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Child Pedestrian Safety in Hartford, Connecticut : A Survey of Hartford Crossing Guards

Louise LaChance-Price

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CHILD PEDESTRIAN SAFETY IN HARTFORD, CONNECTICUT:
A SURVEY OF HARTFORD CROSSING GUARDS

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B.S., St. Joseph College, 1979

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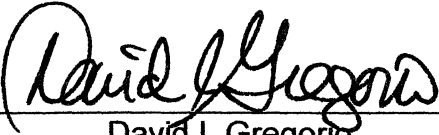
Master of Public Health Thesis

CHILD PEDESTRIAN SAFETY IN HARTFORD, CONNECTICUT:
A SURVEY OF HARTFORD CROSSING GUARDS

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ABSTRACT

The Connecticut Children's Medical Center's (CCMC) Injury Prevention Center in Hartford, CT, developed a survey to collect descriptive data about the demographics of Hartford crossing guards, their training, and the hazards to child pedestrian safety that they observed at their worksites. Fifty-eight of the 93 crossing guards (62.4%) employed by the Hartford Police Department returned completed surveys. Their answers revealed concerns about frequent speeding and other traffic violations by drivers traveling through crossing zones, and concerns about dangerous crossing behaviors by some children and more frequently by parents accompanying their children across streets. Four incidents of crossing guards being struck by motor vehicles while on the job, and ten incidents of children being struck were reported. The survey data also revealed variations in job training reported by crossing guards, with current training for new crossing guards consisting of two weeks of on-the-job training with an experienced guard. The crossing guards rated several kinds of behavioral and environmental interventions on their degree of helpfulness to them in doing their job of keeping children safe as they cross streets, and offered their own suggestions as well for improving child pedestrian safety.

I. INTRODUCTION

Hartford, CT is ranked the 29th most dangerous metro area in the United States for pedestrians, having a higher pedestrian danger index in 2000-2001 than the Boston and New York metro areas (Surface Transportation Policy Project, 2002). The annual collision rate for pedestrians under age 20 in Hartford from 1988 through 1990 was 280/100,000, more than twice the mean national rate of 111/100,000 (Braddock, 1994). Previous studies of child pedestrian injury (PI) in Hartford have examined developmental, socioeconomic, environmental, and geographic factors associated with increased risk of child PI (Braddock, 1991, 1994; Lapidus, 1990, 1991). This study examines the problem of child pedestrian safety from the perspective of crossing guards employed by the Hartford Police Department.

Child PI has been studied from many different perspectives over the last three decades. However, a review of the literature reveals that crossing guards have only played a significant role in one published study of the utilization of crossing guards to provide on-site pedestrian skills training to small groups of children (Yeaton, 1978, 1983). Published press releases led us to another, more recent, unpublished study in which California crossing guards were surveyed about their working conditions (Roadways, 2002; Weaver, 2002). Crossing guards are in a unique position to contribute to our knowledge of the specific environmental and behavioral hazards to child pedestrian safety which exist in the

environments in which they work, through their observations of the environment and pedestrian and motorist behaviors at crossing guard-controlled pedestrian crossing zones.

In this paper, the scope of the problem of child pedestrian injury and mortality and trends in rates of injury and mortality are examined at the global, national, state, and local levels. A review of the research literature on developmental, socioeconomic, and environmental risk factors related to child PI is summarized. The background and basis for the decision to undertake a study of child PI from the perspective of crossing guards is explained. Next, the development of the survey tool used in the study, the methods used to solicit subjects' participation in the study, and the collection and analysis of data are detailed. The results of the crossing guard survey are reported, interpreted, and discussed in comparison to other relevant research findings, and conclusions are drawn on how to best use the findings of this study to improve child pedestrian safety in Hartford.

II. BACKGROUND OF CHILD PEDESTRIAN INJURY

A. Epidemiology of Pedestrian Morbidity and Mortality

1. The Global Problem

In 2000, there were 1,260,000 pedestrian traffic fatalities worldwide (United Nations, 2003; World Health Organization, 2003). Pedestrian collisions occur in disproportionately large numbers in low-income countries (World Health Organization, 2004). Southeast Asia and Africa have the highest pedestrian mortality rates in the world (United Nations, 2003). Large differences exist between pedestrian fatality rates in developing countries and industrialized countries, due to differences in rates of motor vehicle ownership and pedestrian travel. Developing countries have only three motor vehicles per 100 people, compared to 50 vehicles per 100 people in industrialized countries. In developing countries, the majority of pedestrians who died were struck by commercial vehicles such as trucks or buses, in contrast to the United Kingdom where the majority of pedestrian who died were killed by cars (Schirnding, 2004).

In a study of a number of African countries in 1997, pedestrians represented 75% of traffic fatalities in Abidjan, 65% in Nairobi, and 89% in Addis Ababa (United Nations, 2004). In New Delhi, only 5% of traffic fatalities were drivers or passengers in cars (Schirnding, 2004). In industrialized countries, the majority of traffic deaths occurred in drivers and passengers in cars (United Nations, 2004). Pedestrian injuries and deaths in developing countries affect young people and children of lower

socio-economic class disproportionately (United Nations, 2004).

In Ghana, half of all injured pedestrians were children under the age of 15 (Mock, 1999).

In Western Europe and North America, rates of child pedestrian traffic fatalities and injuries have been falling over the last three decades. The decline in fatality and injury rates has not necessarily come about because roadways have become safer for pedestrian travel. Roberts (1995) concluded that fewer children are traveling on foot because roadways have simply become too dangerous.

Roberts (1993) examined trends in pedestrian injury mortality from 1968 onward for England, Wales, Denmark, Sweden, New Zealand, and the U.S. All of these countries experienced a decrease in child pedestrian mortality, but not to the same extent. The greatest percentage reduction in mortality rates from 1968 to 1987 was seen in Denmark (79%), followed by Sweden (68%). New Zealand experienced the smallest reduction in mortality rates (24%), followed by England and Wales (39%). Both Denmark and Sweden implemented legislative changes during that time period, which focused pedestrian safety measures towards environmental change, resulting in lower vehicle speeds in urban areas, whereas New Zealand and Britain focused their prevention efforts on attempts to change child behavior through pedestrian skills trainings. In 1987, New Zealand, England, and Wales had the highest absolute rates of child pedestrian mortality. If England and Wales had had the same child pedestrian

mortality rate as Sweden in 1987, they would have had 130 fewer deaths (Roberts, 1993a).

In Britain, child pedestrian injury rates and fatality rates fell by 49% and 61% respectively, in accidents reported by police between 1968 and 1987 (Roberts, 1993b). However, Roberts (1995) argues that these decreases are not related to improved safety of roadways for pedestrian travel, but rather that they are indicative of the effect of the “safety paradox”, whereby as traffic has increased almost exponentially and roadways have become more dangerous, fewer children are walking. In Hillman, Adams, and Whitelegg’s study (as cited in Rivara, 1996, and Roberts, 1993b) of children’s independent mobility in Great Britain, a large decrease in the proportion of 7 and 8 year old children walking to school unaccompanied was noted, falling from 80% in 1971 to 9% in 1990. Traffic danger was the primary reason cited by parents for their reluctance to allow their children to walk to school independently.

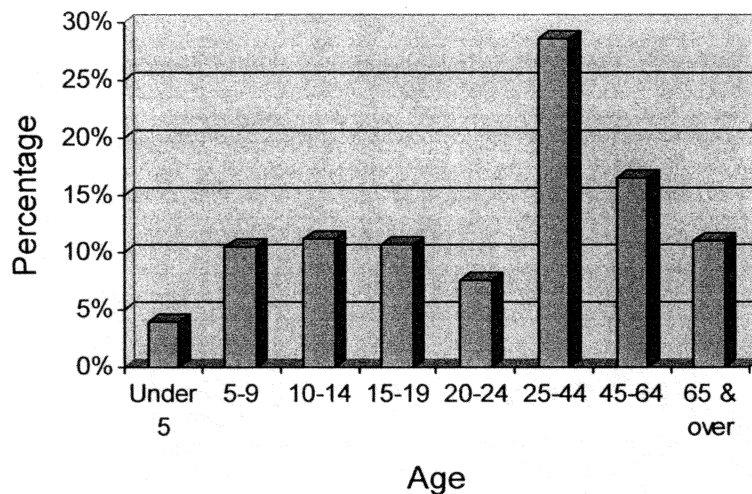
In light of increasing rates of childhood obesity and resulting chronic health problems such as diabetes, decreasing the amount of daily walking is not a desirable way of achieving a reduction in child pedestrian fatalities and injuries. Reductions can be made in other ways. By implementing a comprehensive environmental approach to pedestrian safety and structuring the environment in a way that minimizes the risk to child pedestrians, Sweden has demonstrated that lives can be saved and injuries prevented. If child pedestrian fatalities in the U.S. could be

reduced to a rate equivalent to Sweden's rate of 1.2/100,000 for 5 to 14 year olds, 550 child deaths could be prevented annually in the U.S., for a 52.9% reduction in child pedestrian fatalities (Rivara, 1996).

New Zealand data on pedestrian injury hospitalization yielded rates of 65.9/100,000 for 3 year olds, and 68.9/100,000 for 6 year olds (Roberts, 1993). The child pedestrian death rate in New Zealand had been increasing at a rate parallel to increasing traffic volumes, until the government invoked restrictions on motor vehicle use during the energy crisis. These restrictions, combined with increases in the price of gasoline, resulted in no growth in traffic volume during the next 7 years. During that same time period, the child pedestrian fatality rate fell 46.4% (Roberts, 1992).

2. Child Pedestrian Injury in the United States

In the U.S., a pedestrian is injured every 6 minutes and one is killed every 107 minutes (NHTSA, 1999). According to the National Safety Council (1999) estimates, in 1998 there were approximately 84,000 pedestrian injuries and 5,900 deaths related to motor vehicle collisions with pedestrians in the U.S. Of those killed and injured, 36.3% were under the age of 20 (see figure 1). Children between the ages of 5 and 14 accounted for 21.7% of pedestrian injuries and deaths (National Safety Council, 1999).



■ Percentage of Total Pedestrian Deaths and Injuries by Age Group

Figure 1. Distribution of pedestrian deaths and injuries by age group as a percentage of total pedestrian deaths and injuries for all ages in the U.S. in 1998, N=89,900 (National Safety Council estimate).

From 1978 to 1991, pedestrian injuries in children under 15 years of age decreased by 49 % in the U.S. (Rivara, 1996). From 1979 to 1999, mortality from child pedestrian injuries decreased by 65 % (Rivara, 1999). Pedestrian fatalities in the U.S. declined during the 10-year period from 1992 to 2002, from 5,549 deaths to 4,808 deaths. One fourth of children between the ages of 5 and 9 years old who were killed in traffic crashes were pedestrians (NHTSA, n.d.). The reduction in pedestrian fatalities has come about due to two factors: decreased exposure to traffic because of a decrease in the number of people who are walking, and improved trauma care (Rivara, 1996). In 1969, nearly half of all schoolchildren

walked to and from school. By 1995, this number had declined to only 10% (National Safe Kids Campaign, 2002).

In 2001, pedestrian deaths in the U.S. increased for the first time since 1995, from 4,843 deaths in 2000 to 4,955 deaths in 2001 (Surface Transportation Policy Project, 2002). Children under the age of 16 accounted for 514 of those deaths and 24,000 injuries (Gunnels, 2002). Even though evidence shows that fewer children are walking, pedestrian injury is the second leading cause of death from unintentional injury among children ages 5 to 14 (Surface Transportation Policy Project, 2002). It is the second leading cause of death for children between 5 and 9 years of age, exceeded only by cancer deaths (Hazinski, 1993). Only 5% of all trips are made on foot, but about 12% of all motor vehicle-related deaths are pedestrians (Mean Streets 2002). When child pedestrian fatalities for children traveling to and from school were analyzed on a per-student-mile basis, bicyclists had the highest injury and fatality rates, followed by school-age pedestrians (Fishbeck, 2003).

In 2002, more than 43,300 children ages 14 and under were treated in U.S. hospital emergency rooms for pedestrian-related injuries (National Safe Kids Campaign, 2002). More than 50% of all pediatric trauma admissions to U.S. hospitals and 34% of all pediatric critical care admissions are related to pedestrian injuries (DiMaggio, 2002). Sixty to eighty percent of children admitted to pediatric critical care as the result of pedestrian injuries have severe brain injuries, which are likely to result in

long-term disability (Roberts, 1995). Child pedestrian injuries continue to be a major cause of serious traumatic brain injuries and chronic disability in the U.S. (Rivara, 1999).

3. Child Pedestrian Injury in Connecticut

In Connecticut during 1991, 48 pedestrians were killed and 1,340 were injured (Connecticut Department of Transportation, 2002). Those figures have not changed significantly. There were 1434 pedestrian collisions statewide in 1994, 1446 pedestrian collisions in 1995, and 1399 pedestrian collisions in 1996. Children ages 5 to 19 years old accounted for 30% of pedestrian collisions (Connecticut Department of Transportation, 2002).

Due to the integration of city schools and the creation of magnet schools in cities throughout Connecticut in the 1990's, fewer city students are walking to school. In New Haven, CT, for example, the proportion of students bussed to and from school increased from 35% in 1992 to 73% in 1999. There was also an increase in door-to-door pick-ups and a corresponding decrease in the use of group bus stops. During this time period, there was a corresponding decrease in child pedestrian collisions, from 223 from June 1992 through December 1993, to 87 from June 1998 through December 1999. Other factors may also have contributed to this decrease, including expanded traffic safety education in the New Haven public school system, a safe driving public relations campaign, increased

ticketing by police for traffic violations, and decentralization of public housing (Merrell, 2002).

4. Child Pedestrian Injury in Hartford

Hartford's pedestrian collision rate for children younger than 15 years old was more than three times the estimated national rate from 1986 through 1987 (Braddock, 1991). From 1988 through 1990, in the city of Hartford 374 child pedestrians under the age of 20 were involved in collisions, for an annual collision rate of 280/100,000 for this age group. This was more than twice the mean national rate of 111/100,000 for that time period (Braddock, 1994; Merrell, 2002). In 2000-2001, Hartford had an average all-age pedestrian death rate of 1.6/100,000. Hartford was ranked the 29th most dangerous large metro area for pedestrians for that time period, and had previously ranked 34th in 1997-1998. Hartford had a higher pedestrian danger index in 2000-2001 than the Boston and New York metro areas (Surface Transportation Policy Project, 2002).

In 1995, there were 89 emergency department (ED) visits in Hartford for injuries to pedestrians under the age of 20. ED visits for child pedestrian injuries showed a decline from 1997 to 2000, from 93 to 66 visits. However, that downward trend was interrupted by an increase in 2001 to 76 ED visits, according to CT Hospital Association data as plotted on the graph seen in figure 2 (CT Hospital Association, n.d.). Additional ED visit data, when it becomes available, should clarify whether the

increase seen in 2001 was just a transient increase in an otherwise downward trend, or whether there is in fact no downward trend. The actual number of pedestrian collisions involving children is likely to be higher than these numbers would indicate, because not all victims of pedestrian collisions may have sought hospital ED care for their injuries, particularly if their injuries were minor.

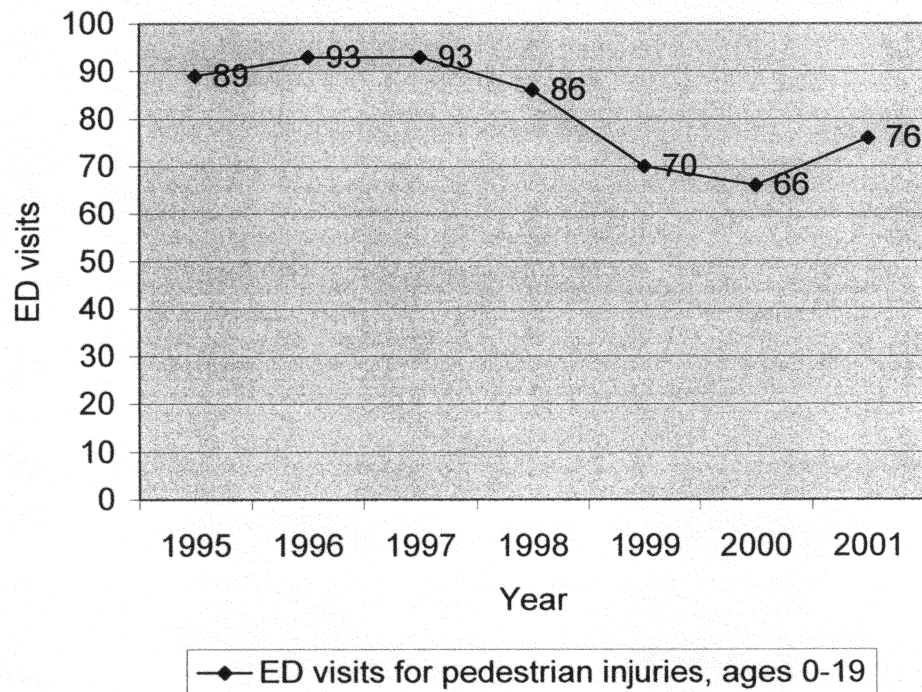


Figure 2. Emergency Department visits (per 100,000) due to pedestrian injury, ages 0-19, in Hartford, CT, 1995-2001 (n=573). Numbers of ED visits plotted on graph are taken from CT Hospital Association, Emergency Department Visit Database: ED Visits for Pedestrian Injury, 1995-2001.

During 1986-1987, the annual pedestrian collision rate for Hartford pedestrians under 20 years old was 228 per 100,000 (Lapidus, 1991).

That rate remained essentially unchanged through the late 1990's (see table 1). The ED visit rates for pedestrian injuries to Hartford children ages 0 to 19, from 1995 to 2001, ranged from a high of 225.9/100,000 in 1996 and 1997, to a low of 160.3/100,000 in 2000. Hartford's rate of child pedestrian injury (see table 1) is much higher than the mean national rate of 111/100,000 (Merrell, 2002). In a 1990 study of childhood injuries in Hartford, the leading cause of death from injury for young school-aged children was pedestrian injury (2/100,000), and it was the second leading cause of hospitalization for injury (80/100,000) (Lapidus, 1990).

Children between the ages of 5 and 9 are usually cited in the literature as having the highest rates of pedestrian injury for all age groups of children under age 20 (DiMaggio, 2002; Hazinski, 1993; Lapidus, 1991). Hartford ED visit rates for child pedestrian injuries were highest in the 5 to 9 year old age group for the years 1995, 1997, and 1998. Surprisingly, in 1996 and 2001, 10 to 14 year olds had the highest rates, and in 1999 and 2000, the rates were highest among 15 to 19 year olds (see table 1).

Table 1
Hartford Emergency Department Visit Rate for Pedestrian Injury per
100,000 Population, Ages 0-19, 1995-2001

Year	1995	1996	1997	1998	1999	2000	2001
Age Group							
0-4	138.4	108.7	98.9	168.1	49.9	39.5	39.5
5-9	260.6	242.0	297.8	260.6	204.7	204.7	204.7
10-14	251.0	291.2	220.9	220.9	190.8	170.7	241.0
15-19	212.7	261.2	280.4	183.7	232.1	222.4	232.1
0-19	216.2	225.9	225.9	208.9	170.1	160.3	184.6

Note. Rates were calculated using data from the Connecticut Hospital Association Emergency Department Database 1995-2001 as the numerators, and U.S. Census 2000 population figures for Hartford, ages 0-19, n = 41,162 as the denominators. For comparison, the mean national rate of pedestrian injury for ages 0-19 = 111/100,000.

In Hartford, among persons under 20 years of age, males were consistently injured in pedestrian collisions more often than females in every year from 1995 to 2001 (see figure 3). This finding is consistent with other reports in the literature (Christoffel, 1996; Lapidus, 1991; Merrell, 2002; Mueller, 1990; Rivara, 1990).

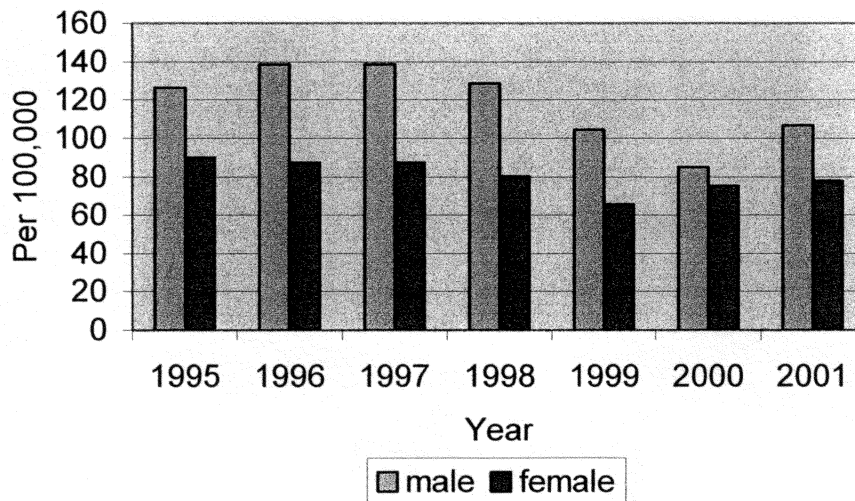


Figure 3. Emergency department visits (per 100,000) due to pedestrian injury, ages 0-19, by gender, in Hartford, CT, 1995-2001 (n=573). (Rates were calculated using data from the Connecticut Hospital Association Emergency Department Database 1995-2001, and U.S. Census 2000 population figures for Hartford.)

B. Developmental, Socioeconomic, and Environmental Risk Factors in the Epidemiology of Child Pedestrian Injury

1. Physical and Developmental Risk Factors

Children between the ages of 5 and 9 years old are more likely to be injured in pedestrian collisions because of physical and developmental factors (DiMaggio, 2002; Mueller, 1990; Rivara, 1985). Part of the reason for this age group being at greater risk may be their shorter height and limited range of view, making it more difficult for them to see traffic from

behind a parked car or other roadside objects (Connelly, 1998).

Small children are also less visible to motorists.

There are cognitive reasons, as well, for the higher risks to this age group. Compared to adults, young school aged children commonly believe that if they can visualize a driver, that the driver also sees them, which may or may not be the case. In addition, young children tend to focus on one aspect of the physical environment when street crossing (e.g. ice cream truck, candy store, friend) and may ignore important traffic cues. Children with attention deficit disorder, with or without hyperactivity, may be at increased risk for pedestrian injury due to their often distracted and impulsive behavior (Connelly, 1998; Demetre, 1992; Malek, 1990; Tanz, 1985).

Children under 10 years of age have poor skills at judging safe distance gap thresholds, and therefore have difficulty making safe crossing decisions, especially when vehicle speeds increase above 50 kph (Connelly, 1998; Demetre, 1992, 1993). Males were observed to make more unsafe crossing decisions than females when judging safe distance gap thresholds (Connelly, 1998). Males are more likely than females to be injured in pedestrian collisions (Agran, 1994; Macpherson, 1998; Mueller, 1990; Rivara, 1985). It is likely that gender differences in rates of pedestrian injury are related to behavioral or developmental factors (Tanz, 1985).

2. Social Risk Factors

The risk of child pedestrian injury is strongly associated with lower socioeconomic status in the industrialized world. In Canada, the poorest income quintile consistently had the highest rates of pedestrian mortality, and a dose-response relationship was found between degree of deprivation and pedestrian injury rates (Laflamme, 2000). Rivara (1985) also found a higher rate of pedestrian injuries among families with lower household incomes and families living below the poverty line in Memphis, Tennessee. In a study of pedestrian injury among Hispanics in California, Agran (1998) observed that the risk of injury increased with poverty, parental illiteracy, and household crowding. In a Hartford study which compared frequency of pedestrian collisions across census tracts, the highest frequency tracts were characterized by a high proportion of female-headed households living below the poverty line, and a greater number of children per acre (Braddock, 1991). Calhoun (1998) also found higher rates of poverty and households headed by females in census tracts with high frequencies of child pedestrian injuries.

Differential exposure of children to hazards, due to differences in the extent and manner of use of streets, may explain the relationship between socioeconomic status and risk of pedestrian injury (Laflamme, 2000). The average number of street crossings by children walking to and from school in Montreal increased with lower socioeconomic status,

indicating an increased exposure to traffic hazards among poorer children (Macpherson, 1998).

Ethnic and racial minority status is associated with an increased risk of pedestrian injury and mortality, possibly because they are less likely to own a car and more likely to travel on foot, by bicycle, or use public transportation (Surface Transportation Policy Project, 2002). Agran (1996) observed that the rate of hospitalization or death from pedestrian injury was more than twice as high in Hispanic children as compared to non-Hispanic white children in Southern California. Rivara and Barber (1985) also found higher proportions of non-whites in census tracts with higher child pedestrian injury rates. In a study of child pedestrian injuries in an Alabama county, minority children accounted for 79.1% of those injured (Calhoun, 1998).

3. Environmental Risk Factors

Most child pedestrian injuries do not take place near schools. In a study of child pedestrian collisions in Philadelphia, only 7% of the collisions occurred within one block of a school, and only 10% occurred during the walk to or from school (Holt, 1999). One study showed that most children were injured within a half-mile of their home (Mueller, 1990). Agran (1994) determined that injuries occurred within 2 blocks of the child's home in 85% of cases. In several studies of child pedestrian injuries by location, the majority of children were injured at mid-block

(Agran, 1994; DiMaggio, 2002; Lapidus, 1991). Older children were more likely to be injured at intersections, and younger children were more likely to be injured at mid-block (Agran, 1994; DiMaggio, 2002).

Living in a multifamily dwelling such as an apartment or condominium was associated with a 5.5 times greater risk of pedestrian injury than living in a single family dwelling (Agran, 1996; Mueller, 1990). A high concentration of children per square acre or square mile was also a correlated with high rates of child pedestrian injury (Braddock, 1991; Calhoun, 1998). Absence of a play area was also associated with increased risk (Mueller, 1990).

Busier streets with higher traffic volumes and higher posted speed limits were associated with increased risk for pedestrian injuries (Mueller, 1990; Roberts, 1995). Higher vehicle speeds were also associated with increased severity of injury and increased pedestrian mortality (Ballesteros, 2004). Streets with a high density of curbside parking had increased rates of pedestrian injury in several studies (Agran, 1996; Calhoun, 1998; Roberts, 1995). Marked crosswalks were associated with a two-fold increase in risk of pedestrian injury, possibly because they create a false sense of security in children who believe that vehicles will stop for pedestrians in crosswalks (Mueller, 1990).

In a descriptive study of child pedestrian injuries in New York City from 1991 to 1997, the risk of injury varied with time of year, day of the week, and time of day (DiMaggio, 2002). Injuries peaked during the

summer months, particularly for 5 to 9 year olds. Injuries occurred most frequently on weekdays during the school year, peaking on Fridays. The proportion of injuries occurring on weekends increased during the summer months. Most injuries occurred during daylight hours, particularly for younger children (DiMaggio, 2002). In two other studies, the highest frequency of child pedestrian injuries occurred between the hours of 4 pm and 8 to 9 pm, which corresponds to the time period after school is dismissed and children are likely to be outdoors playing (Ballesteros, 2004; Calhoun, 1998). In an earlier study of child pedestrian injuries in Hartford, injuries also occurred more frequently during the summer months, on Fridays, and in the late afternoon (Lapidus, 1991).

III. CROSSING GUARDS AND CHILD PEDESTRIAN SAFETY

The problem of child pedestrian safety has been studied from many different perspectives over the last three decades. However, a search of the literature for pedestrian injury studies involving crossing guards located only one published research study which utilized crossing guards to provide on-site pedestrian training to children, and one unpublished study in which crossing guards were surveyed about their working conditions. Most of the information that we have from crossing guards on child pedestrian safety hazards is anecdotal rather than research-based, and has been published in the form of news stories and press releases. These anecdotes tell us much about the serious hazards faced daily by pedestrians and crossing guards alike, and are deserving of further study.

In Brockville, Ontario, Canada, school crossing guards' complaints about drivers failing to heed their stop signs led police to warn that they would issue tickets carrying fines of up to \$190 to motorists who did not heed crossing guards (Pay, 2003). One crossing guard resigned because conditions were too dangerous. Another crossing guard reported having to throw out an arm to prevent a group of children from crossing as a car sped through an intersection (Gillis, 2003). In London, Ontario, Canada, crossing guards reported motorists speeding through school zones, not stopping for crossing guards' signs, and even driving on the shoulder to get around cars that have stopped for a crossing guard. Other crossing

guards reported that drivers ignore them while talking on their cell phones as they drive (Miner, 2003).

Crossing guards in Mission Bend, Texas, reported that motorists violate traffic laws. They reported that drivers do not respect them and do not pay attention to their stop signs. One crossing guard reported having to grab a child by his shirt to prevent him from crossing as a car sped by (LaRicci, 2002). In a case of road rage in Pawtucket, Rhode Island, an irate motorist intentionally ran down a crossing guard after two elderly women in their 80's stopped to give her hugs as she was crossing them in front of a church where they had just attended Mass (Castellucci, 2003).

In an unpublished study of working conditions of crossing guards in Southern and Northern California conducted by Dr. Sheila Sarkar at the California Institute of Transportation Safety at San Diego State University, crossing guards reported that drivers frequently sped past children in crosswalks and ignored their red hand-held stop signs. They reported that three fourths of all motorists exceeded the mandatory 25 mph speed limit in school zones when children were present. Nearly 30% of the 186 crossing guards surveyed stated that they had narrowly escaped being hit by a car on the job, and 3.5% reported that they had been hit while working (Roadways, 2002). One crossing guard reported that in the previous two years, she had barely escaped being hit by at least 20 motorists who ran red lights or ignored her hand-held red stop sign near

the elementary school where she works (Weaver, 2002). In 1999, 52 California crossing guards were injured on the job (Roadways, 2002).

Only one published study involving crossing guards was found in a search of the literature. Yeaton and Bailey (1978) observed crossing guards and children and determined that children attended to them in the same manner as a traffic light, waiting for a signal to cross, rather than attending to traffic and developing their own ability to assess for potential safety in street crossing. In that study and in a follow up study in 1983, crossing guards were trained to provide street-corner pedestrian safety skills training to small groups of children, and the outcome of training in terms of improvement in the subject's crossing skills was measured. In a one year follow up of the children who had received training, they concluded that the children either maintained high levels of pedestrian safety skills, or that their skills were quickly recovered with little remedial training (Yeaton, 1978, 1983). However, many later studies have not supported the efficacy of child pedestrian education programs. They conclude that very few training programs have been shown to be effective, that any resulting modest improvements in pedestrian behavior are short-lived, and that they have not reduced child pedestrian injury and mortality rates (Connelly, 1998; Demetre, 1993; Klassen, 2000; Luria, 2000; Malek, 1990; Miller, 2004; Rivara, 1991; Roberts, 1993, 1995; Tanz, 1985).

Crossing guards are in a unique position to contribute to our knowledge about the environmental and behavioral hazards to child pedestrian safety which exist at the pedestrian crossings where they work, but their observations and experiences have been under-studied and under-utilized. We designed a descriptive research study to capture this information.

IV. MATERIALS AND METHODS

The Connecticut Children's Medical Center's (CCMC) Injury Prevention Center (IPC) surveyed Hartford's crossing guards to determine what factors they feel most affect child pedestrian safety. A descriptive survey was developed to collect data about the demographics of Hartford crossing guards, their training, and the hazards to child pedestrian safety that they observed at their worksites. Survey questions were developed based on themes identified from a search of the literature on crossing guards and child pedestrian injuries, and from information provided by the Hartford crossing guards at their initial meeting with the CCMC IPC research staff. Dr. Sheila Sarkar, Director of the California Institute of Transportation Safety (CITS) at San Diego State University (SDSU), graciously agreed to share with us a survey which was used in her 2001 study of crossing guards, which was in review for publication (S. Sarkar, email communication, November 11, 2003). The Dr. Sarkar's survey also provided us with some ideas on the type of data we wanted to obtain with the CCMC IPC survey.

The Hartford crossing guards meet monthly with their union steward. We received permission from the union steward to attend a meeting for the purpose of explaining our proposed study to the crossing guards and to solicit their ideas on what issues our study should focus on. In preparation for our initial meeting with the crossing guards in September 2003, we prepared a short list of questions to ask them. The

questions were designed to identify issues of concern to the crossing guards on their job sites, which they perceived to be threats to the safety of child pedestrians, and to assess their interest in participating in the study (see Appendix A). The questions were read aloud to the crossing guards as a group by an IPC staff member, and the crossing guards were asked to respond by a show of hands, while another IPC staff member counted hands and recorded the number of responses to each question. Not all of the crossing guards responded to every question.

After all of our questions had been answered, the crossing guards were asked to volunteer their ideas about what issues related to pedestrian safety they wanted to see addressed in the study. Their comments were recorded by an IPC staff member, and a number of the survey questions were designed to obtain more detailed information about the safety issues that they identified (see Appendix B). Several of the crossing guards remained after the meeting adjourned to speak to the IPC staff in greater detail about the pedestrian safety problems that they encountered on their jobs. We observed a great deal of frustration and passion on the part of the crossing guards. They were very concerned about the safety of the children and felt that they were not being utilized enough by both children and parents. They were interested in any programs in the schools related to pedestrian safety and awareness.

A description of the study, working draft of the survey tool, and consent form were submitted to the CCMC IRB for approval, which was

granted. The survey was initially given to three crossing guards to complete in a pilot study, in order to detect any problems with the survey questions. In the pilot study, an IPC staff person read the survey to the three crossing guards who volunteered to participate, and they completed the survey at that time, with opportunities to ask for clarification of any survey items as needed. Some modifications to the survey were then made based on feedback from the subjects who took the pilot survey, and on our observations that some questions were not eliciting clear responses or useful information.

The final version of the crossing guard survey contained 32 items, and was written at the sixth grade level (see Appendix C). At the monthly crossing guard meeting held in May 2004, the study was explained to the guards who were present, and consent forms and surveys were distributed to those who opted to participate. Subject's signatures on the consent forms were witnessed by an IPC staff member, and subjects were given a copy of the consent form to keep (see Appendix D).

An IPC staff member read the consent form and the survey aloud to the entire group, one item at a time, in order to minimize the impact of any literacy limitations on the crossing guards' ability to understand and complete the survey. There was a Spanish-speaking IPC staff member present to translate the survey for any crossing guards who were more comfortable with Spanish. Two crossing guards did complete the survey with the assistance of the IPC staff translator. All of the crossing guards

were encouraged to complete the survey during the meeting, but were also given the option of taking the survey home to complete and return by mail in an addressed, stamped envelope. Nineteen crossing guards turned in completed surveys during the meeting. Although many crossing guards took surveys and return envelopes home, only one completed survey was returned by mail, for a total of 20 completed surveys. Each crossing guard who completed the survey or took a survey home was given a small thank you gift, consisting of two dollars in Dunkin' Donuts gift certificates.

Because of the very low return rate for surveys taken home by crossing guards, we decided to provide a second opportunity for crossing guards who had not yet participated in the study to do so. We attended another monthly crossing guard meeting in October 2004 and obtained four additional completed surveys. One of these four surveys was returned by a crossing guard who had taken the survey home in May to complete, and three were completed at the October meeting. We did not give the crossing guards the option of taking the survey home to complete this time, due to the minimal return rate during the first round of surveys. At the October meeting, we distributed an additional thank you gift to those crossing guards who had already completed the survey in May, consisting of an insulated travel coffee cup with the CCMC IPC logo on it. The three crossing guards who completed the survey at the October

meeting received both a travel mug and two dollars in Dunkin' Donuts gift certificates.

In February, 2005, we attended the annual mandatory meeting of the Hartford crossing guards at the Hartford Police Department, in an attempt to increase our sample size by soliciting more study participants. As an incentive to complete the survey, we explained that the names of all crossing guards who completed the survey at the meeting and those who had previously completed the survey would be entered into a drawing for three gift cards to Target stores, with the prizes to be awarded at the end of the meeting. An additional 34 completed surveys were collected at the February meeting, increasing our sample size to 58 out of the total population of 93 crossing guards employed by the Hartford Police Department, for a response rate of 62.4%. The crossing guards' survey responses were entered into an Access database. The data was exported to Excel, and then to SPSS. SPSS was used to analyze the frequencies of responses for each survey question.

VI. RESULTS

A. Demographics of the Crossing Guard Sample

A total of 58 crossing guards returned completed surveys, but not all subjects completed every question on the survey. This resulted in fewer than 58 responses for some survey questions.

Nearly all of the crossing guards, 82.8% of those in the study, were over the age of 40. Fifteen crossing guards were age 60 and over. None of the crossing guards reported their age as being under 20, and only one was 20 to 29 (see table 2).

Table 2
Age distribution of Hartford Crossing Guards who completed the survey

Age Group	Frequency	Percent	Cumulative Percent
Under 20	0	0	0
20-29	1	1.7	1.7
30-39	6	10.3	12.0
40-49	17	29.3	41.3
50-59	16	27.6	68.9
60 and over	15	25.9	94.8

The gender distribution of the subjects was 44 females and 13 males, with one subject not indicating their gender. Thirty-five subjects reported having graduated from high school, and six of these indicated having attended some college. Five subjects reported having earned a

General Educational Development diploma (GED). Fifteen reported having attended some high school or technical school. English was reported as the primary language of 49 crossing guards. Four indicated that Spanish was their primary language. Four were equally comfortable with English and Spanish, and one crossing guard reported speaking both English and Italian equally well.

B. Work Experience and Training

Number of years of experience working as a crossing guard was reported as less than 1 year, 1 to 5 years, or over 5 years. Seven crossing guards had been working at their jobs for less than one year. Seventeen reported 1 to 5 years of experience, and 33 reported over 5 years of experience working as crossing guards.

Time frame of initial crossing guard training was categorized as less than one year ago, 1 to 5 years ago, or more than 5 years ago. Twenty-eight crossing guards reported that they had first received training more than 5 years ago, 14 reporting first being trained 1 to 5 years ago, and 14 reporting having first received training less than 1 year ago. Two did not indicate when they had first received training.

One survey question elicited data on type of job training received by the crossing guards, including classroom instruction, watching training films, reading a training manual, and on the job training with an experienced crossing guard or a police officer. Multiple responses were

allowed. Twenty-two subjects (37.9%) had received classroom instruction. Eleven subjects (19%) reported that they had watched training films. Only 8 subjects (13.8%) reported having read a training manual. On the job training with an experienced crossing guard was reported by 40 subjects (69%), and 19 (32.8%) reported on the job training with a police officer (see table 3). We attempted to obtain data on the number of hours, days, or weeks of each type of training reported, but the data proved not to be useful because of apparent confusion about how these questions were formatted, leading to multiple responses for each type of training when we had intended for subjects to provide only one response for each type of training. It was not possible to interpret the time spent in training responses in a meaningful way.

Table 3
Types of Training Reported by Hartford Crossing Guards (CGs)

Type of Training	No. of CGs	Percent
Classroom instruction	22	37.9%
Training films	11	19.0%
Training manual or book	8	13.8%
On the job training w/ crossing guard	40	69.0%
On the job training w/ police officer	19	32.8%

Quality of initial crossing guard training was rated as very good, good, okay, poor, or very poor. Only one crossing guard rated their

training as very poor. Five (8.6%) thought their training was okay". Twenty subjects (34.5%) rated their training as "good". Thirty-two (55.2%) rated their initial job training as crossing guards as "very good". Suggestions for improving crossing guard training were requested. Only one response was received from a crossing guard who indicated a desire to have stayed at one post during their training period.

Information was requested on any additional training received by crossing guards during their employment. Thirteen crossing guards (22.4%) reported that they had not received any additional training since they started working. These may be crossing guards who have been working for shorter periods of time, less than one year or 1 to 5 years. Thirty-four crossing guards (58.6%) reported having received additional training within the previous two years. Three crossing guards (5.2%) reported having received additional training 3 to 5 years ago.

Most of the crossing guards (89.6%) reported working 10 to 20 hours per week. None reported working more than 20 hours per week. Nearly all (98.3%) of the crossing guards reported being either "happy" or "very happy" with their jobs. Information was collected on the crossing guards' work sites, including the name of the intersection, street, or school where they usually worked, in the event that we wanted to take a closer look at specific sites in the future, based on concerns described at specific crossing guard work sites.

C. Pedestrian and Traffic Volume

Three-quarters of the crossing guards (75.9%) reported crossing fewer than 99 children in the course of a typical workday (see table 4). Thirteen crossing guards (22.4%) reported numbers of children crossed in excess of 100 per day, with 9 (15.5%) reporting between 100 and 199 children per day, and 3 (5.2%) reporting between 200 and 299 children per day. One crossing guard reported crossing over 500 children per day, and one did not know how many children crossed per day at their worksite.

Table 4
Number of Children Crossed per Day

Number of Children	No. of CGs	Percent
Less than 25	8	13.8%
25-49	19	32.8%
50-99	17	29.3%
100-199	9	15.5%
200-299	3	5.2%
300-399	0	0%
400-499	0	0%
Over 500	1	1.7%
Don't know	1	1.7%

In order to get a sense of the traffic volume at each crossing guard's worksite during their working hours, we asked them to rate the traffic as

very light, light, moderate, heavy, or very heavy, with each category defined as a range of cars per hour (see table 5). Twenty-five crossing guards (43.1%) reported very heavy traffic, defined as over 300 cars per hour, at their worksites. Nineteen crossing guards (32.8%) reported heavy traffic, defined as 201 to 300 cars per hour, at their worksites. Traffic was reported as moderate, 101 to 200 cars per hour, by 12 crossing guards (20.7%). Only one crossing guard (1.7%) reported light traffic, and one reported very light traffic.

Table 5
Traffic Volume at Crossing Guard Worksites During Working Hours

Traffic Volume (cars per hour)	No. of CGs	Percent
Very light (0-50)	1	1.7%
Light (51-100)	1	1.7%
Moderate (101-200)	12	20.7%
Heavy (201-300)	19	32.8%
Very heavy (over 300)	25	43.1%
Don't know	0	0%

D. Posted Speed Limit and Actual Speed Driven

Posted speed limits at crossing guard worksites were reported, and compared to observed speeds driven by motorists. Six crossing guards (10.3%) reported that there were no speed limit signs visible, and one (1.7%) did not know what the speed limit was. The most commonly

reported posted speed limit was 25 to 30 mph (65.5%). Nine crossing guards (15.5%) reported a posted speed limit of 15 to 20 mph, which are probably in school zones. Three (5.2%) reported posted speed limits of 35 to 40 mph.

Table 6
Posted Speed Limit at Crossing Guard Worksites

Posted Speed Limit	No. of CGs	Percent
15-20 mph	9	15.5%
25-30 mph	38	65.5%
35-40 mph	3	5.2%
45-50 mph	0	0%
55 mph or higher	0	0%
No speed limit sign visible	6	10.3%
Don't know	1	1.7%

The usual observed speed of vehicles at crossing guard worksites was reported, relative to the posted speed limit. Forty-nine crossing guards (84.5%) reported actual vehicle speeds as being higher or much higher than the posted speed limit. Only seven crossing guards (12.1%) reported that drivers traveling through their worksites obeyed the posted speed limits. Two surveys had no response marked for this item.

E. Perceived Danger, Pedestrian Collisions, and Near Misses

Perceived danger at crossing guard worksites was rated according to how often crossing guards felt they were in danger from drivers violating traffic laws. Twenty-three crossing guards (39.7%) felt that they were always in danger while working, and sixteen (27.6%) felt that they were in danger most of the time. Two crossing guards (3.4%) felt that they were in danger about half of the time, and 11 (19.0%) reported feeling in danger some of the time on the job. Four crossing guards (6.9%) felt that they were never in danger, and two did not answer this question. When asked how often they perceived that children were in danger from drivers violating traffic laws, the crossing guards' responses for each level of danger to children were very similar to the levels of danger that the crossing guards reported feeling themselves to be in. Only four crossing guards (6.9%) said that children were never in danger (see table 7).

Table 7
Perceived Danger to Crossing Guards and Children from Drivers
Disobeying Traffic Laws as Reported by Crossing Guards

How Often in Danger	CGs	Children
Always	39.7%	43.0%
Most of the time	27.6%	24.1%
About half of the time	3.4%	8.6%
Some of the time	19.0%	17.2%
Never	6.9%	6.9%
No response	3.4%	0%

Four crossing guards (6.9%) reported that they had been hit by a motor vehicle while working. Fourteen more crossing guards (24.1%) reported experiencing at least one near miss while on the job. Eight crossing guards (13.8%) reported having witnessed at least one incident of a child being hit by a motor vehicle while on the job, including one guard who had witnessed three incidents of children being struck, for a total of 10 reported incidents. Eleven more crossing guards (19.0%) reported having witnessed near misses between motor vehicles and children. One crossing guard did not respond to the question. Nineteen of the crossing guards (32.8%) reported that they kept a daily log of traffic violations, but some of these noted that they only kept a log “sometimes”.

F. Crossing Guards' Observations of Child, Parent, and Driver Behaviors

Several questions on the survey addressed crossing guards' observations of the behavior of children, parents, and motorists while on the job. Eighteen crossing guards (31.0%) reported that all of the children at their worksite obeyed directions while being crossed by the guard. Twenty-five (43.1%) reported that most children obeyed directions, and 9 (15.5%) reported that about half obeyed directions. Six crossing guards (10.3%) reported that only some of the children obeyed directions. Parents were generally reported to be less compliant with directions of crossing guards when accompanying their children across the street, with 15 crossing guards (25.9%) reporting that only some parents obeyed

directions, and 2 crossing guards (3.4%) reporting that none of the parents obeyed directions (see table 8).

Table 8
How Many Children/Parents Obey Crossing Guards Directions?

Proportion who obey CG directions	Children	Parents
All	31.0%	15.5%
Most	43.1%	43.1%
About half	15.5%	8.6%
Some	10.3%	25.9%
None	0%	3.4%
No response	0%	3.4%

The crossing guards rated the frequency of observed driver behaviors, including speeding, disobeying traffic signals, making illegal right turns on red lights, talking on cell phones, and disobeying crossing guard directions. Thirty-nine crossing guards (67.2%) reported that drivers speed through their worksites all of the time or most of the time. Thirty-two (55.2%) reported that drivers disobey traffic signals all of the time or most of the time, however, of the 9 crossing guards who did not respond to this question, some noted that there were no traffic signals at their worksites. Twenty-eight (48.3%) reported that all or most drivers made illegal right turns on red lights at their worksites, with some of the 15 who did not answer the question noting that their worksites did not have

traffic signals. Drivers talking on cell phones while driving was reported to be a problem all of the time or most of the time by 39 crossing guards (67.2%). Drivers were reported to disobey crossing guard directions all of the time or most of the time by 21 crossing guards (36.2%), and 9 crossing guards (15.5%) reported that drivers disobeyed them about half of the time (see table 9).

Table 9

Frequency of Driver Behaviors as Reported by Crossing Guards

<u>Frequency</u>	<u>Always</u>	<u>Most of the time</u>	<u>Half of the time</u>	<u>Sometimes</u>	<u>Never</u>	<u>No response</u>
<u>Driver Behaviors</u>						
Exceed posted speed limit	34.5%	32.8%	12.1%	15.5%	1.7%	3.4%
Disobey traffic signals	24.1%	31.0%	6.9%	22.4%	1.7%	13.8%
Illegal right turn on red	20.7%	27.6%	6.9%	13.8%	6.9%	24.1%
Talking on cell phone	43.1%	24.1%	8.6%	6.9%	1.7%	15.5%
Disobey CG directions	15.5%	20.7%	15.5%	25.9%	6.9%	15.5%

Frequency of parent behaviors were also rated, including disobeying crossing guard directions, crossing children at mid-block, crossing children on green lights, not waiting for the walk light to cross children, and talking to the crossing guard and distracting them from doing their job. Only seven crossing guards (12.1%) reported that parents never disobeyed their directions. Approximately one-third (34.5%) said that parents disobeyed directions some of the time, and 5 (8.6%) said that parents disobeyed directions about half of the time. Thirteen crossing guards (22.4%) said that parents disobeyed directions most of the time, and 7 (12.1%) reported that parents always disobeyed them.

More than three-quarters of the crossing guards (82.8%) indicated that they observed parents crossing with their children at mid-block to some degree. Twenty-six crossing guards (44.8%) stated that parents crossed their children at mid-block at least half the time or more. Crossing guards reported less of a problem with parents crossing their children when the traffic light was green, with 17 crossing guards (29.3%) reporting that parents did this at least half of the time or more. Nineteen crossing guards (32.8%) reported that parents did not wait for the walk light to come on before crossing their children at least half of the time or more. Twenty-five (43.1%) reported that this occurred only some of the time or never. The majority of the crossing guards did not perceive parents talking to them and distracting them from their jobs to be a frequent

problem. Thirty-one crossing guards (53.4) said that this never happens, and 8 (13.8%) said that it only happens some of the time (see table 10).

The frequencies of child behaviors were also rated, including disobeying crossing guard directions, crossing at mid-block, crossing on green lights, not waiting for the walk light to come on before crossing, and talking to the crossing guard and distracting them from doing their job. Children were reported to disobey the crossing guard at least half of the time or more by 20 crossing guards (34.5%). Twenty-four crossing guards (41.4%) reported that children sometimes disobeyed them, and 11 (19.0%) reported that children never disobeyed them.

Mid-block crossings by children were reported to occur at least some of the time by 46 crossing guards (79.3%), and at least half of the time or more by 18 crossing guards (31.0%). Twelve crossing guards (20.7%) reported children crossing on green lights most of the time or all of the time. Twenty-one crossing guards (36.2%) said that children cross on green lights some of the time, and 12 (20.7%) said that they never observe this behavior by children. Children did not wait for the walk light to come on before crossing at least half of the time or more frequently as reported by sixteen crossing guards (27.6%). More crossing guards (24.1%) reported that this only happens some of the time, or never happens (20.7%), so the consensus seems to be that children do wait for the walk light most of the time before crossing. Children distracting the

crossing guard by talking to them was not reported to be a frequent problem, with only 17 crossing guards (29.3%) reporting that this occurs at all, and half of these reporting that this only happens some of the time (15.5%) (see table 11).

Table 10

Frequency of Parent Behaviors as Reported by Crossing Guards

Frequency	Always	Most of the time	Half of the time	Sometimes	Never	No response
<u>Parent Behaviors</u>						
Disobey CG directions	12.1%	22.4%	8.6%	34.5%	12.1%	10.3%
Cross child mid-block	15.5%	17.2%	12.1%	37.9%	3.4%	13.8%
Cross child on green light	8.6%	13.8%	6.9%	36.2%	10.3%	24.1%
Don't wait for walk light	10.3%	17.2%	5.2%	32.8%	10.3%	24.1%
Talk to and distract CG	1.7%	8.6%	3.4%	13.8%	53.4%	19.0%

Table 11

Frequency of Child Behaviors as Reported by Crossing Guards

Frequency	Always	Most of the time	Half of the time	Sometimes	Never	No response
<u>Child Behaviors</u>						
Disobey CG directions	10.3%	15.5%	8.6%	41.4%	19.0%	5.2%
Cross at mid-block	10.3%	13.8%	6.9%	48.3%	8.6%	12.1%
Cross on green light	5.2%	15.5%	0%	36.2%	20.7%	22.4%
Don't wait for walk light	8.6%	15.5%	3.4%	24.1%	20.7%	27.6%
Talk to and distract CG	6.9%	5.2%	1.7%	15.5%	50.5%	20.7%

G. Police and Traffic Engineer Actions

One survey question listed six police actions and asked the crossing guards to rate how helpful they thought each would be to them in doing their job. More frequent police patrols were rated as very helpful by 29 crossing guards (50.0%), somewhat helpful by 18 (31.0%), and not very helpful by 5 (8.6%). Having police officers present to catch violators was thought to be very helpful by 24 (41.4%) crossing guards, somewhat helpful by 17 (29.3%), and not very helpful by 6 (10.3%) of them. Having police issue warnings to violators caught by the crossing guard was rated as very helpful by 25 crossing guards (43.1%), somewhat helpful by 12 (20.7%), and not very helpful by 9 (15.5%) crossing guards.

Sixteen crossing guards (27.6%) thought that it would be very helpful to have police provide training to crossing guards, while 14 (24.1%) thought it would be somewhat helpful. Thirteen crossing guards (22.4%) rated police training for crossing guards as not very helpful. The numbers of crossing guards who rated having police provide training to children or to parents as helpful, were about the same as those who thought that police training of crossing guards would be helpful (see table 12).

One survey question listed four traffic engineer actions, which crossing guards were asked to rate according to the degree of helpfulness to them in doing their job. The traffic engineer actions included visiting the crossing guard sites to identify hazards to pedestrian safety, improving signage, designing roads to slow vehicle speed, and designing roads safer

for children and crossing guards. Thirty crossing guards (51.7%) rated identification of road and traffic hazards as very helpful, 13 (22.4%) thought it would be somewhat helpful, and 6 (10.3%) rated it as not very helpful. Thirteen crossing guards (22.4%) did not indicate a response to the road and traffic hazard item. Improving signage was rated as very helpful by 25 crossing guards (43.1%), somewhat helpful by 15 (25.9%), and not very helpful by one guard (1.7%). Seventeen crossing guards (29.3%) did not respond to the signage item. Designing roads to slow vehicle speed was rated as very helpful by 32 crossing guards (55.2%), somewhat helpful by 9 guards (15.5%), and not very helpful by 2 guards (3.4%), with 15 crossing guards (25.9%) not indicating a response to the item. Designing roads to be safer for children and crossing guards was rated as very helpful by 32 crossing guards (55.2%), somewhat helpful by 10 crossing guards (17.2%), and not very helpful by one guard (1.7%), with 15 (25.9%) not responding to the item (see table 13).

Table 12
Helpfulness of Police Actions as Rated by Crossing Guards

Helpfulness	Very helpful	Somewhat helpful	Not very helpful	No response
<u>Police Action</u>				
More frequent police patrol	50.0%	31.0%	8.6%	8.6%
Police present to catch violators	41.4%	29.3%	10.3%	19.0%
Police issue warnings to violators caught by CG	43.1%	20.7%	15.5%	20.7%
Police train CGs	27.6%	24.1%	22.4%	25.9%
Police train children	27.6%	32.8%	19.0%	20.7%
Police train parents	32.8%	24.1%	20.7%	22.4%

Table 13

Helpfulness of Traffic Engineer Actions as Rated by Crossing Guards

<u>Helpfulness</u>	<u>Very helpful</u>	<u>Somewhat helpful</u>	<u>Not very helpful</u>	<u>No response</u>
<u>Traffic Engineer Action</u>				
Identify road/traffic hazards	52.7%	22.4%	10.3%	15.5%
Improve signage	43.1%	25.9%	1.7%	29.3%
Design roads to slow vehicle speed	55.2%	15.5%	3.4%	25.9%
Design roads safer for children and CGs	55.2%	17.2%	1.7%	25.9%

For planning purposes for future CCMC IPC activities addressing child pedestrian safety in Hartford, the crossing guards' levels of interest in teaching a crossing guard lesson to students in their schools, and in attending an Injury Free Coalition for Kids of Hartford meeting were assessed. Twenty-four (41.4%) indicated that they were very interested in teaching a crossing guard lesson, 20 (34.5%) were interested, 10 (17.2%) were not interested, and 4 (6.9) did not respond. Twenty-three crossing guards (39.7%) indicated that they were very interested in attending an Injury Free Coalition of Hartford meeting, 26 (44.8%) were interested, 6 (10.3%) were not interested, and 3 (5.2%) did not respond.

VI. DISCUSSION

A. Crossing Guard Qualifications and Training

In the city of Hartford, crossing guards must be bona fide residents of the city of Hartford, must have completed 8th grade, be 18 years of age or older, pass a police background check, and pass a physical examination including drug and alcohol screening. Hartford crossing guard candidates must also pass an exam, which may include an oral test, related to the requirements of the position including knowledge of laws and ordinances governing traffic, ability to get along with the public, ability to control groups of children, ability to carry out instructions, and evaluation of training and experience (The City of Hartford Department of Personnel, 2003).

The type and amount of job training received varied greatly among the Hartford crossing guards who participated in the survey, and may reflect changes in the training process that have occurred over the years. The current training for new Hartford crossing guards consists of two weeks of on the job training with another experienced crossing guard. Some of the crossing guards who participated in the survey indicated that they had received on the job training with a police officer, which had been the standard training provided until 11 years ago, according to Denise Sillion, the Hartford Police Department's crossing guard supervisor (D. Sillion, personal telephone communication, December 1, 2003).

Some Hartford crossing guards reported that their training included classroom instruction (37.9%), watching training films (19.0%), or reading a training manual (13.8%). However, according to the Hartford Police Department's crossing guard supervisor, Denise Sillion, initial training does not include a classroom component, training manual, or training films (D. Sillion, personal telephone communication, March 23, 2005). Data on crossing guard training was initially collected for descriptive purposes. Although the original intent of this study was not to examine the training of crossing guards, the differences in training amongst survey respondents in this study prompted us to do a search for information on what, if any, federal or state standards exist for the hiring and training of crossing guards.

The Federal Highway Administration (FHA) Manual on Uniform Traffic Control Devices sets qualifications for the selection of adult crossing guards. According to the FHA criteria, candidates should possess average intelligence, good physical condition including sight, hearing, and mobility, mental alertness, neat appearance, good character, dependability, and a sense of responsibility for safety of students (FHA, 2003). The FHA also sets standards for crossing guard uniforms and stop paddles, and for operating procedures for crossing guards (FHA, 2003). However, there are no federal standards for the training of crossing guards.

Training requirements for school crossing guards vary greatly at the state level, from none in Connecticut, to the California Department of Transportation's (DOT) recommendation that "adequate training should be provided", to the Florida DOT's detailed criteria for training not only crossing guards, but also for training crossing guard trainers (California DOT, 2003; Florida DOT, 1998; Traffic Safety Digest, n.d.).

Florida specifies that all crossing guard administrators/trainers must complete a 12-hour training course in order to become certified trainers. Florida requires all crossing guards to complete four hours of classroom instruction consisting of a standardized curriculum, two hours of field instruction, and two hours of supervised work at the guard's primary post with children present, passing a performance checklist with 100% accuracy before leaving the field instruction portion of the training course. This training results in certification by the Florida DOT. All crossing guards must renew their certification by being retrained annually, which must include a minimum of two hours of supervised work and a performance evaluation (Florida DOT, 1998).

B. Characteristics of Crossing Guard's Work Environments

The majority of crossing guards reported crossing fewer than 100 children per day, but about one-quarter reported much larger numbers of pedestrian crossings at their worksites. Traffic volume also varied from

moderate to very heavy, with light or very light traffic volume reported by only two crossing guards. Most of the crossing guards (81.0%) reported posted speed limits of 25-30 mph or less at their worksites. Three crossing guards reported speed limits of 35-40 mph, and six crossing guards reported that there was no posted speed limit at their worksite. If a crossing guard is to be reassigned to a new post, retraining should occur to take into account the differences in traffic and pedestrian volume and patterns, traffic speeds, and the specific environmental characteristics of the worksite.

C. Safety Issues at Crossing Guard Work Sites

1. Speeding

Drivers speeding through crossing zones were reported to be a problem by 84.5% of crossing guards. Their reports are consistent with the findings of a survey of speeding in school zones in 27 U.S. cities, in which over two-thirds of drivers exceeded the posted speed limit, and one-third traveled at speeds of 30 mph or more, in spite of the presence of safety measures including traffic lights, flashing lights, crossing guards, and crosswalks (National SAFE KIDS Campaign, 2000). This finding is alarming because as traffic speed increases, the likelihood of pedestrian collisions and the severity of injuries increases (Mueller, 1990; NHTSA, 1999; Roberts, 1995).

Both active and passive measures need to be taken to enforce speed limits in pedestrian areas. The city of Phoenix, Arizona implemented two speed enforcement initiatives; a Photo Speed at School enforcement program, using two photo-safety vans mounted with radar-controlled cameras at school crossings, which issued 6,872 speeding citations during 2002, and photo red light enforcement at eight school traffic signals. Phoenix also installed effective driver feedback monitors in two school crossings, which monitor and display vehicle speeds, and the message “slow now”, with a bright LED flash mimicking a traffic camera flash when drivers exceed the school zone speed limit (Institute of Transportation Engineers, 2003). The city of Bellevue, Washington installed raised crosswalks in school zones as a passive measure to help reduce vehicle speeds by 5 to 8 mph, as well as to improve pedestrian visibility (Institute of Transportation Engineers, n.d.).

2. Other Traffic Law Violations

In addition to speeding, many crossing guards reported frequent violations of other traffic laws by drivers, including disobeying traffic signals and crossing guard directions, and making illegal right turns on red lights. They also cited drivers talking on cell phones while driving as a frequent behavior of concern, which although not currently illegal, poses a distraction to drivers who should be paying careful attention while driving through pedestrian crossing zones. Cell phone use by drivers was also

cited as a safety concern by crossing guards in the California survey (Miner, 2003).

Four crossing guards (6.9%) reported that they had been struck by a motor vehicle while working, and 8 guards reported 10 incidents of children being struck while they were on duty. An additional 14 crossing guards (24.1%) reported that they had had near misses, and 11 had witnessed near misses between children and motor vehicles. Only 6.9% of crossing guards felt that they and the children that they cross were never in danger from drivers disobeying traffic laws. In a similar survey of 186 California crossing guards (Weaver, 2002a), about 4% of guards reported that they had been hit, and 30% said they had had a near miss.

Clearly, the environment in which Hartford's crossing guards work and children walk to school is a dangerous one, to which many safety improvements need to be made, starting with better enforcement of speed limits and other traffic laws in and near pedestrian crossing zones. The city should consider reducing speed limits in areas where children are frequently pedestrians, not just in school zones. Only 9 Hartford crossing guards reported speed limits of 15 to 20 mph at their worksites. Research by the United Kingdom Department of the Environment, Transport and the Regions (as cited in Pilkington, 2000) showed that 20 mph zones reduced the incidence of child pedestrian and child cyclist accidents by 67%, and that decreasing vehicle speeds from 30 mph to 20 mph reduced the risk of serious injury or death from being struck by a vehicle from 45% to 5%.

Lower vehicle speeds also enhance children's abilities to make safe crossing decisions (Connelly, 1998).

3. Parent and Child Behavior

Crossing guards reported more problems with parents not heeding directions than with children not obeying them. Miller et al (2004) observed that children who crossed intersections with their parents did so less safely than those who walked without their parents, and that parents did not correct their children's unsafe crossing behavior. Unsafe crossing behaviors observed by the Hartford crossing guards included crossing at mid-block, crossing on green lights, and crossing before the walk signal came on. The crossing guards' reports that these behaviors occurred frequently are concerning because parents are teaching these unsafe behaviors to their children by the example that they set when crossing with their children, and because these behaviors are associated with increased risk of pedestrian collisions. Agran et al (1994) found that 53% of pedestrian collisions occurred at mid-block, and that 28% occurred at an intersection, with younger schoolchildren more likely to be injured at mid-block.

D. Intervention Strategies: Behavioral or Environmental?

1. A Behavioral Approach: Pedestrian Safety Training

Many studies have focused on the effects of pedestrian safety training on children's crossing skills. Some have shown no improvements

in safe crossing skills, but even when modest improvements in safe pedestrian behavior resulted, they were short-lived (Connelly, 1998; Demetre, 1993; Luria, 2000; Miller, 2004; Roberts, 1993b, 1995; Tanz, 1985). These findings and the observations reported in this study suggest that it may be more appropriate to target pedestrian safety education interventions at parents rather than at children, although pedestrian safety training for both children and parents was rated as the least helpful of all interventions. Any educational interventions aimed at parents should include education on child development and realistic expectations of children's abilities to cross streets safely. Several studies have shown that parents have unrealistic expectations of children's crossing skills (Dunne, 1992; Rivara, 1989; San Diego State University, 2002).

2. An Environmental Approach: Traffic Calming

Changes in road design to slow vehicle traffic and to make them safer for children and crossing guards were rated as the most helpful of the four proposed traffic engineer actions. Passive injury prevention strategies are more effective than active strategies that depend on human behavior (Luria, 2000). Many studies have demonstrated the superior effectiveness of environmental modifications in producing significant, lasting reductions in pedestrian injuries and deaths. Although the initial costs of environmental modifications are much greater than for behavioral interventions, the beneficial effect of environmental modification in saving

lives and preventing pedestrian injuries becomes permanent, in comparison to the transient benefits resulting from educational interventions.

Environmental modifications to calm traffic such as speed humps and raised crosswalks have been shown to effectively reduce traffic speed (Institute of Transportation Engineers, n.d.; Roberts, 1993a, Tester, 2004). Speed humps have been shown to be effective in reducing the odds of injury or death among children who were struck by motor vehicles (Tester, 2004). Macpherson et al (1998) advocate shifting the focus of interventions from victims to a “mass solution” which focuses on modifying the environment. Many researchers have concluded that environmental modifications are the most effective interventions to reduce child pedestrian injuries and fatalities (Agran, 1994, 1996; Connelly, 1998; Kendrick, 1993; Kiemtrup, 1992; LaFlamme, 2000; Macpherson, 1998; Rivara, 1991, 1999; Roberts, 1993, 1995, Sibert, 1991).

3. Crossing Guards' Suggestions

At the end of the survey, the crossing guards were given an opportunity to offer their own suggestions for improving child pedestrian safety on Hartford's streets. Responses included some excellent suggestions for improving safety, such as making some streets one-way during school hours, painting crosswalk lines in all intersections, putting up traffic lights and push-button walk lights at pedestrian crossings, posting

pedestrian right-of-way signs in crosswalks in both Spanish and English, giving guards cell phones to call police to report traffic violators and accidents, giving guards CPR training, and more driver education on rules and regulations.

VII. CONCLUSIONS

Crossing guards are in a unique position to help public health and safety agencies to identify the risk factors existing at their worksites which increase the risk of child pedestrian injuries and fatalities. The observations reported by Hartford crossing guards reinforce the findings of other child pedestrian studies and the anecdotal reports by crossing guards in other parts of the country on dangerous driver and pedestrian behaviors. Crossing guards are only on duty 20 hours per week, during the hours immediately before and after school, and only during the school year. Most child pedestrian accidents are not associated with walking to and from school, and occur in the late afternoon and early evening hours and during the summer months when crossing guards are not on duty to protect children. Effective measures which are not dependent on the limited presence of crossing guards must be taken to make the environment safer for child pedestrians at all times of the day, year round.

The key findings of this study are that crossing guards report frequent speeding through crossing zones, frequent traffic violations other than speeding, a high degree of cell phone use by drivers, and unsafe pedestrian behaviors by parents more often than by children. In addition, we observed that the type of job training reported by crossing guards varied greatly. From the literature review, the results of the Hartford Crossing Guard Study, and analysis of the data, we make the following recommendations.

1. The Hartford Police Department should implement strict enforcement of speed limits and other traffic laws, particularly in pedestrian areas.
 2. Motorists should be ticketed and fined for not stopping for crossing guards and pedestrians in pedestrian crossings, in the same manner as motorists who do not stop for school busses picking up or dropping off children at bus stops.
 3. The Connecticut legislature should ban the use of cell phones while driving.
 4. Connecticut should adopt standards for the training, evaluation, and certification of crossing guards throughout the state, in order to address the variations in job training reported by Hartford crossing guards, and to insure that all crossing guards possess and maintain an acceptable level of knowledge and skills.
 5. The city of Hartford should consider making environmental modifications to streets to enhance child pedestrian safety, particularly in school zones and neighborhoods with high-density child populations.
 6. If pedestrian safety training is to be implemented, it should target parents rather than children, and should be evaluated for both short and long-term efficacy.
 7. Further research should be done in this area to replicate our results.
- The National Safe Kids Coalition chapters in Providence, Rhode Island, and in Boston and Worcester, Massachusetts, have expressed interest in

replicating The Hartford Crossing Guard Study with crossing guards in those cities. The data from these other cities could be combined with the Hartford data to create a larger, multi-city study.

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Appendix AQuestions Asked at First IPC Meeting with Hartford Crossing Guards-September 2003

1. Number of years as crossing guard
 2. How often do you feel that children use your services? Always,
Sometimes, or Never
 3. How often do you feel each age group below uses your services? 4-8
year olds, 9-12 year olds, 12+ year olds, Always, Sometimes, Never
 4. Do you feel that traffic/cars obey your directions? Always, Sometimes,
Never
 5. Do you observe speeding vehicles while working? Always,
Sometimes, Never
 6. Would you be interested in assisting if a crossing guard lesson was
given to students at your school? Yes, No
 7. Would you be interested in attending Injury Free Coalition for Kids of
Hartford meetings related to pedestrian safety in the neighborhood in
which you work? Yes, No
-

Appendix B

Problems Related to Children and Families Walking That Crossing Guards Would Like to See Addressed

-
- Need more parent involvement in school meetings related to crossing guards
 - Address speeding issue, drivers talking on cell phones, people talking to crossing guards and distracting them from doing their job
 - Many crossing guards willing to participate in school pedestrian education programs (in the early mornings, because some have second jobs)
 - Parents can be disrespectful to crossing guards, drag children across the street when not safe to cross and crossing guard says no
 - Asylum and Sigourney Streets is a problem spot
 - No cones or street signs to mark crosswalk, only hand held stop signs
 - One crossing guard bought a bullhorn to help with getting attention
 - Parents cross on green lights and not at crossing guard posts
 - Parents have negative attitudes at times with crossing guards
 - Pedestrians cross when crosswalk light not yet on, once light turns red they cross, do not wait for crosswalk sign or crossing guard
 - Children cross in the middle of the block, in between crossing guard who are at the intersections
 - Cars turn on red when there is a no turn on red sign
-

Appendix C

Connecticut Children's Medical Center
Injury Prevention Center
(860)-545-9988

The CCMC Injury Prevention Center is doing this survey in order to collect information on the experiences of crossing guards in the city of Hartford. The information that you give to us in this survey will be used to identify the most common and most serious problems experienced by crossing guards as you carry out your job of keeping children safe when they cross streets. In order to help us to identify the problems affecting the safety of crossing guards and the children that they protect, would you please take a few minutes to share the following information about yourself and your experiences as a crossing guard.

Check the answer that applies to you:

1. Age:

- ☐ *Under 20*
- ☐ *20-29*
- ☐ *30-39*
- ☐ *40-49*
- ☐ *50-59*
- ☐ *60 and over*

2. Gender:

- ☐ *Male*
- ☐ *Female*

3. Education:

- ☐ *Some High School or Technical School*
- ☐ *GED*
- ☐ *High School Graduate*
- ☐ *College*

4. Which language are you most comfortable speaking?

- ☐ *English*
☐ *Spanish*
☐ *Other (please specify)* _____

5. How long have you worked as a crossing guard?

- ☐ *Less than one year*
☐ *1-5 years*
☐ *more than 5 years*

6. How long ago were you **first** trained to be a crossing guard?

- ☐ *Less than one year ago*
☐ *1-5 years ago*
☐ *More than 5 years ago*
☐ *I never received any training*

7. What type of crossing guard training did you receive?

(check all that apply)

- ☐ *Classroom training*
☐ *Watched training films*
☐ *Read training manual or book*
☐ *Received on the job training working with an experienced crossing guard*
☐ *Received on the job training working with a police officer*

How many hours, days or weeks did you spend in this kind of training?

(please enter a number where applicable)

_____ hours	_____ days	_____ weeks
_____ hours	_____ days	_____ weeks
_____ hours	_____ days	_____ weeks
_____ hours	_____ days	_____ weeks
_____ hours	_____ days	_____ weeks

8. How good was your **first** training as a crossing guard.

- ☐ *Very good*
☐ *Good*
☐ *Okay*
☐ *Poor*
☐ *Very poor*

9. What changes in your **first** training would have made it better?
10. When was the last time that you received **extra** training to update your skills as a crossing guard?
- ☐ *Never*
 - ☐ *0-2 years ago*
 - ☐ *3-5 years ago*
 - ☐ *6-10 years ago*
 - ☐ *More than 10 years ago*
11. How happy are you with your job as a crossing guard?
- ☐ *Very happy*
 - ☐ *Happy*
 - ☐ *Neither happy nor unhappy*
 - ☐ *Unhappy*
 - ☐ *Very unhappy*
12. Where do you usually work as a crossing guard (intersection, street, school, etc.)? Please be as specific as possible.
13. About how many hours do you work **each week** as a crossing guard? _____
14. About how many children do you cross **each day**?
- ☐ *Less than 25*
 - ☐ *25-49*
 - ☐ *50-99*
 - ☐ *100-199*
 - ☐ *200-299*
 - ☐ *300-399*
 - ☐ *400-499*
 - ☐ *Over 500*
 - ☐ *Don't know*

15. How heavy is the traffic that passes by while you are crossing children?
- ☐ *Very heavy (over 300 cars per hour)*
 - ☐ *Heavy (201-300 cars per hour)*
 - ☐ *Moderate (101-200 cars per hour)*
 - ☐ *Light (51-100 cars per hour)*
 - ☐ *Very light (0-50 cars per hour)*
 - ☐ *Don't know*
16. What is the posted speed limit in the area where you work?
- ☐ *15-20 mph*
 - ☐ *25-30 mph*
 - ☐ *35-40 mph*
 - ☐ *45-50 mph*
 - ☐ *55 mph or higher*
 - ☐ *No speed limit sign visible*
 - ☐ *Don't know*
17. What speed do people usually drive in the area where you work?
- ☐ *Much slower than the posted speed limit*
 - ☐ *Slower than the posted speed limit*
 - ☐ *At the posted speed limit*
 - ☐ *Faster than the posted speed limit*
 - ☐ *Much faster than the posted speed limit*
18. In your work as a crossing guard, how often do you feel that **you** are in danger from drivers violating traffic laws?
- ☐ *Always*
 - ☐ *Most of the time*
 - ☐ *About half of the time*
 - ☐ *Some of the time*
 - ☐ *Never*

19. In your work as a crossing guard, how often do you feel that **children** are in danger from drivers violating traffic laws?

- ☐ *Always*
- ☐ *Most of the time*
- ☐ *About half of the time*
- ☐ *Some of the time*
- ☐ *Never*

20. Do you keep a daily log of traffic violations?

- ☐ *Yes*
- ☐ *No*

21. Have **you** ever been hit by a motor vehicle while working as a crossing guard?

- ☐ *Yes* → *In what year(s) did this happen?* _____
→ *How many times has this happened?* _____
- ☐ *No*
- ☐ *Near miss*

22. Have you ever seen a **child** get hit by a motor vehicle while you were working?

- ☐ *Yes* → *In what year(s) did this happen?* _____
→ *How many times has this happened?* _____
- ☐ *No*
- ☐ *Near miss*

23. How many **children** obey your directions when you are crossing them?

- ☐ *All*
- ☐ *Most*
- ☐ *About half*
- ☐ *Some*
- ☐ *None*

24. How many **parents** obey your directions when you are crossing them with their children?

- ☐ *All*
☐ *Most*
☐ *About half*
☐ *Some*
☐ *None*

25. In your work as crossing guard, how often do you see each of these **driver** behaviors?

	Always	Most of the time	About half of the time	Some of the time	Never
(a) <i>Driving faster than the posted speed limit</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(b) <i>Disobeying traffic signals (running red lights and stop signs)</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(c) <i>Right turn on red when there is a "no right turn on red" sign</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(d) <i>Drivers talking on cell phones</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(e) <i>Drivers disobeying crossing guard directions</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

26. In your work as a crossing guard, how often do you see these **parent** behaviors?

	Always	Most of the time	About half of the time	Some of the time	Never
(a) <i>Parents disobey crossing guard directions and cross children when guard tells them not to.</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(b) <i>Parents cross children in the middle of the block where there is no guard or in between guards.</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(c) <i>Parents cross children on green lights.</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(d) <i>Parents do not wait for walk light to come on and cross children as soon as light turns red.</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(e) <i>Parents talk to crossing guard and distract them from doing their job.</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

27. In your work as a crossing guard, how often do you see each of these **child** behaviors?
- | | Always | Most of the time | About half of the time | Some of the time | Never |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| (a) <i>Children disobey crossing guard directions and cross when guard tells them not to.</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| (b) <i>Children cross in the middle of the block where there is no guard or in between guards.</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| (c) <i>Children cross on green lights.</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| (d) <i>Children do not wait for walk light to come one and cross as soon as light turns red.</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| (e) <i>Children talk to crossing guard and distract them from doing their job.</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

28. How helpful you think the following **police** actions would be to you in doing your job?
- | | Very helpful | Somewhat helpful | Not very helpful |
|--|--------------------------|--------------------------|--------------------------|
| (a) <i>More frequent police patrol.</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| (b) <i>Have police present to catch the violators.</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| (c) <i>Have police issue warnings to violators caught by the crossing guard.</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| (d) <i>Have police provide training to crossing guards.</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| (e) <i>Have police provide training to children.</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| (f) <i>Have police provide training to parents.</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

29. How helpful you think the following **traffic engineer actions** would be to you in doing your job?
- | | Very helpful | Somewhat helpful | Not very helpful |
|--|--------------------------|--------------------------|--------------------------|
| (a) <i>Visit the crossing guard sites to identify road/traffic hazards to pedestrian safety.</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| (b) <i>Improve signage.</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| (c) <i>Design roads to slow vehicle speed.</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| (d) <i>Design roads safer for children and crossing guards.</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

30. How interested would you be in teaching a crossing guard lesson if a crossing guard lesson were given to students at your school?

- ☐ *Very interested*
☐ *Interested*
☐ *Not interested*

31. How interested would you be in attending Injury Free Coalition for Kids of Hartford meetings about pedestrian safety in the neighborhood where you work?

- ☐ *Very interested*
☐ *Interested*
☐ *Not interested*

32. Please tell us about any ideas that we have not already asked you about in this survey that you think might help to improve the safety of child pedestrians in Hartford.

If you would be willing to participate in research and activities of the CCMC Injury Prevention Center to improve child pedestrian safety in Hartford, please fill out (optional) the information below. Information is kept confidential and used for research work only.

Name _____ (optional) Phone _____ (optional)

Email address _____ (optional)

Thank you for your efforts to keep children safe!

Appendix D

INFORMED CONSENT FOR PARTICIPATION IN RESEARCH ACTIVITIES

Connecticut Children's Medical Center

CCMC Investigator: Garry Lapidus, PA-C, MPH

Collaborators: Krista Eddy, BSN, RN, Louise LaChance-Price, BSN, RN

Department: Injury Prevention Center Phone: 860-545-9988

Title of Research: Child Pedestrian Safety in Hartford, CT: A Survey of School Crossing Guards.

Purpose of Research: The purpose of this research study is to identify specific factors that impact child pedestrian safety in the city of Hartford. School crossing guards are in a unique position to help us to identify these factors because they assist and observe large numbers of children who walk to school and back home along city streets. The data will be collected by distributing a written survey to the crossing guards. Analysis of the data will provide us with information which will assist us in identifying what crossing guards see as the most frequent and serious problems, and assist us in designing interventions to improve child pedestrian safety in Hartford.

Procedures:

1. You are being asked to complete a written survey, the purpose of which is to gather information about your observations of and experiences with pedestrian safety issues that you encounter in performing your job.
2. At the bottom of the survey, you will be asked to indicate whether you are willing to be contacted by the Injury Prevention Center in the future for possible continuing participation in child pedestrian safety research activities. Providing permission and information for us to contact you is optional.
3. If you choose to participate in this study, you may return this signed consent form and your completed survey to the Injury Prevention Center in the addressed, stamped envelope which we have provided to you.

Risks and Inconveniences: Union consent has been obtained for the Injury Prevention Center to solicit the voluntary participation of the crossing guards in the study. Individual survey responses will be kept confidential. Once all of the survey data have been analyzed, the results

of the study may be submitted for publication in the form of a research paper and/or press release.

Benefits: The information that we gain from you will be used to identify the most frequent and severe safety problems facing crossing guards and child pedestrians. We will use this information to plan ways to improve the safety of crossing guards and child pedestrians.

Voluntary: Your decision to participate is voluntary and you may refuse to participate and/or withdraw your consent and discontinue your participation at any time. Your decision whether or not to participate in this study will not affect your eligibility to participate in future studies with the Injury Prevention Center. You will be told of any new information that may influence your willingness to continue your participation in the study.

Questions: The investigator is willing to answer any questions that you may have concerning the study described in this form. Further questions about this study may be directed to **Garry Lapidus or Krista Eddy at 860-545-9988.**

Compensation: Study participants will not receive any form of compensation for their participation.

Confidentiality: Confidentiality of records of research data will be maintained in accordance with applicable state and federal laws. No information that would reveal your identity will be released or published without your permission. The Connecticut Children's Medical Center and the CCMC Institutional Review Board may view the research records.

Costs: There is no cost to you to participate in this study.

Injury: There is no risk of injury to you if you choose to participate in this study. We are only asking that you complete and return a written survey.

Please read the above information carefully and discuss this study with the principal investigator or his or her staff. You may obtain information about the results of this study when it is completed, by contacting the principal investigator.

Based on the information provided, I agree to participate in this study. Upon signing, I will receive a copy of this form. All the questions that I have at this time have been answered.

I willingly agree to participate in this investigation, Child Pedestrian Safety in Hartford, CT: A Survey of School Crossing Guards. I understand the purpose, procedures, and length of my involvement, as stated below:

Parent/Guardian/Subject if 18 or older Date

Witness Date

Translator/Interpreter Date

