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An Analysis of Available Bicycle and Pedestrian Accident Data

A Report to the New York Bicycle Coalition

Prepared with funding provided by the
Governor's Traffic Safety Committee

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Introduction

The New York Bicycling Coalition (NYBC) has set out on an ambitious three-year New York Community Safety Campaign funded by Governor's Traffic Safety Committee (GTSC). This effort is multi-faceted, touching on many aspects of bicycle and pedestrian safety. This report is one of the initial tasks in the NYBC campaign. This report, now in its second edition, is one of the initial tasks in the NYBC campaign. Based upon great demand for the report following its initial circulation last fall, NYBC staff made minor stylistic and formatting changes to this new version during January, 2000. Findings, conclusions and recommendations developed by Mr. Brustman have not changed at all.

The report has three purposes, all relating to Bicycle/Pedestrian Accident data.

The first purpose is to take stock of what is known or might reasonably be inferred about bicycle and pedestrian accidents in New York State. The idea is to review readily available data and summarize the scope and character of the problem.

The second purpose is to help guide the accident field investigations that will take place later in the project. This report will be shared with members of the local task force in the four pilot counties selected for participation in this grant, other transportation and enforcement officials, at all levels of government, as well as local bicycle and pedestrian constituencies and other interested citizens. It is NYBC's hope that this report will help generate input and support for the investigations, which will include detailed engineering analyses of problem sites. This report will be used to help narrow the selection of initial investigation areas to those counties most likely to yield useful results.

The third purpose is to suggest possible improvements in local and Statewide data collection systems and current analytical approaches. The report offers observations on the available data, discussing sources and related issues. The report provides some ideas on how this data might be made more complete and how bicycle and pedestrian accidents can be better reported.

Key Findings

Bicycle/Pedestrian Traffic Accidents pose a considerably bigger societal problem than most people assume. While such accidents are 11% of all reported traffic accidents, their detrimental effects are disproportionately larger because:

Each Bicycle/Pedestrian Accident is more serious:

- Bicycle/Pedestrian accidents are 16% of all reported serious traffic injuries
- Bicycle/Pedestrian accidents are 30% of all reported traffic fatalities.

Bicycle/Pedestrian Traffic Accidents affect the very young and elderly:

- Small children and young adults are primary bicycle accident victims.
- Small children and the very elderly are primary pedestrian victims.

Bicycle/Pedestrian Accidents have greater economic impacts:

- A bicycle fatality averages ten years more loss in productive life than other traffic fatalities.
- Bicycle/Pedestrian injuries on average are more serious, incurring higher medical costs.

Bicycle/Pedestrian Accidents are underreported:

- Bicycle-only accidents do not involve auto insurance claims, removing a filing incentive.
- One-third of bicycle accident hospitalization cases aren't in traffic accident databases.

While New York City has more Bicycle/Pedestrian accidents than the balance of the State, accident severity is more serious on Long Island and Upstate:

- Counties outside NYC have 30% of all pedestrian accidents, but have 50% of the fatalities.
- Similarly, these counties have 45% of all bicycle accidents, but 60% of the fatalities.

Systems for Collecting Bicycle/Pedestrian accident data are fairly good, but issues remain:

- Underreporting of bicycle accidents, compared to motor vehicle accidents occurs due to differences in accident definitions, in reporting criteria and in public awareness of reporting requirements.
- Not all collected data is processed and thus does not become available for analysis.
- Routine Bicycle/Pedestrian accident analyses and surveillances are few and limited in scope.

Simple improvements to data systems are administratively and financially possible:

- Recommended remedial actions are within the existing administrative authorities of overseeing State agencies.
- Programs in TEA-21 (the principal Federal Transportation Legislation) mean to encourage safety data systems improvement and offer financial assistance to States for system upgrades.

Section 1

Bicycle/Pedestrian Accidents in New York State

This section provides select statistics about New York's pedestrian and bicycle accidents, giving an overview on the situation's magnitude and character. It also offers some contrasts between New York City and the balance of the State with statistics comparing their respective Bicycle/Pedestrian accident experiences.

The information is for a "Composite 1995" - representing that calendar year but not necessarily from any one data source. This is because New York data from various sources do not exactly agree and, in some cases, are not available for all years. So the data portrayed here is sometimes adjusted, rounded, or inferred. In some cases data extrapolated from other sources fills gaps. This portrayal technique foregoes detailed explanations of source-to-source variances. 1995 is used because it has good coverage from multiple sources and is fairly recent.

A Statewide Picture

The general perception is that bicycle and pedestrian accidents are a small subset of existing traffic safety problems. This is probably because Bicycle/Pedestrian accidents are a small portion of all reported accidents. Table 1 refutes this perception by showing the share of **Bicycle/Pedestrian injuries and fatalities are far from negligible**. That share is disproportionately high, especially when compared to respective shares of traffic safety attention.

Table 1. NYS Traffic Accidents

	Total	Bicyclists & Pedestrians	Percent Bicycle/ Pedestrian
Reported Accidents	250,000	29,000	11%
Injuries	190,000	30,000	16%
Fatalities	1,700	500	30%

High as they are, the proportions of Bicycle/Pedestrian injuries shown in Table 1 are nevertheless significantly underestimated, particularly for bicyclists, due to flaws in current reporting requirements. While motorists self-assess their injuries in a Motor Vehicle Accident Report, bicyclists may only report “serious” injuries in a Bicycle Accident Report. Department of Motor Vehicles (DMV) definition of “serious” is an injury causing risk of death, loss or impairment of an organ, or a protracted disfigurement.

Thus, **on motor vehicle reports a complaint of a sprain can result in a personal injury accident classification, while on bicycle reports the threshold is an injury likely to demand urgent hospital treatment.** In addition to relative underreporting, we may also assume that the average reported injury for a bicyclist is substantially more serious and the attendant medical damages many times more costly. New York State Department of Health data on hospitalizations and length of hospital stay supports this assumption.

Further, research indicates even serious bicycle accidents are underreported. This is especially so if a moving vehicle is not involved though the accident is reportable by law or regulation. A national study (Stutts and Hunter, Highway Research Record 1635) showed **less than two-thirds of serious bicycle accidents (taken from emergency room records) are in State Motor Vehicle Accident databases.**

We can conclude then that a good portion of serious accidents aren’t captured in the DMV database, with the result being that Table 1 numbers actually understate the situation. **Bicycle/Pedestrian accidents could number as high as 25% of reportable injuries.** Further, since the reportable threshold for bicycle injuries is

much more severe, as many as 35% of the really serious traffic injuries involve bicyclists.

Table 2 reviews select contributory factors in Bicycle/Pedestrian accidents. Every accident has one or more contributory factors. In the case of human factors, only data from police reports are used in the table. Police reports are presumed more objective in this regard than motorist reports. While the table's analysis is not exhaustive, it does help paint a picture of what is involved in such accidents - and what is not involved. A sense of the relative magnitude of involved factors, given in this table and in some of the following tables, helps orient investigative efforts.

While factors suggest a diagnosis, they are neither sufficient nor explicit enough to indicate proper accident countermeasures. The factors need physical context, which is why field investigations are necessary. Investigators reconstruct accident situations from actual filed reports to establish in detail likely events and recurrence patterns at a particular site. Then, by comparing a field examination of the accident site against its accident pattern, they can devise specific and general (for similar sites) remediation strategies. To give a simplified example, knowing that a stop sign is a factor tells little about possible causes. Site investigation is necessary to determine whether the sign is obscured from view, is improperly placed or is even the appropriate traffic control device for the location.

Table 2. Select Contributory Factors^{1,2} in Bicycle/Pedestrian Accidents

Factor	Observation	Comment
Bicyclist/ Pedestrian Error or Confusion	This is a significant factor, found in 20% of Bicycle/ Pedestrian accidents, 40% of bicyclist fatalities and 30% percent of pedestrian fatalities.	This high presence in fatalities likely reflects that the bicyclist and pedestrian population includes a high number of small children and vulnerable elderly. These individuals often cannot make needed judgements, react quickly or take fast evasive action. Further, intoxicated pedestrians are likely to be confused. This factor may be overstated, especially for fatalities and extremely serious injuries, since incapacitated bicyclists/pedestrians cannot relate their version of events to the police at the scene. Further, the source of the confusion is unclear as to whether it is due to age, impairment, poor traffic control, obscured signs, etc.
Driver Error: Driver Inattention	This is a factor in about 10% of Bicycle/Pedestrian accidents.	Driver error is present in over one-third of all reported Bicycle/Pedestrian Accidents. Pedestrian and bicyclist error is present in about 20% of them. Collectively, human error is probably the most significant factor.
Driver Failing to Yield Right-of-Way	This is a factor in about 10% of Bicycle/Pedestrian accidents.	
Unsafe Speed or Maneuver	This is a factor in about 6% of Bicycle/Pedestrian accidents.	
Alcohol/Drug Involvement	Appears to be significant among fatalities. Present in under 2% of Bicycle/Pedestrian Accidents, but in one third of Bicycle/Pedestrian fatalities.	The data doesn't indicate whether the driver or the bicyclist/pedestrian is impaired. Anecdotal evidence suggests intoxicated pedestrians are frequently involved in fatal accidents.
Bicyclist/Pedestrian Disregarding Traffic Control	This occurs in 2% of pedestrian accidents and 3% of bicycle accidents.	Instances of widespread disregard likely predominate, but don't often result in an accident.
Time of Day	Highest occurrences in PM, peaking during the evening rush hours.	Corresponds to expected levels of Bicycle/Pedestrian activity. Evening peaks often coincide with dusk, but traffic density is more likely the cause than lighting level.
Rain or Snow	Doesn't appear to be a significant factor	Bicyclists and pedestrians are less likely to be out in rain or snow.
Collision with Fixed Objects	Not a significant factor, even for bicyclists.	It is possible these bicycle accidents, even serious ones, are significantly underreported.
Non-Human Factors	Not a significant factor according to the data.	These include brake and other equipment failure, potholes and debris in road, etc. Anecdotal evidence suggests understatement since debris may cause evasive actions reported as erratic bicyclist error.
Roadway Design Flaws	No Data Collected	This data would be unreliable, as it requires engineering judgements generally beyond the expertise of individuals filing accident reports. Professional field investigation is needed to spot such flaws.
Notes:	<p>1. Data on human factors are from police reports only. These are presumed more objective than motorist reports.</p> <p>2. There can be more than one factor in an accident.</p>	

Data drawn from DMV Form MV144

Roadway factors are, of course, also of interest in Bicycle/Pedestrian accidents. Table 3 provides an overview of two factors: Roadway Type and Traffic Control. A third factor, Roadway Alignment, is mentioned only to convey its apparent lack of effect.

Table 3. Select Roadway Factors in Statewide Bicycle/Pedestrian Accidents

Factor	Proportion				Comment
	Bicycle		Pedestrian		
	Accidents	Fatalities	Accidents	Fatalities	
Roadway Type:					<p>Accidents are distributed among roadway types in accord with expected Bicycle/Pedestrian activity, but fatalities are skewed towards roadway speed (except on limited access roads where bicycles are generally prohibited.)</p> <p>Pedestrians on limited access highways are at exceptional risk of being killed. A motorist whose car breaks down can become a pedestrian in this situation.</p>
Municipal Streets	77%	50%	85%	55%	
State, County and Town Roads	23%	50%	14%	30%	
Limited Access Highways	<1%	0%	1%	15%	
Traffic Control:					<p>Similar distributions for accidents and fatalities suggest traffic control devices are not a dominant factor in accident severity.</p> <p>The pedestrian numbers at "None" suggests jaywalking accidents, but a check of NYC data showed "None" had a much lower rate. Alternatively, the numbers may suggest that "None" reflects walking outside of NYC along roadways without sidewalks.</p> <p>No passing zones account for the majority of fatalities in "Other."</p>
None	45%	41%	50%	60%	
Signal	35%	39%	38%	30%	
Stop Sign	15%	6%	5%	2%	
Other	5%	14%	7%	8%	
Roadway Alignment:	Data do not appear to show significant patterns				Roadway alignment includes factors such as curves and grades.

Data drawn from DMV Form MV144

Another dimension in these accidents are the types of individuals involved. Table 4 shows that the involved population is largely male and younger than that for all traffic accidents. The principal exception is elderly pedestrians.

Table 4. People Involved in All Bicycle/Pedestrian Accidents

	Median Age (for fatalities only)	Gender	Observation	Comments
Bicyclists	25 years	80% Male	30% are children under 15 years, 20% are from 15 to 45 years. There is a bimodal age distribution, with the two peaks occurring at 13 and 30 years for fatalities, and 13 and 40 for injuries.	The median fatality age for all traffic accidents is 35 years. So at 25 years, Bicycle/Pedestrian accidents tend to claim more children and young adults. Aside from the emotional toll, in economic terms this means ten more years of lost productive life in each fatal accident. Some injuries require lifelong medical treatment.
Pedestrians	35 years	70% Male	Teenagers and elderly over 70 years dominate.	The median fatality age is the same as for all traffic accidents, but the distribution tends towards children and elderly.

Before concluding this Statewide overview, two other pieces of information should be noted. First, while statistics can vary from year to year, **the long-term trend in all traffic accidents is a total decline approximating 2% per year. Both bicycle and pedestrian accidents share this trend.**

The other information involves accident rates. Because there is little solid information on distances walked or biked, bicycle and pedestrian fatality rates are given as fatalities per population rather than as per unit of travel. **New York’s bicyclists suffer 2.7 fatalities per million persons each year compared to the National rate of 3.0. The State’s pedestrians suffer 21 fatalities per million persons each year compared to the National rate of 20.**

In and Outside New York City

There are many contrasts between NYC and the balance of the State. These generally stem from the differences in traffic and population densities, travel speeds and the availability of transit.

The crowded nature of the City makes traffic and pedestrian conflict more inevitable, leading to considerably higher numbers of pedestrian accidents there. However, a denser environment also makes vehicle speeds lower on average. **It should be no surprise then that a Bicycle/Pedestrian accident occurring outside the city is more likely to be fatal.**

The widespread availability and use of public transit in New York City also affects Bicycle/Pedestrian accident rates. Public transit trips require each rider to be a pedestrian for a portion of the journey, much more so than with car trips. That is, the walk to and from a transit stop is usually much longer than the walk to and from a parked vehicle, especially so in the outer boroughs. Thus transit travel creates additional pedestrian exposure. Conversely, transit makes pre-driver aged children less dependant on bicycles than their rural and suburban counterparts, decreasing bicycle exposure for this group.

Accidents in and outside NYC are compared in Table 5. New York City has a lower proportion of all traffic accidents, but a higher proportion of pedestrian accidents. The bicycle accident data is less skewed, but still show more accidents in the city. When looking at fatalities, the data skews less towards the city, implying that the consequences of an accident tend to be more serious outside NYC, reflecting – as noted previously - higher motor vehicle speeds.

Table 5. Distribution of New York State Accidents and Fatalities Outside and Within New York City

	Outside New York City		Within New York City		Comment
	Accidents	Fatalities	Accidents	Fatalities	
All Traffic Accidents	60%	70%	40%	30%	Using fatalities as an indicator, accident severities appear greater outside the city for all traffic accidents, Bicycle/Pedestrian incidents included. Though NYC has by far the most pedestrian accidents, the area outside the City has about the same amount of pedestrian fatalities.
Bicycle Accidents	45%	60%	55%	40%	
Pedestrian Accidents	30%	50%	70%	50%	
Population	55%		45%		

Accident data drawn from DMV Form MV144

Table 6 shows comparable data for pedestrian location in pedestrian accidents. Pedestrian behavior isn't seen to be much different whether in or outside NYC, at least in terms of pedestrian locations. Comparable data for bicyclist location at traffic controls is unfortunately not available. Also, accidents between bicyclists and pedestrians not involving a motor vehicle do not exist in DMV's database.

Table 6. Pedestrian Location in Pedestrian Accidents

Action	Statewide	New York City	Comment
Crossing Without Signal or Crosswalk	24%	20%	NYC pedestrian location patterns are similar to Statewide patterns. Differences are probably an indication of the greater number and density of signals in NYC. Accidents when crossing with a signal probably involve turning vehicles. "Emerging Between Parked Vehicles" heavily involves children under age 15.
Crossing With Signal	19%	25%	
Crossing Against Signal	11%	13%	
Crossing in Marked Crosswalk	5%	6%	
Emerging Between Parked Vehicles	8%	8%	
Note: Columns do not sum to 100% because many locations were unspecified.			

Data drawn from DMV Form MV144

The Bicycle/Pedestrian accident picture for New York State shows that each year 500 bicyclists and pedestrians are killed and tens of thousands seriously injured. It also reveals that the problem, especially in regard to bicycle accident injuries, is significantly underreported. Human error (on the part of cyclists, pedestrians and motorists), principally from confusion, inattention and unsafe travel are present in about half of all Bicycle/Pedestrian accidents. Males and young people are the principal victims of both bicycle and pedestrian accidents. People over age 70 are also over-represented in pedestrian accidents.

Section 2

Guidance for Accident Field Investigations

The Statewide picture just provided gives magnitude to the overall problem, but it is not sufficient to guide field investigators to the promising locales – a major goal of NYBC’s Community Safety Campaign described in the introduction to this report. This section attempts to narrow the choice of locales to those likely to provide the best opportunities for mitigation of specific “hot spots” – intersections or road stretches within the local transportation system – with the overarching goal of preventing and reducing Bicycle-Pedestrian accidents and fatalities.

General Method

The choice of locales has to be based on more than just accident data. Other factors are important to successful fieldwork. A list of relevant factors that should be considered include:

- Accident Rates
- Accident Occurrences and Clustering
- Area Type (e.g., NYC, suburban, upstate metro, rural)
- Local Resources (e.g., academic institutions, student interns)
- Local Cooperation (e.g., police/sheriff, highway departments, advocacy groups)
- Logistics (ease and cost of conducting investigations)

The last three factors require information beyond the scope of this report, and must be sought when NYBC conducts its county outreach efforts. In fact, these factors may “make or break” a county’s application for inclusion in this new program and be the primary determinants of eventual success – as measured by reduced injuries and a local population that is more educated about bicycle and pedestrian issues. This report utilizes available data, relating to the first three factors, to narrow the choices, creating a pool of promising candidate counties. Final choice lies with the NYBC Board of Directors, who will weigh all six factors outlined above.

Employed Data

Several sets of data were looked at to see which could be useful for the task of county selection, with the two most promising sets coming from the NYS Departments of Health (DOH) and Transportation (DOT). They involve, respectively, hospitalization and accident surveillance data, from 1992 (DOH) and 1993 (DOT) - older than desired but reflecting the best and most complete available for this task.

DOH’s data on “Hospitalizations Due To Bicyclist and Pedestrian Injuries” are the most useful of the two sets, and preferable to DMV statistics for two principal reasons. First, and most important, they are more reflective of the actual injury situation for reasons discussed elsewhere in this report. Second, they are readily available, while DMV’s injury data require that time be secured for special computer runs.

DOT’s “Summary of Bicycle and Pedestrian Accidents on State Highways” was a secondary source. It reflected output from DOT’s State Accident Surveillance System, a database that looks for clusters of accidents on State Highway routes. While this system omits accidents on local roads, is useful to see what cluster patterns exist on the busier roadways. Unfortunately the data was too thin and most clusters had too few accidents to be statistically meaningful. Still, the clustering was used as a general indication and DOT’s surveillance data may be of some use within counties eventually selected, pointing to sites for field investigations coordinated by traffic engineers under contract to NYBC.

A summary of DOH data by county can be found in the Appendix to this report, presented in two tables, one for pedestrians and one for bicyclists.

DOH Hospitalization data sets were chosen over DOH Death data sets for analytic reasons. The main one is they provide a far larger number of incidents, making them statistically more reliable. The corollary of this is that the difference between a death and a serious injury in any incident is often only a quirk; a slight variance in the angle of the impact, or the blow just missing a vital organ. This makes the pattern of deaths more erratic compared to the pattern of injuries.

Another reason is that from an economic point of view, injuries in total are a problem quite comparable to fatalities. A Bicycle/Pedestrian fatality may cost thirty productive years of life and a serious injury may cost a quarter of a productive year plus \$7,000 in hospital costs (DOH estimate). Serious injuries often require post-hospital rehabilitation, maybe lasting a lifetime, incurring substantial additional cost. With serious injuries out-numbering fatalities 70 to 1, their economic loss in aggregate approaches that of fatalities.

Candidate Counties

From the DOH data, the five counties outside of NYC with the highest frequencies and the five with the highest rates were identified for further examination. This was done for both pedestrian and for bicycle injuries. **As it turns out NYC does not have high rates for bicycle injuries**, perhaps because people below driving age, a high incidence group, aren't as dependent on bicycles for mobility as they are elsewhere in the State. **On the other hand, NYC has a very high rate of pedestrian injuries.**

New York City's special character requires a different process for accident investigation site selection. NYBC's work plan for this grant from GTSC waits until Year Two to select a NYC borough for inclusion in this Statewide grant, and the organization is working with city and State agencies, along with local private constituent groups, to devise a program best tailored to NYC's unique circumstances. **Thus, the guidance in this section of the report section is for areas outside New York City.**

The pool of candidate counties has been made through two cuts. New York has 62 Counties, 57 outside of NYC. The first cut (Table 7- Counties of Interest) narrows the focus to fifteen. These counties are of interest because they exhibit the highest injury frequencies, the highest injury rates, and/or showed some clustering. Table

7 lists the counties, their injury data, whether the county drew attention from DOT’s Surveillance System, and the counties area types.

Table 7. Candidate Counties

(Outside NYC)

County	Bicycle Injuries		Pedestrian Injuries		NYSDOT Surveillance Indication ¹	Area Type ²
	Frequency	Rate	Frequency	Rate		
Albany	33	11.28	44	14.92	X	UM
Cattaraugus	18	20.97	11	12.66		R
Chemung	19	19.96	9	9.45		UM
Delaware	13	26.82	--	11.29		R
Erie	150	15.52	176	18.14		UM
Madison	14	19.97	6	8.68		R
Monroe	71	9.90	100	14.05	X	UM
Nassau	194	15.10	348	27.06		S
Oswego	17	14.23	13	10.95	X	UM
Rockland	37	14.06	46	17.33	X	S
Schenectady	22	14.74	32	21.20		UM
Suffolk	255	19.32	261	19.74		S
Sullivan	7	10.59	8	12.03	X	R
Tompkins	15	15.59	7	7.08	X	UM
Westchester	101	11.55	185	21.15		S
Notes:						
1. Surveillance Indication means DOT system indicated some clustering.						
2. Area Types: R = Rural; S = Suburban; UM = Upstate Metro						

Injury data from DOH Bureau of Injury Prevention

The remaining task is to reduce the counties in Table 7 into a short list that is the pool of Candidate Counties. This was done using a scoring system that gave each county points based on its rank in each of Table 7’s frequency and rate columns: 5 points for the highest rank, 4 for the next, and so on. Three points were also given to each county that had a surveillance indication.

A representation of area types is also necessary. At least one county of each type should be among the candidates. To facilitate this, the top scoring counties are grouped by area type (and by order of score within the group).

The resulting Pool of Candidates is provided in Table 8. The counties in this table provide a good range of bicycle and pedestrian accident situations and

environments. In the table, the column “Minimum Number” is the smallest number of counties needed from the group.

Table 8. Pool of Candidate Counties (Second Cut)

Area Type	Minimum Number	Candidates
Suburban	1	Nassau Suffolk Westchester
Upstate Metro	2	Erie Monroe Schenectady Albany
Rural	1	Delaware Cattaraugus Madison

The actual choice of counties for field investigations, as mentioned earlier, entails factors other than accident data. Table 8 is based only on accident data, and so is not the sole consideration. Based on non-data factors and other information available to the investigators, other counties may be chosen, and further logistics may affect the sequencing of the fieldwork.

Section 3

Observations on Bicycle/Pedestrian Data

A purpose of this report has been to take a look at available Bicycle/Pedestrian data and collect enough of it to describe the general situation in New York. This section conveys brief observations on the strengths and limitations of the data found. It also mentions possibilities to consider for improvement of data capture, data quality and data dissemination.

Data Sources

Potential sources of statistical data and other information were sought in person, by phone and over the internet to see what was available. These sources can be roughly classified into four groups: Federal, State, Local and Other.

Federal. Federal Sources, principally the Bureau of Transportation Statistics and the Federal Highway and National Highway Traffic Administrations, have vast amounts of information. Being national in purview, their information permits comparisons between New York and other states. The two main shortcomings are limited information on non-fatal accidents and little information on location (e.g. highway class, geometrics and area type). One Federal resource, FARS (Fatal Accident Reporting System) provided authoritative information on fatalities but, by definition, none on non-fatal accidents.

State. The chief State data source was the Department of Motor Vehicles. By far it has the most extensive and best information available on New York Bicycle/Pedestrian traffic accidents. This is an immensely valuable resource. **DMV's "canned" summaries were good, which is especially important since**

most users heavily rely on this type information. The State Department of Transportation does not collect Bicycle/Pedestrian data, though it does some analysis of DMV's data by adding some location information. The Department of Health had good data on deaths and injuries, but includes only injuries serious enough to require hospitalization. The Division of State Police does not keep a traffic accident database.

Local. Local Agencies are not a meaningful source of data. Information collected by local police, as with State Police, is forwarded to DMV. A few random inquiries revealed that, with the exception of NYC, cities and counties across the State do not keep meaningful statistical data. **It could be logically concluded that local safety agencies are not currently doing systematic analyses of accident data.**

Other. Several national and local sources compile information. Two notable sources are the Insurance Institute for Highway Safety and the Bicycle Helmet Institute. Neither collects original data but each did data syntheses and analyses of information collected from government, industry and institutional sources. A few academic, advocacy and research groups have done narrow, specialized studies.

Data Issues

As discussed below, awareness of selected data issues provides a context for issues such as interpretations of analyses, expectations of precision and reliance on findings.

The relative limitations of available Bicycle/Pedestrian accident data are somewhat limited relative to motor vehicle accident data. Progress is being made in improving the rate of capture and the quality of this data, and in recent years DMV has introduced useful modifications to its procedures. Yet there remains a lot more to be done by this and other State agencies

The relative limitations of available Bicycle/Pedestrian accident data do not make it unusable, just more difficult to investigate certain types of problems and to get high degrees of statistical confidence. Inferences and conclusions, however reasonable, drawn from current data cannot be "proven beyond a doubt." Of course, this should not deter action on the problems but rather underlines the need for continued improvement.

Data issues fall into four broad categories:

Data Design. In that DMV processes bicycle-pedestrian accidents, when reported, on forms designed for motor vehicle accidents, it can be seen that DMV, historically, treats Bicycle/Pedestrian accidents as a type of motor vehicle accident. This may make the system easier to administer, but does not fit the situation as well as it could. For instance, data collection for accidents involving bicyclists and vehicles focus on factors pertaining to the driver's actions and relatively little on the bicyclist and pedestrian actions. Also, reporting requirements and thresholds for bicycle-only accidents (either inadvertently or by administrative necessity) are different, preventing comparative analyses.

Reporting Levels. There are numerous reasons why Bicycle/Pedestrian accidents, particularly bicycle accidents, are greatly underreported relative to motor vehicle accidents. The current reporting system is oriented to Bicycle/Pedestrian collisions with moving motor vehicles on public roads.

Bicycle-only accidents on public roads and any accident on private roads need not be reported. These exclusions tend to understate the size of the bicycle safety problem and obscure the significance of certain accident types. While they can provide useful data, bicycle-only accidents like hitting a curb, getting caught in grates or potholes and hitting utility poles are rarely captured. Similarly, there is no capture of data for accidents occurring on bike paths, institutional roadways, most sidewalks, off street parking areas, shopping center roads, etc.

A major impediment to the capture of good data is the simple fact that the bicycling public is largely unaware that there is even a reporting system. Furthermore, bicycle-only accidents do not trigger auto insurance claims, taking away a major incentive for filing reports with DMV.

Data Compatibility. While most agencies are generally internally consistent in data collection, there are some inconsistencies between agencies and between time periods. This is not due to sloppiness but rather to varying definitions and techniques, chosen to suit each agency's particular purposes. In the case of temporal inconsistencies, it is often due to the introduction of process refinements or new definitions, causing one year's data to be not quite comparable to subsequent time periods.

Smaller Incident Population. Relative to motor vehicle accidents, Bicycle/Pedestrian accidents are few in number - only about 1% of the total. Thus, the data is comparatively thin and patterns are hard to detect. This is particularly a problem when disaggregating data to county levels, specific road locations and other similar areas. At those levels statistical confidence is low, requiring analyses to be necessarily more reliant on judgement. The relatively small incident population also forces administrative compromises. For example, processing bicycle-only accident reports may not be economical. It appears that the expense of computer coding and programming for a relatively small amount of data is a deterrent, and at this time **DMV does not process the bicycle-only accident reports currently received.**

Possible Data Improvements

There are many possibilities for improving Bicycle/Pedestrian accident data capture and processing. Some ideas and suggestions are provided in this section and they require further serious discussion and analysis. Even if they are found technically feasible, questions of benefit/cost, of appropriate regulation and of government roles and priorities would need to be weighed and addressed.

Data Definition.

- Modify the “serious” injury only criteria for bicycle-only accident reports to something comparable to the KABC system for motor vehicle injuries. (The KABC system classifies injury into four levels of severity - see Form MV104 Instructions in Appendix.)
- Redefine bicycle accident reporting criteria to include key bicycle-only accident situations and to include serious off-highway accidents.

Data Collection.

- Use sampling to determine what is not being reported. More needs to be known about underreporting if policy making in the area of Bicycle/Pedestrian safety is to be more effective.
- Consider an Emergency Room reporting requirement for serious bicycle accidents similar to that for gun shot wounds.

- To increase public awareness of the reporting system, seek the cooperation of groups such as:
 - Health insurance companies/doctors should request copies of accident reports for their files when treating bicycle injuries.
 - Helmet manufacturers could offer a “bounty” (perhaps in the form of a helmet discount) for a copy of the filed accident report and damaged helmet when the bicyclist is purchasing a replacement.
 - Bicycle Clubs should remind their members about the need to report bicycle accident data to local law enforcement and public health officials.
 - Other groups, such as Insurance Companies, AAA and service organizations should include the need to report bicycle accidents in safety materials and programs provided to schools, scouting, and other youth oriented organizations.
 - Counties and other Municipalities should be urged to use and analyze Bicycle/Pedestrian data as part of their traffic safety programs.

Data Processing and Analysis.

- The Department of Motor Vehicle should start processing bike-only accident reports on a regular basis, or at least a statistically sampling of the reports it receives.
- At the next redesign of Report Forms and Accident Summary Sheets (Forms MV 104 and MV144), consider revisions that enhance Bicycle/Pedestrian accident data utility, such as include the bicycle as a vehicle in “two vehicle manner of collision” summaries (MV 144’s Table 12B). At present it does not portray the nature of the collision for bicycles.
- DMV should report annually on Bicycle/Pedestrian accidents, including an analysis of statistics, trends and countermeasures taken.
- The Department of Transportation should do an annual surveillance of Bicycle/Pedestrian accidents to spot high incidence locations.

- Require before and after accident data analysis for Bicycle/Pedestrian accident countermeasures taken by DMV and DOT. Such analyses can help evaluate the effectiveness of measures taken, including general regulation, specific accident site remedies, and large-scale safety education programs.

The preceding ideas do not require new laws. Existing laws seem adequate, or at least the possibilities allowed by them are far from exhausted. Instead, the above ideas mostly involve State Agency actions within current authorities and voluntary cooperation from interested parties.

Financing for such improvements is available from Federal programs meant to encourage States to upgrade their traffic safety data systems. The Safety System Management funds authorized in the landmark Federal Transportation Efficiency Act for the 21st Century (TEA-21) could be a principal source of funding.

Appendix

This appendix contains the following items:

DMV Form MV-104, Report of Motor Vehicle Accident, Pages 1 and 2. This form is used for bicycle and pedestrian accidents involving a motor vehicle. It requires the reporting of any accident causing death, any injury or \$1000 of property damage anywhere in the State.

DMV Form MV-104C, Bicycle Accident Report, Pages 1 and 2. This form is for bicycle accidents **not** involving a motor vehicle. Note the instructions call for the reporting of deaths and only serious injuries on public highways. Other injuries, property damage, and off-highway accidents (bikeways, sidewalks, many campus roads, etc.) are not to be reported.

DMV Fatality Data by County. This table shows 1995 Fatal Traffic Accidents, Total Deaths, Pedestrian Deaths and Bicycle Deaths.

DOH Hospitalizations Due to Bicycle Injuries by County. This data was referred to in the section Guidance for Accident Field Investigations. It was used to help select candidate counties.

DOH Hospitalizations Due to Pedestrian Injuries by County. This data was also referred to and used in the section Guidance for Accident Field Investigations.