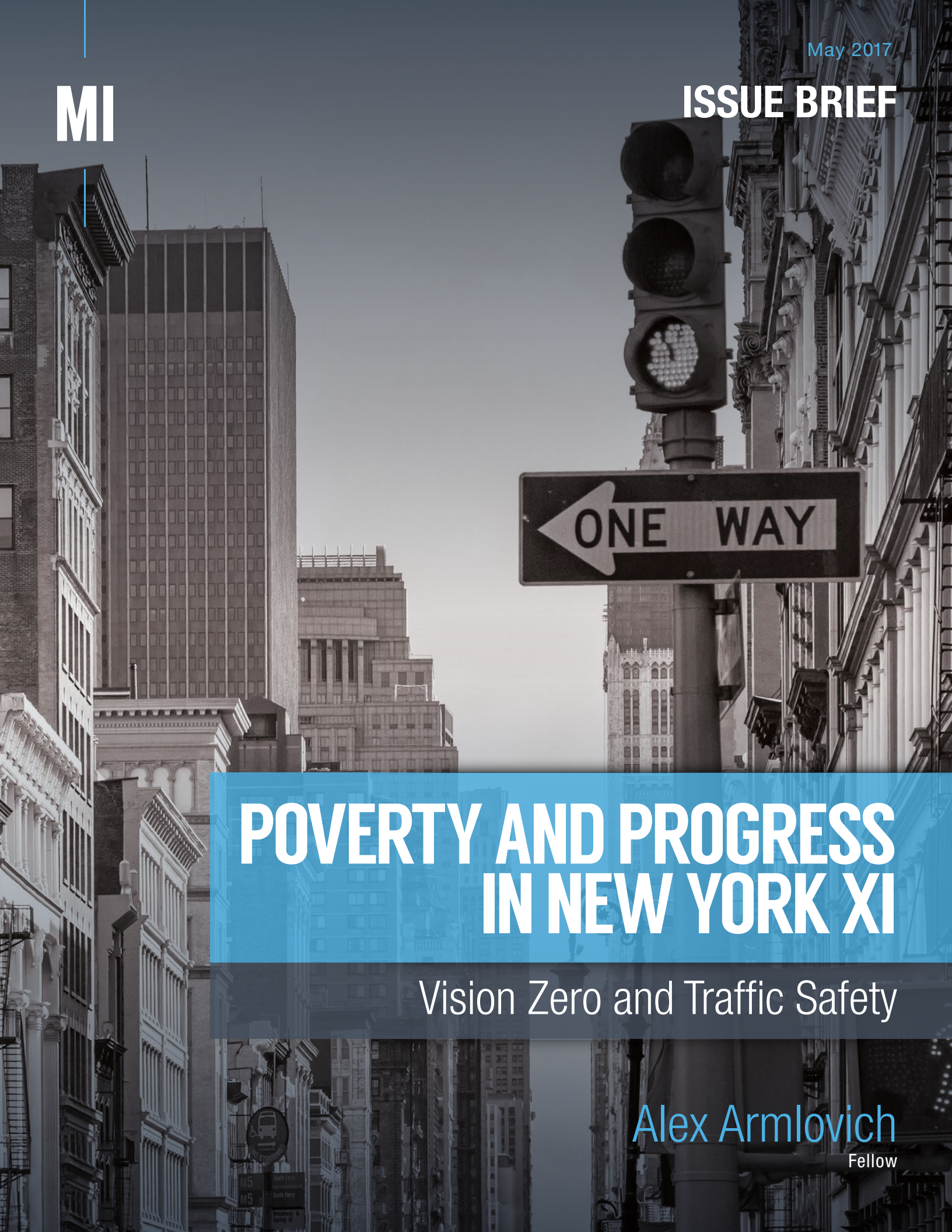

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ISSUE BRIEF

POVERTY AND PROGRESS IN NEW YORK XI

Vision Zero and Traffic Safety

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Fellow

Contents

Executive Summary

Vision Zero is a safe-streets initiative created by New York City's Department of Transportation (DOT) in 2014, the first year of Mayor Bill de Blasio's administration. The Vision Zero concept and program emerged in the late 1990s in Sweden, which aimed to eliminate traffic deaths and serious injuries. A number of other countries and cities subsequently adopted similar traffic safety programs; and safe-street improvements were undertaken under the administration of New York's previous mayor, Michael Bloomberg.

In NYC, Vision Zero consists of reengineering intersections and streets: it simplifies complex intersections, narrows traffic lanes, adds speed bumps and bicycle paths, shortens pedestrian-crossing distances, alters the timing of traffic lights, adds speed-detection and red-light cameras, and installs "leading pedestrian intervals" to give pedestrians a head start at a light before drivers can turn into the crosswalk.

The evidence is clear that Vision Zero has improved street safety:

- Between 2009 and 2016, pedestrian and bicycle deaths at roughly 4,600 intersections receiving at least one safety treatment during Vision Zero declined by 34% (50 deaths in 2009, compared with 33 deaths in 2016). By contrast, about 25,700 untreated intersections saw a 3% increase in bicycle and pedestrian deaths (109 deaths in 2009, compared with 112 deaths in 2016).
- Pedestrian deaths overall increased slightly in 2016 over 2015, but only at intersections that had not received Vision Zero treatments.
- The Vision Zero treatments implemented through 2016 have slightly favored higher-income neighborhoods, especially in Manhattan's Upper East Side and Upper West Side.
- Lower-income residential neighborhoods have not received intensive Vision Zero treatment relative to their risk, at least partly due to resistance by the community boards that administer them. The result is that lower-income neighborhoods continue to experience higher pedestrian-crash rates.

Introduction*

When New York City mayor Bill de Blasio assumed office in January 2014, he promised to "take dead aim at the tale of two cities . . . [and] put an end to economic and social inequalities that threaten to unravel the city we love."[1] The Manhattan Institute's "Poverty and Progress in New York" series tracks the effects of de Blasio's policies in New York, with a special focus on lower-income New Yorkers. Though healthy superstar cities cannot reduce locally measured income inequality other than by perversely displacing either the mobile poor or the mobile rich,[2] they can reduce disparities in traditional city services such as schools, parks, transportation infrastructure, and public safety. This paper evaluates Vision Zero, a public-safety initiative created by New York City's Department of Transportation (DOT) in the first year of the de Blasio administration.

De Blasio's Vision Zero builds on the "Safe Streets for Seniors" initiative and other major street-design innovations undertaken by the administration of Mayor Michael Bloomberg. The Vision Zero concept and program itself emerged in the late 1990s in Sweden, which aimed to eliminate traffic deaths and serious injuries. A number of other countries and cities subsequently adopted similar traffic safety programs.[3]

In NYC, Vision Zero consists of reengineering intersections and streets: it simplifies complex intersections, narrows traffic lanes, adds speed bumps and bicycle paths, shortens pedestrian-crossing distances, alters the timing of traffic lights, adds speed-detection and red-light cameras, and installs "leading pedestrian intervals" to give pedestrians a head start at a light before drivers can turn into the crosswalk.[4]

Vision Zero is (and, given the size of New York City, will probably always be) a work in progress, but the evidence is clear that it has improved street safety:

- Between 2009 and 2016, pedestrian and bicycle deaths at roughly 4,600 intersections receiving at least one safety treatment during Vision Zero declined by 34% (50 deaths in 2009, compared with 33 deaths in 2016). By contrast, about 25,700 untreated intersections saw a 3% increase in bicycle and pedestrian deaths (109 deaths in 2009, compared with 112 deaths in 2016).
- At the neighborhood level, the intensity of Vision Zero treatment is strongly correlated with the reduction in pedestrian injuries and fatalities since 2009. That is, the more city engineers have redesigned a particular neighborhood's streets and sidewalks, the more that neighborhood has experienced reduced traffic injuries and deaths.
- Pedestrian deaths actually increased slightly in 2016, from 126 to 128, *but only at intersections that had not received Vision Zero treatment.*

*Connor Harris provided research assistance for this report.

In light of the mayor's "tale of two cities," there are two additional, noteworthy findings:

- The Vision Zero treatments implemented through 2016 have slightly favored higher-income neighborhoods, especially in Manhattan's Upper East Side and Upper West Side.
- Lower-income residential neighborhoods have not received intensive Vision Zero treatment relative to their risk, and continue to suffer higher pedestrian-crash rates. Yet the DOT's Vision Zero plans appropriately target lower-income neighborhoods in proportion to risk. Nevertheless, 12 of the city's 55 neighborhood areas[5] have worsened since 2009, half of which were in outer Queens neighborhoods receiving minimal Vision Zero treatment.

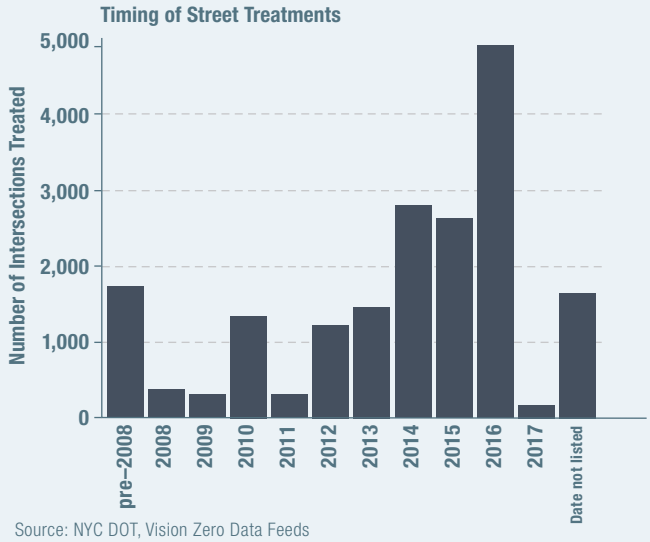
Vision Zero, by the Numbers

New York City's DOT has established a strong track record on streetscape-safety improvements, dating to the launch of major improvements under Bloomberg and DOT commissioner Janette Sadik-Khan. In de Blasio's 2014 launch document announcing Vision Zero, DOT found that intersections treated in the Bloomberg era since 2005 had already experienced a 34% decrease in pedestrian deaths.[6] De Blasio's DOT commissioner, Polly Trottenberg, has continued to improve safety on the city's streets.

Because of this continuity of policy across different political administrations at DOT, some of the analysis in this paper includes street-safety improvements that predate the current branding of Vision Zero. (A few of the earliest improvements in the public database date to the 1970s.) The bulk of the analyzed intersection improvements came in two batches: a small batch for 2008–10 under Mayor Bloomberg's "Safe Streets for Seniors"; and a larger batch since the launch of de Blasio's Vision Zero (**Figure 1**).

FIGURE 1.

Intersection Improvements in New York City



Source: NYC DOT, Vision Zero Data Feeds

Intersection Analysis: More Vision Zero Treatments Means Fewer Deaths

As **Figure 2** shows, intersections where the city has applied Vision Zero treatments saw larger decreases in bicycle and pedestrian deaths between 2009—the earliest period for which public data were available—and 2016. Since deaths are rare at individual intersections, we pooled all intersections into two categories, with intersections receiving any Vision Zero treatment showing a 34% decline in fatalities, versus a 3% increase in fatalities at untreated intersections. There was a widely reported blip in the downward pedestrian death trend in 2016, when several more pedestrians died than in 2015—but the trend existed only at untreated intersections, as **Figure 3** shows.

Neighborhood Analysis: Overall, Vision Zero Works...

As in the intersection analysis, Vision Zero's progress is visible even at a coarse neighborhood level. **Figure 4** shows that our index of Vision Zero treatment intensity—that is, the concentration of treatments in a given community district (or "neighborhood," as we will refer to these CDs in this report)—has a strong relationship with the decline in pedestrian crashes between 2009 and 2016.[7] The VZ Index is a measure of the share of treated intersections in a neighborhood, versus the citywide average. At a VZ Index value of 1, a neighborhood has the same share of intersection treatment as NYC as a whole; for a value of 2, twice the citywide treatment share; and so on. (The "r" value in this and subsequent figures is the correlation coefficient, a measure of the linear relationship between two variables. The value of r varies from –1 to +1, from a perfect negative correlation, to no correlation at zero, to a perfect positive correlation.)

FIGURE 2.

2009–16: Intersection Treatments, Pedestrian and Bicyclist Deaths

	2009 Deaths	2016 Deaths	Number of Intersections	Percent Change
Untreated Before Jan. 2016	109	112	25,730	3%
Treated Before Jan. 2016	50	33	4,589	–34%

Source: Author's calculations from NYC DOT, Vision Zero Data Feeds

FIGURE 3.

2015 vs. 2016: Intersection Treatments and Pedestrian Deaths

	2015 Pedestrian Deaths	2016 Pedestrian Deaths	Change in Deaths, 2015 to 2016
Untreated Intersections	80	87	7
Treated Intersections	46	41	-5

Source: Author's calculations from NYC DOT, Vision Zero Data Feeds

…But Poorer Neighborhoods Are More Dangerous

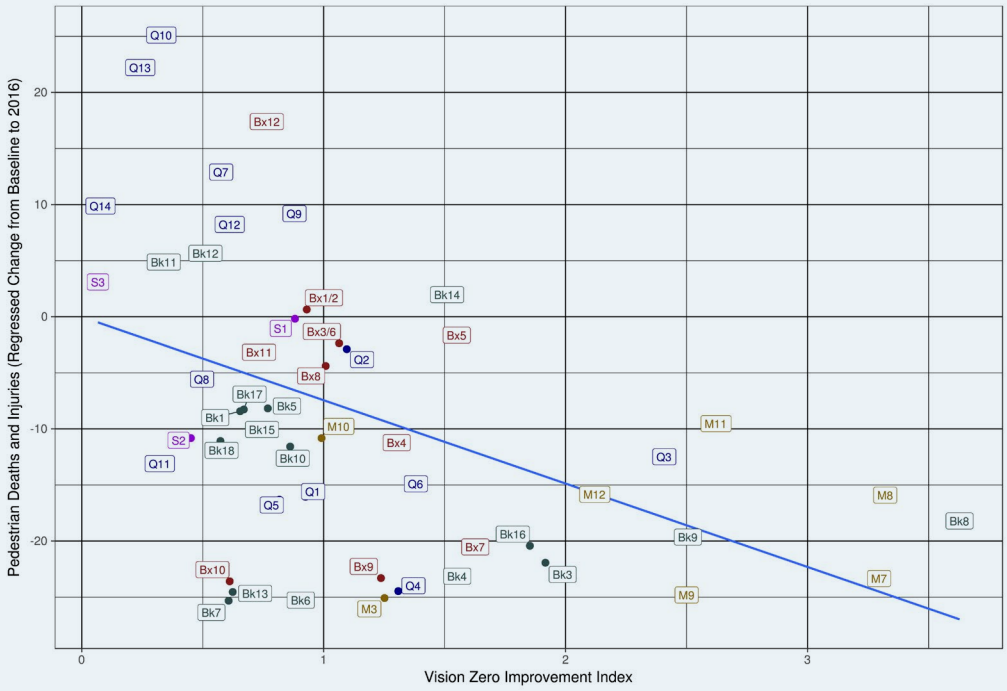
At the start of Vision Zero in 2014, poorer residential neighborhoods were substantially more dangerous—per resident, as well as per square mile. A person walking or cycling through one of the 10 poorest neighborhoods was 9% likelier to be killed or injured in traffic than the city's residential districts' average. The riskiest residential neighborhood, Brooklyn 17, had a baseline pedestrian injury or death rate of about 2.5 per thousand residents. The least risky neighborhood, Staten Island 3, had a baseline pedestrian death or injury rate of about 0.5 per thousand residents. For a sense of scale, New York City's violent crime rate[8] in 2016 was about 4.5 per thousand residents. **Figure 5** and **Figure 6** show the 2009–13 average relationship between risk and neighborhood median income.

Figures 5 and 6 show overall the clear relationship between income levels and community traffic safety. They also show, on the best-fit line, the average citywide relationship between injury or death rates and income. Those neighborhoods above the line have higher than average risk than predicted for their income, while those below the line have lower risk than predicted for their income. Figure 5 shows the risk per resident, while Figure 6 shows the risk in relation to physical space. For example, highly populated space may have a lot of injuries per square mile but not as many injuries per resident.

The exceptions were the Upper West and Upper East Sides, M7 and M8, which experienced more deaths and injuries, considering their higher incomes. Note the "residuals"—the distance from the citywide best-fit lines—for M7 and M8: per

FIGURE 4.

Change in Pedestrian Deaths and Injuries vs. Vision Zero Treatment Index, by Community District (r= –0.478)



Source: Author's calculations from NYC DOT, Vision Zero Data Feeds

Note: In this and subsequent figures, "M" = Manhattan, "Bx" = Bronx, "Bk" = Brooklyn, "Q" = Queens, and "S" = Staten Island. The numbers represent community districts, which are units of land governed by a community board—see the sidebar on page 9. Thus M1 stands for Manhattan's Community District 1. "Baseline" rates of any quantity are means of the five years 2009–13. "Average" rates are means of the eight years 2009–16. "Percentage change" of any quantity is the change from the 2009–13 baseline to 2016. "Regressed percentage change" of any quantity is the best-fit line of the quantity from 2013 to 2016. For further discussion of the methodology in this report, see the **Appendix**.

square mile, they're far riskier than expected for their income. But per resident, they're a lot closer to the best-fit line. This suggests that much of the excess risk per unit of physical space in M7 and M8 is accounted for by the high population densities of M7 and M8.

Planning vs. Execution

The DOT establishes priorities for Vision Zero, and its procedures are based squarely on safety in physical space. Priority Intersections are those in each borough containing at least 15% of pedestrian deaths or serious injuries; Priority Corridors and Priority Areas are streets and neighborhoods containing at least 50% of the killed or seriously injured pedestrians in each borough.[9] Beyond ensuring equitable representation of each borough, DOT hewed strictly to the goal of saving the most lives per intersection.

However sensible are DOT's plans, the execution of them is another matter.

Figure 7 and **Figure 8** together show VZ's priority planning versus actual treatment intensity of past work through 2016, respectively. The priority index in Figure 7 appropriately emphasizes lower-income neighborhoods—that is, the city has pledged to redesign such neighborhoods' intersections as befits their higher traffic risk. But because of the recent intense activity in redesigning streets on the Upper East and Upper West Sides, the city has so far not emphasized lower-income neighborhoods in work already done or under way. Specifically, Figure 8 (actual treatment) would have had a similarly negative slope as Figure 7 (planned treatment) except for the outliers of M7 and M8.

As before, the best-fit line shows the average relationship across the city. The slope of the line shows the strength of the average relationship between the Y variable and the X variable, and neighborhoods above the line saw more of the Y variable than expected for their income, while those below the line saw less than expected for their income.

NYC Community Districts*

Borough	Number	Neighborhood Name
Bronx	1	Melrose, Mott Haven, Port Morris
Bronx	2	Hunts Point, Longwood
Bronx	3	Morrisania, Crotona Park East
Bronx	4	Highbridge, Concourse Village
Bronx	5	University Hts., Fordham, Mt. Hope
Bronx	6	East Tremont, Belmont
Bronx	7	Bedford Park, Norwood, Fordham
Bronx	8	Riverdale, Kingsbridge, Marble Hill
Bronx	9	Soundview, Parkchester
Bronx	10	Throgs Neck, Co-op City, Pelham Bay
Bronx	11	Pelham Pkwy., Morris Park, Laconia
Bronx	12	Wakefield, Williamsbridge
Brooklyn	1	Williamsburg, Greenpoint
Brooklyn	2	Brooklyn Heights, Fort Greene
Brooklyn	3	Bedford-Stuyvesant
Brooklyn	4	Bushwick
Brooklyn	5	East New York, Starrett City
Brooklyn	6	Park Slope, Carroll Gardens
Brooklyn	7	Sunset Park, Windsor Terrace
Brooklyn	8	Crown Heights North
Brooklyn	9	Crown Heights South, Wingate
Brooklyn	10	Bay Ridge, Dyker Heights
Brooklyn	11	Bensonhurst, Bath Beach
Brooklyn	12	Borough Park, Ocean Parkway
Brooklyn	13	Coney Island, Brighton Beach
Brooklyn	14	Flatbush, Midwood
Brooklyn	15	Sheepshead Bay, Gerritsen Beach
Brooklyn	16	Brownsville, Ocean Hill
Brooklyn	17	East Flatbush, Rugby, Farragut
Brooklyn	18	Canarsie, Flatlands
Manhattan	1	Battery Park City, Tribeca
Manhattan	2	Greenwich Village, Soho
Manhattan	3	Lower East Side, Chinatown
Manhattan	4	Chelsea, Clinton
Manhattan	5	Midtown Business District
Manhattan	6	Stuyvesant Town, Turtle Bay
Manhattan	7	West Side, Upper West Side
Manhattan	8	Upper East Side
Manhattan	9	Manhattanville, Hamilton Heights
Manhattan	10	Central Harlem
Manhattan	11	East Harlem
Manhattan	12	Washington Heights, Inwood
Queens	1	Astoria, Long Island City
Queens	2	Sunnyside, Woodside
Queens	3	Jackson Heights, North Corona
Queens	4	Elmhurst, South Corona
Queens	5	Ridgewood, Glendale, Maspeth
Queens	6	Forest Hills, Rego Park
Queens	7	Flushing, Bay Terrace
Queens	8	Fresh Meadows, Briarwood
Queens	9	Woodhaven, Richmond Hill
Queens	10	Ozone Park, Howard Beach
Queens	11	Bayside, Douglaston, Little Neck
Queens	12	Jamaica, St. Albans, Hollis
Queens	13	Queens Village, Rosedale
Queens	14	The Rockaways, Broad Channel
Staten Island	1	Stapleton, Port Richmond
Staten Island	2	New Springville, South Beach
Staten Island	3	Tottenville, Woodrow, Great Kills

*NYC's 59 Community Districts correspond with 55 Public Use Microdata Areas, the smallest geographic unit for which the U.S. Census Bureau's American Community Survey provides income statistics used in this report.

The Upper East and Upper West Sides both have higher crash rates per square mile than expected for their income, as well as more treatment than expected for their income. But **Figure 9** below shows the higher crash rate still didn't fully explain residuals in these neighborhoods. Higher-income residential areas, driven by these two exceptions, received more treatment before 2016 than expected, given their crash rates per square mile.

Playing Politics with Safety: NIMBYism in Poorer Neighborhoods

Despite successes so far, lower-income neighborhoods still need more intense treatment and faster improvement in order to close the gap between income and safety evident in Figures 5 and 6. Of the 12 city neighborhoods that have seen no improvement in Figure 4, seven have median income below the citywide median: Bk11, Bk12, Bk14, Bx1/2, Bx12, Q14, and Q7. DOT understands these needs, as evidenced by the importance placed on lower-income neighborhoods in the department's planning documents.

Moreover, this treatment can be expected to work. Streets in the Upper East and Upper West Sides have had more Vision Zero treatments and, with them, more improvement in crash rates.

Yet lower-income neighborhoods face a hurdle that is difficult to quantify. In several neighborhoods, local community

leaders have resisted DOT's efforts to roll out Vision Zero improvements. In addition to opposition from elected officials, community boards—whose members are appointed by each borough president, with half nominated by each community's city council member—have resisted change, as well.

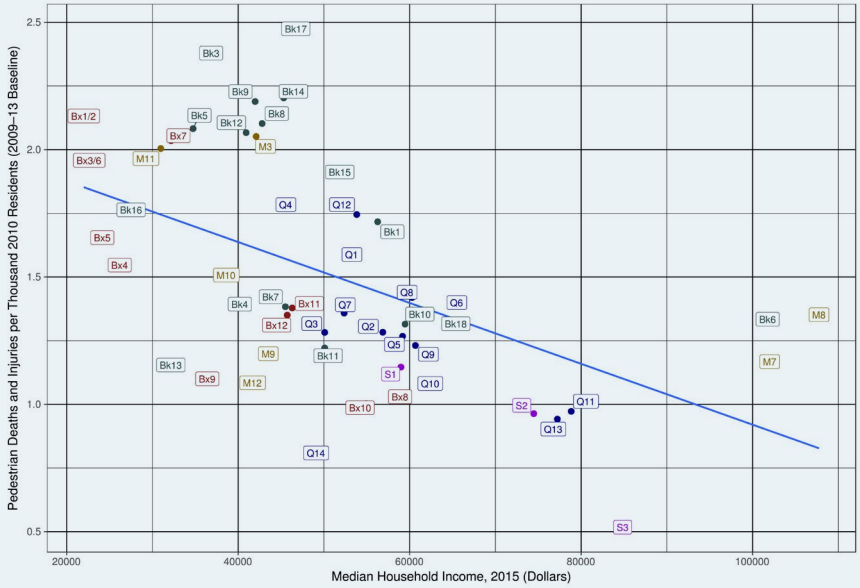
Change is slow and difficult for one main reason: any change, even if a majority of constituents favor it or are indifferent to it, upsets the status quo, and the status quo often benefits politically active residents. In Park Slope, Brooklyn, more than half a decade ago, for example, a group of residents unsuccessfully fought a bike lane. Though the community board approved it, the residents went so far as to sue the city after its installation. Many of the residents were concerned about a loss of parking spaces.[10]

More recently, in Corona, Queens, the local community board voted against Vision Zero treatment, with many residents also concerned about the parking loss.[11] Though Vision Zero NIMBYism occurs in rich, middle-class, and poorer neighborhoods, delays to safety fixes in poorer neighborhoods mean that they remain much worse off than wealthier neighborhoods, as they start off at such a disadvantage.

For example, Queens Community Board 4 had the largest gap between DOT plans and actual treatments completed until 2016, as measured by contrasting the VZ Priority Index with the VZ Treatment Index.[12] This includes the 111th Street corridor in the Corona neighborhood, which the mayor approved, over the objections of the community board, during the preparation of this report.[13] Community boards in the Bronx and in Sheepshead Bay, Brooklyn, have recently rebuffed similar DOT safety treatments.[14] In a city of slow change and entrenched politics, NIMBY sentiment may be the only variable more fundamental to public policy than income.

FIGURE 5.

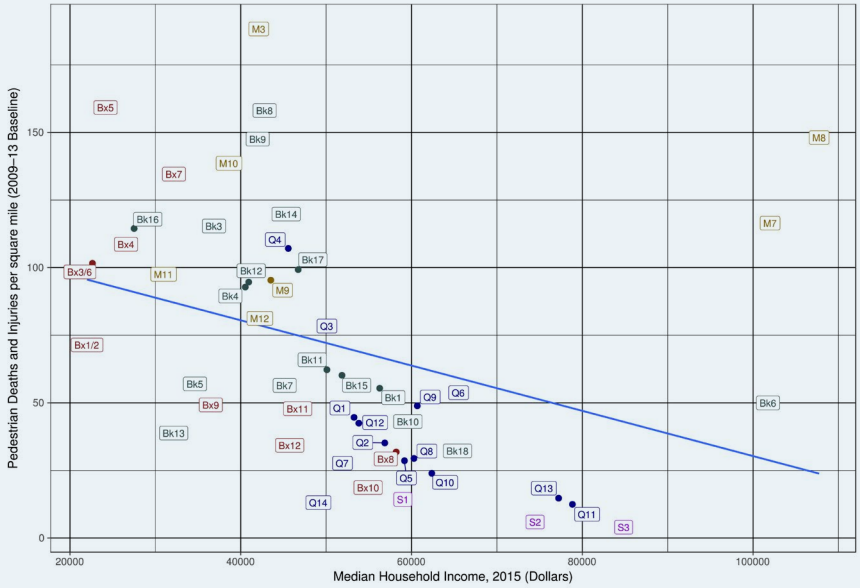
Baseline Injury and Death Rate per Thousand Residents vs. Median Income (r= −0.521)



Source: Author's calculations from NYC DOT's Vision Zero Data Feeds, and the U.S. Census Bureau, American Community Survey, 2011–2015 5-Year Estimates

FIGURE 6.

Baseline Injury and Death Rate per Square Mile vs. Median Income (r= −0.348)



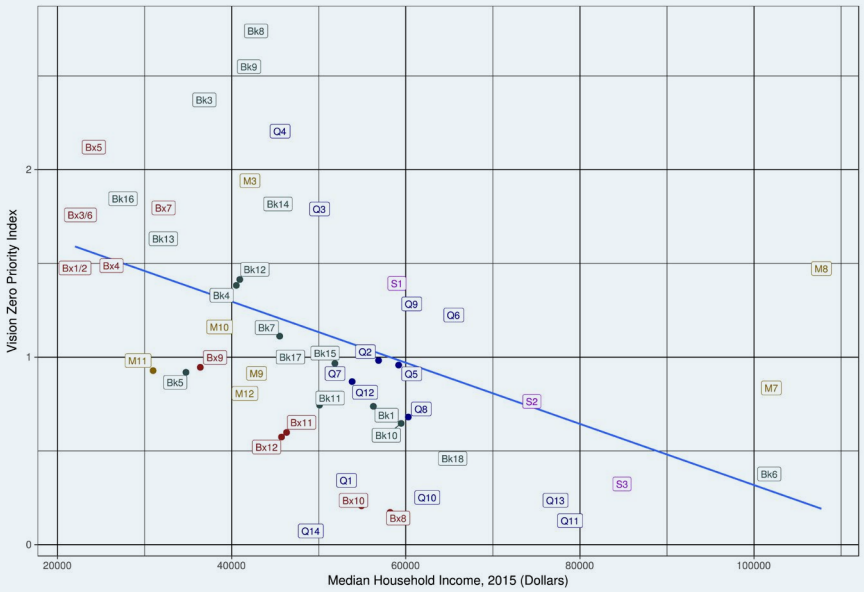
Source: Author's calculations from NYC DOT, Vision Zero Data Feeds, and U.S. Census Bureau, American Community Survey, 2011–2015 American Community Survey 5-Year Estimates

Conclusion

The traffic safety improvements undertaken under Vision Zero have reduced serious crashes, deaths, and injuries between 2014 and 2016, compared with the 2009–13 period. Despite this success, lower-income neighborhoods were and remain more dangerous than middle-income and higher-income areas. The city has not specifically targeted neighborhoods for future improvements because their residents have lower or higher incomes; rather, it has begun to target these neighborhoods for future projects because of their objectively higher traffic risk as described in the pedestrian borough action plans. But to continue reducing risks to pedestrians and bicyclists posed by poorly governed motor-vehicle traffic, the city must continue to overcome neighborhood opposition to traffic safety improvements.

FIGURE 7.

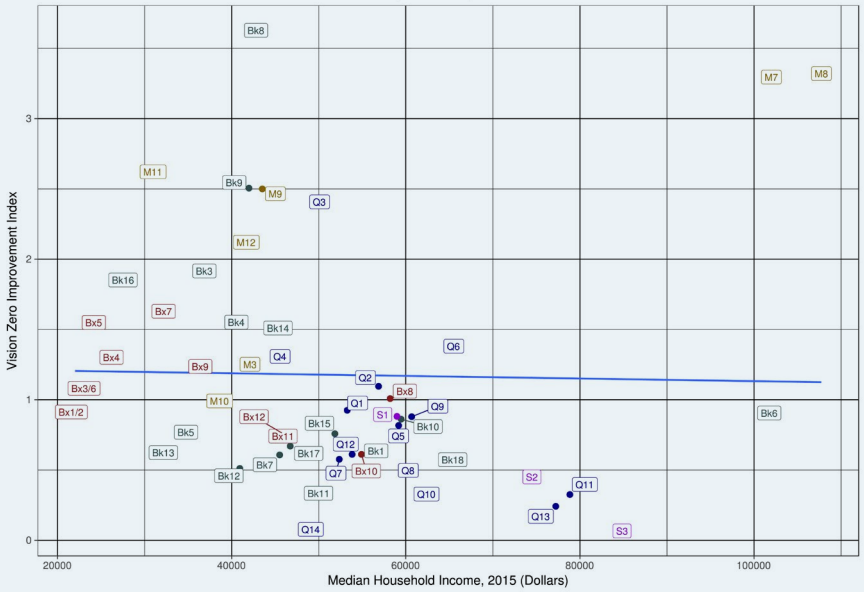
Vision Zero Priority Index vs. Median Income: DOT Planning (r= −0.479)



Source: Author's calculations from NYC DOT, Vision Zero Data Feeds and the U.S. Census American Community Survey, 2015 5-Year Estimates

FIGURE 8.

Vision Zero Improvements Index vs. Median Income (r= −0.21)



Source: Author's calculations from NYC DOT, Vision Zero Data Feeds and the U.S. Census American Community Survey, 2015 5-Year Estimates

Appendix

DEFINITIONS

NYC "Community Districts" are units of land governed by a community board. CD boundaries are given in the Vision Zero Data Feeds (summary_community_districts.json). This report identifies Community Districts by a borough designation ("M" = Manhattan, "Bx" = Bronx, "Bk" = Brooklyn, "Q" = Queens, and "S" = Staten Island) and a community district number, such as "M1" for Manhattan's Community District 1.

Community Districts in this report exclude M1 (Lower Manhattan), M4 (West Midtown), M5 (Central Midtown), M6 (East Midtown), and Bk2 (Downtown Brooklyn). These commercial centers have far higher foot traffic than one would predict from their modest residential populations, so they were excluded from many analyses.

"Joint Interest Areas" (JIAs) are 12 regions of park and airport land excluded from CDs. These areas have nominal CD numbers but no residents and very few traffic accidents. We include traffic accidents in Joint Interest Areas in borough-level counts but exclude JIAs from CD and PUMA analyses.

"Public Use Microdata Areas" (PUMAs) are defined by the Census Bureau and are the smallest areas for which the American Community Survey allows valid estimates of quantities such as average household income. NYC contains 55 PUMAs, all but four of which are coterminous with a CD and zero or more JIAs. The four exceptions each comprise two CDs: M1 and M2 (Downtown Manhattan, Lower Manhattan, and Greenwich Village), M4 and M5 (West and Central Midtown), Bx1 and Bx2 (South Bronx), and Bx3 and Bx6 (south-central Bronx). We denote these four districts as M1/2, M4/5, Bx1/2, and Bx3/6. We do not consider JIAs to be part of any PUMA; thus traffic injuries and deaths that occur in a JIA are not included in any PUMA's statistics, and JIA land area is not added to the land area of any PUMA. This avoids deflating the per-square-mile accident statistics of land area that includes a PUMA.

FIGURE 9.

Vision Zero Improvements Index vs. Median Income, Controlling for Baseline Accidents per Square Mile

Source: Author's calculations from NYC DOT, Vision Zero Data Feeds and the U.S. Census American Community Survey, 2015 5-Year Estimates

"Residential PUMA" includes all PUMAs except M1/2 (Lower Manhattan, Downtown Manhattan, and Greenwich Village), M4/5, M6, and Bk2.

"Baseline" rates of any quantity are means of the five years 2009–13. "Average" rates are means of the eight years 2009–16. "Percentage change" of any quantity is the change from the 2009–13 baseline to 2016. "Regressed percentage change" of any quantity is the best-fit line of the quantity from 2013 to 2016, with the 2013 data point replaced by the 2009–13 baseline and overweighted by a factor of five.

"Income" and "household income" refer to the 2015 American Community Survey's five-year estimates of median household income, as reported on the Census Bureau's American FactFinder. Locations of district boundaries and pedestrian-safety construction projects and programs are taken from Vision Zero's website. All statistics on the locations of crashes, as well as the numbers of pedestrians and bicyclists killed and injured in them, are taken from Vision Zero's injury_all_monthly.json and fatality_all_monthly.json."Population" refers to population figures from the 2010 Census, as reported in Vision Zero's data files. We have not tried to account for changes in population over time.

GEOGRAPHIC ANALYSIS

Vision Zero's data files do not provide exact locations of traffic accidents but rather the location of the nearest street intersection. Because of rounding errors intrinsic to computer arithmetic, VZ's data files portray many intersections as slightly distant, often even by a fraction of an inch, from lines such as district boundaries that should contain them exactly. We have thus defined a "margin" of 50 feet: any intersection that falls within 50 feet of any geographical feature, whether a point, line, or area, counts as contained within that geographical feature. (The figures in this report are affected only immaterially by changes in the margin from 1 to 50 feet.)

Border-Splitting

According to the rules above, many points on district borders count as contained by multiple districts. We treat such points as follows. Accidents that occurred on district borders were split between every bordering district (not counting JIAs). For example: if, in some year, 20 pedestrians were injured in a district's interior, 10 on the border with one district, five on the border with two other districts, and three on the border with a JIA, we consider 20 + (10/2) + (5/3) + 3 = 29.67 pedestrians to have been injured in the district that year. Intersection improvements are counted similarly.

INCONSISTENCIES IN VZ FILES

We have used Vision Zero's monthly data files for all analyses. For recent years, the yearly data files list larger numbers of pedestrians and bicyclists killed or injured than the monthly data files. The differences are never larger than 2%, except in 2015, when the yearly data files claim that 15 bicyclists were killed and the monthly data files claim 13. We do not know the reasons for the discrepancy.

A more severe inconsistency is the difference between Vision Zero's provided data files and the citywide totals of car-crash victims provided by the Vision Zero View (VZV) map viewer. The counts that VZV provides are always higher; we suspect that this is because VZV includes crashes for which the NYPD provided no useful geographic information. The discrepancies are especially severe in 2016, when VZV's counts of injured bicyclists and pedestrians were, respectively, 25.1% and 20.0% higher than the counts in the monthly data files. For bicyclist and pedestrian injuries, we have adjusted for this discrepancy by scaling accident counts per district and year by the difference between the VZ data files and the VZV summary; for example, if the VZ data files report 10,000 pedestrian injuries in NYC in 2014 but VZV reports 11,000, we have inflated each district's count of pedestrian injuries in 2014 by 10%. Though this method does not noticeably affect the rank order of districts' raw accident rates or trends, it does affect their absolute values; 13 CDs' scaled accident rates are higher in 2016 than the baseline but only four CDs' unscaled rates are.

We did not scale counts of traffic deaths in the same way, and we used unscaled figures for analyses of the effectiveness of street improvements (which use data per intersection, not per district).

VISION ZERO INDEXES

To compute the district-level Vision Zero improvement index, we compute each of these following quantities for each district (all from the Vision Zero Data Feeds), divide by the corresponding quantity for the city as a whole (excluding JIAs), and average:

- Percent of intersections with an intersection-oriented Street Improvement Project (SIP) completed between 2014 and 2016 (locations and times of completion of SIPs are from the Vision Zero Data Feeds "Street Improvement Project (Intersections)")
- Percent of intersections in a corridor with a Corridor-Oriented SIP ("Street Improvement Projects (Corridors)") completed between 2014 and 2016
- Percent of intersections on a corridor with "Speed Humps" installed between 2014 and 2016
- Percent of intersections with a "Leading Pedestrian Interval" crosswalk signal installed between 2014 and 2016
- Percent of intersections at which traffic signals have been retimed to match a 25 mph speed limit between 2014 and 2016 ("Signal Retiming")

The priority index is a similar average of the following quantities:

- Percent of intersections that are in a designated priority zone ("VZ Priority Zones")
- Percent of intersections that are in a designated priority corridor ("VZ Priority Corridors")
- Percent of intersections designated as priority intersections ("VZ Priority Intersections")

The "Treatment Gap Index" equals the improvement index subtracted from the priority index.

Endnotes

1 "Text of Bill de Blasio's Inauguration Speech," *New York Times*, Jan. 1, 2014.

2 Alex Armlovich, "Poverty and Progress in New York X: Income Inequality Trends Under de Blasio," Manhattan Institute, Dec. 13, 2016.

3 There is a good overview, with references, of the international Vision Zero movement in Wikipedia.

4 City of New York, Mayor Bill de Blasio, "Vision Zero Action Plan 2014."

5 New York's 55 Public Use Microdata Areas designated by the census align with New York's 59 community districts.

6 "Vision Zero Action Plan 2014," p. 7.

7 See methodology in Appendix.

8 Murder, rape, robbery, and felony assault; see NYPD Historical NYC Crime Data.

9 Vision Zero, "Pedestrian Safety Action Plan Manhattan," 2015.

10 "In Brooklyn, Divided Opinion About a Bike Lane by a Park," *New York Times*, Mar. 8, 2011.

11 "Street Fight: DOT to Install Bike Lanes on Queens Blvd. Despite Community Board Opposition," *Queens Tribune*, May 19, 2016.

12 See "Treatment Gap Index" under "Vision Zero Indexes" in Appendix.

13 Stephen Miller, "NIMBY Rages Against Shadowy Bike Lobby After de Blasio Overrules Community Board," *Village Voice*, Mar. 30, 2017.

14 Ibid.

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