

INJURY PREVENTION IN PUBLIC HOUSING: DO INSURANCE INCENTIVES WORK?

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Abstract

This paper presents the results of a research project that examined an injury prevention program administered in public housing facilities. This study brought together university researchers, public housing administrators, and insurance company personnel to focus on strategies aimed at increasing the safety of public housing residents. Regression analyses demonstrated that implementation of one injury prevention standard was statistically significant in terms of reducing the number of injury-related insurance claims. The article includes suggestions for program improvement, as well as a series of reflections on the lack of notable impact for most of the standards implemented.

Study Background

Unintentional injuries result in nearly 70,000 deaths and millions of nonfatal injuries each year. Unintentional injuries are the leading cause of death in the United States for people aged 1 to 44 years. The leading causes of death from unintentional injuries are motor vehicle crashes, fires, burns, falls, drownings, and poisonings (Centers for Disease Control [CDC], 1996).

In addition to the human suffering and loss of life associated with them, these injuries also represent a significant financial cost to society. According to the CDC, the cost of unintentional injuries - including medical care, lost wages and reduced productivity - has increased 42% in the last decade. The estimated total cost associated with these injuries is calculated at more than \$224 billion (CDC, 1992).

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Research indicates that unintentional injuries do not occur at random. Indeed, some segments of the population are at increased risk not only for being injured, but also for having significantly limited access to medical services and to the ability to recover from injuries (Baker, 1975; Committee on Trauma Research, 1985). For example, death rates due to unintentional injuries are highest in the more rural areas of the United States (Baker, O'Neil, & Karpf, 1992). However, while geographic differences nationally can significantly predict the likelihood of injuries at the state level, at the individual level there is a strong class gradient (Brown, Howland, Bell, & Lang, 1994). Research has shown that the lower the per capita income, the higher the probability of suffering unintentional injuries (Baker, 1992).

Children, minorities, and the elderly are especially at risk for injury. A recent study found that the mortality rate from unintentional injuries was 2.7 times higher for children receiving AFDC than for other children (Nelson, 1992). In a similar study, researchers found that between 1981 and 1990 the risk of death associated with injury was nearly two times greater among children who either lived in a rural area, were African-American, or had mothers who smoked (Cummings, Theis, Mueller, & Rivara, 1994).

In addition, small-area analyses have demonstrated that in certain sections of New York City, the census tract proportions of low-income households, single-parent families, and unemployment were significant predictors for being at risk for unintentional injuries that result in hospitalization or death (Durkin, Davidson, Kuhn, O'Connor, & Barlow, 1994). The sociodemographic characteristics associated with knowledge and use of preventive measures have been linked to the injury victim's ethnicity, as well as to the educational level of the head of household, family income, and poverty level (Mayer & LeClere, 1994). In addition, cultural and geographical transitions also appear to contribute to differences in childhood injury rates among ethnic groups (Anderson, Agran, Winn, & Tran, 1998).

Falls are the most frequent cause of nonfatal unintentional injuries (Wilson, Baker, Teret, Schock, & Garbarino, 1991). Among children they are responsible for one-third of all injury-related emergency department visits (Gallager, Guyer, Kotelchuck, Bass, Lovejoy, McLoughlin, & Mehta, 1982). Falls are also cited as the leading cause of injuries among the elderly, who in comparison with other age groups have the highest death rates resulting from falls (Baker, 1992). Not surprisingly, fear of falling ranks first when compared to other fears the elderly have (Howland, Peterson, Levin, Fried, Pordon, & Bak, 1993).

In recent years, a considerable amount of attention has been focused on ways to decrease motor vehicle injuries. This emphasis on effective preventive measures has been successful in reducing the incidence of unintentional injuries. However, little attention has been given to how other types of injuries might be prevented. For instance, while there has been extensive research on the relationship between alcohol and other drugs (AOD) and motor vehicle accidents, little is known about the relationship between AOD and injuries that do not involve motor vehicles (Hingson & Howland 1993; Howland et al., 1993). Furthermore, in discussions regarding injury prevention,

attention is often focused on the victims rather than on the effectiveness of preventive measures. Overall, the lack of injury prevention and control strategies is not adequately recognized as a significant public health issue (Pless, 1994).

Injury in Public Housing Settings

In the United States, public housing provides shelter for people who, in many ways, mirror the population at greatest risk for unintentional injury. Public housing residents often represent a community's highest proportion of low-income, female heads of household, children, elderly, and minority families. According to the CDC, there is a pressing need to evaluate interventions aimed at reducing unintentional injuries both in terms of their cost effectiveness and their overall impact on improving public health outcomes (CDC, 1995). The need for such evaluation is particularly true in the public housing context, where there is a surprising scarcity of research available.

A notable exception is the work being conducted by researchers at the University of Memphis. In an effort to reduce fire incidence among its 19,000 low-income residents the Memphis Housing Authority (MHA) implemented a fire prevention training program. McConnell, Dwyer, & Leeming (1995) found that the residents who participated in the training program were almost five times less likely to experience a fire than were non-participating residents. These researchers have concluded that prevention interventions aimed at behavior-specific practices are more effective in reducing injuries in public housing settings than are interventions focused only on environmental changes.

In today's atmosphere of shrinking federal dollars and budgetary constraints, human service providers and public housing officials need to know which injury prevention and risk control strategies work, as well as how cost effective and feasible they are to implement.

Objectives of the Study

This study focused on an examination of a comprehensive program developed by Housing Authority Insurance, Inc. (HAI) to reduce insurance risk by preventing unintentional injuries in public housing settings. The main objective of the study was to assess the success of an incentive-based injury prevention program by analyzing insurance claims data for all unintentional injuries (i.e., both major and minor in nature) reported during the study period.

The overall goal of this study was to 1) examine a program aimed at reducing unintentional injury, morbidity, mortality, disability, and economic loss in public housing settings; and 2) to identify the injury prevention strategies and behavior-specific practices of public housing management, administrators, maintenance and grounds personnel, and to examine the organizational context that influences risk control effectiveness. This research explored the premise that effective injury prevention programs should be administered under contextual conditions that facilitate the adoption of behavior-specific practices.

HAI insures 360 housing authorities in the United States, or approximately 34% of all public housing units. HAI's Housing Authority Risk Retention Group (HARRG) administers what is known as a risk-control program. (See Appendix A for a descriptive overview of the risk-control standards in HARRG's program.) This program is designed to reduce the incidence of unintentional injuries in public housing settings through a series of preventive strategies or "standards," that promote public housing residents' quality of life while simultaneously reducing insurance costs. Reductions in insurance premiums serve as incentives for housing authorities to be involved in the program. Housing authorities can reduce their annual insurance premiums by participating in the risk-control program and by actively working to increase their level of participation. Housing authorities have the opportunity to reduce their premiums and simultaneously improve the quality of life for their residents, while the insurance company, HAI, has the opportunity to reduce its burden of claim payments. Of the 360 housing authorities insured by HAI, 220 take part in HARRG's risk-control program at some level of participation.

While all housing authorities covered by HARRG are invited to participate in the risk-control program, the extent of their participation varies. While some adhere to many if not all of the injury prevention measures suggested and outlined by HARRG, others implement and adhere only to a select number of the standards. Participants in the risk-control program may implement only one standard or more, up to a total of nine different standards (up to eleven before 1990).

Housing authorities must submit written documentation as evidence of satisfying the requirements of each risk-control standard. Then the level of participation is determined by HARRG. As the standards become increasingly more stringent, HARRG agents and housing authority administrators typically negotiate what specifically needs to be done in order to satisfy a particular standard.

Most of the injury claims received by HARRG are due to cuts, abrasions, or contusions (27%). Sprains or strains (25%) account for the second most often reported cause of injuries, followed by fractures (about 17%) and burns (about 4%). Yet, despite the spiraling medical and legal costs associated with unintentional injuries, as well as the multiple ways in which public housing residents represent those most at risk to suffer injuries, there is little empirical evidence about the effectiveness of injury intervention programs administered in public housing settings.

Study Design

Quantitative Component

The primary research effort involved an analysis of injury claims data provided by the HARRG. The data for the analyses were taken from four different files: a claims file containing information about all the claims filed, and three other files containing additional information for the analysis. The variables obtained from the different files included information on the type and level of participation in the risk-control program (i.e., type and number of standards applied) and the year in which the standards were

implemented, the type of housing unit where the reported injury occurred, the number of housing units of each housing authority, the geographical location of the housing units, the exposure to extreme weather conditions, and differences in state litigation rates.

All injuries reported as unintentional were used in the analysis. Unintentional injury was defined as the type of injury that is not self-inflicted. (Since the data used were about types of injuries and no information was available on the mechanisms that produced them, it is not clear if all injuries were accidental. HARRG investigates possible fraud, and if such a case is discovered it is treated separately.) First, the characteristics that would be used as controlling or predictive factors were identified. These characteristics included the type of housing (high- or low-rise), type and level of participation in the HARRG risk-control program (i.e., the number of standards implemented), age distribution of housing residents (i.e., elderly units vs. family units), geographical location of the units, and additional factors such as different litigation rates and weather conditions between various states and regions of the country.

Other factors that would have been of interest to the analysis – such as detailed information on the structural differences of the housing units and how the injuries actually occurred – were not available. Only those claims reported to have occurred in the resident units and not in other places were included in the analysis. The decision to exclude these other-place claims from the analysis was made because the number of injuries occurring in other places was relatively small. It would have been ideal to use as a unit of analysis the number of claims per 1000 persons. However, in the absence of information on the numbers of people living in the different housing complexes, the number of claims reported per housing unit was used as the dependent variable. The multiple regression model used to analyze the claims data by policy years 1992 and 1993 is described below:

$$UI = f(RC, PY, HT, HU, GL, LI, EW)$$

where:

- UI = Claims of unintentional injuries one year after program implementation (1993)
- RC = Type and level of participation in risk-control program (1992) (See Appendix A for the details of the risk-control standards.)
- HT = Type of housing unit where the injury occurred (i.e., family or elderly unit)
- HU = Number of housing units (in the site where injury occurred)
- GL = Geographical location of housing units (i.e., census regions)
- LI = Litigation (i.e., active legal venue in a state)
- EW = Extreme weather conditions (i.e., snow and ice)

Full and reduced forms of various specifications of this model were analyzed. Controlling for the potential effects of the other independent variables, the main variable of interest, the type and level of participation in the risk-control program (RC), was studied in order to determine the effects of participation in HARRG's risk-control program.

(The 11 risk-control standards available in the risk-control program are described in detail in Appendix A.) Each one of the 11 risk-control standards included in the program was included in the model as a dummy variable. This model allowed for individual analyses of each of the standards. Of the five independent variables included in the regression model, four were categorical. The same approach of transforming them into dummy variables was followed. (In this way, the model had a total of 23 degrees of freedom, as indicated in Table 3.)

For consistency and to improve data quality, only those claims considered to have complete data were used. Data were defined as “missing” if all the information pertinent to the study design was not available for a member housing authority in a policy year. Only 18% of all reported claims in the policy years 1992-1994 had incomplete records. While the number of completed records accounts for about 82% of all reported claims, a larger number of incomplete records existed among housing authorities not reporting any injuries to HARRG during these same policy years. Housing authorities that did not report any injuries had 25% incomplete records.

In total, 143 housing authorities submitted complete records in 1992 (see Table 1). Given that every housing authority reports claims for family and elderly housing independently, the total number of reports available was 282, and all these were included in the regression analysis (see Table 3).

Incomplete records could not be included in the analysis, and the possible types of bias that missing records could introduce were examined. Incomplete records were mostly from housing authorities not reporting any claims. This examination found that only Geographical Region No. 1 (including Washington and California) was consistent in submitting complete records to HARRG (i.e., approximately 75% to 95% complete records in policy years 1992-1994). No specific pattern was observed among other geographical regions.

Additionally, of the public housing authorities included in the analysis, a smaller number than expected did not implement *any* of the risk-control standards suggested by HARRG. This fact indicates that public housing authorities less likely to implement the risk-prevention program are also less likely to submit accurate and complete documentation to the insurance company. This could introduce some downward bias in the analyses, as it is possible that if analysis of the complete data set had been possible, the risk-control standards might have shown greater impact on reducing injury claims. In addition, this could also indicate a pattern of underreporting both the annual information required by HARRG, as well as minor injury claims, which again would introduce conservative or downward bias as described above.

Qualitative Component

In order to examine from a variety of perspectives the context in which risk-control programs are implemented, a mixed methods research component was added to the study. While the use of mixed methods was somewhat limited, the effort complemented the study's focus on program development and improvement. Two comple-

mentary qualitative research efforts were undertaken: a qualitative analysis of hazard areas using photographs and a focus group interview with the staff of one public housing authority.

With the help of housing authority maintenance staff, photographs were taken of interior and exterior areas at two public-housing complexes. A preventive maintenance resource guide to interior and exterior hazards developed by HARRG was used to determine what potentially hazardous areas should be photographed. Interior hazards included such things as trash chute openings, elevators, smoke detectors, and stairwells. Exterior hazards included steps, curbs, sidewalks, playground equipment, and parking lots.

After photographing examples of both potential interior and exterior hazard areas, a qualitative analysis of the photographs was performed. The positive content of the photographs, such as well-tended gardens, secured fencing, and locked doors, was compared with the negative content, such as broken glass and uneven sidewalk joints. The analysis focused on examining the hazard area types in conjunction with the risk-control standards. The types of injury claims (e.g., abrasions, sprains, fractures, and burns) were linked to the hazard area types. The objective was twofold: first to understand how more behavior-focused risk-control practices might enhance the risk-control program and, second, to inform subsequent data collection and analysis efforts.

Questions arising during the analysis of the photographs were used to inform the focus-group interview protocol. Analysis of the photographs prompted questions about how the risk-control program could be improved to account for the apparent disconnect between the hazard area types and the behaviors of residents that might contribute to their being injured. In other words, were certain risk-control efforts indicated that would raise the residents' awareness about how their daily behaviors and actions could help prevent injuries?

The purpose of the focus group interview was to understand the risk-control practices among the housing authority participants in the program. Participants in the focus group were chosen from a housing authority that had been one of the first to implement HARRG's program; therefore, they had the most experience from which to draw conclusions and recommendations. The participants included five individuals who had been involved in the program since its inception. All five individuals were employed by the same housing authority. The participants included the housing authority's executive director, risk-control administrator, maintenance director, administrative assistant, and housing resident liaison representative. The focus group participants were asked to describe their involvement in the HARRG's risk-abatement program, what training or trainings in risk-abatement and/or injury prevention techniques they had received, which risk-control standards they felt were most effective in terms of reducing injuries, and what could be done to improve the risk-abatement and injury prevention program.

Through this formative evaluation phase of the study, ways to improve the program were developed from the perspective of those involved in its daily administration and operation. Unfortunately, budgetary constraints limited this portion of the study to

only one focus group. Quite clearly, the views generated in this group are not generalizable and should not be construed to reflect the perspectives of other participants in HARRG's risk-control and injury prevention program. However, the results of the focus group, as well as suggestions made by its participants, take on added weight in light of the limited impact demonstrated by implementation of the standards on reducing claims.

Results

Quantitative Component

A description of the data used in the analyses is presented in Tables 1 and 2. The data analyzed included claims submitted by 143 public housing authorities (PHA) in 1992, and by 189 housing authorities in 1993. The total number of units owned by these public housing authorities was 258,841 in 1992 and 287,662 in 1993.

The number of claims submitted to HARRG decreased from 1,325 in 1993 to 899 in 1994. However, given that claims may take a considerable amount of time to be settled, the observed decline in 1994 could simply indicate that a number of claims were still in the process of been investigated at the time these data were made available to us. Consequently, 1994 data were not used in the analysis.

About 65% of the housing units in the sample were family units; the remaining units housed elderly residents. Unfortunately, the data did not allow a determination of what proportion of each type of unit was owned by the various participating housing authorities. Therefore, it was not possible to estimate the number of claims per unit according to the type of housing unit.

As indicated in Table 1, the number of claims per unit was considerably higher in family units than in units housing the elderly as partly explained because more people live in family units than in elderly units. In 1993, the number of injury claims was nearly 8 per 1,000 units for family housing, and about 1.5 per unit in elderly housing. Of course, injuries can also occur outside the housing units. In 1993, about .2 claims per 1,000 units were reported to occur in other places (e.g., parking lots or playgrounds).

Table 2 presents the number of HARRG standards implemented by the housing authorities included in our analyses. In 1992, 27 of the 143 PHA that submitted injury claims implemented four of the risk-control standards offered by HARRG. Nine public housing authorities implemented all HARRG's standards. Only five of the housing authorities included in our study did not implement any of the standards.

Using regression analysis, the impact of the different risk-control standards was investigated for being predictive of the number of claims submitted by housing authorities in the study. In particular, the possible impact of risk-control standards implemented in 1992 on the number of claims submitted in 1993 was examined. The impact of standards implemented in 1993 on the number of claims submitted in 1994 was also analyzed. However, given reservations about using incomplete data that could possibly bias the results, the study focused on the effect of standards implemented in 1992 on predicting claims in 1993. First, regression analysis was used to examine if the

Table 1. Descriptive Statistics of the Data for Insurance Claims by Policy Year and Housing Type.

Policy year	No. of housing authorities ¹	No. of claims	No. of family units	No. of elderly units	Total No. of housing units	Family housing Mean # of claims per 1,000 units	Elderly housing Mean # of claims per 1,000 units	Other ² Mean # of claims per 1,000 units	Total No. of claims per 1,000 housing units
1992	143	1,118	179,472	79,369	258,841	7.0285	1.6475	0.0741	4.32
1993	189	1,325	193,453	94,209	287,662	7.9497	1.5211	0.2304	4.61

¹Each housing authority submits separate claims for family and for elderly housing.

²These reported injuries did not happen inside the housing units but in other places.

Table 2. Number of Risk Control Standards/Strategies Implemented by Housing Authorities in Policy Years 1992-1993.

Policy Year	Number of Standards Implemented*											Total No. of Housing Authorities	
	0	1	2	3	4	5	6	7	8	9	10		11
1992	5	6	11	14	27	13	20	10	10	15	3	9	143
1993	3	5	10	17	15	21	17	20	20	26	16	19	189

* Indicates the total number of standards implemented in any possible combination. For example, "3" indicates implementation of any 3 standards out of the 11 suggested by HARRG.

number of standards implemented would have an impact on the number of claims reported by the different housing authorities. This analysis was not statistically significant. The possible impact of any of the different standards subscribed by HARRG was also analyzed.

Table 3 presents the results of the regression analysis. A negative coefficient indicates fewer claims, whereas a positive coefficient indicates more claims. The factors that were statistically significant are indicated with asterisks.

In the process of assessing the appropriateness of the study model, an examination of residual plots of the data showed that they were not normally distributed, and consequently the assumptions of normality implicit in regression analysis were violated. To correct this problem, a log transformation of the claim data was performed. This is a frequently used procedure to better deal with outlier values. The log transformation was sufficient to produce reasonable residual plots. In addition, the correlation of the variables included in the model was examined. None of the variables had a correlation higher than .18, with the exceptions of states with extreme weather conditions (e.g., snow and ice) and/or description by the insurance company industry as “active legal venues” (areas with high litigation rates). The correlation among those two variables was .40. The correlation was determined not to be problematic because these were not the main variables of interest and were simply controlled for in the analyses.

By controlling for the geographical location of the public housing authorities that had submitted the claims, a comparison of geographical areas showed that most geographical areas tended to have fewer injury claim rates when compared with Geographic Region No. 5, which includes New York, New Jersey, and Pennsylvania. Some of the regions - such as Region No. 1 (including Washington and California) - reported significantly fewer claims than did Region No. 5. It should be noted that these data did not include records from either New York City or Chicago.

The fact that certain states are particularly active in terms of litigation rates was acknowledged and controlled for in the analyses. The “active legal venue” variable was associated with higher injury claims. In other words, those public housing authorities not in regions with high litigation rates had significantly lower numbers of claims.

Extreme weather conditions were not significant in predicting injury claims. In addition, housing and insurance personnel indicated that the preventive measures associated with the reduction of injury claims could be different from those associated with a reduction of injuries in the housing units themselves. Controlling for the total number of housing units in each public housing authority, the analysis showed that the number of claims reported from elderly units was significantly lower than the number of the claims submitted from family units. A possible explanation is that elderly could be more likely to make use of Medicare or Medicaid when they are injured, instead of submitting a claim to their housing authority. Another possibility is that protective features in elderly units, such as grab bars in bathrooms, effectively reduce injuries.

The analysis of the impact each of the HARRG standards had in predicting claims during the following policy year, in comparison with not implementing the program,

Table 3. Claims of Unintentional Injuries One Year after the Implementation of Risk Control Programs by Authority in Policy Years 1992-93 Parameter Estimates and Standard Errors from the Regression Model (a)

Policy year: 1992	(Injury claims: 1993)	
	Coeff.	(s.e.)
Risk Control Programs Implemented by a Housing Authority^c		
Actual Risk Control Administration	-0.0205	(0.1611)
Actual Preventive Maintenance Program	-0.1857	(0.1233)
Risk Control Policy	0.2407*	(0.1396)
Emergency Action Plans	0.0235	(0.1289)
Record Keeping Policies	-0.0769	(0.1388)
R. C. Committee	-0.0878	(0.1349)
Formal Self-Inspection Program	-0.1317	(0.1635)
R. C. Training and Education	0.0958	(0.1310)
Property Conservation	-0.2210*	(0.1236)
Evaluate R. C. Program	0.1318	(0.1853)
Member in a Safety Organization	0.5725***	(0.1388)
Site Where Injury is Reported		
Family Housing ^b		
Elderly Housing	-0.6913***	(0.4616)
Total Number of Housing Units	0.00034***	(0.000035)
Factors Affecting Claims in a State		
Snow & Ice	0.3688	(0.4185)
no ^a		
Active Legal Venue in a State	0.3732**	(0.1493)
no ^a		

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Table 3. continued

Policy year: 1992	(Injury claims: 1993)	
	Coeff.	(s.e.)
9 Census Regions^d		
Region 5 ^b		
Region 1	-1.6745***	(0.4704)
Region 2	0.8923	(0.6754)
Region 3	-1.1032	(0.6743)
Region 4	-0.5138**	(0.2102)
Region 6	-0.3723**	(0.1678)
Region 7	-0.8251**	(0.3547)
Region 8	-1.0768	(0.8059)
Region 9	-0.8756*	(0.4652)
Intercept	0.8677*	(0.4616)
Standard Error	0.8701	
R2	0.5810	
DF (Model)	23	
DF (Error)	259	
Prob > F	0.0001	

*** p < 0.01 ** p < 0.05 * p < 0.10

(a) The dependent variable in the regression model has been transformed using a log transformation, i.e., log (claims+0.5). In this analysis a negative coefficient indicates fewer claims, whereas a positive coefficient indicates more claims.

(b) Comparison Group

(c) The Risk Control Program Comparison Group includes the claims submitted by PHAs not implementing the specific strategy

(d) 9 Census Regions:

- Region 1: Washington, California
- Region 2: Wyoming, Nevada, Utah, Colorado, Arizona, New Mexico
- Region 3: Minnesota, Kansas, Missouri
- Region 4: Wisconsin, Michigan, Illinois, Indiana, Ohio
- Region 5: New York, New Jersey, Pennsylvania
- Region 6: Maine, Vermont, New Hampshire, Massachusetts, Rhode Island, Connecticut
- Region 7: Oklahoma, Arkansas, Texas
- Region 8: Alabama, Mississippi, Tennessee
- Region 9: Florida, Georgia, North Carolina, Maryland, Delaware, Virginia, West Virginia

showed that only one standard, when implemented in 1992, was significant in predicting a lower number of claims in 1993, when we controlled for the variables previously described. This standard was the implementation of a Property Conservation Program (PCP). The PCP standard covers the adoption of policies and procedures to cover vacant and/or damaged units, the removal of appliances, change of locks, frequency of unit inspection, and disconnection of utilities.

Conversely, two of the standards - Risk Control Policy and Member in a Safety Organization - were associated with a higher number of claims in the year following their implementation. Interestingly, these two standards were revised by HARRG in 1995. HARRG eliminated them when they were determined both to be redundant of other standards and not well linked to any concrete action.

Qualitative component

A qualitative analysis of the hazard area photographs was conducted by the researchers and study cooperators. In this analysis, the positive content of the photographs was compared with the negative content in order to provide the researchers with a clearer understanding of the study context. The qualitative analysis nurtured a growing recognition among the study researchers that injuries in public housing are often the result of behaviors, rather than of hazard areas per se. Themes and questions arising during the analysis of the photographs were used to inform both the focus group interview protocol and the analysis of the focus group data.

The focus group participants spoke candidly about their experiences and perceptions of this program after being assured that these data would be handled in a confidential manner and reported anonymously. The duties of the focus group participants relative to the risk-control program included writing and documenting the risk-control plan, handling accident/incidence reports and forwarding them to HARRG, and implementing the injury prevention strategies/standards.

According to the focus group interviewees, every housing authority participating in HARRG's program must submit a risk-control plan to the insurance company on a yearly basis. The amount of insurance premium credit (or rebate) granted by the insurance company is determined through a protracted process of negotiations between the staff of the housing authority and insurance company. These negotiations involve a time-consuming process of documentation examination, review, and substantiation. For example, the housing authority involved in this focus group applied for seven out of the nine possible risk-control standards and were granted only two. In order to substantiate their application for one of the standards, the housing authority staff had to produce a canceled check as evidence that they had paid their membership dues and were, in fact, members of the National Safety Control Group. In previous years this level of substantiation had not been required by HARRG. As one participant explained, "This time it was very confusing. Sometimes they insist on having a paper trail and other times they don't. You never know what to keep or what to submit."

According to the focus group participants, several factors appear to have contributed to an uneven, and at times seemingly capricious, determination of credit. When

asked to explain, the focus group participants were quick to point out changes in the risk-control personnel at HARRG. In addition to personnel changes, the focus group participants pointed to HARRG's failure to clearly outline the application process. As one focus group participant explained, "This year it wasn't enough to say or check 'Yes' to something like the fact that we have risk-control meetings. This time they made us send in the attendance sign-in sheets and all this was after the fact."

It is important to emphasize the importance that the housing authority staff in this study places on their risk-control plan. While the premium credits represent a significant avenue for cost containment and cost reduction, the housing staff are genuinely committed to the residents' safety. As one of the focus group participants stressed, "I think that what is really important is to get every standard met and to have a plan that really works. Getting the premium reduction is important, but the headaches associated with the paper-shuffle are just part of the problem. The real motivation is to run a good housing authority where the residents feel and are safe. The way this is structured is that there is a gap between how we run the housing authority and our ability to complete paperwork!"

When asked about those elements of the risk-control program that work, the focus group participants emphasized the importance of training. For example, they noted HARRG's Risk Control Standard 6, which calls for ongoing training of both residents and housing authority staff. They also singled out Standard 5, which establishes a formal self-inspection program. The housing authority staff involved in implementation of the plan said that HARRG's inspection checklist was a useful tool.

In terms of how HARRG's Risk Control Program might be improved, the housing authority staff was quick to point out the apparent disconnect between the risk-control standards and truly effective strategies for reducing opportunities for human error to occur. As one focus group participant explained, "None of these standards addresses one of the biggest resources we have: the residents." One participant added, "Before I went to work for the housing authority, I used to be a resident here. I used to have the attitude, 'It's not my house.' But the attitude has really come from the top down, from management; and I have seen a change in attitude, especially in the maintenance staff. When the tenants also see us caring about tears in the rugs, extension cords, broken walkways, ..., then they pick it [the change in attitude] up from us."

It was apparent that the housing authority staff who participated in this focus group were committed to improving the quality of life of the residents. As one of the participants explained, "We are going to develop our own focus groups in each of our housing sites. In each development, we are going to have monthly meetings with the residents and the maintenance staff. We are going to let the tenants know what the risk issues are. What we have already found is that these people are really motivated. This will give us a way to get the residents involved as equals and as an important piece of solving our risk-control problems."

HARRG takes an active role in helping public housing authorities implement the risk-prevention standards. HARRG offers on-site assistance, peer assistance, contact by phone, and video tape support, as well as regular opportunities to attend training

seminars on a wide range of injury prevention and risk-abatement issues. Each year, HARRG's program, service, and work plan concept are evaluated by HAI's Risk Control Committee and Board of Directors. Both groups have representation from a cross section of public housing authorities, and the individuals in the groups represent various departments within housing authorities. HARRG is committed to ongoing improvement of its risk-control and prevention program and is currently in the process of completing a member survey aimed at future program refinements and enhancements. Whether participant housing authorities were aware of and benefited from these efforts was raised as an issue during the focus group interview.

The following suggestions for improving the risk-control program were generated by the focus group participants:

1. HARRG's risk control standards are sometimes difficult for housing staff – both administrative and maintenance – to understand. It is important for all program participants to understand exactly how to satisfy the requirements of each of the standards.
2. Ways to actively involve the residents in the risk-control program should continue to be explored and expanded. Tenant involvement in the risk-control process should be pursued in order to bridge the gap between risk-control standards and the residents' attitudes and behaviors so as to focus on behavior-specific injury prevention strategies.
3. In terms of processing claims, it is essential to have clear lines of communication between the housing authority administration and the insurance company.
4. There needs to be ongoing efforts between the housing authorities and the insurance company for injury prevention education and training.

Reflections on the Study

The main limitation of the study was the inability to analyze all the injury claim records. Acknowledging this limitation, the researchers scrutinized the data to identify any possible differences between incomplete and completed records. They found that the average number of claims submitted by those public housing authorities with complete records was higher than the number submitted by housing authorities with incomplete data. The data included about 82% of all claims reported to HARRG between 1992 and 1994. Unfortunately, it was not possible to determine the extent to which the housing authorities with incomplete records participated in the risk-control program. It is possible that if the complete data set had been analyzed, the risk-control standards might have shown a great impact on reducing injury claims.

The fact that no association was found between implementing a greater number of standards and a lower number of claims is a likely indication that specific standards, rather than the number of standards, are important in preventing injuries. It is plausible that housing authorities more likely to have a greater number of injury claims implement a greater number of risk-prevention standards in order to reduce their premiums – thus taking advantage of the incentives provided by HARRG – but perhaps do not make a serious commitment to implement the standards. Other factors not included in

the analysis could also be associated with the likelihood both of implementing specific risk programs and of increasing or reducing the risk of injury. Such factors might include differential educational levels of the residents and/or the structural or organizational characteristics of the housing authorities.

Generalizations from this study should be made with caution, since HAI insures 34% of all public housing units in the United States. All public authorities that request coverage from HAI are eligible, but occasionally those complexes with exceptionally high records of claims are denied enrollment in the insurance company. Although denial seldom occurs, caution is advised in extrapolating these findings to the housing complexes with exceptionally high records of claims. As previously described, the study sample included a lower number of complete records from housing authorities not reporting injuries. The lower-risk housing authorities in the sample and the housing authorities without claims are likely to cancel any bias they would introduce alone.

In spite of the sample's limitations, some observations from the analysis are relevant to current housing policy discussions. The fact that the Property Conservation Program was found to be significant in reducing the risk of injury points out the value of enforcing this and similar risk-control programs. This standard covers policies and procedures to cover vacant and/or damaged units, removal of appliances, change of locks, frequency of inspections, and disconnection of utilities. As indicated earlier, the two standards (Risk Control Policy and Member in a Safety Organization) associated with a higher number of claims in the year following their implementation were revised and eliminated by HARRG in 1995.

Other positive aspects of the Property Conservation Program are related to good management practices. Ongoing debates about public housing laws are likely to result in changes that require housing authorities to become more entrepreneurial and efficient (Quercia & Galster, 1997). As federal subsidies continue to decline and competition for funds among public housing authorities increases, performance indicators will become increasingly prominent in decisions regarding subsidy allocations (Nutt-Powell & Gallo, 1997). Recommended best practices for housing authorities include provisions for improving safety and security in public housing communities (U.S. Department of Housing and Urban Development [HUD], 1998). Participation in risk reduction efforts - and in particular, individual elements of these efforts such as the Property Conservation Program - can institutionalize housing authority approaches to improving these management practices.

One of the most interesting observations from the focus group was the desire of PHA management to increase participation of residents in property maintenance and safety initiatives. HUD has recognized that public housing residents are the most important stakeholders in management programs that advocate best practices (HUD, 1998). Resident participation in public housing management can improve program effectiveness. Important opportunities may exist, therefore, to expand awareness of risk reduction programs, or individual elements of such programs, that serve to improve management practices and increase resident safety.

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References

- Anderson, C.L., Agran, P.F., Winn, D.G., & Tran, C. (1998). Demographic risk factors for injury among Hispanic and non-Hispanic white children: an ecological analysis. *Injury Prevention, 4*, 33-38.
- Baker, S. P. (1975). Determinants of injury and opportunities for intervention. *American Journal of Epidemiology, 101*, 98-102.
- Baker, S. P., O'Neil, B., & Karpf, R. S. (1992). *The Injury Fact Book*. Lexington, Massachusetts: Heath and Company.
- Brown, P. C., P., Howland, J., Bell, N., & Lang, M. (1994, October). *State Level Clustering of Safety Measures and its Relationship to Injury Mortality*. Presentation at the Annual Meeting of the American Public Health Association, Washington, DC.
- Centers for Disease Control and Prevention (1996). *Ten Leading Causes of Death Tables, 1994* [On-line]. Available: <http://www.cdc.gov/nchs/fastats/lcod.htm>
- Centers for Disease Control (1992, March 27). Methodology for assessing the effectiveness of disease and injury. *Morbidity and Mortality Weekly Report, 41* (RR-3), 5-11.
- Centers for Disease Control (1995, August 18). Assessing the effectiveness of disease and injury prevention programs: Cost and consequences, *Morbidity and Mortality Weekly Report, 44* (RR10).
- Committee on Trauma Research. (1985) *Committee on Trauma Research. Injury in America. A Continuing Public Health Problem*. Washington, DC: National Academy Press.
- Cummings, P., Theis, M. K., Mueller, B. A., & Rivara, F. P. (1994). Infant injury death in Washington state, 1981 through 1990. *Archives of Pediatric and Adolescent Medicine, 148*, 1021-1026.
- Durkin, M., Davidson, L., Kuhn, L., & O'Connor, P., Barlow, B. (1994). Low-income neighborhoods and the risk of severe pediatric injury: a small-area analysis in northern Manhattan. *American Journal of Public Health, 84*, 587-592.
- Gallager, S. S., Guyer, B., Kotelchuck, M., Bass, J., Lovejoy, F. H., Jr., McLoughlin, E., & Mehta, K. (1982). A strategy for the reduction of childhood injuries in Massachusetts: SCIPP. *The New England Journal of Medicine, 307*, 1015-1019.

Hingson, R., & Howland, J. (1993): Alcohol and non-traffic unintended injuries. *Addiction*, 88, 877-883.

Howland, J., Peterson, E.W., Levin, W., Fried, L., Pordon, D., & Bak, S. (1993). Fear of falling among the community-dwelling elderly. *Journal of Aging and Health*, 5 (2), 229-243.

Howland, J., Smith, G. S., Mangione, T., Hingson, R., DeJong, W., & Bell, N. (1993). Missing the boat on drinking and boating. *Journal of the American Medical Association*, 270 (1), 91-92.

Kemp, A., Gibbs, N., Vafidis, G., & Sibert, J. (1998). Safe Child Penarth: Experience with a Safe Community strategy for preventing injuries to children. *Injury Prevention*, 4, 63-68.

Klein, S. J. (1997). Building collaborative bridges between public health and health care delivery: leadership strategies for new partnerships. *Journal of Public Health Management Practice*, 3 (1), 34-41.

Mayer, M., & LeClere, F.B. (1994, May 31). Injury prevention measures in households with children in the United States, 1990. *Advance Data, Vital and Health Statistics of the CDC, NCHS*, 250.

McConnell, C.F., Dwyer, W.O., & Leeming, F.C. (1995, November).

Reducing fire incidence in public housing. Paper presented at the International Evaluation Conference, Vancouver, Canada.

Nelson, M. D. (1992): Socioeconomic status and childhood mortality in North Carolina. *American Journal of Public Health*, 84, 1131-1133.

Neter, J., Wasserman, W., & Kutner M.H. (1990). *Applied Linear Statistical Models*. Boston: Irwin, Homewood.

Nutt-Powell, T.E. & Gallo, V.A. (1997). Comment. *Housing Policy Debate*, 8 (3), 571-581.

Pless, I.B. (1994). Unintentional childhood injury-where the buck should stop. *American Journal of Public Health*, 84 (4), 537-539.

Quercia, R.G. & Galster, G.C. (1997). The challenges facing public housing authorities in a Brave New World. *Housing Policy Debate*, 8 (3), 535-569.

U. S. Department of Housing and Urban Development. (1998). *Celebrate the Spirit of Success: A Guide to Best Practices*. Washington, DC: Author.

Wilson, M. H., Baker, S., Teret, S. T., Schock, S., & Garbarino, J. (1991). *Saving Children: A Guide to Injury Prevention*. New York: Oxford University Press.

Appendix A: HARRG's Risk Control and Injury Prevention Standards

Risk Control Standard	Description
1. Public housing authority administrations make a commitment to a program of risk management.	This commitment involves adoption of a formal risk-control policy statement and a commitment from the public housing authority's top administrator to attend quarterly risk-control committee meetings. The public housing authority's top administrator receives reports on potential hazard areas and monitors corrective action to ensure their elimination.
2. A full- or part-time risk-control administrator is designated at the public housing authority.	The risk-control administrator ensures proper investigation of all accidents, performs risk-control training, identifies potential hazard areas, and receives continuing education.
3. An active risk-control committee is created at the public housing authority.	The risk-control committee establishes annual risk-control goals and tracks a risk-control work plan to completion. It evaluates the preventive maintenance of the public housing authority's building, equipment, grounds, and vehicles.
4. A risk-control preventive maintenance program is put in place at the public housing authority.	This program covers a time-specific plan for monitoring the safety and operation of such equipment as generators, emergency lighting, security lighting, elevators, smoke detectors, fire alarm systems, fire alarm pull boxes, fire extinguishers, hot water heaters, door buzzer systems, entrance locks, and playground equipment.
5. A formal self-inspection program is established at the public housing authority.	The self-inspection program includes a systematic program for both informal and formal self-inspections, the creation of forms for documentation of the program, and a plan for monitoring corrective action.
6. The public housing authority conducts risk-control training and education for both public housing staff and residents.	Residents receive training on fire safety, emergency procedures, alarm use, use of elevators, security measures, and lead-based paint hazards. The housing staff receive training on conducting inspections, hazard identification, emergency procedures, accident investigations, conflict resolution, harassment discrimination, drug-free policies, violence in the workplace, and lead-based paint control.

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| 7. The public housing authority develops emergency action plans. | These written plans cover procedures in the event of fire, serious injury, weather-related occurrences, power failure, gas leak, chemical spill, civil disorder, bomb threat, emergency evacuation, and workplace violence. |
| 8. The public housing authority implements a property conservation program. | This program covers the adoption of policies and procedures to cover vacant and/or damaged units, the removal of appliances, change of locks, frequency of unit inspection, and disconnection of utilities. |
| 9. The public housing authority establishes an accident and incident investigation program. | This program establishes a set of written procedures to be followed in the event of an accident. |
| 10. Risk-control policy | Note: This standard was deleted in 1995 because it was considered duplicative or redundant of previous standards. |
| 11. Member in a safety organization | Note: This standard was deleted in 1995 because it was considered duplicative or redundant of previous standards. |
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