ORIGINAL ARTICLE

Injury Prevention in an Urban Setting: Challenges and Successes

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Abstract. *The Harlem Hospital Injury Prevention Program (HHIPP) was established in 1988 with the goal of reducing injuries to children in central Harlem by providing safe play areas, supervised activities, and injury prevention education. To achieve this goal, a broad-based coalition was formed with state and local governmental agencies interested in injury prevention and with community groups, schools, parents, and hospital staff. An evaluation of the program in terms of both process and outcome formed a critical element of this effort.*

Since 1988 the HHIPP, as the lead agency for the Healthy Neighborhoods/Safe Kids Coalition, developed or participated in two types of programs: injury-prevention education programs and programs that provide safe activities and/or environments for children. The educational programs included Window Guards campaign; Safety City Program; Kids, Injuries and Street Smarts Program (KISS); Burn Prevention Curriculum and Smoke Detector Distribution; Harlem Alternative to Violence Program; Adolescent Outreach Program; and Critical Incident Stress Management Teams. The safe activities and environmental programs included the Bicycle Safety Program/Urban Youth Bike Corps; Playground Injury Prevention Program; the Greening of Harlem Program; the Harlem Horizon Art Studio; Harlem Hospital Dance Clinic; Unity through Murals project; baseball at the Harlem Little League; winter baseball clinic; and the soccer league.

Each program was conceived using injury data, coupled with parental concern and activism, which acted as catalysts to create a community coalition to respond to a specific problem. Data systems developed over time, which monitored the prevalence and incidence of childhood injuries in northern Manhattan, including central Harlem, became essential not only to identify specific types of childhood injuries in this community but also to evaluate these programs for the prevention of injuries in children.

Injury is the leading cause of childhood morbidity, disability, and mortality in the United States.[1] Because patterns of injury

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TABLE I
RATE OF PEDIATRIC SEVERE INJURY AND DEATH

	Rate/100,000
Central Harlem*	1141
Northern Manhattan†	857
Ohio‡	518
United States‡	656

* 1983–1987 unpublished data HHIPP
† Davidson LL (2)
‡ National Center for Health Statistics (3).

vary by age and geographic setting, a clear understanding of the epidemiology of injuries is essential for the development of primary, secondary or tertiary injury-prevention programs. This paper describes how basic epidemiologic data, combined with the engagement of a local community, were used to develop the Harlem Hospital Injury Prevention Program (HHIPP) in an attempt to reduce childhood injury rates in central Harlem.

Epidemiology of Injury in Central Harlem

Four datasets are used to describe the patterns and characteristics of injuries to children in central Harlem: (*a*) Harlem Hospital Trauma Registry; (*b*) Harlem Hospital Pediatric Emergency Room surveillance; (*c*) Central Harlem School Health injury data; and (*d*) the Northern Manhattan Injury Surveillance System (NMISS). The NMISS, which is a population-based survey of severe injuries to children in all of northern Manhattan including central Harlem,[2] constituted the essential element in the definition of injuries in central Harlem and in the evaluation of the effects of the interventions of the HHIPP. The baseline injury rate for central Harlem children before the intervention (1983–1987) was 1141/100,000 (Table I).[3] Changes in injury rates are used as outcome measures in the evaluation of the HHIPP.

Model for Change

The model for primary prevention of injury used by this program is illustrated in Figure 1. This model began with epidemiologic data, which included information about both the mech-

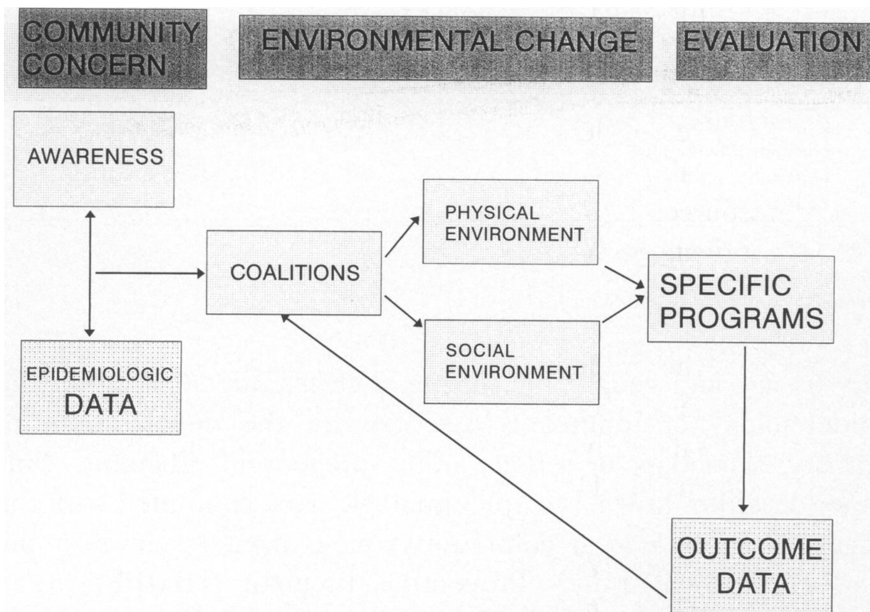

FIG. 1. Data-based model for change. Epidemiologic information, coupled with community awareness, ultimately results in specific programs designed to deal with concerns arising from children's physical and social environments. Outcome data from the programs are incorporated, to effect further changes.

anism and type of injuries in the community. These data became the basis for the development of parental/community awareness and concern, which in turn served as catalysts for social change.[4] This change was forged through collaborative efforts across a variety of groups and coalitions, to force necessary changes in the physical or social environment by the development of specific programs based on the insights gained from epidemiologic data. These same data systems were used to assess the effects of these programs and to inform the community-based coalitions of the effectiveness of their efforts.

Coalitions

Successful community collaboration requires (*a*) identification of all community organizations/groups interested in the targeted injury or defined program; (*b*) agreement of all participants on the process; (*c*) acknowledgment of community concerns and ideas; (*d*) community definition of the activities that promote good health

and prevent injuries; (*e*) an openness to criticism and to change in program or process as necessary; and (*f*) acknowledgment of the contribution of all parties. In short, such community-based coalitions must develop a level of trust. Once formed, such broad-based community coalitions, with data in hand, can begin to recruit the support/resources from the political structure, the outer community (e.g., private foundations), and the media, to accomplish their goals.

Evolution of the Harlem Injury Prevention Program

Using these principles, two types of efforts—educational projects and safe activities/environmental change projects—have evolved to form the HHIPP.

Educational Projects

The Window Guard Campaign

In 1972, in response to data showing that falls from heights represented 12% of unintentional deaths in children under 15 years of age, the New York City Department of Health developed a health education program, "Children Can't Fly." In 1976, the New York City Board of Health enacted legislation that requires owners of multiple dwellings to install window guards in apartments wherein children younger than 11 years of age live. In 1983, Barlow and colleagues reported medical and social data for 61 children admitted to Harlem Hospital over a 10-year period for falls from heights of one or more stories.[5] Although there was no mortality for children who fell three or fewer stories, 50% of those who fell from five or six stories died. Seventy-seven percent of the falls were unintentional; 23% of the children jumped or were pushed. Using these data and the window guard law, and working with the NYC Department of Health, Harlem Hospital pediatricians and pediatric surgeons and school health staff began a community-based effort to educate both parents and children about the importance of window guards. The Harlem Hospital School Health Program formed the basis of this project. Questionnaires that inquired about the presence or absence of window guards at

home were distributed to all students in the schools. School assemblies featured student-developed skits about window falls. Poster contests for the children were conducted, and prizes were given for the best posters about window falls. The school health personnel solicited local real-estate agents and the Harlem Hospital Ladies Auxiliary to raise the modest amount of money to mount this initial effort. Barlow reported a 96% decrease in falls from heights since 1979.[5] To date, 95% of central Harlem dwellings are appropriately gated, and falls from windows have become rare.

Safety City Program

Urban children usually are injured by motor vehicles as pedestrians, rarely as occupants. In 1990, through the good offices of the Harlem Hospital School Health Program, Harlem School District 5, in collaboration with New York City Department of Transportation's education unit, built a full-sized model street, a "Safety City," on a Harlem elementary school playground. The Safety City program teaches city street safety to all third grade students using classroom didactic lessons and practice on the model street in the playground. Each year, 1800 children participate in the program. An additional 3500 children (grades K through 4) have participated in theater performances that demonstrate safety concepts.

As a result of the experience from this program, the City Volunteer Corps (through federal funding) and the Department of Transportation (through state funding) have expanded the original program into a Mobile Safety City Program, a self-contained presentation involving puppetry and traffic training. In 1995, this mobile city will visit schools in the five New York City boroughs, training all third graders.

Kids, Injuries and Street Smarts (KISS)

In 1989–1990, an injury-prevention curriculum was developed by the HHIPP in collaboration with the New York City Emergency Medical Services, Community School District 5, and the

New York City Health and Hospital Corporation. This curriculum involves four subject areas: (*a*) introduction to the NYC Emergency Medical Service; (*b*) getting help/how to call EMS; (*c*) Street Smarts protocols and scenarios; and (*d*) guns and gun play. The Street Smart tips include such basics as what to do if someone is shot, bleeding, stabbed, or having a seizure. Specific scenarios with role playing are used to illustrate what might be done during such emergencies. Pre- and post-tests evaluate knowledge acquisition after the course. The KISS curriculum has been used in one junior high school in central Harlem and in an alternative school for pregnant/parenting adolescents. For the over 600 children who have participated, pre- and post-test scores have shown significant gains in knowledge.

In addition, a gun-safety flyer for parents and children and a pamphlet, *Streets of Harlem: a Kid's Guide to Survival*, were developed. Over 10,000 pamphlets have been distributed to children and parents in central Harlem.[5]

Burnwise: School and Community-based Burn Education and Smoke Detector Distribution for Pregnant Adolescents

Low-income children younger than four years of age are at highest risk for burns and smoke inhalation. Since 1990 HHIPP, in collaboration with NY Hospital Cornell Burn Outreach Program and the National Safe Kids Coalition (which donated smoke detectors), has conducted a burn-prevention program for pregnant and parenting adolescents enrolled at a small alternative high school in central Harlem. The educational program, which includes interactive scenarios, significantly increases the adolescents' knowledge of risks for burns. This knowledge was sustained at 2-month follow-up. In the year following the smoke-detector giveaway program, the percentage of functioning smoke detectors in a study sample of homes increased.[6]

From this experience, the distribution of free smoke detectors has expanded to become part of the Harlem household survey project funded by the Centers for Disease Control and Prevention.

Adolescent Outreach Program

From 1988 to 1991, Harlem Hospital admissions for trauma decreased for children 2 to 12 years of age but not for adolescents (Fig 2). For this reason, an outreach program specifically designed for this age group was developed. The program is based on the concept that injury-prevention efforts must address the whole range of experiences that may place adolescents at risk (for example, sexual behavior and drug use) or serve to protect them (school, career development, extracurricular activities). In collaboration with the Harlem Hospital school health program, the local school district and a variety of community groups working with adolescents, a series of conferences, interactive workshops, computer games, alternatives to violence curriculum, and a rap group entitled Talking Straight were developed. Talking Straight provides a safe haven for adolescents to discuss a whole range of issues. The group facilitator often serves as liaison between parents and adolescents. In the first 2 years of the outreach efforts, more than 1300 adolescents participated in various aspects of the program.[7]

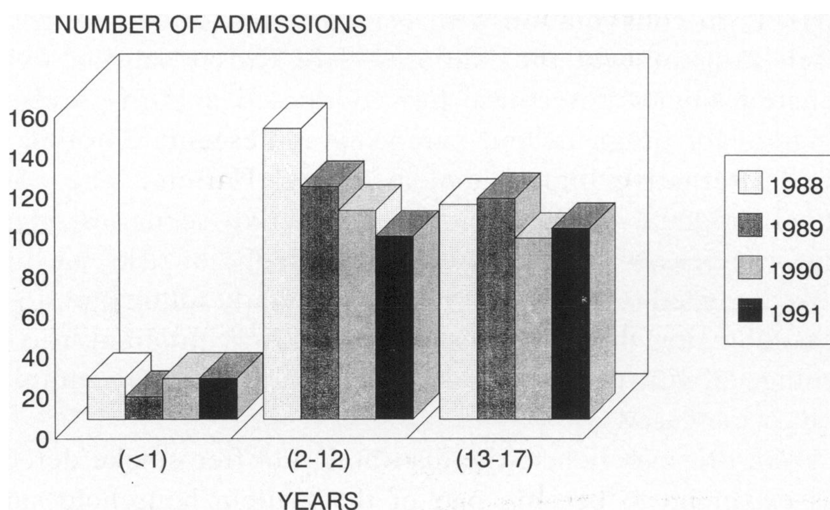

FIG. 2. Pediatric trauma admissions; Harlem Hospital, 1988 to 1991.

Harlem Alternatives Program

From 1960 to 1993, 372 children were admitted to Harlem Hospital for gunshot wounds.[8] Since 1983, when the NMISS began, 83% of all deaths from gunshot occurred before hospitalization; adolescents represented 89% of all fatalities. These data suggested that only primary prevention could result in significant decreases in deaths resulting from gunshot in adolescents.

The first step was to develop some understanding of the circumstances of these gunshots to children. In 1982, when Barlow and colleagues described a 10-year experience with these injuries at Harlem Hospital, one third of the shootings were intentional, another third were unintentional, and the remainder happened to children caught in the crossfire.[9] Over the past 10 years, however, these distinctions have become less clear: for example, there have been fewer unintentional gunshot injuries.

Using these insights, HHIPP's approach to the problem of gunshot wounds to children was broadly based. First, safe places and activities for both children and adolescents were developed. Second, addressing the specific issues of violent behavior, an "alternatives to violence" training program was developed for youth and adults in the schools and community. In 1993–1994, 90 children and 150 adults were trained in violence alternatives. Third, gun safety education in the community was addressed through educational brochures: 5000 gun safety letters were distributed to parents in district schools. Fourth, HHIPP lobbied at all legislative levels for gun control as one of the most effective means of preventing gunshot injuries to children.

Critical Incident Stress Management Team

The immediate emotionally traumatic effects of injury on the witnesses of violence, as well as on staff involved in caring for the victims of injury and/or violence, have led to the creation of a Critical Incident Stress Management (CISM) team. CISM, a planned approach to support administrators, staff, and students who may be overwhelmed by traumatic incidents, has two components: (*a*) advance training of administrators to be prepared for

critical incidents affecting staff and students and (*b*) formation and support of a Critical Incident Stress Debriefing Team to intervene after an incident. The program involves a debriefing process that guides the symptomatic person through the critical incident from a cognitive reconstruction to an emotional expression, and returns to the cognitive realm by closing with stress education and planning.[10] CISM education acquaints involved adults and adolescents with the signs and symptoms of stress in their children and in themselves and teaches them what the CISM team is and how to access it for interventions and referrals. Since 1992, 60 people on the staffs of Harlem Hospital and District 5 community school have been trained.

Safe Activities and Environment Programs

Playground Injury Prevention Project

The playground injury prevention project began with data developed from the injury surveillance data sets, a survey of parental perceptions of playground safety, on-site survey of all playgrounds in central Harlem, and analysis of risk factors for playground injury. Using these data, diverse groups in the community, including the Department of Parks and Recreation, were mobilized with the goal of rehabilitating the playgrounds of central Harlem. After 1 year of intervention, the Harlem Hospital Trauma Registry data showed a 12% decrease in emergency room visits for playground injuries and a 15% decrease in school playground injuries.[4,11] After 2 years of intervention, such major injuries as trauma from motor vehicles decreased 23% from baseline, which may be attributed to the availability of safe play areas for children. To date 19 playgrounds have been fully renovated.

Bicycle Safety Awareness Program and Urban Youth Bike Corp

In 1990 a physician survey of the NY Chapter 3 of the American Academy of Pediatrics showed that bicycle safety, including helmet use, was a major injury-prevention concern for pediatricians. A small grant to the department of pediatrics of Harlem Hospital from the American Academy of Pediatrics helped begin

the process of community awareness. An initial survey of 557 children at five different community sites showed that, although 80% owned a bicycle, only 7.8% owned a bicycle helmet.

A coalition of such community groups as Concerned Athletes of Harlem and the MACH 5 Cycling Club, combined with the local chapter of the American Academy of Pediatrics, the NYC Department of Transportation, and a local recreation center, was formed to develop programs for bicycle safety. The initial program involved Bicycle Fix Up Days held at the local recreation center, at which men from the bicycle club volunteered to fix bicycles for the community's children. While the children had their bicycles fixed, they were given a short course on safety, pocket-sized rules of the road for bicycle safety, and bicycle helmets. During this activity 559 bicycle helmets were distributed free or for a modest fee.[12,13]

With this experience, in 1993 the MACH 5 club leader and HHIPP received grant funds to establish a delinquency prevention program, the Urban Youth Bike Corp, designed specifically for adolescent males. This program teaches bicycle racing and repair to interested young men in community schools, in addition to offering group counseling sessions, alternatives to violence training, and injury prevention. Since its inception, 245 young men have participated in the program; they have entered more than 50 bicycle races.

Greening of Harlem

In 1989, the Injury Prevention Program located a gardener who lived in Harlem and worked for the New York City Department of Parks and Recreation. In collaboration with the Department of Parks and under the leadership of the local gardener and science teachers, the Injury Prevention Program developed horticulture projects in several central Harlem schools. Sixty students participate every year. In addition, during the summer the gardener offers a variety of gardening projects for children in a number of the renovated playgrounds as well as in other areas of the community.

Harlem Horizon Art Studio

In 1989, a unique program was created to provide a creative outlet for child and adolescent victims of injuries. The studio, located in a converted pantry on the pediatric inpatient floor of the hospital, is managed by two professional artists. Both hospitalized and community children are involved in the art program, which is based on the concept that children and adolescents should develop their own imagery and style. More than 160 children have participated in the program each year. The work of these young artists has been formally presented in exhibitions throughout the country. The program is supported through donations by foundations and organizations.

Unity Through Murals Project

This program, which complements the playground and Greening of Harlem projects, is directed by one of the Harlem Horizon Art studio directors. Work begins in the schools with active participation of the teachers. The students, with the guidance of the art director, determine the theme and plan all aspects of murals for the walls of community or school playgrounds. The children paint the murals. More than 100 students participate each year. The program is supported in part by the Department of Parks and Recreation, Harlem Horizon Art Studio, and Columbia Community Service.

Harlem Hospital Dance Clinic

In 1989, in collaboration with HHIPP, a professional dancer began a dance program for children at Harlem Hospital. This program teaches children the discipline of dance, allows creative expression, and promotes cultural awareness of the origins of dance. The more than 180 children and adolescents who participate have traveled both nationally and internationally, representing themselves and their community. The program is supported through donations by foundations and organizations.

Harlem Little League

One of the first parks renovated in the playground project included a baseball diamond. Parents who lived in Harlem approached the Injury Prevention Program for assistance in beginning a Little League in the community. From this beginning, a coalition of community parents, the HHIPP, the NYC Department of Parks and Recreation, and community businesses have developed a Little League in which 650 children participate each year. The baseball activities have expanded into other sports activities for children. Supported by the Harlem business community, parents, the NYC Department of Parks and Recreation, and HHIPP, the Harlem soccer league was established. More than 150 children participate each year.

In addition, in recognition of the need for ongoing activities for children during the winter, adults who serve as coaches in the Little League developed a Saturday winter baseball clinic. Because of the prior collaborations, the HHIPP persuaded the New York City Department of Parks and Recreation to provide space for this activity in a park facility. An average of 120 children receive instruction in baseball each Saturday during the winter months.

Evaluation

Evaluation of the individual programs and the Injury Prevention Program as a whole used the paradigm of the injury pyramid (Fig. 3). The pyramid illustrates a hierarchy of outcomes and interrelates knowledge and attitudinal changes to reduction in injury morbidity and mortality. Three levels of evaluation were used: (*a*) pre- and post-intervention tests of knowledge, attitude, and reported behavior (e.g., smoke detector use) were used to look for immediate and long-term gains; (*b*) injury surveillance data, including school, emergency room, and hospital admission data, were employed to compare specific injury types at baseline and at a time after the interventions were instituted; (*c*) population-based

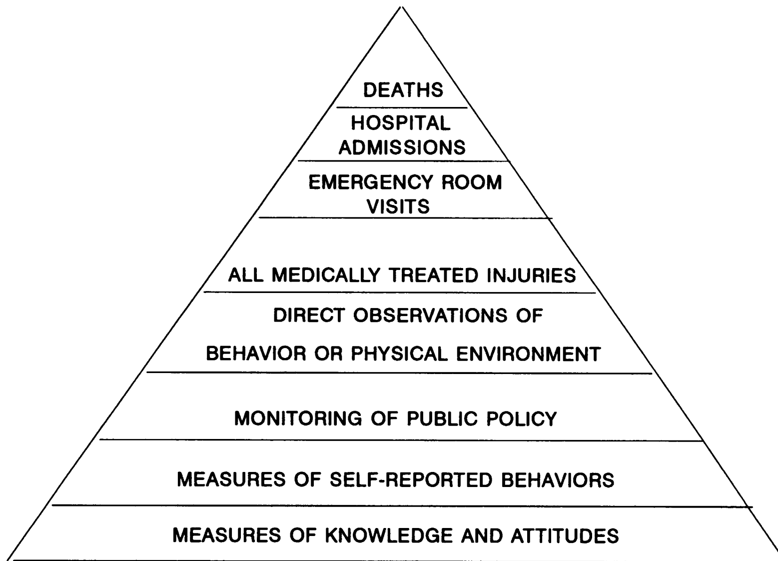

FIG. 3. Hierarchy of injury outcome. The model diagramatically suggests that untoward measures of outcome (ER visits, admissions, and deaths) are inversely related to increased knowledge and positive perceptions of the value of injury prevention. Adapted from Frederick P. Rivara, personal communication.

TABLE II
EFFECT OF HARLEM HOSPITAL INJURY PREVENTION PROGRAM
CENTRAL HARLEM CHILDREN (5–16 YEARS)*

	Number	RR	95% CI
All targeted injuries	664	0.56	0.45, 0.71
Assaults	199	0.52	0.34, 0.79
Motor vehicle	302	0.45	0.32, 0.64
Outdoor falls	212	1.35	0.75, 2, 42
Guns	100	0.56	0.31, 1.02
All nontargeted injuries	580	1.03	0.78, 1, 35

* Adapted with permission from Davidson LL (14)

injury rates for children in the community were analyzed over time to determine changes.

As noted above, gains in knowledge and attitudes regarding the value of injury prevention tactics such as the use of smoke detectors were clearly seen. Decreases in specific injury types, such as playground injuries, were demonstrated from school data, emergency room data, and hospital admissions. Finally a population-based analysis was undertaken (Table II).[14] A Poisson regression was used to analyze injury rates over time, including periods

before and during the intervention, while adjusting for pre-intervention trends in the incidence rates. An estimated 44% reduction in risk for injuries targeted by the program for school-aged children was found. The decrease in injuries was specific to the age group (5 through 16 years of age) and largely specific to the injury types targeted by HHIPP. The injury rate for central Harlem children post-intervention (1988 to 1991) is 885/100,000 as compared with a rate of 1,141/100,000 for the 1983 to 1987 period.

These data and the efforts of those who brought about the HHIPP Safe Kids/Healthy Neighborhood intervention provide an optimistic view of the benefit of providing a safe and nurturing environment for children. The gains in such a primary approach to injury prevention results in community-supported, sustainable change and provides definitive solutions to address the leading cause of excess morbidity and mortality to children and adolescents. This program, based in a clinical hospital department, does not represent the traditional activity of health professionals.

The Harlem Hospital is a public general hospital in a very poor community. Nevertheless, even from this setting, major changes in the excess childhood morbidity and mortality found in such communities can be accomplished with effort, determination, and ingenuity. The health professional's role in this effort involves data collection, analysis, and evaluation of the effort. It also involves the development of trust between all segments of the community concerned with the welfare of children. As each new project develops and as the results of the effort become evident, this trust broadens and deepens. This aspect of the program is critical, for without trust the collaboration necessary for change would be impossible.

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