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Road Infrastructure as a Contributing Factor to Pedestrian Fatalities in New Jersey

New Jersey Bicycle and Pedestrian Resource Center

About

The Alan M. Voorhees Transportation Center (VTC) is a national leader in the research and development of innovative transportation policy. Located within the Edward J. Bloustein School of Planning and Public Policy at Rutgers University, VTC has the full array of resources from a major research university on transportation issues of regional and national significance.

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Introduction

Pedestrian fatalities account for a large fraction of crash fatalities in the state of New Jersey. In 2012, reported pedestrian fatalities accounted for 26.5% of all crash fatalities, the highest proportion in the nation[1]. This is largely because New Jersey is an urbanized state and has a relatively high share of pedestrian travel. The preliminary estimate is that 169 pedestrians were killed in 2014. Reducing the number of pedestrian fatalities is clearly a major objective. This study seeks to understand how poorly designed road and pedestrian infrastructure contributes to pedestrian fatalities: Can a causal mechanism be determined whereby changes in road infrastructure may be able to reduce fatalities and the risk that pedestrians face when travelling?

In conducting this work, we have uncovered many other issues that hinder the advancement of policies to reduce pedestrian fatalities. Chief among these is problems with the crash data on which decision making relies. This ranges from the crash forms that police use to record information to the ultimate processing of that information by state agencies. As part of this project we have examined these issues to provide a better understanding of what factors are associated with pedestrian crashes.

Defining Pedestrians

Transportation planners generally consider pedestrians to be people who are traveling on foot from one location to another[2]. These may be purposeful utilitarian trips that are made to access a destination or may be leisure or recreational trips (e.g., "dog walking" or for exercise). They may also constitute part of a longer journey that includes another mode of travel, especially a transit trip. These trips generally take place on public roads, but may also include portions that are on private property, such as across parking lots. As walking offers a host of health and environmental benefits, most planners see pedestrian activity as something to be encouraged. It is however not without risks, most notably the risk of being injured or killed by a motorized vehicle. According to police reports, 157 pedestrians were killed in the state of New Jersey in 2012.

The National Highway Transportation Safety Administration (NHTSA) classifies pedestrians as:

> *… any person on foot, walking, running, jogging, hiking, sitting or lying down who is involved in a motor vehicle traffic crash. Also, a traffic crash is defined as an incident that involves one or more vehicles where at least one vehicle is in transport and the crash originates on a public trafficway. Crashes that occurred exclusively on private property, including parking lots and driveways, [are] excluded (National Highway Traffic Safety Administration, U.S. Department of Transportation 2014).*

This definition differs from that used by transportation planners. The NHTSA definition focuses on the location of the motor vehicle, not the pedestrian, and puts the vehicle at the center of the definition, not the victim. Further, it ignores the motivation of the "pedestrian" and whether they were engaged in traveling from an origin to a destination or simply strolling.

Why does this matter? How we define pedestrians has an effect on the number of people who are counted as pedestrian deaths. The definition used by NHTSA means that some people killed or injured by motor vehicles may not have been traveling as pedestrians. For example, some are motorists who are killed or injured standing outside a disabled vehicle. While this information needs to be recorded, in our view, these are not "pedestrian" casualties.

1 Excluding the District of Columbia

2 According to dictionary.com a pedestrian is "a person who goes or travels on foot; walker."

Likewise, someone gardening in front of their house who is hit by an out of control car is not a pedestrian in the definition used for planning purposes. Alternatively, the NHTSA definition may be undercounting deaths of pedestrians who are going from one location to another but are doing so in private parking lots or on private roads.

The question of who counts as a pedestrian matters because it affects how we assess risk for pedestrians. How transportation planners, traffic engineers, and public health officials determine risky roads, intersections and types of facilities is contingent on knowing where and how these deaths occur. While it is important to count people killed and injured by motor vehicles, not all are pedestrians. Planning efforts and funding to address pedestrian safety and mitigate future deaths could be more effectively spent if an understanding of who is a pedestrian engaged in travel were more explicitly measured in aggregate datasets.

Methodology

For this report, we analyzed all of the police reports for pedestrian deaths in New Jersey for the year 2012. We chose to study 2012 because the reports for all of 2013 were not yet available. First, we obtained a list of the all the police report identification numbers from the Plan4Safety database, a database of crash reports compiled by the Rutgers Center for Advanced Infrastructure and Transportation. We then took this list to the New Jersey Department of Transportation (NJDOT) where we obtained paper copies of each police report.

Once we had complete police reports, we summarized the information on police reported crash causes, demographics on the victim and driver, and environmental information, such as weather conditions. Neighborhood and roadway images from Google Maps and Google Street View were added to our summaries and provided a basis for examining the road infrastructure. Information about how the police report assigned fault and whether the report described the pedestrian wearing dark clothing was also included. Reports also provided information on the drivers perspective and whether the driver saw the pedestrian beforehand or indicated that the "pedestrian appeared out of nowhere."

A Microsoft Access form was created to input data for each police report. On a weekly basis, we convened a group meeting to discuss a subset of reports to ensure that our Access form was sufficiently capturing the complexity of the police reports and to identify any "non-pedestrian" fatalities that do not match the definition discussed above.

The summaries we created for all the 2012 pedestrian fatalities, including aerial and Street View imagery can be found in the Appendix.

Data Issues

A difficulty in studying the collisions came from many inconsistencies in the data. From the crash location to the NJDOT reporting system, the reports go through a series of steps, each providing the opportunity for introduction of errors and inconsistencies.

Difficulties begin at the crash site, where the responding officer may not be trained in analyzing traffic collisions. The first officer on scene may not have the training or experience needed to properly assess a traffic collision, but it does fall on that officer to file the report. While free training is available (via a grant from the New Jersey Division of Highway Traffic Safety), many departments cannot afford the time commitment required. This explains some of the broad variations in detail found in the reports. Some reports were no more than one sentence long and essentially boiled down to "a vehicle hit a pedestrian at this location" with no further analysis, while others included over a dozen pages of narrative and pertinent information. Furthermore, even the training available does not provide officers with the knowledge to assess how infrastructure may be a causal factor in a crash (O'Day, 1993).

Aside from training, local priorities come into play when determining the amount of effort that goes into investigating a crash. A municipality with a high crime rate, for example, may have a police force that sees traffic crashes as a distraction, rather than a critical component to community policing. In those cases, a pedestrian fatality may be seen as an open and shut case. Other municipalities, however, may spend the time needed to find witnesses and collect as much evidence as possible before closing the case.

The lack of training can directly lead to the officer coming to the wrong conclusion on who was at fault in the crash. Officers are asked to code a box related to the pre-crash pedestrian action. We observed examples where an officer would mark the code for jaywalking, even though the description of the scene noted that it was an intersection, where pedestrians legally are permitted to cross. In some cases, it appears that the officer did not understand New Jersey law related to unmarked crosswalks at T-intersections.

The standardized form they are given to report the collision also limits officers. For example, for street lighting, an officer can choose from one of seven codes. That limits the discussion of street lighting to "off," "spot," or "continuous," but does not speak to the actual amount of light present at the scene. As so many collisions occurred during nighttime hours, visibility is obviously an important factor. Only two reports actually measured and reported the amount of illumination at the point of collision, with some simply noting the distance to the nearest street light. It is possible that including a box for light measurements could result in more useful data to prevent future crashes.

Many vehicles today include a "black box" which records the speed of the vehicle before a crash, but specialized equipment is needed to access this data, and the vehicle must remain in police custody for an extended period of time. Most police departments do not have this equipment, and different vehicle manufacturers have different standards concerning data access. Police officers must also obtain a warrant to access this data and this is seen as an obstacle[3]. Vehicles that have an "OnStar" system, for example, have data that may have been recorded by OnStar. The officer must request a warrant and then it must be presented in-person to the company, as they do not take requests by fax or email. In one report, this potentially time-consuming process was needed just to discover that data about the collision was not even recorded.

Other legal barriers include access to drug and alcohol tests. New Jersey recently increased the requirements to obtain drug and alcohol testing from drivers, which now requires a telephone warrant. Delays in receiving the warrant could eliminate the evidence. The same is true of testing the pedestrians involved. We found most reports had no follow up information on drug and alcohol tests, listing these as "pending".

Technical problems also limited access to the reports by the research team. In some situations, important details may have been completed by the department, but were not available to the research team. Fifty-four of the 154 reports lacked a diagram, although in many cases text was displayed stating that a diagram was attached. However, it could not be downloaded for this study. Thirty completed reports also mentioned that a supplementary report was available or was to be made. It is possible that these additional reports were filed, but could not be downloaded through the DOT system due to the way reports are compiled. This was especially problematic in the case of 13 reports that had no narrative available to us, as it was included in a separate file. Some reports noted that the case was handed over to a dedicated traffic collision team, which may have produced a very comprehensive report. Again, however, the team was not able to access these files.

Finally in three cases, pages had not been uploaded properly and were missing, while seven reports could not be found in the system at all. Four reports had been over-written by a change-report which only included the results of the driver blood test. In the cases where reports were not available, media sources were sought to help fill in the gaps.

3 Personal communication, Arnold Anderson, Essex County College Police Academy

What Counts as a Pedestrian?

How pedestrian deaths are counted has important implications for public policy. The inclusion of deaths which are not actually pedestrians could lead to identifying "hot spots" that are not really hot if a number of non-pedestrian deaths occur in the same place. Alternatively, noise in the data from these erroneous pedestrian deaths could mask real hot spots where pedestrians are being killed on dangerous roads.

As part of our analysis we examined whether each pedestrian fatality was correctly reported according to NHTSA's classification. NHTSA provides a definition of pedestrian deaths used in federal reporting, which states that pedestrian deaths must involve a motor vehicle traffic crash on a "public trafficway" which excludes "private property, including parking lots and driveways." We also determined whether the fatality was really a pedestrian engaged in travel – that is, were they walking from an origin to a destination? This would exclude drivers who have left a disabled vehicle (e.g. on an Interstate) and drivers entering or exiting their vehicle. Some of the cases that should not be reported to NHTSA may actually be pedestrians engaged in travel, such as walking across a private parking lot.

Of the reports examined, 12 should not be reported to NHTSA given their definition. As shown in **Table 1**, most of these are not pedestrian crashes. The reports included three intentional homicides, a workplace accident, and cases where the victim was killed on private property, in two cases by their own vehicle. On the other hand, NHTSA's definition fails to include some crashes that might properly involve a pedestrian traveling. These are shown in **Table 2**. Two incidents were in private parking lots. It is possible that the victims had exited their own vehicles and thus would not strictly be traveling pedestrians, but there is insufficient information to make this judgment. In any case, they serve to show how NHTSA may not include some pedestrian crashes in their definition. The third incident occurred off a public "trafficway" (on a boardwalk) and the victim was walking along the boardwalk, and so was a pedestrian.

Table 1: Incorrectly reported to NHTSA and are not pedestrian crashes

ID	Description of crash
11	Remote start used, car backs up over victim onto front yard
12	Private parking lot, driver accelerated instead of braking
13	Victim stopped to close fence on private property, car in neutral rolled back over him
18	Intentional homicide
26	Intentional homicide
37	Sanitation worker fell under truck when attempting to jump on
40	Intentional homicide in a private parking lot
81	Victim sitting on grass next to parking lot in her lawn chair, out of control car jumped curb from parking lot
87	Private parking lot, victim had just gotten out of the same car and was hit by it

Table 2: Incorrectly reported to NHTSA, but may be a pedestrian crash

ID	Description of crash
65	Remote start used, car backs up over victim onto front yard
112	Victim sitting on grass next to parking lot in her lawn chair, out of control car jumped curb from parking lot
121	Private parking lot, victim had just gotten out of the same car and was hit by it

A larger category of reported crashes fit NHTSA's definition, but do not involve pedestrians who are traveling. These include a variety of incidents that occurred on public "trafficways" and range from people standing or sitting near the road and being killed by vehicles departing the road, potential suicide victims, and victims who entered the roadway in front of their home (but were not traveling anywhere). Nine cases are shown in **Table 3**. An additional 14 cases are incidents where a driver or passenger exits a motor-vehicle on a major highway and is killed standing near their vehicle or walking across the road. These were victims who were traveling by motor-vehicle and not on foot, and thus should not be classified as pedestrians. These are shown in **Table 4**.

Table 3: Correctly reported to NHTSA, but are not pedestrian crashes

ID	Description of crash
29	Victim was standing outside his car door in private parking lot, drunk driver flew off highway into parking lot
45	Victim was looking for phone on road
49	Domestic incident, victim fell when grabbing car door
56	Backing out of driveway, victim on sidewalk was neighbor who walked behind car from neighboring garden
60	Child retrieving dog from road in front of home
79	Lost elderly man, possibly with Alzheimer's just outside his home
84	Victim in middle of freeway lane – potential suicide or mental illness
111	Victim was naked in the snow – mental illness or dementia
115	Potential suicide - walking against traffic on highway
139	Two individuals wrestling in roadway – one fatality (was also a hit and run)

Table 4: Correctly reported to NHTSA, victim outside vehicle, was likely a driver or passenger

ID	Description of crash
16	Driver exited vehicle on highway to close hood that opened. Vehicle rear-ended, and victim/driver was killed
28	Victim was preparing to enter his car, was hit by passing vehicle
39	Disabled car, victim crossed Interstate highway
44	Victim left motorcycle, possibly to retrieve dropped object, crossed controlled access arterial
47	Victim had just exited car that she parked. Unclear whether walking to final destination or just crossing street
57	Left car and ran across Garden State Parkway and back for no apparent reason (according to friends in car)
67	Victim outside vehicle parked along NJ Turnpike
68	Operating or standing next to forklift in roadway, victim struck by vehicle
72	Victim outside vehicle parked along I-80
128	Victim got out of car on Garden State Parkway and driver left her. She then walked into traffic.
141	Driver attempting to push his disabled vehicle off roadway
146	Victim was in middle of street – report implies she had just exited another vehicle
151	Driver got out of his disabled vehicle on Turnpike

Finally, some cases are not possible to classify and may or may not be pedestrians. Two cases were identified and are shown in **Table 5**. For case 54, it may be that the victim had fallen into the road for some other reason; for case 152, there was also insufficient information to know whether this was a suicide or drug overdose, as opposed to a pedestrian intentionally walking along the road.

Table 5: Ambiguous information on report, cannot determine classification of whether victim was a pedestrian

ID	Description of crash
54	Insufficient information to classify, victim may have been lying in roadway when run over
152	Victim was walking along or in road – could be suicide or drug overdose, unclear

Assuming that the misclassification of nine cases in **Table 1** is corrected, this leaves 23 cases where we would dispute whether these were really "pedestrian" crashes (total of **Table 3** and **Table 4**). While they are definitely important cases to study and examine, they do not contribute to our understanding of the relative risk of different modes of travel. These are better understood as vehicle crashes where a person outside a vehicle is a victim. Of additional concern are cases that NHTSA does not count, but may be pedestrian crashes by our definition (the three cases in **Table 2**). Regardless of these classifications, all of these were reported to NHTSA as pedestrian fatalities for the year 2012 and are shown as aggregate totals in Traffic Safety Facts (National Highway Traffic Safety Administration, U.S. Department of Transportation 2014).

Data Analysis

The following summarizes our analysis of all 157 reported pedestrian deaths in New Jersey in 2012, including those that should not be reported to NHTSA, and those that are not really "pedestrian" fatalities. Here we present our findings on four aspects of these deaths. First, we review who owns and maintains the road facility where the death occurred. This includes state, county, and municipal roads. Second, we analyze aspects of the road infrastructure which may contribute to the crash. Third, we examine the weather and lighting at the time of the crash. Finally, we summarize the information in the police reports designating blame for the pedestrian death.

Ownership

The largest share of reported fatalities occurred on state owned roads. In total, 70 reported fatalities, 44 percent of the total, occurred on state roadways. The next largest shares occurred on county roads, 33 (21 percent) and municipal roads, 32 (20 percent). The remaining 22 reported fatalities (14 percent) died on private, interstate and turnpike authority owned roads.

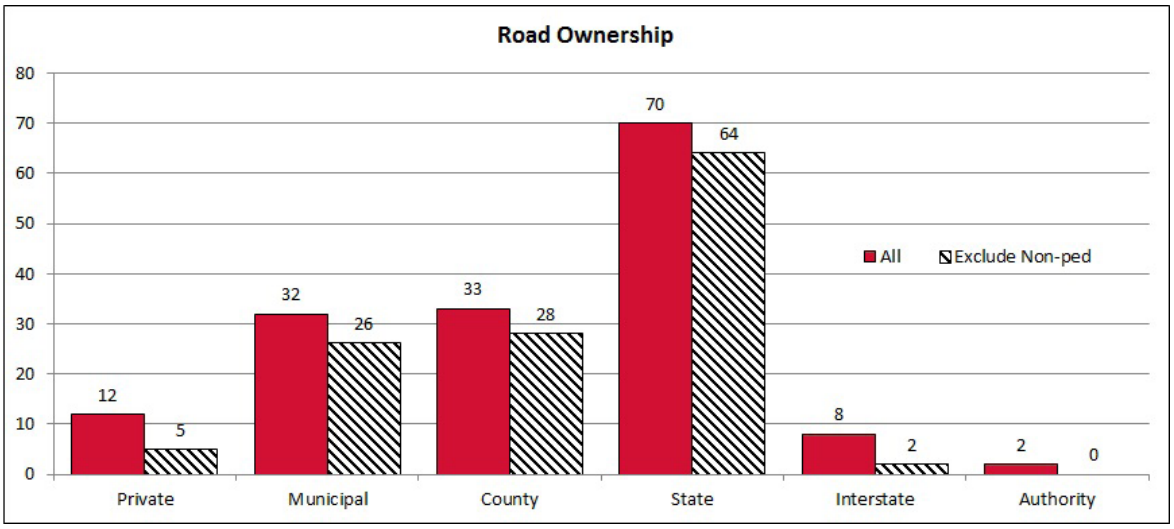

Figure 1: Ownership of road where fatality occurred

Infrastructure

The speed a vehicle is traveling has a large impact on the probability of a pedestrian fatality. A vehicle moving at a higher speed is much more likely to kill a pedestrian in the event of a collision. Meanwhile, higher speeds may increase the probability of a collision occurring because it gives less time for the driver and the pedestrian to prevent the collision. Pedestrians may also fail to properly estimate the speed of an oncoming vehicle, and so incorrectly predict the time available to cross a street.

Speed limits are an imperfect way of estimating the speed of a collision as many drivers frequently exceed the limit. This is especially true on streets with multiple, wide lanes, that are designed for high speeds but signed for lower limits. Unfortunately, very few of the crash reports included investigations into the actual speed of the vehicle at the time of the collision.

Thirty-nine of the 157 reported deaths happened on streets with a speed limit of 25 mph. An additional sixty reported pedestrian deaths occurred on roads with speed limits from 30 mph to 45 mph, and forty-five occurred on roads with speed limits of 50 mph or higher. In the remaining thirteen cases, the roads were either private or it was not possible to determine the posted speed limit. There were few reported pedestrian deaths on roadways with high speed limits, as in New Jersey, higher speed limits are reserved for limited access highways that ban pedestrians. Most of the deaths that took place on these high-speed roadways were the result of motorists who exited their vehicle on the highway and were then classified as a pedestrian.

Fifty-five collisions occurred on streets with only two lanes. Twelve occurred on roadways with seven or more lanes, which correspond to fatalities on major limited access highways. N/A includes fatalities that occurred outside public roadways (parking lot, etc.) or cases where the report did not make the exact location clear.

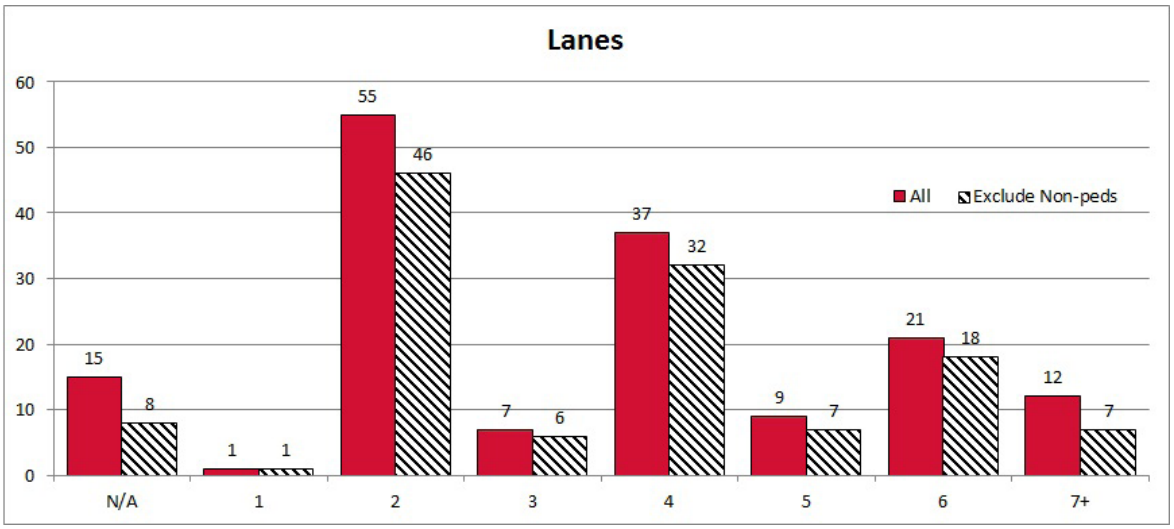

Figure 2: Number of lanes

Using available imagery from Google Street View, we noted how many marked crosswalks exist at the 76 collisions that occurred at intersections. A best effort was made to use images taken closest to the date of the collision. Only twenty-four (31.5 percent) of the intersections had crosswalks marked across all four legs. Twenty-four percent had no marked crosswalks at all. The other category includes intersections with more or less than three legs (including t-intersections). Of those, only one had crosswalks across all legs.

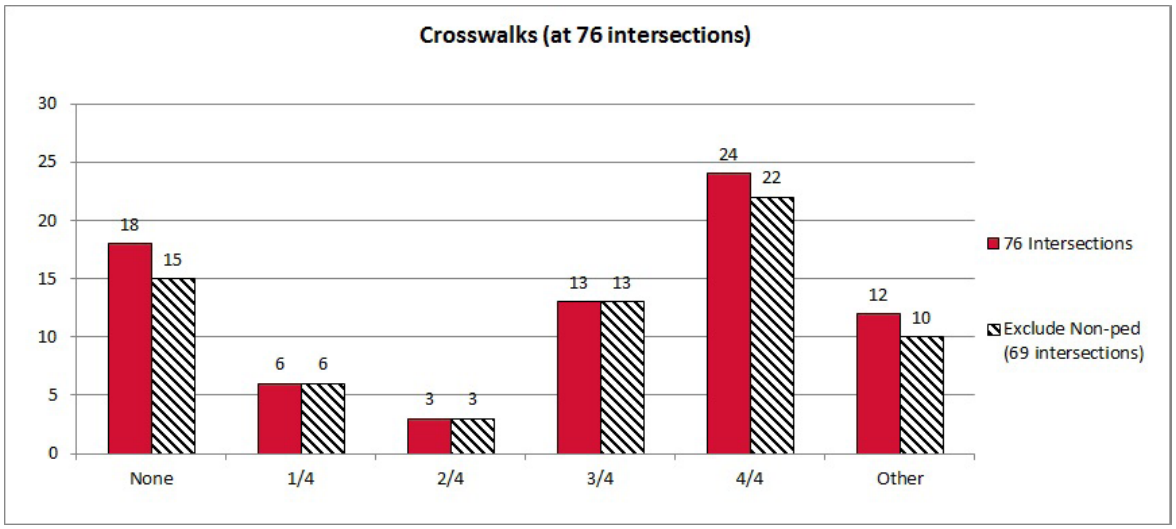

Figure 3: Number of crosswalks

Infrastructure Examples

This section highlights examples of crashes where the design of the roadway and surrounding area may have played a part in the fatal collision. Further, they were selected because the infrastructure problems highlighted were found in other fatalities, and are design issues that are found throughout New Jersey. Additional details for the collisions can be found in the Appendix.

One common location for reported pedestrian fatalities is when a major roadway passes through a thickly settled area, and acts as a significant barrier. Many local streets terminate at the roadway, because a median blocks access across, and no crosswalks are provided. In the example shown in Figure 4, pedestrians have to go out of their way to reach the only marked crosswalk at a signalized intersection, and even then, one leg has no crosswalk at all. Faced with these kinds of barriers and long waits to cross the street, pedestrians might opt to cross illegally, with fatal consequences. Two pedestrians were killed here by a hit and run driver. Although the report was very limited, the street design is common throughout New Jersey.

Figure 4: Piaget Avenue (US 46) in Clifton, Passaic. Crash 19.

Figure 5 demonstrates a case with no sidewalks on either side of the street, which forced the pedestrian who was killed here to walk in the shoulder. In this example, the shoulder suddenly ends as a lane is added for turns into a jughandle. With a median barrier preventing the pedestrian from crossing the street, and dense vegetation off the roadway, the pedestrian was forced into an active travel lane where he was killed. A complete lack of street lighting probably contributed to the incident.

Figure 5: NJ 38 in Hainesport Township, Burlington County. Crash 24.

Figure 6 shows a large regional mall (Cherry Hill Mall) on the east side of Haddonfield Road attracting the attention of pedestrians who leave their car at one of six vehicle maintenance shops on the west side of the roadway. However, there are no crosswalks available, and no sidewalks leading to the mall. In this collision, a 77-year-old pedestrian was returning to a Midas repair shop after spending the day inside the mall. As the two nearest signalized intersections do not have sidewalks towards the mall, and do not have crosswalks across Haddonfield Road, the pedestrian chose to cross midblock, the most direct path, when she was hit by a vehicle traveling at 40-45 mph. The driver reported not seeing her due to poor lighting in the area.

Figure 6: Haddonfield Road in Cherry Hill, Camden County, just west of the Cherry Hill Mall. Crash 33.

Figure 7 is an example where too many lanes with not enough traffic can promote high speeds, which can be inappropriate for urban areas with pedestrians, such as this avenue in Newark. In this collision, a NJ Transit bus killed a 72-year-old man.

Figure 7: Clinton Avenue, near Astor Street, in Newark, Essex County. Crash 38.

In the collision that occurred in Figure 8, the roadway is lined with businesses and is near a residential area, but the 40 mph roadway has no sidewalks or crosswalks, and very few lights. A driver used the shoulder, possibly to pass a turning car, and killed a teenager carrying laundry home who had no safe place to walk.

Figure 8: Bergen Boulevard (NJ 63) neat E, Edsall Boulevard, in Palisades Park Borough, Bergen County. Crash 50.

Many of the reported pedestrian fatalities involved people who were using transit as part of their trip. Some cases (such as 122, 135, and 143, among others) involved pedestrians that were explicitly going to or coming from transit. In case 122, the victim had just exited a NJ Transit bus, where there is a shelter but no sidewalks in any direction. In case 135, the victim was rushing from her work to a bus stop in an area with no sidewalks. In case 143, the victim was killed shortly after getting off a NJ Transit bus and attempting to cross a high-speed roadway. In that case, the victim was at a stop he was unfamiliar with.

Others, such as cases 134, 144, and 154, had pedestrians in the immediate vicinity of a bus stop. In these cases, the report did not confirm whether the pedestrian was a transit customer, but based on the surroundings and the pedestrian actions, it appears most likely that the pedestrian was arriving at or departing a bus stop.

Throughout New Jersey, there are bus stops that have no connection to the pedestrian network. In case 55, there is no safe or legal way for pedestrians to reach this bus stop (shown in Figure 9 and Figure 10), which is separated from a major mall with six lanes of 50 mph traffic. To cross the highway, pedestrians have a choice of running across the divided highway, or walking up a ramp and across an overpass with no sidewalks or shoulders. A pedestrian may be blamed for crossing illegally, but in this case, there was no legal crossing from a bus stop.

Figure 9: Highway 46, by Willowbrook Mall, in Wayne Township, Passaic County. Crash 55.

Figure 10: Overhead view of area pictured in Figure 9.

Time of Day and Street Lighting

One hundred and thirteen (72 percent) of the reported pedestrian deaths occurred when it was dark. This indicates that poor visibility is a significant factor in pedestrian fatalities.

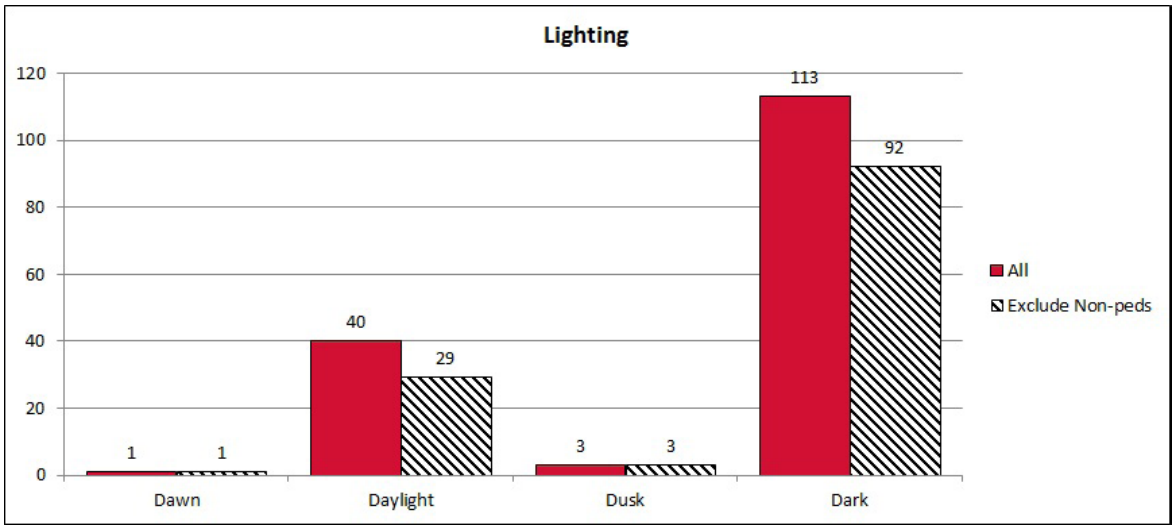

Figure 11: Lighting conditions at time of crash

Of the 113 reported pedestrian deaths that happened when it was dark, 70 percent occurred in areas with street lighting. However, very few officers actually described in detail what the street lighting situation was at the location of the collision. For example, continuous street lighting can mean that there is only a dim light on every other utility pole. This type of lighting may be appropriate in helping motorists see the direction of the roadway, but may not be helpful in spotting a pedestrian who is not standing directly below a light.

Only two of the reports measured the amount of lighting on the ground at the site of the collision. In case 33, the Cherry Hill police used an "Extech Easy View 3.3 Light Meter" to determine the foot-candle lighting in the area. Four measurements were taken, and the location and condition of the nearest streetlights (along with their pole numbers) were reported. However, no conclusions were drawn from these observations within the narrative as to whether lighting was a factor.

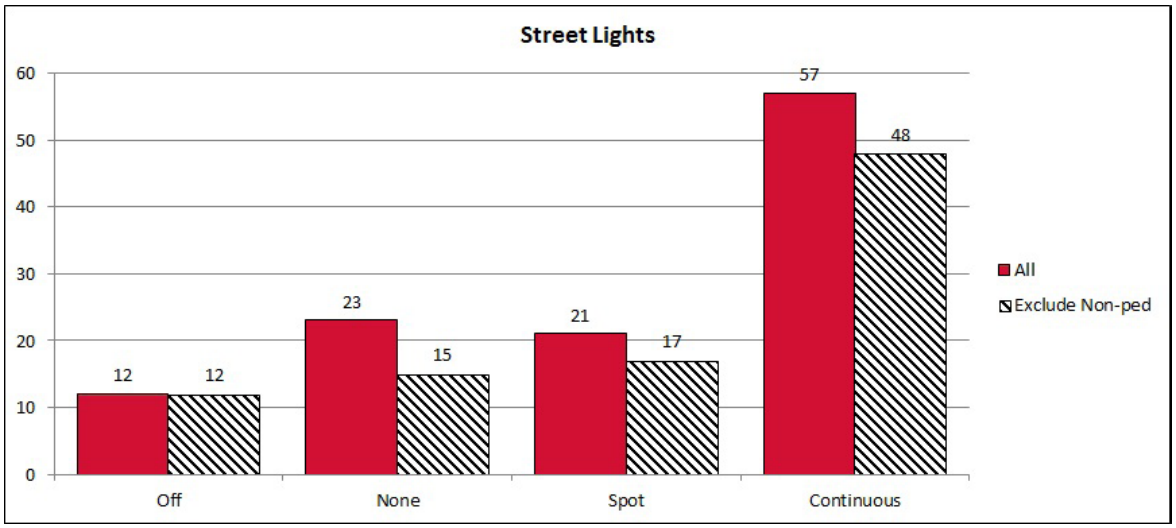

Figure 12: Street lights (for crashes that occurred in the dark)

Of the 157 reported pedestrian deaths, 103 (65 percent) occurred between 6pm and 6am. Fewer pedestrians were killed between 9am and noon than between midnight and 3am, even though one expects busier roadways and more pedestrians during daytime hours. It is likely that time of collision is a good proxy for lighting and visibility.

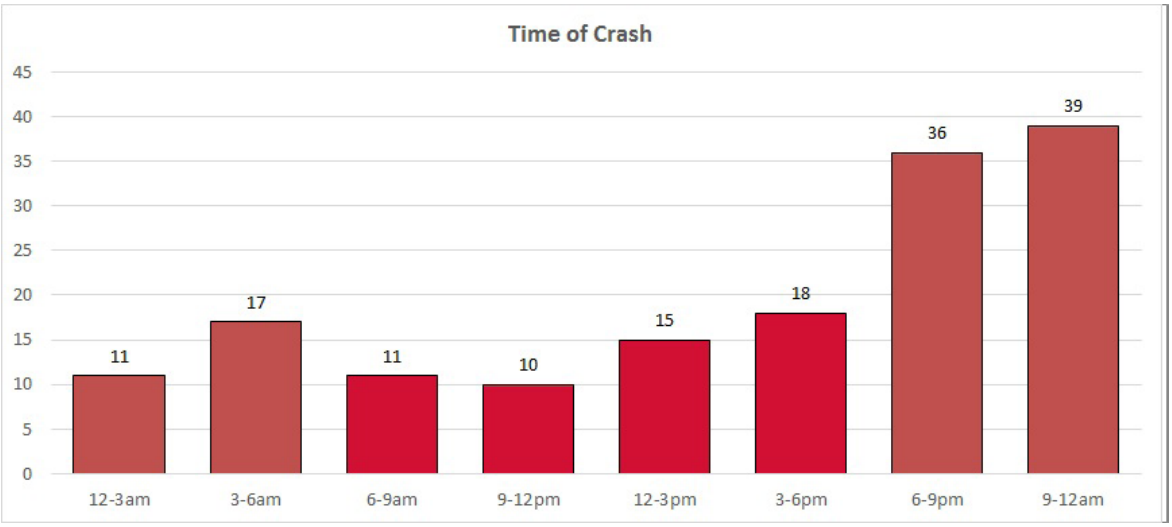

Figure 13: Time of crash

Police Reported Blame for Crash

Figure 14 shows who was assigned blame in the report by the reporting officer. The chart does not account for the contributing factors that were coded in separately (see below), but only from statements taken directly from the text. However, in almost half of the police reports, the write-up did not assign blame for the fatality.

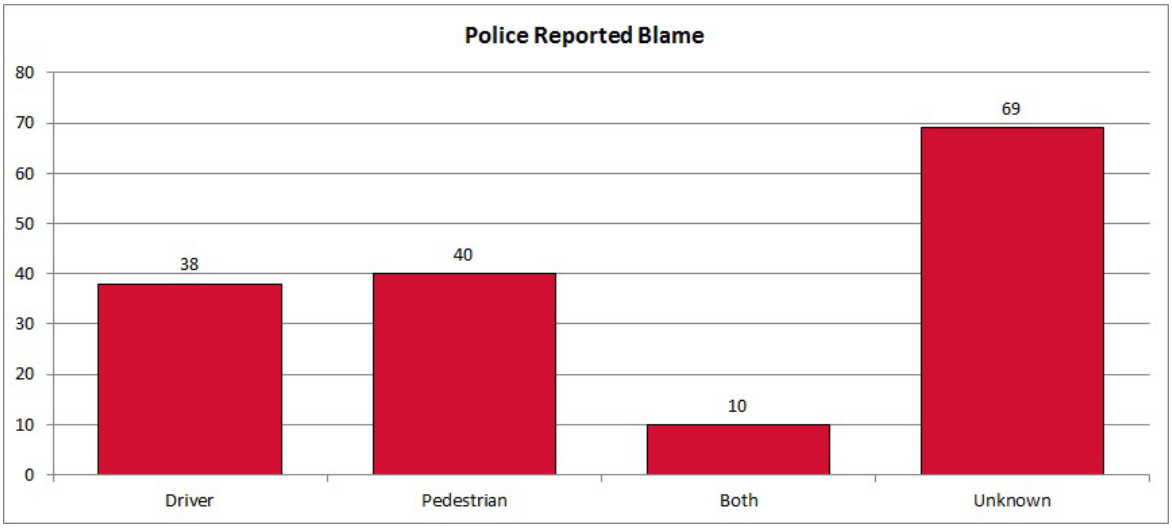

Figure 14: Police reported blame

In their reports, officers are also asked to code contributing factors. Those factors that were listed do not always reflect what was found in the report narrative. In case 132, the officer used code 05 to indicate "alcohol, drug, or medication use", which requires an explanation in the crash description, according to the report guide. The only narrative to support this is a witness statement that the victim was stumbling.

In case 123, there was no narrative attached to the report, but the officer filled out the codes for the pedestrian "crossing where prohibited" (72), and also "crossing at unmarked crosswalk at intersection" (44), which appears to be a contradiction.

Further, the contributed factor does not mean the officer issued a charge for the violation. As shown in **Table 6**, driver inattention was the most common factor reported by a large amount, with failure to yield and unsafe speed distant second.

Table 6: Vehicle Contributing Factor (based on police report coding)

Factor	Count
Driver Inattention	36
Failed to Yield Right of Way to Vehicle/Pedestrian	9
Unsafe Speed	9
Other Driver/Pedalcyclist Action	6
Backing Unsafely	4
Other Roadway Factors	2
Improper Passing	2
Windows/Windshield	2
Improper Lane Change	1
Sun glare	1
Failure To Keep Right	1
Defective Lights	1
Improper Use/No Lights	1

The most frequently cited reason for assigning pedestrian blame was for wearing dark clothing or low visibility to the driver. This occurred in 40 of the reported fatalities. **Table 7**, which shows the number of instances that dark clothing was mentioned, is based off the narrative, which did not always match the coding on the report.

Crossing where prohibited was cited as a factor thirty-five times; however, in many cases it appears to be improperly used, as a review of the location showed no prohibitions to crossing. In some cases, the code was used even when the pedestrian had the right of way in an unmarked crosswalk. Case 123, mentioned previously, noted the pedestrian crossed where prohibited, but also stated the pedestrian was within a crosswalk at an intersection.

Table 7: Pedestrian Contributing Factor (based on police report coding)

Factor	Count
Dark Clothing/Low Visibility to Driver	40
Crossing Where Prohibited	35
Other Pedestrian Factors	17
Running/Darting Across Traffic	16
Inattentive	15
Failed To Obey Traffic Control Device	15
Walking in Road When Sidewalk Present	7
Failure to Yield ROW	5
Failed to Yield Right of Way to Vehicle/Pedestrian	4
Following Too Closely	1

In case 121, the fatality occurred at a private parking lot when a senior driver accelerated rather than braked when reversing from a parking space at a high speed. The officer used the codes for "walking in a road when sidewalk present" (77) and "walking/jogging with traffic" (33) for the pedestrian contributing factors, which is confirmed in the narrative. However, as is the case with all parking lots, pedestrians must walk within the travel lanes to reach their vehicles, and it is questionable if a parking access lane can be considered a road for the purpose of the coding.

In case 132, the officer notes that the collision happened at the intersection of Summer Street and Arnett Street, which is a T-intersection. There is little additional information, but the crash diagram does show the intersection. While it appears that the pedestrian was inside an unmarked crosswalk, the officer filled out the codes for "pedestrian inattention" (74), "running/darting across traffic" (78) and "crossing/jaywalking at mid-block" (46). The officer should have used code 44 "crossing at an unmarked crosswalk at an intersection".

In cases 131 and 152, the diagram and description show the collision happened near a t-intersection with an unmarked crosswalk. In case 152, the officer concluded that the "pedestrian caused the crash when he walked into the path of the vehicle [and] violated the following statute: Failure to yield right of way to vehicle prior to crossing roadway (not at an intersection)". The report stated the incident occurred 18 feet from the intersection. In case 131, the officer reported the incident as occurring outside an address, which is a home at the corner. In both cases, it is unclear how much investigation was made to determine the exact location of the point of collision, and whether the pedestrian was actually outside the unmarked crosswalk.

We also made a note when a report explicitly stated that a pedestrian was wearing dark (or black) clothing at the time of the collision. Most reports included no information, other than in the narrative, as to what clothing the pedestrian had on at the time. Thirty of the reports (twenty-seven when excluding the non-pedestrian fatalities) indicated that the victim was wearing dark clothes (21 percent of the total).

The presence of street parking was noted because it can be a factor in pedestrian fatalities. Forty-four of the pedestrian deaths occurred on streets with on-street parking (thirty-seven when excluding the non-pedestrian collisions). Street parking can narrow the width of a roadway, which can cause drivers to proceed at slower speeds. In those cases, the presence of street parking can save lives. However, street parking can also limit visibility at intersections, that is, "illegal" parking which is too close to the intersection, may result in crashes. Further, street parking does result in pedestrians electing to cross in the middle of the block to reach their cars. In one fatality, the pedestrian killed was attempting to enter their parked vehicle when they were hit (Case 28).

In almost thirty percent of pedestrian fatalities, the police report states that the driver was not aware of the pedestrian. In thirty-six of the reports, it is stated that the driver did not see the pedestrian prior to the collision and a further eleven reports stated that the pedestrian appeared "out of nowhere." We did not count the number of reports where a driver admitted to seeing the pedestrian before the collision, but it was very rare.

Only thirty-five percent of the drivers were tested for drugs or alcohol after a collision resulting in the death of a pedestrian. Only ten pedestrians were noted as having been tested for drugs or alcohol on the reports. It is not known if additional autopsies included a test that was not recorded on the crash report.

The most common charges listed in the reports can be seen in **Table 8**. In some cases, we included information found in media reports. There were 123 charges made against 43 drivers though some drivers faced multiple charges. In cases where the driver was visibly intoxicated, it was common for the officer to charge the driver with multiple violations. The charges displayed here do not account for any charges that may have been dropped after the fact, or added after the report was filed. There was no information on ultimate prosecution or judgments rendered (other than what could be drawn from media reports).

Table 8: Police Charges

Top 5 Charges		Count
39:4-97	Careless driving	11
39:4-50	Driving while intoxicated	10
39:4-96	Reckless Driving	9
39: 4-129	Leaving scene of accident	9
2C: 11-5a	Death by auto	7
39:3-40	Driving while suspended (license or registration)	7

Conclusions

This analysis highlights a number of issues in the classifying, reporting, and analysis of pedestrian deaths in New Jersey.

First among these issues is the quality of data provided to NHTSA as an input to national statistics. In our analysis, we found about 8% of the reported pedestrian deaths in the state database, which are reported to NHTSA, were in violation of the definitions specified by NHTSA. These included deaths that occurred entirely on private property, intentional homicides, and suicides.

Also problematic is the federal definition, which includes people killed by a motor-vehicle, many of who would not be considered pedestrians traveling on foot. These accounted for almost 15% of the 2012 pedestrian fatality data.

While we only examined one year, it is likely that this issue exists in other years. FARS data on the number of pedestrian deaths in New Jersey from 1994 through 2012 would not suggest that 2012 is an outlier in either the total number of pedestrians killed or that pedestrians were classified any differently in that year than in other years (Figure 15). Obviously, if this is an over count of pedestrian deaths (according to NHTSA's definition), then New Jersey is seen as having a larger pedestrian fatality problem relative to other states (unless data from other states suffers from similar issues).

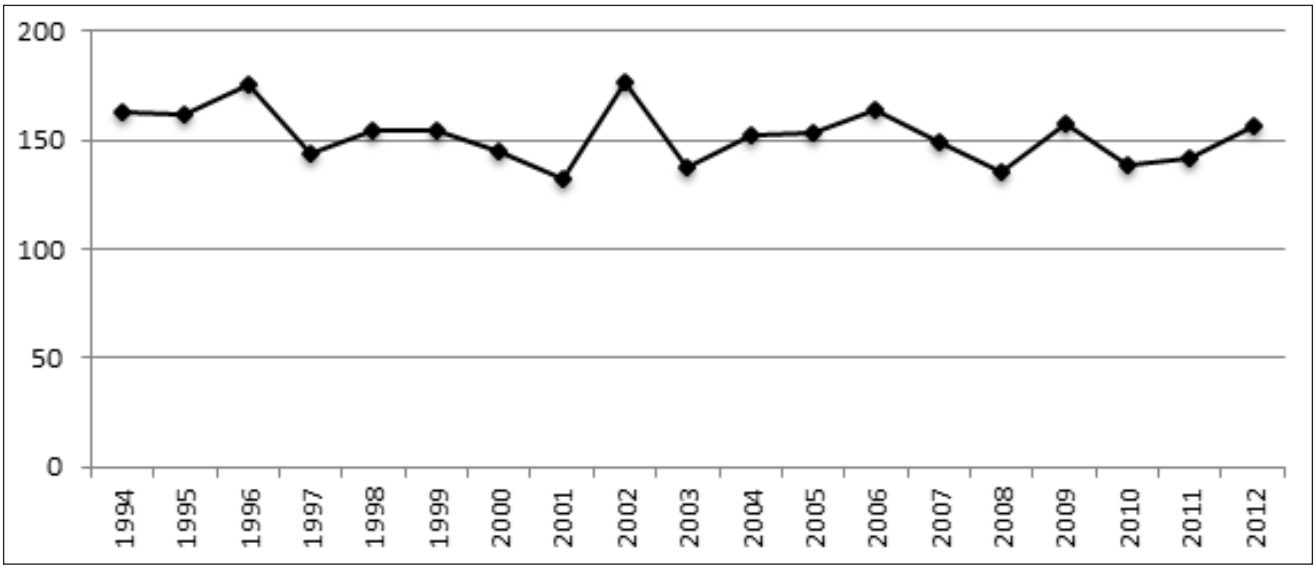

Figure 15: New Jersey Pedestrian Deaths, 1994 to 2012. Source: FARS database

From a policy perspective, the "questionable pedestrian" deaths presents two problems. First, we cannot accurately assess risk without knowing the number of pedestrian deaths. This is particularly problematic since the actual number of pedestrian deaths is relatively low in each year. The second, and related problem, is that policies derived from analyses of questionable pedestrian deaths might prevent us from identifying actual threats to safety and direct resources towards locations and facilities where they are not needed.

The second major policy issue is that police reports are often incomplete and or inconsistent. These problems with reports begin at the crash site itself, where the first responder might not be trained in analyzing traffic crashes and could lead to errors in determining fault. Additionally, while many modern cars include a "black-box," officers are often unable to obtain the data from these recorders due to technical, legal and other constraints.

While NJDOT and the NJ state police must increase the quality control on how data is collected and processed, the definitions of a pedestrian need to be reevaluated by USDOT. Police officers need to be provided with adequate training, support, and resources to properly report and record information on pedestrian crashes and fatalities.

Third, we have several recommendations for improving infrastructure in New Jersey to ensure the safety of pedestrians. The first infrastructure policy has to do with improving pedestrian safety near commercial areas. A number of pedestrian fatalities occurred along major arterials where commercial areas abutted residential neighborhoods. Locating commercial land uses within walking distance of residential areas is certainly a laudable goal, but transportation planners and engineers need to ensure that the pedestrian paths to and from these areas are safe and accessible. In several cases that we examined, the only safe passage required long detours to crosswalks that were apparently avoided in favor of more direct, but clearly dangerous, shorter paths.

The second infrastructure policy is to reduce auto speeds in areas with a large number of pedestrians. We found a number of cases where the road design seemingly encouraged high speeds, regardless of the posted speed limit. In these cases, we recommend traffic calming approaches such as reducing the number of lanes, or implementing a road diet. As part of implementing complete street policies, counties and NJDOT should install and maintain sidewalks on their roads; historically many county roads have not included sidewalks.

In addition, better lighting at intersections and crosswalks can increase the visibility of pedestrians. Better enforcement and removal of vehicles parked illegally within 25-feet of intersections can also improve visibility.

NJ Transit should ensure the safety of customers accessing their transit stops. We found a number of cases where pedestrians died during their transit trip in places where there were no sidewalks or where access to the transit stop was dangerous. NJ Transit should work with communities to either move these bus stops or improve pedestrian access to them.

Finally, we attempted to determine whether there was any systematic bias in placing blame on pedestrians. While we noted some cases where pedestrians were blamed for not crossing legally, when they were at unmarked crossings, we cannot say for certain that there is a bias in how police assess blame. There is perhaps some blame put on pedestrians for wearing dark clothing, but poor lighting could be equally at fault. As indicated above, the reporting process has its own flaws and should be improved to ensure that police officers correctly record crash information. Providing officers with an understanding of infrastructure deficiencies and why pedestrians may be traveling or crossing these roads would provide needed context to their reports and be helpful in finding solutions to reduce the pedestrian death toll.

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