



**THE EFFECTS OF HOUSING AUTHORITY INSURANCE GROUP'S
FIRE PREVENTION POSTER PROGRAM
ON PUBLIC HOUSING AUTHORITY PARTICIPANTS**

by

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Housing Authority Insurance Group is a trade name for a family of affiliated companies which includes Housing Authority Risk Retention Group, Inc.; Housing Authority Property Insurance, A Mutual Company; Housing Authority Insurance, Inc.; Housing Insurance Services, Inc.; Housing Telecommunications, Inc.; Satellite Telecommunications, Inc.; Housing Investment Group, Inc.; and Housing Enterprise Insurance Company, Inc.

Introduction

In 1998, the Risk Control Department of the Housing Authority Insurance Group created a Fire Prevention Poster Contest to increase awareness of fire safety among residents of Public Housing Authorities and subsequently, to decrease match fires among insured properties. This program provides prize money to insured public housing authority members, which is then awarded to young residents who draw excellent posters that illustrate various fire prevention topics. Since its inception, the program has drawn over 11,000 participants from over 200 different public housing authorities and awarded nearly \$190,000 in prize money. While there is little doubt that the program increases fire prevention awareness for participating children, the actual decrease in fire incidents among housing authorities completing the program remains unexamined. This paper analyzes the effect of completing the fire prevention poster program on the incidence of child/match fires and makes recommendations to bolster the poster program's impact.

Design of the Analysis

To understand the impact of the poster program on participants, it is important to consider the realm of possible factors that might influence variation in the rate of occurrences of child/match fires at a housing authority. Factors that might make some housing authorities more likely to report higher rates of child/match fire than do other housing authorities should be accounted for in the analysis. If these factors are accounted for when conducting the analyses, it is possible to see the singular effect of fire poster program participation on the number of child/match fires a housing authority reports as well as the likelihood that a housing authority will report such a fire from year to year.

In addition, the specific characteristics of each housing authority that remain fairly constant overtime, such as size, location, vacancy rate, level of upkeep, ‘riskiness,’ and management as well as unknown characteristics of a housing authority that might contribute to fires, should be held constant in the analysis.

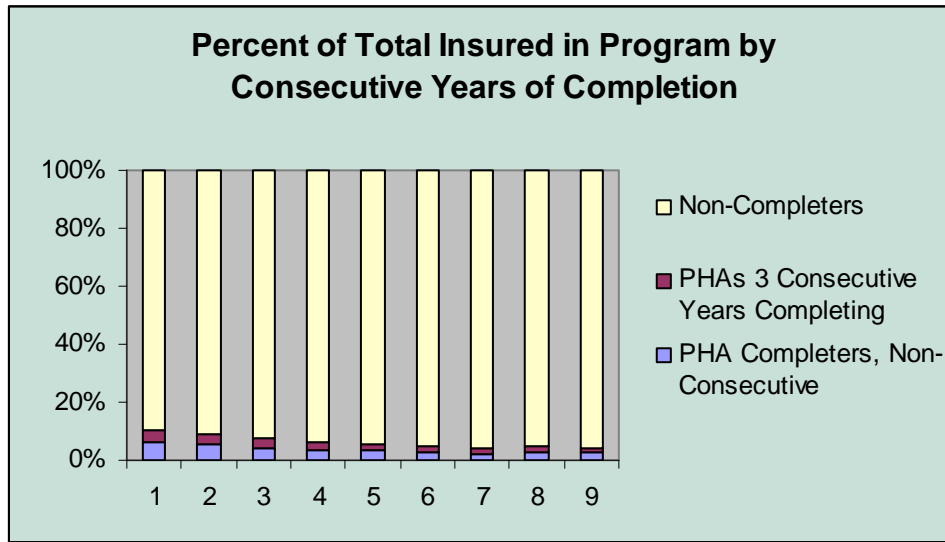
Along with housing authority’s specific characteristics, this analysis considers the impact of program participation, the number of losses from year to year, the number of fires reported from year to year, consecutive years spent in the program, and the consecutive years as an HAI customer on the number and likelihood of child/match fires. Specifically, these factors are modeled using a pooled cross-sectional time series logistic regression model and a pooled cross-sectional time series poisson regression model.

Yet before these analyses are discussed, it is important to highlight the composition of program participants and trends in program participation over time. In particular, it is useful to compare the characteristics of members who are selecting to join the program versus those who do not choose to participate. If the composition of program completers varies substantially from non-completers, assessments of program impact may be misleading.

Analysis of Program Participants

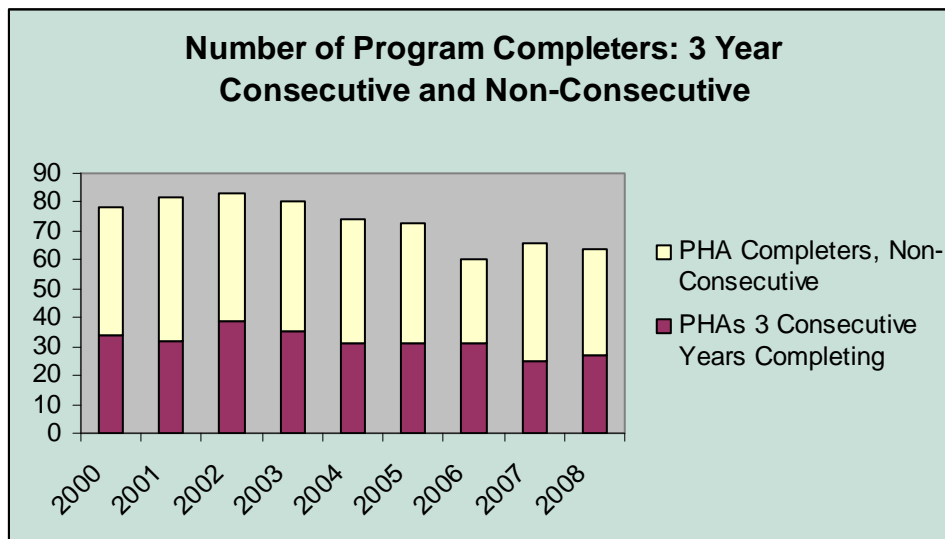
The number of insured members completing the program has varied over time. There tend to be about seventy-two members participating in the program each year, on average. The rate of completion at the onset of the program in 1999 was over ten percent of all members. However, as the number of insured has grown steadily, the number of member participants has not followed this trend as seen in Table 1. Last year, just over four percent of insured members completed the program. In addition, members tend to

Table 1:



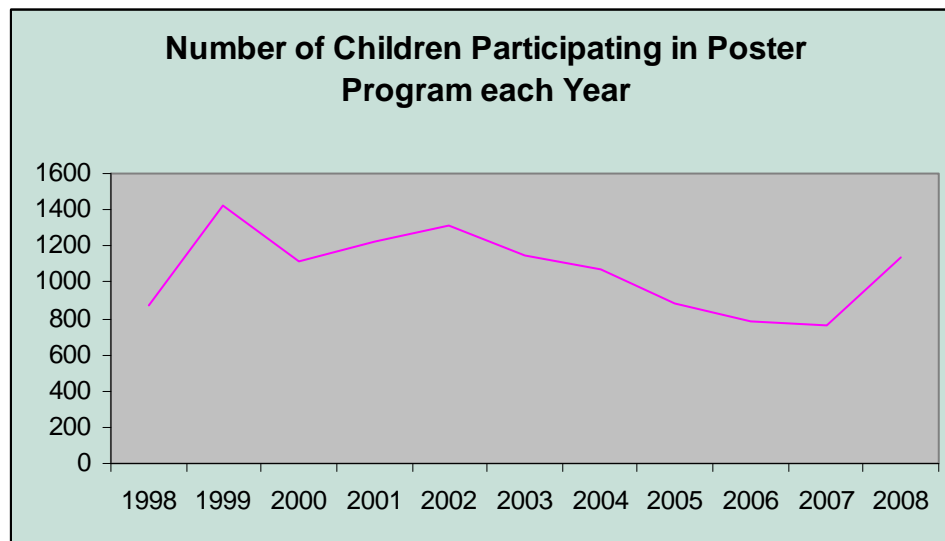
exit in and out of the program fairly frequently, with consistently less than half of participants completing the program for three consecutive years in any given year as seen in Table 2. This trend makes it difficult to measure the impact of the program and potentially, for the program to achieve its desired results.

Table 2:



The participation of resident children also varies by housing authority over time as seen in Table 3. While reporting is sometimes spotty, housing authority participants indicate anywhere from one to over two-hundred children participants each year. The mean level of participation is about fourteen children per housing authority per year. However, beyond the number of child artists it is difficult to estimate how many children and adults are reached through the program.

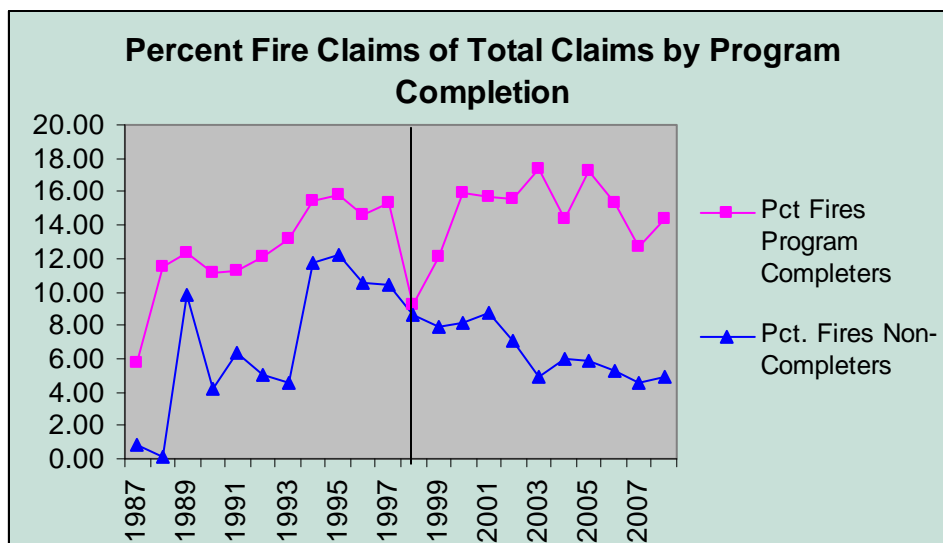
Table 3:



Beyond these descriptors, it is important to understand which characteristics shared by program completers make them more likely to join the program (analysis shown in Appendix A) and then to assess the impact these shared characteristics have on the likelihood of experiencing a child/match fire (analysis shown in Appendix B). Not surprisingly, the largest determinants of housing authority participation in the poster program are the number of fire incidents that the insured has experienced and similarly, the percentage fires represent of their total claimed losses. The greater number of fire

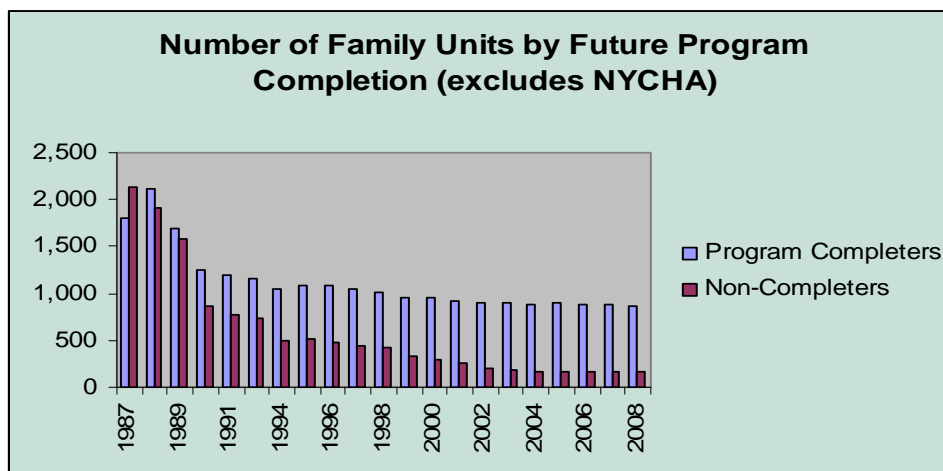
losses a member has experienced and the larger the percentage of fire losses they report to total losses, the more likely it is that the member will join the program. More specifically, each additional fire reported by a housing authority in a given year increases its predicted probability of completing the poster program by over thirteen percent. Table 4 illustrates the higher rate of fire claims for program completers versus those who do not complete the program. In general, fires represent a higher proportion of program completer's total claims than they do for non-completers. It is also important to note that while a greater number of smoking fires, unknown fires, and total fires each increase the likelihood that an insured will join the poster program, the number of children/match fires alone have little impact on a member's propensity to join. Plainly, members with high rates of total fires join the program, not members that report high incidences of child/match fires in particular.

Table 4:



Similarly, program completers tend to be larger in size than are non-completers, as seen in Table 5. With more units and tenants as well as larger expanses of property to oversee, larger housing authorities naturally report more claims, including fires. Specifically, a housing authority with over 1200 family units has a predicted probability of completing the program over two hundred percent higher than a housing authority with fewer units.

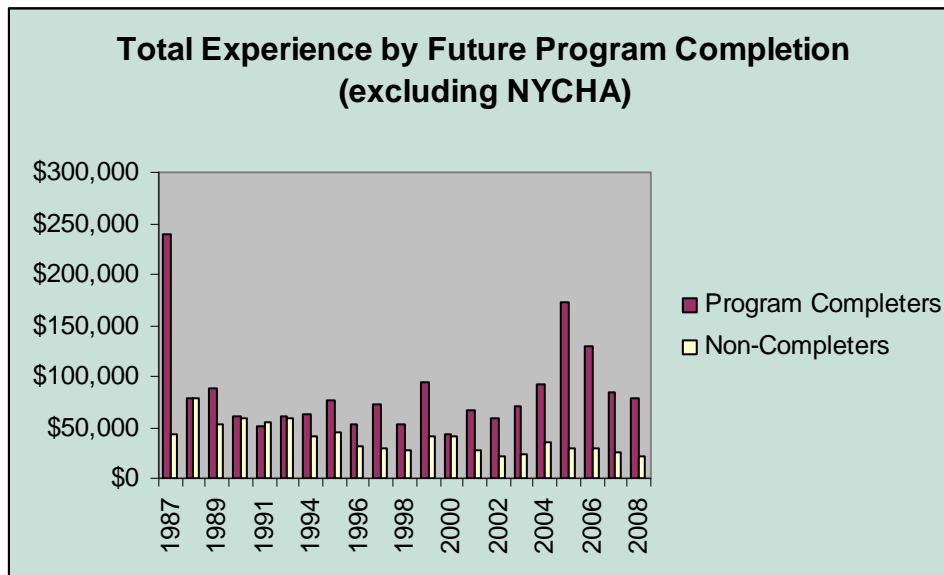
Table 5:



Yet those members that complete the program are not necessarily more risk-prone. While program completers report higher rates of fire than do non-participants, they do not report higher rates of overall losses, but lower rate of loss. However, while they do not report more claims, the losses program completers do experience tend to be slightly larger than those reported by members who do not complete the program as seen in Table 6. Specifically, each additional \$10,000 dollars in housing authority losses increases the predicted probability that a housing authority will complete the program by almost one half percent. Together, these finding suggest that housing authorities that

complete the program are not simply ‘riskier’ housing authorities, but have a specific problem with fire and experience more damaging losses. In addition, participants tend to be larger housing authorities, which are more likely to experience fire because of their size and urban location.

Table 6:



The characteristics of program participants outlined above have implications for program success. First, there is a clear selection bias in the program that leads participants to exhibit higher rates of child/match fires than non-participants. Those selecting into the program are more likely to experience a fire and given the law of large numbers (the more fires an institution has, the more likely several of them are due to children playing with matches), are also more likely to experience a child/match fire. Moreover, participant goals in joining the program do not necessarily match the goal of the program. While the program is aimed at reducing child/match fires, participants may hope to reduce the overall number of fires by joining. Given that the program targets

children specifically, it may not be equipped to reduce the total number of fires at a housing authority.

Assessment of Program Impact

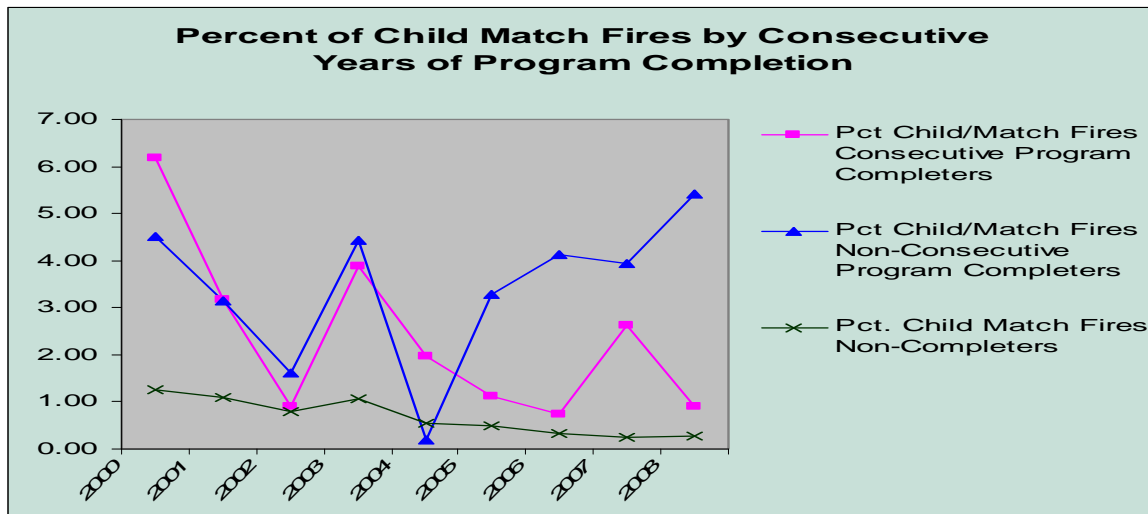
Having outlined the factors that might make housing authorities completing the poster program already more prone to child/match fires, this information is then accounted for when evaluating the impact of the program on participants. Simply considering the likelihood that a program completer will have a child/match fire, statistical analyses show that electing into the program increases the likelihood of having a child/match fire or a general fire, despite controlling for the number of previous losses and the housing authority specific characteristics that remain fairly constant overtime. Again, this finding is directly related to the greater likelihood of experiencing all types of fires exhibited by those who tend to join the program. With a higher rate of fire, it is also more likely that more fires will involve children and matches. Indeed when the number of previous fires is accounted for in the analysis, those entering the program do not exhibit a higher likelihood of reporting a child match fire when joining. In other words, looking at two housing authorities with the same number of past fires, the member who has completed the program is no less likely to have a child/match fire than the member who has not participated in the program. This finding suggests that completion of the poster program in any given year has little impact on child/match fire prevention.

However, there are some indications of program success. As noted above, members tend to transition in and out of the program. Any program practiced consistently over time is more likely to succeed. Thus, the lack of evidence for program impact in a given year could be related to the high rate of program turnover and the

necessity of time for progress to be measured. This idea proves true for the poster program. As a member participates in the program for more consecutive years, they reduce the likelihood that they will experience a child/match fire by almost ten percent and also lower the total number of child/match fires that they report as seen in Table 7. Having completed the poster program for at least three consecutive years also reduces the chance that a housing authority will experience any type of fire. This result suggests that rather than simply completion of the program, consecutive participation in the program is necessary to produce a reduction in child/match fires and total fires.

Given the tendency of larger, more fire prone housing authorities to take advantage of the poster program, it is possible that the program is more effective at reducing child/match fires for those experiencing more trouble. However, the effect of consecutive participation on fire reduction is not stronger for more risky housing authorities (those that experience more losses) or for those who report a greater number of fires. As a result, consecutive participation in the program should have the same fire-reducing impact for all members despite their size.

Table 7:



In addition, as housing authorities are insured with HAI for more consecutive years, they also exhibit a reduced number of child match fires. Each additional consecutive year as an HAI member, reduces the number of child/match fires by slightly over one in any given year. It may be that a consistent focus on risk prevention exhibited by both in participation in the poster program and renewed HAI membership contributes to the reduction in the likelihood of child/match fires. In this case, either contact continued with HAI or a risk-focused (or more cost attentive) manager helps to reduce the likelihood of fire, but at a much lower rate than participation in the poster program.

Recommendations

Because the program is successful only when it can consecutively retain members, the participant retention strategy should be a major focus. This strategy could include reducing housing authority staff time promoting and overseeing the program by coinciding HAI staff member visits with program promotion and recruitment. Such a strategy might also increase the level of outreach to children participating in the program as an HAI staff-led recruitment might do more to peak the interest of resident children and their parents. Garnering additional interest from residents might also encourage housing authorities to remain in the program. For instance, if recruitment tactics were especially appealing to children (see examples below) the program might gain in resident popularity.

In addition, the goals of the program might be revisited in an effort to combat the mismatch of participant motivations for joining and the program's intent. Because participants tend to join due to high general fire incidences as opposed to specific child/match fire incidences, the program might be expanded to include general fire

prevention outreach. Activities that would reach the parents of the children, such as assemblies to show off or recruit poster artists, might be a step in this direction as would activities that would appeal to children not inclined to draw, such as fireman visits and fire truck rides. Alternatively, housing authorities with high incidences of child/match fires could be more intentionally targeted and program resources focused on these groups. For instance, a threshold percentage of child/match fires to total losses or to total fires could be established as the parameters for participation. In this case, larger rewards or more focused attention on program participants could be provided, which might increase the impact of the program.

Finally, an effort to increase participation in the program from both housing authorities and child artists should be considered. To increase participation by artists in the program, incentives for artist participation might be reconsidered. For instance, if the prizes were more tailored to children's interests, such as bicycles, video-games, or other toys, children might be more inclined to participate. Similarly, if the level of attention or accolades given to winners was raised, parents and children might be more likely to be involved in the program. Likewise, if the strategy to reduce housing authority staff was introduced, housing authorities might be more inclined to participate. Also if a publication stressing the benefits of participation was available, housing authority staff might be more aware of participation outcomes. Increased advertising in general might be helpful in raising the number of member participants.

Appendix A: Analysis of the Determinants of Completing (Joining) the Poster Program

Table 1: Pooled Time Series Cross-Sectional Logistic Regression Results of Joining, Marginal Effects

	Dy/Dx	Standard. Error	Z - score	Significance
Number of Losses reported (last year)	-.0337134	.00883	-3.82	***
Total Experience Reported (last year)	.000000357	.00000	1.92	*
Number of Total Fires Reported (last year)	.1361384	.03444	3.95	***
Number if Child/Match Fires Reported (last year)	-.0519353	.11783	-0.44	
PHA > 1200 family units	2.686724	.44266	6.07	***
Urban Location	.1729679	.32815	0.53	

***= P<.001 **=P<.01 *=P<.05.

**Additional sensitivity analyses include the impact of arson fires, smoking fires, and unknown fires on the likelihood of joining the program as well as the percent of fire claims to total claims reported.*

Appendix B: Analysis of the Impact of Poster Program on Child/Match Fires

Table 1: Pooled Time Series Cross-Sectional Random-Effects Logistic Regression

Results of Having a Child/Match Fire

	Dy/Dx	Standard. Error	Z - score	Significance
Number of Total Fires Reported (last year)	.1018683	.02226	4.58	***
Completed Poster Program (last year)	.2688759	.18473	1.46	
Number of Losses reported (last year)	.0069036	.00451	1.53	
Consecutive Years in Program (last year)	-	.04256	-2.24	*
Consecutive Years as HAI Customer (last year)	.0167876	.00969	1.73	
PHA > 1200 family units	2.058066	.23017	8.94	***
Urban Location	.2392255	.17522	1.37	

***= P<.001 **=P<.01 *=P<.05

Table 2: Pooled Time Series Cross-Sectional Fixed-Effects Poisson Regression

Results of the Number of Child/Match Fires

	Coefficient	Standard. Error	Z - score	Significance
Number of Total Fires Reported (last year)	0.021288	0.012114	1.76	~
Completed Poster Program (last year)	0.331817	0.165261	2.01	*
Consecutive Years in Program (last year)	-0.12793	0.046074	-2.78	**
Number of Losses reported (last year)	0.00727	0.002391	3.04	**
Consecutive Years as HAI Customer (last year)	-0.04338	0.010307	-4.21	***

***= P<.001 **=P<.01 *=P<.05 ~=<.10

**Additional sensitivity analyses include the impact of percent of fire claims to total claims reported on the predicted number of child/match fires. They also examined the impact of these factors on the number of total fires.*