcp/html/transportation/td\\_bike\\_share.shtml](http://www.nyc.gov/html/dcp/html/transportation/td_bike_share.shtml).

NYCDCP, 2010. *2009 NYC Cycling Map*. Accessible at: <http://www.nyc.gov/html/dcp/html/bike/cwbm.shtml>

NYCDOH, 2009. *NYC Bicycle-Related Fatalities, 2003-2007*. NYC: New York City Department of Health and Mental Hygiene Bureau of Vital Statistics, Bureau of Epidemiology Services, Injury Epidemiology Unit, July 2009.

NYCDOH, 2010. *Epiquery: NYC Interactive Health Data System - Community Health Survey 2007*. NYC: New York City Department of Health and Mental Hygiene, 2009. Accessible at: <http://nyc.gov/health/epiquery>.

NYCDOT, 2007. *Application for Bicycling Friendly Community status to League of American Bicyclists*. NYC: Department of Transportation.

- NYCDOT, 2008. *Sustainable Streets Strategic Plan for the 2008 and Beyond*. NYC: New York City Department of Transportation. Accessible at: <http://www.nyc.gov/html/dot/html/about/stratplan.shtml>
- NYCDOT, 2009a. *DOT Completes Unprecedented 3-year, 200-mile Installation of Bike Lanes*. NYCDOT Press Release, July 8, 2009. Accessible at: [http://www.nyc.gov/html/dot/downloads/pdf/pr09\\_030.pdf](http://www.nyc.gov/html/dot/downloads/pdf/pr09_030.pdf)
- NYCDOT, 2009c. *Innovative Bicycle Facility Design in New York City: Street Design for Bicyclist Safety and Comfort*. New York City Department of Transportation. Presented by Joshua Benson at Toronto Bike Summit, Toronto, Canada, May 29, 2009.
- NYCDOT, 2009d. *Summer Streets*. New York City Department of Transportation. Accessible at: <http://www.nyc.gov/html/dot/summerstreets/html/home/home.shtml>
- NYCDOT, 2010a. *Bicycling*. NYC: New York City Department of Transportation. Accessible at: [www.nyc.gov/html/dot/html/bicyclists/bikemain.shtml](http://www.nyc.gov/html/dot/html/bicyclists/bikemain.shtml).
- NYCDOT, 2010b. *New York City commuter cycling indicator*. NYC: Department of Transportation. Accessible at: [http://www.nyc.gov/html/dot/downloads/pdf/commuter\\_cycling\\_indicator\\_and\\_data\\_2009.pdf](http://www.nyc.gov/html/dot/downloads/pdf/commuter_cycling_indicator_and_data_2009.pdf)
- NYCDOT, 2010c. *Bike Maps*. NYC: Department of Transportation. Accessible at: <http://www.nyc.gov/html/dot/html/bicyclists/bikemaps.shtml>
- NYCDOT, 2010d. *Bikes in Buildings*. NYC: Department of Transportation. Accessible at: <http://www.nyc.gov/html/dot/html/bicyclists/bikesinbuildings.shtml>
- NYCDOT, 2010e. *NYC DOT Homepage*. NYC: Department of Transportation. Accessible at: <http://www.nyc.gov/html/dot/html/home/home.shtml>; and <http://www.nyc.gov/html/dot/html/sidewalks/sidewalks.shtml>
- NYCDOT, 2010f. *Look Bicycle Safety Campaign*. NYC: New York Bicycle Safety Coalition. [http://www.nyc.gov/html/look/html/about/about\\_us\\_text.shtml](http://www.nyc.gov/html/look/html/about/about_us_text.shtml)
- NYCDOT, NYCDOH, DYDPR, NYPD, 2006. *Bicyclist Fatalities and Serious Injuries in New York City 1996-2005*. NYC: New York City Departments of Transportation, Health, Parks and Recreation, and Police. Accessible at: <http://www.nyc.gov/html/dot/downloads/pdf/bicyclefatalities.pdf>
- NYC Mountain Bike Association, 2009. *New York City trails*. Accessible at: [www.nycmtb.com/?page\\_id=282](http://www.nycmtb.com/?page_id=282).



- NYMTC, 2010. *NYMTC Bicycle Data Collection Program*. NYC: New York Metropolitan Transportation Council. Accessible at: [www.nymtc.org/project/NYMTC\\_Bicycle\\_Data\\_Collection\\_Program/www\\_html/index.htm](http://www.nymtc.org/project/NYMTC_Bicycle_Data_Collection_Program/www_html/index.htm)
- NYSDMV, 2001-2010. *Summary of New York City Motor Vehicle Accidents*. New York State Division of Motor Vehicles. Accessible at: <http://www.nydmv.state.ny.us/stats.htm>
- NYSDOH, 2009. *NYC bicycle-related non-fatal injuries, 2003-2007*. New York State Department of Health Statewide Planning and Research Cooperative System, SPARCS. Prepared by NYC DOHMH, Bureau of Epidemiology Services, Injury Epidemiology Unit, July 2009.
- NJTransit, 2009. NJTransit website – bike program. [www.njtransit.com/rg/rg\\_servlet.srv?hdnPageAction=BikeProgramTo](http://www.njtransit.com/rg/rg_servlet.srv?hdnPageAction=BikeProgramTo)
- Pucher, J., 2008. Bike parking. *Momentum* 36, 30-33.
- Pucher, J., Buehler, R., 2009. Integrating bicycling and public transport in North America. *Journal of Public Transportation* 12 (3), 79-104. Accessible at: [http://policy.rutgers.edu/faculty/pucher/PUCHER\\_BUEHLER.pdf](http://policy.rutgers.edu/faculty/pucher/PUCHER_BUEHLER.pdf)
- Pucher, J., Komanoff, C., Schimek, P., 1999. Bicycling renaissance in North America: Recent trends and alternative policies to promote bicycling. *Transportation Research A-33* (7/8), 625-654.
- Pucher, J. and Buehler, R. (2008a) Making Cycling Irresistible: Lessons from the Netherlands, Denmark, and Germany. *Transport Reviews*, 28, 495 - 528.
- Pucher, J., Dijkstra, L., 2000. Making Walking and Cycling Safer: Lessons from Europe," *Transportation Quarterly*, 54 (3), 25-50 (with Lewis Dijkstra
- Pucher, J., Dijkstra, L. (2003) Promoting Safe Walking and Cycling to Improve Public Health: Lessons from the Netherlands and Germany. *American Journal of Public Health*, 93 (9), 1509-1516.
- Pucher, J., Dill, J. and Handy, S. L. (2010) Infrastructure, Programs and Policies to Increase Bicycling: An International Review. *Preventive Medicine*, 48, pp. S106-S125.
- Pucher, J., Renne, J. (2003) Socioeconomics of Urban Travel: Evidence from the 2001 National Household Travel Survey," *Transportation Quarterly* 57 (3), 49-78.
- Robinson, D., 2005. Safety in numbers in Australia: More walkers and bicyclists, safer walking and cycling. *Health Promotion Journal of Australia*, 16, pp. 47-51.

- Shoup, D., 2005. *The High Cost of Free Parking*. Chicago: Planners Press.
- Slater, T., 2004. North American gentrification? Revanchist and emancipatory perspectives explored. *Environment and Planning A* 26, 1191-1213.
- Slatkin, H. (NYC Department of City Planning), 2009. email: June 17, 2009.
- Transportation Alternatives, 2009. *Rules of the Road*. website:  
[bikingrules.org/rules/rulesoftheroad](http://bikingrules.org/rules/rulesoftheroad).
- Tuckel, P., Milczarski, W., 2009a. *Bike Lanes or Blocked Lanes? An Observational Study of Vehicular Obstructions of Bike Lanes in Manhattan*. New York City: Hunter College, Departments of Sociology and Urban Planning. Accessible at:  
[http://web.cuny.edu/news/newsreleases\\_p=5217.html](http://web.cuny.edu/news/newsreleases_p=5217.html)
- Tuckel, P., Milczarski, W., 2009b. *Biking Behavior in Mid-Manhattan*. New York City: Hunter College, Departments of Sociology and Urban Planning.
- Uncivil Servants, 2010. Website for reporting bike lane violations. Accessible at:  
<http://nyc.uncivilservants.org/violation/6>
- U.S. Census Bureau, 2010a. *American Fact Finder: 1990 Decennial Census*. Washington, DC: U.S. Department of Commerce. Accessible at:  
[www.factfinder.census.gov](http://www.factfinder.census.gov).
- U.S. Census Bureau, 2010b. *American Fact Finder: 2000 Decennial Census*. Washington, DC: U.S. Department of Commerce. Accessible at:  
[www.factfinder.census.gov](http://www.factfinder.census.gov).
- U.S. Census Bureau, 2010c. *American Fact Finder: 2000-2008 American Community Survey, Journey to Work*. Washington, DC: U.S. Department of Commerce. Accessible at: <http://factfinder.census.gov>
- USDOT, 1994. *The National Bicycling and Walking Study: Transportation Choices for a Changing America*. Washington, D.C.: U.S. Department of Transportation, Federal Highway Administration.