

Pedestrian-Cyclist Accidents in New York State: 2007-2010

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Introduction

While considerable attention has been paid to pedestrians involved in motor vehicle accidents, little attention has been accorded to pedestrians involved in accidents resulting from collisions with cyclists. This lack of scrutiny is surprising given the growing popularity of cycling in America. With so many more individuals adopting cycling as an alternative means of transportation, the potential for collisions with pedestrians has grown markedly.

An abundance of anecdotal evidence already exists suggesting that crashes between pedestrians and cyclists is a common phenomenon. Newspapers, radio, and television are replete with stories about individuals being hit or being nearly hit by cyclists. “Rogue cyclists” – those who flout traffic laws by running red lights, riding in the opposite direction of traffic, riding on sidewalks, etc – have been prominently featured in the media. Yet little systematic data has been collected to either support or challenge this anecdotal evidence. What is the incidence of crashes between pedestrians and cyclists? Is it a common occurrence or is it a relatively rare event? What is the profile of pedestrians most likely to be involved in these collisions? And where do these collisions happen? The present study attempts to answer these questions based upon empirically-gathered data.

Methodology

This study rests upon data furnished by the Statewide Planning and Research Cooperative System (SPARCS) under the auspices of New York State’s Department of Health. A basic description of SPARCS is provided on its website: “SPARCS currently collects patient level detail on patient characteristics, diagnoses and treatments, services, and charges for every hospital discharge, ambulatory surgery patient, and emergency department admission in New York State.”¹

A key feature of the SPARCS data set includes a diagnosis for each patient using the International Classification of Disease (ICD) code. One of the values of this ICD code is for patients who were involved in a pedestrian-cyclist accident (E826.0). This value of the code pertains only to the pedestrians who necessitated medical treatment – not the cyclists.

The data set for this study is based upon both in- and out-patients who were assigned this value on the ICD code for the four years from 2007 to 2010. In addition, all “non-identifying” information (i.e., non-personal information) attached to each patient’s record was included in the data set. This additional information included both individual-level variables such as age, sex, race, ethnicity (Hispanic origin/non-Hispanic origin) and geographic variables such as county, city, and zip code. All together, the data set consisted of 4,121 individuals of whom 3,779 were out-patients and 342 were in-patients.

Findings

1) The frequency of pedestrian-cyclist accidents over time

Table 1 below displays the number of out- and in-patients involved in pedestrian-cyclist accidents for each year spanning the period under investigation.

Table 1. Frequency of Accident by Year

	Type of patient		Total
	out-patient	in-patient	
Year			
2007	1012	85	1097
2008	1013	99	1112
2009	911	74	985
2010	843	84	927
Total	3779	342	4121

As the data indicate, there are approximately 1,000 patients involved in pedestrian-cyclist accidents per year, the vast proportion of whom are out-patients. Though there appears to be a downward trend in the number of

accidents over time, this inference must be treated with caution as the number of data points (e.g., years) are few.²

2) The frequency of pedestrian-cyclist accidents by month

In Table 2 below are presented the number of patients involved in pedestrian-cyclist accidents in each month aggregated over the four years covered by this investigation. Not unexpectedly, the data reveal a seasonal pattern. Most accidents occur in the summer months – June, July, and August. The fewest number of accidents occur in the winter months – December, January, and February.

Table 2. Frequency of Accident by Month: 2007-2010

Month	Frequency	Percent
January	94	2.3
February	64	1.6
March	181	4.4
April	382	9.3
May	525	12.8
June	591	14.4
July	672	16.4
August	599	14.6
September	434	10.6
October	303	7.4
November	159	3.9
December	100	2.4
Total	4104	100.0

2) Demographic profile of accident victims

The data in Table 3 reveal there is a sex imbalance in the number of patients. Overall, three-fifths of the patients are male and two-fifths are female. However, this sex imbalance vanishes among in-patients. Here the frequency of males and females is almost the same. *This indicates that*

among more serious cases necessitating hospital admission, there is no gender gap.

Table 3. Sex of patients: 2007-2010

Sex	Type_of patient	
	out-patient	in-patient
Female	39.4%	48.8%
Male	60.6%	51.2%
Total	100.0%	100.0%

The age of patients differs significantly depending upon their status as out- or in-patients (see Table 4). Out-patients tend to be much younger than in-patients. Among out-patients, the vast majority (72.3%) are under the age of 40. By contrast, only about a third of in-patients (34.5%) are under the age of 40.

Compared to the entire New York State population, individuals involved in pedestrian-cyclist accidents who were out-patients are much less younger. Almost 24 percent of out-patients were under the age of 10 and an additional 26.5 percent were between the ages of 10 to 20. By comparison, only 12 percent of New York State's population is under the age of 10 and only 13.4 percent are between the ages of 10 to 20.

Table 4. Age of patients vs. Age of New York State Residents

		Type_of patient		Total	N.Y. State
		out-patient	in-patient		
Age	less than 10 yrs.	23.9%	11.1%	22.8%	12.0%
	10 to 20 yrs.	26.5%	7.9%	25.0%	13.4%
	21 to 39 yrs.	21.9%	15.5%	21.4%	27.4%
	40 to 55 yrs.	14.7%	18.7%	15.0%	21.8%
	55 plus yrs.	13.0%	46.8%	15.8%	25.4%
Total		100.0%	100.0%	100.0%	100.0%

Importantly, there is also a sex-age interaction effect on the incidence of accidents among both out- and in-patients (see Table 5). *For both types of patients, females are far more likely to be found among those in the highest age category – 55 years of age or older.* For example, among out-patients in the highest age category, fully 62 percent are female compared to just 38 percent who are male. Among in-patients in the highest age category, the same story unfolds: 59.4 percent are female and 40.6 percent are male.

Table 5. Age and Sex of Accident Victims by Patient Status

Type of patient			Age				
			less than 10	10 to 20	21 to 39	40 to 55	55 thru highest
out-patient	sex	F	39.1%	26.7%	38.4%	44.6%	62.0%
		M	60.9%	73.3%	61.6%	55.4%	38.0%
	Total		100.0%	100.0%	100.0%	100.0%	100.0%
in-patient	sex	F	31.6%	22.2%	45.3%	46.9%	59.4%
		M	68.4%	77.8%	54.7%	53.1%	40.6%
	Total		100.0%	100.0%	100.0%	100.0%	100.0%

In terms of race, almost three-fifths of the patients (58%) are white, 16.7 percent are black, 4.1 percent are Asian, and the remainder are of other races (see Table 6). Compared to New York State as a whole, whites and Asians are underrepresented.

Looked at in terms of ethnicity, three-quarters of patients are non-Hispanic and one-quarter are of Hispanic origin. According to the 2010 U.S. census, individuals who are Hispanic or of Latin origin comprise 17.6 percent of the population of New York State. *Thus, Hispanics are overrepresented among individuals involved in pedestrian-cyclist accidents in New York State.*

Table 6. Race of Patients Vs. Race of New York State Residents

Race	Patients (%)	New York State Residents (%)*
White	58.0	65.7
Black or African American	16.7	15.9
Native American	0.6	0.6
Asian	4.1	7.3
Native Hawaiian	0.0	0.0
Other race	19.2	7.4
Unknown	1.4	(missing)
Two or more races	(missing)	4.8
Total (%)	100.0	100.0
Total (N)	(4121)	(19,378,102)

*Statistics for “Unknown” in New York State and “Two or more races” for patients were not available.

3) Geographic residence of accident victims

Respecting place of residence, 55 percent of all patients come from New York City. A higher proportion of New York City residents tend to be in-patients than residents from elsewhere in the state.

Table 7 below exhibits the New York City boroughs in which accident victims live. Altogether, Brooklyn has the largest number of victims, followed by Manhattan in second place and Queens in third place. The Bronx occupies a distant fourth place with Staten Island trailing far behind in last place.

Interestingly, this ranking of place of residence of individuals involved in pedestrian-cyclist accidents parallels exactly the ranking of the location of *all pedestrian deaths* in New York City. That is to say, most pedestrian deaths occur in Brooklyn followed by Manhattan, Queens, the Bronx, and Staten Island. Within this context, it should be noted that this ranking is not simply attributable to population size. For example, Queens has many more residents than Manhattan (2,230,722 vs. 1,585,873) but lags behind Manhattan in the number of pedestrian deaths.

The ranking of the boroughs with respect to place of residence of victims, though, changes according to the status of the patient. Among in-patients, Manhattan has the greatest number of victims. In part, this is due to the fact that Manhattan has a disproportionately high number of victims who are 40 years of age or older who, we have seen, are more likely to be in-patients.

Table 7. Borough of accident victims: 2007-2010

Borough	Type of patient		Total
	out-patient	in-patient	
Bronx	13.1%	9.9%	12.8%
Brooklyn	34.7%	32.1%	34.4%
Manhattan	26.7%	39.5%	28.1%

Queens	18.6%	16.0%	18.4%
Staten Island	6.8%	2.5%	6.4%
Total	100.0%	100.0%	100.0%

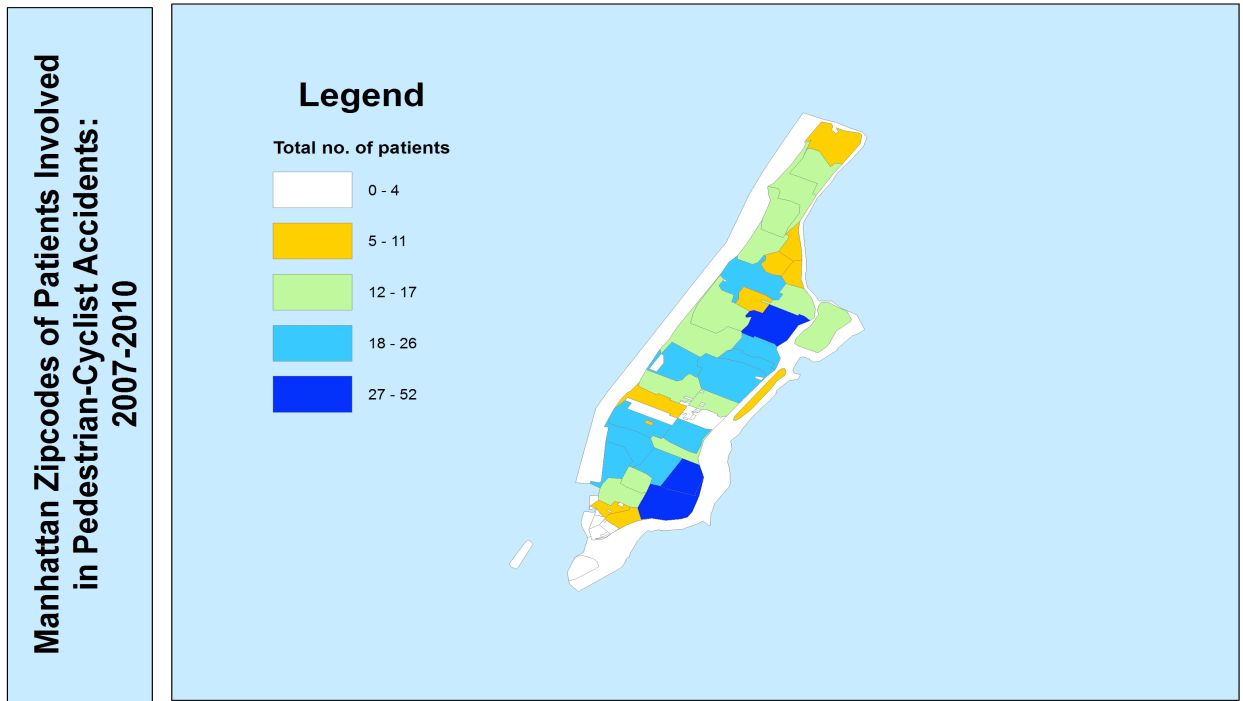
In Table 8 below are presented the top five zip codes in each of New York City's boroughs ranked according to the number of patients involved in pedestrian-cyclist accidents spanning the time period from 2007 to 2010.

Table 8. Top Five Zip Codes in Each of New York City's Boroughs In Terms of Number of Patients Involved in Pedestrian-Cyclist Accidents: 2007-2010

Bronx		Brooklyn		Manhattan		Queens		Staten Is.	
Zip	No.	Zip	No.	Zip	No.	Zip	No.	Zip	No.
10456	29	11206	44	10029	52	11102	27	10301	24
10467	26	11211	43	10002	44	11373	25	10314	20
10453	23	11220	39	10009	43	11106	23	10303	18
10457	21	11221	33	10128	27	11368	21	10310	16
10458	19	11212	32	10014	26	11377	21	10304	15

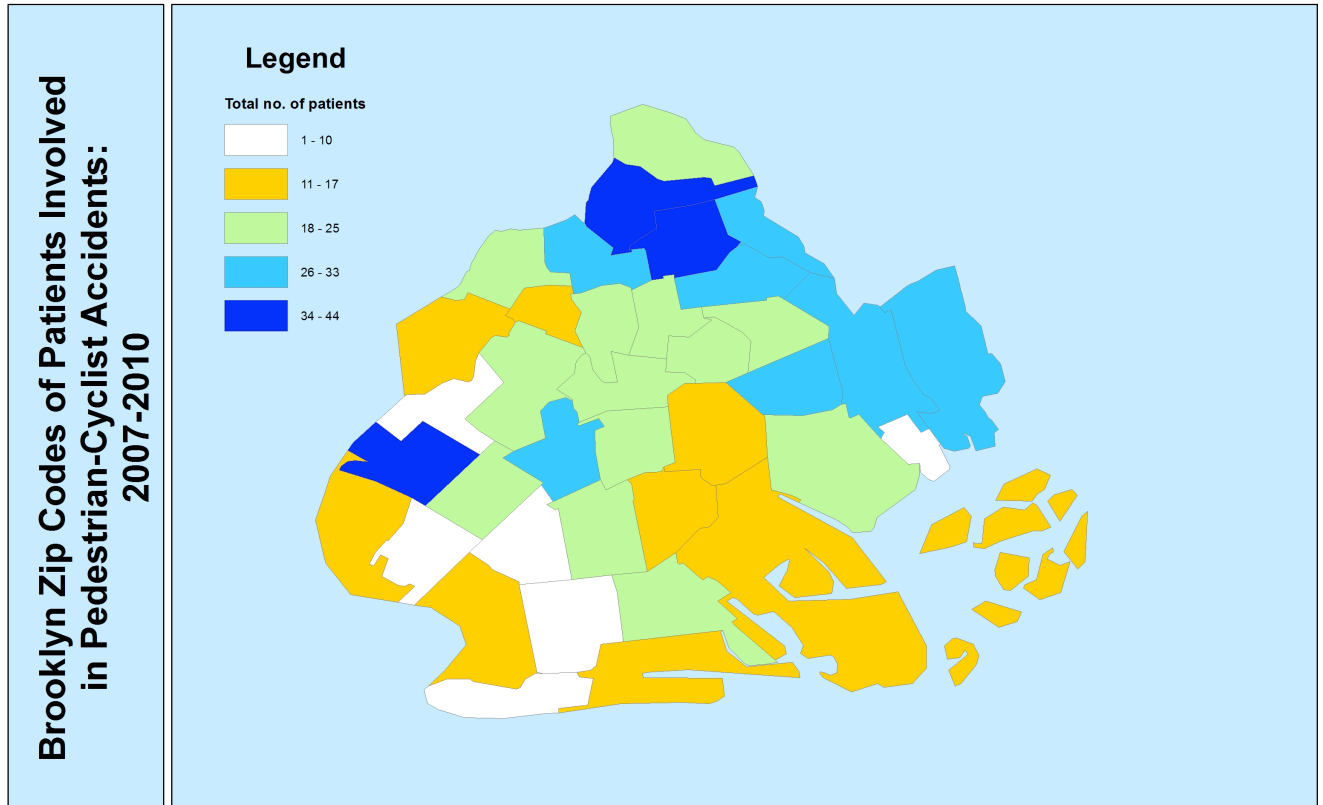
Overall, the zip code with the highest number of patients is located in Manhattan – number 10029. This zip code is situated in the neighborhood of East Harlem. Its boundaries extend North-South from E. 116th Street to E. 96th Street and East-West from FDR Drive to 5th Avenue. Two other zip codes in Manhattan with a large number of patients are situated in the Lower East Side – numbers 10002 and 10009. Map 1 below thematically shades the frequency distribution of patients by Manhattan zip codes.

Map 1. Manhattan Zip Codes of Patients Involved in Pedestrian-Cyclist Accidents: 2007-2010



In Brooklyn, the zip code with the highest frequency of patients is number 11206. This zip code is situated in the Bedford-Stuyvesant neighborhood. The second and third place zip codes in Brooklyn are numbers 11211 and 11220 which are situated in the Greenpoint and Sunset Park neighborhoods, respectively. The distribution of patients by zip codes in Brooklyn is displayed in Map 2.

Map 2. Brooklyn Zip Codes of Patients Involved in Pedestrian-Cyclist Accidents: 2007-2010



Summary and Conclusions

Several important findings have emerged from this study. First and foremost, the incidence of pedestrians involved in accidents with cyclists who needed to receive medical treatment at a hospital far exceeds previous estimates. Earlier research, based on a sample of hospitals nationwide, estimated that there were approximately 1,000 pedestrians hit by a cyclist each year in the United States who needed to obtain medical treatment at a hospital. This present study, based on *every* hospital in New York State, has found that in New York State alone, there were approximately 1000 pedestrians struck by cyclists each year necessitating medical treatment at a

hospital. Even this figure grossly underestimates the frequency with which pedestrians are injured in collisions with cyclists. This figure of 1,000, for example, excludes pedestrians involved in cycling accidents who received medical attention at a walk-in clinic or from their own personal physician. Moreover, it excludes countless number of pedestrians involved in cycling accidents who either did not sustain injuries at all or whose injuries were not serious enough to warrant seeking professional medical attention.

A second finding emerging from this study is that the profile of pedestrians injured in cycling accidents is a distinctive one. Compared to the population for New York State as a whole, victims tend to be much younger and to be members of minority racial/ethnic groups. In particular, Hispanics are overrepresented among pedestrians involved in cycling accidents.

There are also notable demographic differences between out-patients and in-patients who have been involved in pedestrian-cyclist accidents. In-patients, who have sustained more serious injuries, are more apt to be female and older when compared to out-patients.

Finally, the geographic distribution of pedestrians involved in cycling accidents tends to be concentrated in New York City as compared to the rest of the state and also to be concentrated in specific locales within the city. Brooklyn has the highest number of patients and Manhattan has the second highest number of patients. Even within these boroughs, accident victims tend to cluster within smaller geographical units. These boroughs also lead in terms of the total number of pedestrian fatalities.

In sum, this study supports the wide body of anecdotal data that pedestrians are at risk not only from motor vehicle drivers but also from cyclists. In any collision between a pedestrian and a cyclist, blame might be assigned to the pedestrian, to the cyclist, or to both parties. This study has not furnished any evidence which could be used to apportion responsibility. But it has underscored the fact that pedestrian-cyclist accidents are far more common occurrences than previously thought and that government and public health officials need to pay more attention to this phenomenon.

Endnotes

1. New York State, Department of Health, “SPARCS Overview,” p. 1, <http://www.health.state.ny.us/statistics/sparcs/operations/overview.htm>
2. These results indicate that estimates concerning the incidence of pedestrian-cyclist accidents generated by an earlier research study understate the magnitude of the problem. This earlier study estimated that there were approximately 1,000 pedestrian-cyclist accidents necessitating emergency-room visits per year *nationwide*. The previous study was based upon data culled from a random sample of approximately one hundred hospitals with emergency rooms from across the county. (See “The Cyclist- Pedestrian Wars,” J. David Goodman, *New York Times*, September 18, 2010, <http://cityroom.blogs.nytimes.com/2010/09/18/spokes-the-cyclist-pedestrian-wars>.) The authors of this earlier study also helped to analyze the data for this current research.