

# HOW HOUSING EVALUATIONS AFFECT PARTICIPATION IN A HOUSING ALLOWANCE PROGRAM

SINCLAIR B. COLEMAN

R-2781-HUD

APRIL 1982

## HOUSING ASSISTANCE SUPPLY EXPERIMENT

Sponsored by

The Office of Policy Development and Research  
U.S. Department of Housing and Urban Development

**Rand**  
SANTA MONICA, CA 90406

The research reported here was performed pursuant to Contract No. H-1789 with the Office of Policy Development and Research, U.S. Department of Housing and Urban Development.

Library of Congress Cataloging in Publication Data

Coleman, Sinclair B.  
How Housing Evaluations Affect Participation  
in a Housing Allowance Program

"R-2781-HUD"--T.p.

1. Housing subsidies--Wisconsin--Brown  
County. 2. Housing subsidies--Indiana--  
St. Joseph County. I. United States. Dept.  
of Housing and Urban Development. II. Title.  
HD7303.W6C64 363.5'8 81-22752  
ISBN 0-8330-0379-8 AACR2

333.322.3 ✓

(77561)

665

ions Series: The Report is the principal publication doc-  
mitting Rand's major research findings and final research  
Note reports other outputs of sponsored research for  
1. Publications of The Rand Corporation do not neces-  
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## PREFACE

This report models participation in the housing allowance program conducted as part of the Housing Assistance Supply Experiment, a research effort carried out from 1974 to 1979 in Brown County, Wisconsin, and St. Joseph County, Indiana. Specifically, it analyzes how an enrollee's failure on a required housing evaluation, and his response to that failure, affected his chances of actually participating in the program—that is, of ever receiving payments.

The report is one of several Rand analyses of eligibility and participation in the allowance program; others include C. Peter Rydell, John E. Mulford, and Lawrence W. Kozimor, *Dynamics of Participation in a Housing Allowance Program*, N-1137-HUD, February 1981 (first issued as WN-10200-HUD in June 1978); Phyllis Ellickson, *Who Applies for Housing Allowances? Early Lessons from the Housing Assistance Supply Experiment*, R-2632-HUD, August 1981; James C. Wendt, *The Decision To Apply to the Housing Allowance Program*, R-2782-HUD, forthcoming; and Grace M. Carter and Steven L. Balch, *Measuring Eligibility and Participation in the Housing Assistance Supply Experiment*, R-2780-HUD, forthcoming. Findings from those analyses will be integrated to form a single model of participation and presented in the forthcoming final report by Grace M. Carter and James C. Wendt, *Eligibility and Participation in a Housing Allowance Program*, R-2783-HUD.

The author acknowledges the helpful comments of Michael P. Murray and Allan Abrahamse to an earlier version of the report. Grace M. Carter and Ira S. Lowry contributed substantially to the study. Publication processing was by Charlotte Cox (editing) and Dolores Davis (typing), under the supervision of Judith A. Rasmussen.

The report was prepared for the Office of Policy Development and Research, U.S. Department of Housing and Urban Development, pursuant to Contract H-1789, Task 2.16.6.

17th April 1971

Dear Mr. [Name],

I have received your letter of the 14th April regarding the matter of [Topic]. I am sorry that I cannot give you a more definitive answer at this time, but the situation is somewhat complex and requires further investigation.

The information you have provided is being reviewed by the relevant departments, and we will contact you again once a final decision has been reached. I appreciate your patience and understanding.

Yours faithfully,  
[Signature]

## SUMMARY

The experimental housing allowance program conducted from 1974 to 1979 in Brown County, Wisconsin, and St. Joseph County, Indiana, offered low-income households conditional assistance with their housing expenses. Any eligible renter or homeowner was entitled to a monthly cash payment (the amount varying with income and household size), but only while he occupied a dwelling that met program standards as to space, domestic equipment, and conditions affecting health and safety.

About half of those who enrolled in the program initially occupied dwellings that failed those standards. This report compares households whose dwellings passed with households whose dwellings failed. For the latter, it analyzes their response to failure: some arranged for repairs to the failed dwellings; some moved to acceptable dwellings; and others dropped out of the program rather than comply with its housing requirements.

Among those who enrolled in the program, the incidence of substandard housing varied for different household types. Controlling for other characteristics, each of the following household attributes independently increased the probability of a dwelling's failing the program standards:

- Nonwhite head of household
- Nonelderly head of household
- Large family
- Children present
- Very low income

The higher failure rates for households with the listed characteristics merely reflect the relative spaciousness and quality of their dwellings and their habits of dwelling maintenance. When household characteristics are taken into account, there is little residual difference in failure rates between renters and owners. Large families were especially likely to fail the space standard, but were also more likely than small families to fail standards of dwelling condition.

Among those who failed, about 80 percent either repaired the failed dwelling or moved to an acceptable one; the other 20 percent dropped out of the program. Termination rates were about the same for renters and owners, but the two groups differed in how they acquired acceptable housing. About a fifth of the renters moved to acceptable dwellings, three-fifths repaired, and the remainder terminated. Owners either repaired or terminated; they rarely moved. Because of that difference in behavior, we modeled postfailure responses separately for owners and renters.

Among enrolled homeowners whose dwellings failed, repair rates were lower and termination rates were higher for those whose expected financial benefits from the program were small and for those whose dwellings were overcrowded or needed extensive repairs. Termination rates for renters varied similarly but were also affected by dwelling type. Those in multiple-unit dwellings were more likely to move, less likely to repair, and more likely to terminate than those in single-family houses, presumably because the maintenance of multiple-unit dwellings is less subject to the influence of a single tenant.

The estimated cost of repairs influenced enrollees' decisions less than did the number and type of items needing repair. Overcrowding, not usually remediable by repairs, nearly always

led owners to drop out of the program; overcrowded renters were equally likely to move or to terminate their enrollment. Household characteristics such as age of head and family composition that were influential in one site were not influential in the other. For both renters and owners, response patterns changed over time; in general, the incidence of moving decreased and the incidence of repairing increased for later enrollees whose dwellings failed.

Among those who qualified for payments (by whatever means), a fourth (Brown County) to a third (St. Joseph County) failed subsequent annual evaluations, usually because their dwellings had deteriorated rather than because their households had become overcrowded. Roughly the same factors were associated with initial and subsequent annual failures; response patterns were also similar. However, only about an eighth of those who failed annual evaluations responded by terminating their enrollment.

A companion study of enrollment shows that both expected financial benefits and expected repair or moving costs influenced the decision to enroll; hence, enrollees were a self-selected group who judged, on the evidence available, that the program offered a net benefit. The initial housing evaluation provided them with good estimates of the participation costs, which deterred about a fifth of the enrollees who failed their initial enrollment evaluation. In general, those costs were greatest for large families with very low incomes (because they were most likely to be overcrowded and their dwellings were in worse condition). But the financial benefits were also greatest for those families, so most of them took the necessary steps to qualify for payments.

Participation rates in a housing allowance program could be raised by increasing program benefits and by relaxing some of the housing standards, particularly those pertaining to crowding and lead-based paint hazards. Our study suggests that doubling the average allowance entitlement would increase homeowners' participation rates by about 4 percentage points, and would increase renters' participation by about 6 percentage points. The two most onerous housing standards pertain to crowding and lead-based paint hazards. Eliminating the former would have only a small effect on participation because relatively few enrollees are overcrowded (about 10 percent of the owners and 14 percent of the renters). Eliminating the paint standard would increase owners' participation by between 1 and 2 percentage points, and would increase renters' participation by about 4 percentage points.

In all, our study suggests that enrollees do not greatly value the housing improvements required by program standards. Rather, they value the allowances and are willing to comply with housing standards in order to qualify for payments.



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## I. INTRODUCTION

This report is one of several that will analyze participation in the housing allowance program conducted as part of Rand's Housing Assistance Supply Experiment (HASE). The experiment, which formed part of a broader research effort sponsored by the U.S. Department of Housing and Urban Development (HUD), offered direct cash housing assistance—in the form of housing allowances—to all eligible households in two midwestern sites.<sup>1</sup> Eligibility was based primarily on income, adjusted for family size, and both renters and homeowners could apply. No restrictions were placed on how a person could spend the allowance money, although to receive payments, a household had to live in a dwelling that met minimum health and safety standards, had adequate facilities, and was of sufficient size.

The experiment began in the first site, Brown County, Wisconsin (whose principal city is Green Bay), in mid-1974, and in the second, St. Joseph County, Indiana (principal city, South Bend), in January 1975. All of Brown County was included from the start. Operations in St. Joseph County originally covered only central South Bend, but they were expanded to most of the county by March 1976 and to all of it by November.

The sites were selected to represent two metropolitan types: one (Brown County) with a flourishing urban center and a racially homogeneous population; the other (St. Joseph County) with a deteriorating central city and a segregated minority population. A further consideration was the limited experimental budget: costs would be lower in a mid-sized metropolitan area than in a major city.

In both sites, the program recruited participants through newspaper, radio, and television advertising, by means of mailed flyers, and by word of mouth. Families who believed they might be eligible could apply through their local housing allowance office (HAO). In general, a household was eligible if its total income was less than four times the local cost of adequate housing for a family its size. The allowance such a family could receive was the difference between a quarter of its income and the cost of "standard housing" (for a definition of the cost of standard housing and how it was derived, see Lowry, 1980; Lowry, Woodfill, and Dade, 1981; and Lowry, Woodfill, and Repnau, 1981).

Once a household was determined eligible by the HAO, its dwelling was evaluated as to health and safety factors (including after January 1977 the presence of lead-based paint), essential kitchen and bathroom facilities, and size. The evaluation followed a 38-item checklist (detailed in Appendix A); failure on any one item resulted in a dwelling's failing the evaluation. A household whose dwelling passed this first ("initial") evaluation could immediately begin receiving payments. One whose dwelling failed could qualify for payments either by repairing its unit so it could pass a reevaluation or by moving to another dwelling that met, or was repaired to meet, the program's standards.

Having passed the first evaluation and so become an allowance recipient, a household then had to have its dwelling reevaluated once a year in order to continue receiving payments. The HAO also rechecked income eligibility during this "annual" evaluation; eligibility might be affected, or the amount of an allowance might change, according to changes in a

---

<sup>1</sup>Although Rand's monitoring of the allowance program ended in 1979, the program itself is continuing under local control in the two sites until 1984.

recipient's income. A household that failed the annual evaluation was given a short time to move or to repair its dwelling to program standards before payments were stopped.

Failure on either evaluation was then a critical factor in determining whether households participated in the program; those who failed had to either overcome that obstacle or forgo the program's benefits. This report considers the way households responded to failure on the initial or the annual evaluation, and develops models of how various factors contributed to the chances of failing or to the mode of response (moving, repairing, leaving the program). Our ultimate objective is to determine who benefited from the program and why.

The analysis uses five years of HAO program data for Brown County and four years for St. Joseph County. Although the data cover all enrolled households and all housing evaluations, our sample is restricted to eligibles who enrolled and had a housing unit evaluated, and for whom the evaluation record was usable.<sup>2</sup> As Table 1 shows, the sample includes better than 18,500 initial evaluation records in the two sites combined, more than 8,500 of which were useful for determining the response to failure on an initial evaluation. The corresponding records for annual evaluations numbered 9,500 and 2,400, respectively.

Table 1

RECORDS USABLE FOR ANALYZING FAILURE RATES AND RESPONSE  
TO FAILURE: BROWN AND ST. JOSEPH COUNTIES

Type of Record	Number of Records, by Enrollee Tenure						Total Usable Records
	Brown County			St. Joseph County			
	Renter	Owner	Total	Renter	Owner	Total	
<i>Failure Rate Analysis</i>							
Initial evaluation	5,371	2,792	8,163	4,730	5,687	10,417	18,580
Annual evaluation	2,633	1,602	4,235	1,980	3,267	5,247	9,482
<i>Response-to-Failure Analysis</i>							
Initial evaluation	2,097	1,335	3,432	2,422	2,715	5,137	8,569
Annual evaluation	571	292	863	704	818	1,522	2,385

SOURCE: Tabulated by HASE staff from HAO records for Brown County through year 5 and for St. Joseph County through year 4.

NOTE: Entries reflect sample size reductions of 6.3 percent for Brown County and 12.5 percent for St. Joseph County. Most excluded records were incomplete; in almost all cases, enrollees terminated without ever receiving allowance payments.

Section II reports evaluation failure rates at enrollment and analyzes the factors affecting failure. Section III examines the aftermath of failing the initial evaluation: how households responded and what influenced their decision. Section IV summarizes the outcome of the annual evaluation and the factors affecting a household's response to failure on it. Section V first integrates the results to show how the various factors affected the chances both of an enrollee's ever receiving payments and of losing payments because his dwelling deteriorated; it concludes by discussing the policy implications of the findings.

<sup>2</sup>To be usable, a record had to be complete, and no variables necessary for modeling could have missing values. Records for determining the response to an evaluation failure had to have no missing values for required variables; in addition, the household's response (move, repair, terminate) had to have been recorded.

## II. INITIAL EVALUATION FAILURE

As explained in Sec. I, before an allowance program enrollee could begin receiving payments, the HAO housing evaluators inspected his dwelling to determine if it met program standards regarding health and safety hazards, essential facilities, occupancy, and lead-based paint. This section begins by reporting the rates at which enrollees' dwellings failed the initial evaluation. It then develops a model that analyzes the effects of various factors on the rate of failure.

### FAILURE RATES

Of all households in both sites that completed an initial evaluation, about half failed. The fact that the overall failure rate for St. Joseph County (55 percent) was higher than for Brown County (47 percent), as shown in Table 2, may reflect differences in housing quality between the two sites (Rydell, 1980, documents the generally poorer housing conditions in St. Joseph County). Although failure rates for homeowners were nearly the same in both sites, there was almost a 15 point discrepancy between renters' rates—in St. Joseph County they failed at an overall rate of 59 percent, compared with 45 percent in Brown County.

Table 2

INITIAL EVALUATION FAILURE RATES: BROWN AND  
ST. JOSEPH COUNTY ENROLLEES BY TENURE

Tenure Group	Failure Rate, by Type (%)		
	Overall	Occupancy	Condition
<i>Brown County</i>			
Renter	45	12	37
Owner	51	11	45
All enrollees	47	12	40
<i>St. Joseph County</i>			
Renter	59	15	52
Owner	52	8	46
All enrollees	55	11	49

SOURCE: Tabulated by HASE staff from HAO records for Brown County through year 5 and for St. Joseph County through year 4.

NOTE: "Overall" category includes failure on either or both housing standards.

The overall failure rate can be divided into failure on the HAO's occupancy standard (which matches the size of a dwelling with the size of the family living there) and on the condition standards (which have to do with the physical state of the dwelling).<sup>1</sup> In general, condition-standard failures were the more common. In St. Joseph County, however, renters failed more often because of occupancy defects—that is, crowding (15 percent)—than owners (8 percent), and more often for that reason than either renters or owners in Brown County (12 and 11 percent, respectively).

## FAILURE MODEL

Simply comparing failure rates for different household characteristics, such as race and life-cycle stage, would show higher rates for nonwhites than for whites and lower rates for the elderly than for the nonelderly (as reported in appendix Table C.1). Nonwhites, however, are more likely than whites to be renters; and the elderly are more likely than the nonelderly to be homeowners. Because of such interrelations, we used logistic regression (logit) analysis to examine the effect on failure rates of each household characteristic in turn, holding constant (or controlling for) all others.

The household characteristics of interest include tenure (renter or owner), race, size of household, type of household (according to life-cycle stage—elderly couple, elderly single person, single parent, nonelderly couple with children, nonelderly single person), and household income (measured by amount of allowance entitlement—the amount a household was eligible to receive after its dwelling passed an evaluation).<sup>2</sup> The model also includes the effects of program time (time since enrollment began)<sup>3</sup> and of the introduction of the lead-based paint standard.<sup>4</sup> All these factors—the independent variables in the model—are listed with their mean values in Table 3.

The dependent variable in the model is the housing evaluation outcome—pass (0) or fail (1). The model then relates the expected outcome, or probability of failure, to the independent variables. If  $Y$  is the outcome of an evaluation and  $X = (x_1, \dots, x_k)$  represents the independent variables, the logit model is of the form

$$E(Y | X) = Pr\{Y = 1 | X\} = \frac{1}{1 + e^{-(\alpha + X\beta)}}$$

where  $\alpha$  and  $\beta$  are unknown parameters to be estimated from the data ( $\beta$  is a vector of parameters). The coefficients give estimates of the change in the logarithm of the probability of failure due to the effect of one independent variable, controlling for all others. The exponential of each coefficient then directly measures that variable's contribution to changes in the probability of failure.

<sup>1</sup>Refer to Appendix A for details.

<sup>2</sup>The allowance amount is inversely related to household income. It is used here rather than directly measured income for consistency with other HASE reports; in the analysis in Sec. III, it appears as a measure of participation benefits.

<sup>3</sup>Mulford et al. (forthcoming) suggest that failure rates could change as different parts of the housing stock were evaluated, or as the same housing was evaluated for new enrollees.

<sup>4</sup>The paint standard (last item in Appendix A) assumed that any cracking, scaling, chipping, peeling, or loose paint on surfaces readily accessible to children under seven posed a hazard to them because of the paint's lead content, although the HAO did not actually test the paint for lead. The standard went into effect in January 1977; it would therefore be expected to have an effect on evaluation failure rates after that date.



Table 3

MEAN VALUES OF FACTORS AFFECTING INITIAL EVALUATION FAILURE:  
BROWN AND ST. JOSEPH COUNTIES

Factor	Unit of Measurement	Mean Value	
		Brown County	St. Joseph County
<i>Household Characteristics</i>			
Tenure	1 = owner, 0 = renter	.34	.55
Race of head	1 = white, 0 = other	.96	.75
Size of household	Persons	2.57	2.49
Type of household: <sup>a</sup>			
Elderly couple	1 = yes, 0 = no	.07	.10
Elderly single person	1 = yes, 0 = no	.19	.26
Single parent	1 = yes, 0 = no	.29	.30
Nonelderly couple with children	1 = yes, 0 = no	.24	.17
Allowance entitlement	\$000/year	.851	.857
<i>Program Time</i>			
Date of enrollment	Yr + (days/365)	76.50	76.77
Enrolled during first year	1 = yes, 0 = no	(b)	.30
After paint standard in effect	1 = yes, 0 = no	.35	.40

SOURCE: Tabulated by HASE staff from HAO records for Brown County through year 5 and for St. Joseph County through year 4.

<sup>a</sup>Residual category is nonelderly single persons.

<sup>b</sup>Variable not significantly related to failure rate for Brown County and therefore deleted from that analysis.

## RESULTS

Table 4 presents the differences in the probability of failing an initial evaluation—both overall and separately for the two housing standards—for given differences in each independent variable ("factor affecting failure"); the underlying logit results are given in Appendix C. Generally, the elderly and whites failed less often than other households, and large households failed more often than smaller ones. In Brown County, for example, whites were 14 percentage points less likely to fail than nonwhites, and a household of four was 9 points more likely to fail than a two-person household. The results for St. Joseph County were similar, although the effect of race was smaller. The effect of allowance entitlement (income) was smaller than that of either age, race, or family size, but it showed that poorer families failed more often.

The small effect of tenure in St. Joseph County seems contrary to the earlier finding (Table 2) that failure rates for renters there were the highest of all groups. However, because those renter households were more likely to be nonwhite and to consist of large families, controlling for race and household size left only a small effect for tenure.

The sites show a notable difference in the effect of program time. The failure rate in both counties was higher the first program year than subsequently, but whereas the annual decline in the Brown County rate was only about 2 percentage points, after the first year in St. Joseph County the rate declined almost 7 percentage points a year. The other time variable, a dummy for enrollment during the first program year, takes the value 1 for the first year and the value zero for all others; because it did not improve the description of program time effects for Brown County, it was not included in that analysis.

The paint standard variable is also a dummy, taking the value 1 for households who entered the program after the paint standard went into effect (January 1977) and zero for those entering before then. As Table 4 shows, there was almost a 10 percentage point overall increase in failure rates for St. Joseph County following institution of the paint standard.

The effects on the components of dwelling failure are very similar in both sites. We expected large households to fail the occupancy standard more than smaller households simply because the larger dwellings they require are harder to find; and the regressions on occupancy failure confirmed that expectation. We found, however, that larger households were more likely to fail the condition standards than smaller ones. In St. Joseph County, for example, condition failure was about 7 points higher for a four-person than for a two-person household. Race also had a noticeable effect on the components of dwelling failure; nonwhite families were almost 10 points more likely to fail because of condition defects than were whites.

Both component failure rates declined over time. In Brown County, the change was regular. In St. Joseph County, there was an increase in condition failures coinciding with the institution of the paint standard, but that rate generally declined with time.

To summarize, we find that nonwhite families and larger households had higher failure rates on the initial evaluation than other groups, all other factors being equal; and that the elderly failed less often. While poorer households failed more often than others, the effect of allowance entitlement was small. In Sec. III, we consider what happened to households that failed the initial evaluation and what influenced their response.

Table 4

## FACTORS AFFECTING INITIAL EVALUATION FAILURE RATES: BROWN AND ST. JOSEPH COUNTIES

Factor Affecting Failure	Values Compared	Percentage Change in Failure Rate, by Type					
		Brown County			St. Joseph County		
		Overall	Occupancy	Condition	Overall	Occupancy	Condition
<i>Household Characteristics</i>							
Tenure	Renter to owner	3.9*	-6.5*	7.0*	-2.5*	-5.5*	-.4
Race of head	Nonwhite to white	-13.6*	-8.9*	-13.2*	-7.2*	-2.2*	-9.5*
Size of household	2 to 4 persons	9.2*	13.6*	7.3*	9.2*	17.0*	6.7*
Type of household:							
Elderly couple	No to yes	-3.1	-3.6*	-1.6	-7.0*	2.8	-5.6*
Elderly single person	No to yes	-3.6*	0	-1.0	1.0	-4.3	-.2
Single parent	No to yes	2.4	-3.9*	7.4*	4.7*	-3.6*	7.8*
Nonelderly couple							
with children	No to yes	7.9*	7.4*	6.5*	-1.4	1.9*	2.9
Allowance entitlement <sup>a</sup>	Small to large <sup>b</sup>	1.6*	.1	1.8*	2.3*	1.6*	2.1*
<i>Program Time</i>							
Date of enrollment	Jan 76 to Jan 77	-2.3*	-1.5*	-1.3	-6.7*	-1.0	-5.8*
Enrolled during first year	No to yes	(c)	(c)	(c)	-5.6*	-.6	-4.9*
Paint standard in effect	Before to after	4.8*	-.1	6.8*	9.5*	.9	11.2*

SOURCE: Computed from coefficients reported in appendix Tables C.2, C.3, and C.4.

NOTE: Entries give percentage point change in each type of failure rate for indicated change in each factor's value, all others set at mean values. "Overall" category includes failure on either or both housing standards.

<sup>a</sup> Measure of household income; see accompanying text.

<sup>b</sup> Changes bound interquartile range; see appendix Table C.9 for specific values.

<sup>c</sup> Variable not significantly related to failure rate for Brown County and therefore deleted from that analysis.

\* Variable statistically significant at 95 percent confidence level or better.

### III. RESPONSE TO INITIAL EVALUATION FAILURE

Households who passed the initial evaluation could immediately begin receiving allowance payments; those who failed had to either move or repair before they could become recipients. In this section, we consider how households responded to failing the initial evaluation and what factors affected their response. Our analysis is based on a decision model that treats renters and owners separately but that compares the effects of the same set of variables.

#### RESPONSE RATES

After failing an initial evaluation, fully 80 percent of the enrollees chose to remain in the program by either repairing their dwellings or moving to other acceptable ones (see Table 5). Both renters and owners tended to repair rather than move, but in different proportions. In Brown County, more than 20 percent of the renters moved and about 60 percent repaired, whereas only 3 percent of the owners moved but 78 percent repaired; about a fifth of each group terminated. The results are similar for St. Joseph County, except that renters there had a higher termination rate; they were also the group with the highest evaluation failure rate.

Table 5

RESPONSE TO INITIAL EVALUATION FAILURE: BROWN AND  
ST. JOSEPH COUNTY ENROLLEES BY TENURE

Tenure Group	Percent Responding as Indicated			
	Move	Repair	Terminate	Total
<i>Brown County</i>				
Renter	21	59	20	100
Owner	3	78	19	100
All enrollees	14	66	19	100
<i>St. Joseph County</i>				
Renter	17	56	27	100
Owner	2	78	20	100
All enrollees	9	68	23	100

SOURCE: Tabulated by HASE staff from HAO records for Brown County through year 5 and for St. Joseph County through year 4.

## DECISION MODEL

The differences between the responses of renters and owners to initial evaluation failure led us to use a different analytic method for each group. Renters exercised all three options—move, repair, and terminate. Of the two methods available for modeling their decision, we chose discriminant analysis—which entails estimating linear combinations of independent variables, called *discriminant functions*.<sup>1</sup> The coefficients in the functions are chosen to maximize the separation of the groups (that is, the categories of the dependent variable—in this case, the three possible responses to failure).<sup>2</sup>

The choice exercised by owners was largely between repairing and terminating; as noted, they rarely moved in response to dwelling failure. Because of the extremely low likelihood of the last choice—which caused discriminant analysis to produce statistically significant coefficients for insignificant variables—we reduced the dependent variable to just two categories (move or repair, and terminate) and applied the logit method (see Sec. II).

The independent variables for both the discriminant and the logit models are listed with their mean or median values in Table 6. We divide them into three general categories: benefits to households from participating in the allowance program, costs to households of participating, and control variables. The following paragraphs describe the benefit and cost variables. The control variables consist, with three exceptions,<sup>3</sup> of the household characteristic and program time variables whose effect on initial evaluation failure was analyzed in Sec. II (refer back to Tables 3 and 4 and the accompanying text).

### Participation Benefits

The first measure of participation benefits is the amount of the allowance entitlement, in thousands of dollars per year; poorer households were entitled to larger amounts. The second is the expected duration of a household's eligibility for the program, measured by the logarithm of the expected number of years of eligibility.<sup>4</sup> Having no direct measure of a household's expectations regarding its continued eligibility, we derived an estimate based on previous occupations and amounts and sources of income, as reported in the annual HASE household surveys (described in Helbers, 1979, and Mulford, 1979); Appendix B gives details of the estimation procedure.

### Cost of Repairs

The first of the variables measuring costs of participating in the program is cost of required repairs. Higher values should lower the likelihood of a household's repairing its dwell-

<sup>1</sup>The other method is that of polytomous logit; evidence is that the two methods yield essentially the same results. Halperin, Blackwelder, and Verter (1971), for example, fit logit and discriminant models to data sets that included both continuous and discrete variables, finding only negligible differences in parameter estimates, standard errors, and *t*-statistics. Extensive sensitivity tests conducted at Rand by Gus Haggstrom generally confirm those findings. Since discriminant analysis is cheaper, it was used.

<sup>2</sup>Discriminant functions can be analyzed directly; they can also be used to estimate the probabilities of membership in each group. In the second application, the difference between the values of the discriminant functions of two groups equals the natural logarithm of the odds that an individual is from one group rather than the other.

<sup>3</sup>As follows: (a) amount of allowance entitlement, which is treated in the decision model as a measure of participation benefits rather than a household characteristic (income) as in the failure model; (b) tenure, since renters and owners are analyzed separately in the decision model; (c) whether the paint standard was in effect, which is dropped entirely for the decision model.

<sup>4</sup>Using the logarithm for an asymmetric variable such as this improves the performance of discriminant analysis.

Table 6

MEAN OR MEDIAN VALUES OF FACTORS AFFECTING RESPONSE TO INITIAL EVALUATION FAILURE:  
BROWN AND ST. JOSEPH COUNTY ENROLLEES BY TENURE

Factor Affecting Response	Unit of Measurement	Mean or Median Value			
		Brown County		St. Joseph County	
		Renter	Owner	Renter	Owner
<i>Participation Benefits</i>					
Allowance entitlement	\$000/yr	.923	.807	1.062	.747
Duration of eligibility	In yrs	.67	.52	1.47	1.76
<i>Cost of Repairs<sup>a</sup></i>					
Cost of required repairs <sup>b</sup>	\$	28.73 <sup>c</sup>	26.70 <sup>c</sup>	49.22 <sup>c</sup>	40.05 <sup>c</sup>
Number of defects	Integer	1.66	1.65	2.10	1.73
Type of defect:					
Occupancy	1 = yes, 0 = no	.26	.22	.25	.15
Paint <sup>d</sup>	1 = yes, 0 = no	.15	.06	.17	.08
Stairway or porch	1 = yes, 0 = no	.48	.69	.52	.62
Plumbing or wiring	1 = yes, 0 = no	.17	.16	.15	.12
Other condition items	1 = yes, 0 = no	.40	.29	.50	.38
Other defects <sup>e</sup>	1 = yes, 0 = no	.15	.11	.23	.19
<i>Cost of Moving</i>					
Duration of residency <sup>f</sup>	Yrs or $\sqrt{\text{yrs}}$	2.51 <sup>c</sup>	3.20 <sup>c</sup>	2.56 <sup>c</sup>	3.64 <sup>c</sup>
Rent discount	1 = yes, 0 = no	.08	(g)	.07	(g)
<i>Control Over Repairs<sup>h</sup></i>					
Single-family house	1 = yes, 0 = no	.26	.85	.52	.93
Duplex	1 = yes, 0 = no	.06	.01	.04	.01
Row house	1 = yes, 0 = no	.01	(g)	.02	(g)
<i>Household Characteristics</i>					
Race of head	1 = white, 0 = other	.93	.98	.63	.77
Size of household	Persons	2.80	3.38	2.90	2.67
Type of household: <sup>i</sup>					
Elderly couple	1 = yes, 0 = no	.02	.12	.02	.14
Elderly single person	1 = yes, 0 = no	.10	.23	.11	.33
Single parent	1 = yes, 0 = no	.36	.21	.49	.22
Nonelderly couple with children	1 = yes, 0 = no	.31	.36	.21	.19
<i>Program Time</i>					
Date of enrollment	Yr + (days/365)	76.35	75.99	76.59	76.54
Enrolled during first year	1 = yes, 0 = no	(j)	(j)	.34	.34

Table 6 (continued)

SOURCE: Tabulated by HASE staff from HAO records for Brown County through year 5 and for St. Joseph County through year 4.

<sup>a</sup>Repairs may also benefit a dwelling's occupants; see accompanying text.

<sup>b</sup>Estimated dollar cost of repairing all except occupancy defects.

<sup>c</sup>Median value for highly skewed distribution.

<sup>d</sup>Entries based on full sample, including households enrolling before paint standard was implemented. For initial evaluations conducted after 1 January 1977, when standard became effective, mean failure rates are 0.32, 0.44, 0.22 and 0.46.

<sup>e</sup>Principally, missing or inoperable kitchen or bathroom facilities.

<sup>f</sup>For renters, number of years; for owners, square root of number of years.

<sup>g</sup>Not applicable.

<sup>h</sup>Residual category for renters is multiple dwellings; for owners, it also includes row houses.

<sup>i</sup>Residual category is nonelderly single persons.

<sup>j</sup>Variable not significantly related to failure rate in Brown County and therefore deleted from that analysis.

ing and correspondingly increase the likelihood of its moving or terminating from the program. Since we had direct costs only for households that actually repaired their dwellings, but needed a value over all households to measure the effect on the choice of repairing as against the other options, we used estimates reported elsewhere (McDowell, 1979, 1980) and constructed the variable as described in Appendix B.<sup>5</sup> The next variable—number of defects—should also affect a household's willingness to undertake repairs, even after controlling for cost: a large number would be associated with a lower probability of repairing, either because of the high "nuisance value" or simply because of the difficulty of repairing multiple defects.

Repair costs due to dwelling defects relate to the occupancy, lead-based paint, and condition standards. Failing on the occupancy standard could entail a wide variety of repairs, from a major remodel (to remedy insufficient rooms) to simply fixing a window. Because the attendant repair costs range from overwhelming to trivial, average cost is not a good estimate of actual cost; we therefore exclude occupancy-standard repairs from the variable for cost of required repairs.

Failure on the lead-based paint standard is represented by a dummy variable (the cost of

<sup>5</sup>The estimates exclude costs of repairs related to failure on the occupancy standard; see below.

repairing paint defects is included in the cost-of-required-repair variable). The paint standard would be particularly difficult for renters in multiple-unit buildings to meet if their dwelling failed because of defects in another unit or on an exterior building.

The model includes four indicator variables for condition defects: hazardous interior or exterior stairways or porches (including absence of railings where required), hazardous plumbing or electrical systems (including water heaters), other condition items (excluding paint defects), and other defects (including missing or inoperable kitchen or bathroom facilities). These variables may be taken as dual measures of both costs and benefits. That is, the likelihood of an enrollee's making the effort to remedy condition defects seems related to the value he places on the items as against the cost of acquiring, repairing, or replacing them.

### **Cost of Moving**

The cost-of-moving variables assume that households who have lived in their current residence a long time and renters who pay below-market rent (that is, receive a rent discount) will encounter greater moving costs than other households and will hence be less likely to move after failing a housing evaluation. Length of stay (years in current residence) is measured directly for renters; for owners, we use the square root of length of stay.<sup>6</sup>

One set of measures that might be expected to affect the cost of moving—those that rate neighborhood characteristics, including access to facilities and services and overall quality—is not included in either the discriminant or the logit model (neighborhoods are defined for program purposes in Bala, 1979, and Ellickson, 1980). Conceivably, enrollees living in more attractive areas might prove less likely to move out of them than those in less desirable areas. In actuality, however, nearly all moves during the experiment left the movers still in their original neighborhoods; neighborhood characteristics therefore do not affect the response to dwelling failure.

### **Control Over Repairs**

Variables related to building type are included as indicators of a household's control over the possibility of making repairs; some repairs may be more difficult to carry out in a multiple-unit dwelling (just as some paint defects are harder to remedy in those circumstances). The categories include single-family residence, duplex, and row house, with multiple-unit buildings as the residual.

## **RESULTS**

Tables 7, 8, and 9 present the results of our analysis of how the factors presented in Table 6 affect the different responses to failing the initial housing evaluation. Table 7 gives the benefit and cost results for Brown County; Table 8, for St. Joseph County. Table 9 considers other factors.

<sup>6</sup>Length of stay is generally much longer for owners than for renters, and the distribution is much more skewed. The square root serves the same purpose for this variable as the logarithm did for expected duration of eligibility (see above).



Table 7

**BENEFITS AND COSTS AFFECTING RESPONSE TO INITIAL EVALUATION FAILURE:  
BROWN COUNTY ENROLLEES BY TENURE**

Factor Affecting Response		Change in Percent Responding as Indicated				
		Renter			Owner	
Benefit or Cost Measure	Values Compared	Move	Repair	Terminate	Move or Repair	Terminate
<i>Participation Benefits</i>						
Allowance entitlement	Small to large	.4*	10.6*	-11.0*	9.2*	-9.2*
Duration of eligibility (ln)	Small to large	1.6	-.6	-1.0	.2	-.2
<i>Cost of Repairs<sup>a</sup></i>						
Cost of required repairs <sup>b</sup>	Small to large	.6	-1.1	.5	-.9	.9
Number of defects	Small to large	3.5	-6.8	3.3	-11.4*	11.4*
Type of defect:						
Occupancy	Pass to fail	31.3*	-41.7*	10.4*	-22.8*	22.8*
Paint	Pass to fail	7.3*	-15.9*	8.1*	-10.2*	10.2*
Stairway or porch	Pass to fail	-2.1	1.0	1.1	7.8*	-7.8*
Plumbing or wiring	Pass to fail	-2.1	1.4	-1.8	2.7	-2.7
Other condition items	Pass to fail	.4	4.8	-4.4	1.4	-1.4
Other defects <sup>c</sup>	Pass to fail	6.9*	-19.8*	12.9*	-8.8*	8.8*
<i>Cost of Moving</i>						
Duration of residency <sup>d</sup>	Small to large	-.5	.5	0	-3.1*	3.1*
Rent discount	No to yes	-2.7	4.6	-2.0	(f)	(f)
<i>Control Over Repairs<sup>e</sup></i>						
Single-family house	No to yes	-3.9	5.0	-1.1	3.5	-3.5
Duplex	No to yes	-4.0	7.4	-3.4	-1.4	1.4
Row house	No to yes	10.7	-1.6	-9.2	(f)	(f)

SOURCE: Computed from coefficients reported in appendix Table C.5 for renters and C.7 for owners.

NOTE: Entries give percentage point change in each type of response for indicated change in each factor's value, all others set at mean or median values. "Small to large" changes span interquartile range of values for relevant sample; see appendix Table C.9 for specific values. Because response options are exhaustive, row entries for each tenure group sum to zero.

<sup>a</sup>Repairs may also benefit a dwelling's occupants; see accompanying text.

<sup>b</sup>Estimated dollar cost of repairing all except occupancy defects.

<sup>c</sup>Principally, missing or inoperable kitchen or bathroom facilities.

<sup>d</sup>For renters, number of years; for owners, square root of number of years.

<sup>e</sup>Residual category for renters is multiple dwellings; for owners, it also includes row houses.

<sup>f</sup>Not applicable.

\*Variable statistically significant at 95 percent confidence level or better.

Table 8

**BENEFITS AND COSTS AFFECTING RESPONSE TO INITIAL EVALUATION FAILURE:  
ST. JOSEPH COUNTY ENROLLEES BY TENURE**

Factor Affecting Response		Change in Percent Responding as Indicated				
		Renter			Owner	
Benefit or Cost Measure	Values Compared	Move	Repair	Terminate	Move or Repair	Terminate
<i>Participation Benefits</i>						
Allowance entitlement	Small to large	1.9*	11.4*	-13.3*	7.6*	-7.6*
Duration of eligibility (ln)	Small to large	1.0*	2.0*	-3.0*	1.0	-1.0
<i>Cost of Repairs<sup>a</sup></i>						
Cost of required repairs <sup>b</sup>	Small to large	.6*	-4.2*	3.6*	-1.4*	1.4*
Number of defects	Small to large	2.0	1.5	-3.5	-5.3*	5.3*
Type of defect:						
Occupancy	Pass to fail	14.6*	-29.5*	14.9*	-21.9*	21.9*
Paint	Pass to fail	-3.1*	-20.8*	23.9*	-9.0*	9.0*
Stairway or porch	Pass to fail	-6*	-4.6*	5.2*	.4*	-.4*
Plumbing or wiring	Pass to fail	.2	1.9	-2.1	-.2	.2
Other condition items	Pass to fail	4.3*	-5.8*	1.5*	-1.5	1.5
Other defects <sup>c</sup>	Pass to fail	1.0*	-13.1*	12.1*	-7.6*	7.6*
<i>Cost of Moving</i>						
Duration of residency <sup>d</sup>	Small to large	-.1	.3	.2	-2.7*	2.7*
Rent discount	No to yes	-1.1	-1.6	2.7	(f)	(f)
<i>Control Over Repairs<sup>e</sup></i>						
Single-family house	No to yes	-5.3*	6.9*	-1.6*	-.7	.7
Duplex	No to yes	-4.5	9.6	-5.2	-3.0	3.0
Row house	No to yes	.1*	9.8*	-9.9*	(f)	(f)

SOURCE: Computed from coefficients reported in appendix Table C.6 for renters and C.8 for owners.

NOTE: Entries give percentage point change in each type of response for indicated change in each factor's value, all others set at mean or median values. "Small to large" changes span interquartile range of values for relevant sample; see appendix Table C.9 for specific values. Because response options are exhaustive, row entries for each tenure group sum to zero.

<sup>a</sup>Repairs may also benefit a dwelling's occupants; see accompanying text.

<sup>b</sup>Estimated dollar cost of repairing all except occupancy defects.

<sup>c</sup>Principally, missing or inoperable kitchen or bathroom facilities.

<sup>d</sup>For renters, number of years; for owners, square root of number of years.

<sup>e</sup>Residual category for renters is multiple dwellings; for owners, it also includes row houses.

<sup>f</sup>Not applicable.

\*Variable statistically significant at 95 percent confidence level or better.

Table 9

OTHER FACTORS AFFECTING RESPONSE TO INITIAL EVALUATION FAILURE: BROWN  
AND ST. JOSEPH COUNTY ENROLLEES BY TENURE

Factor Affecting Response	Values Compared	Change in Percent Responding as Indicated				
		Renter			Owner	
		Move	Repair	Terminate	Move or Repair	Terminate
<i>Brown County</i>						
Race of head	Nonwhite to white	-2.0	7.1	-5.0	18.1*	-18.1*
Size of household	2 to 4 persons	-6.9*	2.2*	4.7*	-2.2	2.2
Type of household: <sup>a</sup>						
Elderly couple	No to yes	-4.5	8.6	-4.1	-.3	.3
Elderly single person	No to yes	-7.7*	13.8*	-6.0*	.4	-.4
Single parent	No to yes	4.3	-.8	-3.5	6.0	-6.0
Nonelderly couple with children	No to yes	4.2	-2.8	-1.4	-3.3	3.3
Date of enrollment	Jul 75 to Jul 77	-6.6*	4.1*	2.5*	-1.5	1.5
<i>St. Joseph County</i>						
Race of head	Nonwhite to white	-.9	1.3	-.4	.1	-.1
Size of household	2 to 4 persons	-3.6*	0*	3.6*	-2.5*	2.5*
Type of household: <sup>a</sup>						
Elderly couple	No to yes	4.5	2.4	-6.9	10.9*	-10.9*
Elderly single person	No to yes	-7.3*	16.1*	-8.8*	8.3*	-8.3*
Single parent	No to yes	5.8*	-.2*	-5.6*	-1.7	1.7
Nonelderly couple with children	No to yes	3.5	-7.1	3.7	-7.1*	7.1*
Date of enrollment	Jan 76 to Jan 77	-2.9	4.0	-1.1	2.2	-2.1
Enrolled during first year <sup>b</sup>	No to yes	8.8*	-8.9*	.1*	4.3	-4.3

SOURCE: Computed from coefficients reported in appendix Tables C.5 and C.6 for renters, C.7 and C.8 for owners.

NOTE: Entries give percentage point change in each type of response for indicated change in each factor's value, all others set at mean or median values. Because response options are exhaustive, row entries for each tenure group sum to zero.

<sup>a</sup>Residual category is nonelderly single persons.

<sup>b</sup>Variable not significantly related to failure rate for Brown County and therefore deleted from that analysis.

\*Variable statistically significant at 95 percent confidence level or better.

## Participation Benefits

Together, the first two tables show that higher program benefits correspond to a greater likelihood of a household's moving or repairing its dwelling and thereby remaining in the program. For example, the probability that a renter household with a larger allowance entitlement would terminate from the program was about 12 percentage points less than for a renter household with a smaller entitlement. The probability that the former would stay in the program by repairing its dwelling was around 11 percentage points higher than for the latter; and the likelihood of its staying in the program by moving to an acceptable dwelling was at most 2 points higher. The results for owners show almost as important an effect; those with the higher allowance entitlement had over a 9 point lower termination rate than other owners in Brown County, with a slightly smaller effect in St. Joseph County. In all cases, the effect was statistically significant.

For longer as against shorter expected durations of program eligibility, we found that renters in the first category had about a 2 point lower likelihood of terminating. The likelihood that renters with short expected eligibilities would repair was less than 1 point lower in Brown County and about 2 points higher in St. Joseph County; the likelihood that they would move was around 1 point higher in both sites. Owners with longer expected eligibilities also showed slightly lower termination rates; the effect was statistically significant only for St. Joseph County renters.

## Cost of Repairs

The effect of estimated repair costs operated in the expected direction; namely, higher costs were associated with fewer repairs and with a greater likelihood of terminating. However, the size of the effect was quite small, which may partly reflect the narrow range of costs (recall that the cost of repairing occupancy defects is excluded); and the effect was statistically significant only for St. Joseph County.

After estimated repair costs were controlled for, the actual number of defects had a significant effect only for owners. The probability that an owner whose dwelling had more defects would terminate was about 5 percentage points higher in St. Joseph County than for an owner whose dwelling had fewer, and over 11 points higher in Brown County.

Failing because of occupancy or paint defects had the largest effect on both renters' and owners' responses. Renter households who failed on the occupancy standard had a significantly lower probability of repairing after dwelling failure (42 points less in Brown County, 30 points less in St. Joseph County). For owners, there was a 22 point higher termination rate for those who failed than for those who passed. Renters in Brown County showed a higher propensity to move or repair rather than terminate in response to occupancy failure; in St. Joseph County, the proportions of those moving and terminating were about equal.

Renter households who failed the paint standard had a repair probability that was almost 16 percentage points lower in Brown County and over 20 points lower in St. Joseph County than for those who passed. Many more of those (by 24 percentage points) who failed the paint standard terminated in St. Joseph County; for owners in both counties, the difference in termination rates between passing and failing was about 10 points, perhaps reflecting a greater ease of repairing such defects, at least for owners in St. Joseph County. In Brown County, the options of moving and terminating were chosen about equally (as was the case

with occupancy-standard failures in St. Joseph County). The differences may be due to the housing-stock differences between sites noted earlier.

Because the effects of the occupancy and paint standards far exceeded the effects of the estimated cost of repairs, we varied both of the former factors at once to analyze their combined effect (considering St. Joseph County only). For renters, the combined effect on termination rates was even larger than the sum of the two separate effects, though the effect on repair rates was somewhat less than the summed result. Renters failing both standards had termination rates 40 percentage points higher than those who passed both; repair rates showed almost a 47 point lower rate for those failing both standards.

Failures due to deficient stairways, porches, plumbing, or wiring had very little effect on either renters' or owners' responses, although Brown County owners whose dwellings had such defects showed both a larger effect than their St. Joseph County counterparts and a greater propensity to move or repair rather than terminate. Other condition items had a small effect, which was significant only for St. Joseph County renters.

Defects in the "other" category most affected the likelihood of repairing. Renters in Brown County who failed because of such defects had almost a 20 percentage point lower probability of repairing than those who did not fail for those reasons; in St. Joseph County, the probability was 13 points lower. Owners who failed had about an 8 point greater likelihood of terminating. Those results suggest that enrollees do not view adequate kitchen or bathroom facilities as important benefits of participating in the program relative to the cost of repairing or acquiring them.

### **Cost of Moving**

As already noted, very few owners moved in response to dwelling failure, attesting the importance of tenure to the probability of moving and accounting for the separate analyses we carried out for each tenure group. Measures of the costs of moving therefore exclude the most important variable affecting those costs. Included are the amount of time a household had resided in its current dwelling and, in the case of renters, whether they enjoyed a rent discount. Neither measure showed significant differences in the relative probabilities of moving, repairing, or terminating for renters. The length-of-stay variable was marginally significant for owners—the termination rates differed by about 3 percentage points for those with small as against large durations.

### **Control Over Repairs**

The variables for building type indicate the extent to which an enrollee could control whether required repairs were done. In Brown County, building type had no effect on the likelihood of a renter household's moving or repairing. In St. Joseph County, renters in single-family residences had a repair rate about 6 percentage points higher than those in multiple-unit buildings; those in row houses or duplexes had a rate almost 10 points higher, although the rate for duplexes was not statistically significant. In neither county was there a significant effect on homeowners' decisions. Although there are very few row houses compared with single-family residences in St. Joseph County, the results there support the notion that certain repairs are more difficult to carry out in multiple-unit buildings.

### Control Variables

Table 9 reports the results for other factors affecting the response to evaluation failure. In general, it shows that elderly households more often moved or repaired in response to failure than the nonelderly, and that larger households more often terminated than smaller ones, other factors being equal. There was a difference between sites, however. In Brown County, termination rates for elderly and nonelderly owners were virtually the same. In St. Joseph County, elderly owners were between 8 and 11 percentage points less likely to terminate from the program than were the nonelderly. After controlling for other factors, whites and nonwhites generally responded to dwelling failure in much the same way.

The variable for date of enrollment showed that renters had a growing likelihood to repair with longer time in the program. There was a slight increase in termination rates in Brown County over time, a slight decline in St. Joseph County. Neither that variable nor the indicator for enrollment during first year (St. Joseph County only) had any significant effect on owners' responses.

## IV. ANNUAL EVALUATION FAILURE

Households who became allowance recipients had to pass an annual housing evaluation to continue receiving payments; the procedure was the same as for the initial evaluation. Here, we analyze the rates at which households failed the first annual evaluation and their responses to that failure, comparing the results with those reported earlier for initial evaluations.

### RATE AND PROBABILITY OF FAILURE

We would expect households who underwent an annual evaluation to have lived in better housing than those who never reached that stage, simply because they had previously passed a housing evaluation—either because their dwelling met the program standards all along, because they had moved to better housing, or because they had improved the original dwelling. The outcome of the first annual evaluation bore out those expectations. Failure rates, both overall and on the occupancy and condition standards, were substantially lower than on initial evaluations. Whereas about half the initial evaluations were failed, only a third of the annual evaluations in St. Joseph County and less than a fourth in Brown County resulted in failure (see Table 10). Failure rates continued to be higher in St. Joseph County than in Brown County for both components of dwelling failure.

The group with the highest failure rate on initial evaluations—St. Joseph County renters—manifested the smallest decrease in failure between the initial and the annual evaluation, even though they had the highest termination rate following initial evaluation failure (refer to Table 5). That result once again points up the poorer housing conditions in St. Joseph County, especially for renters.

We modeled the effects of household characteristics on annual evaluation failure rates much the same as for initial evaluations; and the results were virtually the same: whites and the elderly failed less often than others, and larger households failed more often. (The logit analysis results are reported in appendix Table C.10.)

### RESPONSE TO FAILURE

Households who failed the first annual evaluation were much more likely to repair their dwellings and much less likely to terminate from the program than were those who failed the initial evaluation. Eighty percent in both sites repaired after failing the annual test (see Table 11), as against about 67 percent after failing the initial evaluation. Only 8 percent in Brown County and 14 percent in St. Joseph County terminated, whereas slightly over a fifth left the program after failing the initial evaluation. St. Joseph County renters were again the group least likely to repair and most likely to terminate.

Our model of how program benefits and costs, household characteristics, and other factors affected the response to annual evaluation failure is essentially the same as that for initial evaluations. The results are different, however, in that fewer of the variables significantly affected the response to failing the annual evaluation. Tables 12 and 13 summarize the statistically significant effects, first for renters, then for owners.

Table 10

**ANNUAL EVALUATION FAILURE RATES: BROWN AND  
ST. JOSEPH COUNTY ENROLLEES BY TENURE**

Tenure Group	Failure Rate, by Type (%)		
	Overall	Occupancy	Condition
<i>Brown County</i>			
Renter	24	3	22
Owner	19	2	17
All enrollees	23	3	20
<i>St. Joseph County</i>			
Renter	42	5	39
Owner	28	3	24
All enrollees	34	4	30

SOURCE: Tabulated by HASE staff from HAO records for Brown County through year 5 and for St. Joseph County through year 4.

NOTE: "Overall" category includes failure on either or both housing standards.

Table 11

**RESPONSE TO ANNUAL EVALUATION FAILURE: BROWN AND  
ST. JOSEPH COUNTY ENROLLEES BY TENURE**

Tenure Group	Percent Responding as Indicated			
	Move	Repair	Terminate	Total
<i>Brown County</i>				
Renter	17	76	7	100
Owner	3	89	8	100
All enrollees	12	80	8	100
<i>St. Joseph County</i>				
Renter	12	71	16	100
Owner	2	87	11	100
All enrollees	7	80	14	100

SOURCE: Tabulated by HASE staff from HAO records for Brown County through year 5 and for St. Joseph County through year 4.



Table 12

STATISTICALLY SIGNIFICANT FACTORS AFFECTING RENTERS' RESPONSE TO ANNUAL  
EVALUATION FAILURE

Factor Affecting Response	Values Compared	Change in Percent Responding as Indicated		
		Move	Repair	Terminate
<i>Brown County</i>				
Size of household	2 to 4 persons	-5.5	7.7	-2.2
Elderly single person	No to yes	-8.9	8.5	.4
Occupancy defect	Pass to fail	41.5	-48.5	7.0
Paint defect	Pass to fail	2.5	-14.1	11.7
<i>St. Joseph County</i>				
Occupancy defect	Pass to fail	10.9	-21.6	10.7
Paint defect	Pass to fail	2.9	-13.6	10.7
Stairway or porch defect	No to yes	-4.8	-5.0	9.8
Duplex	No to yes	-6.9	14.3	-7.4
Date of enrollment	Sept 75 to Sept 76	-7.1	1.8	5.3

SOURCE: Tabulated by HASE staff from HAO records for Brown County through year 5 and for St. Joseph County through year 4.

NOTE: Entries give percentage point change in each type of response for indicated change in each factor's value, all others set at mean or median values. Listed variables are statistically significant at 95 percent confidence level or better; complete model includes all variables given in Table 6.

Two factors had a significant effect on renters' response to annual evaluation failure: occupancy defects and paint defects. Renters in both sites who failed the paint standard were over 10 percentage points more likely to terminate than those who passed that standard. The same applies to the occupancy standard in St. Joseph County; in Brown County, renters who failed the occupancy standard were about 7 points more likely to terminate than those who passed. For St. Joseph County renters, the effect on termination rates of a failure because of defective stairways or porches was about the same as that of failing because of occupancy or paint defects.

The differences in repair rates between renters who passed or failed the occupancy or paint standards were even greater than the differences in termination rates, especially for occupancy. Renters in Brown County who failed on that basis were more than 48 points less likely to repair than those who passed; the corresponding difference in St. Joseph County was more than 20 points. Many renters who failed because of crowding remained in the program by moving to an acceptable dwelling, especially in Brown County.

Among household characteristics, the largest effect for renters was for elderly single

Table 13

**STATISTICALLY SIGNIFICANT FACTORS AFFECTING OWNERS' RESPONSE TO ANNUAL  
EVALUATION FAILURE**

Factor Affecting Response	Values Compared	Change in Percent Responding as Indicated	
		Move or Repair	Terminate
<i>Brown County</i>			
Size of household	2 to 4 persons	-4.9	4.9
Allowance entitlement	Small to large <sup>a</sup>	6.9	-6.9
Occupancy defect	Pass to fail	-19.3	19.3
Number of defects	1 to 3	-10.7	10.7
<i>St. Joseph County</i>			
Occupancy defect	Pass to fail	-20.5	20.5
Paint defect	Pass to fail	-6.9	6.9
Number of defects	1 to 3	-6.1	6.1
Duration of eligibility (ln)	Small to large <sup>b</sup>	4.6	-4.6

SOURCE: Tabulated by HASE staff from HAO records for Brown County through year 5 and for St. Joseph County through year 4.

NOTE: Entries give percentage point change in each type of response for indicated change in each factor's value, all others set at mean or median values. Listed variables are statistically significant at 95 percent confidence level or better; complete model includes all variables given in Table 6.

<sup>a</sup>Values bound interquartile range: \$429 to \$1075 per year.

<sup>b</sup>Values correspond to expected years of program eligibility: 0.77 (2.2 yrs) to 2.67 (14.4 yrs).

persons in Brown County. Although the termination rate for members of that group was about the same as for the other life-cycle groups, they were less likely to move and more likely to repair.

For owners, those who failed because of occupancy defects were 20 percentage points more likely to terminate than those who did not. Brown County owners whose dwellings had three condition defects were better than 10 points more likely to terminate after failure than those with one defect; the difference in the other site was about 6 percentage points. It is interesting that those measures still had important effects even after an annual evaluation; presumably, such defects would have been corrected in order to pass the initial evaluation. The paint standard was significant only for St. Joseph County owners; its effect was about the same as that for number of defects.

As for program benefit measures, the amount of the allowance entitlement was significant for Brown County owners; for St. Joseph County, the log of the expected term of eligibility was significant. Owners in the first site were about 7 percentage points more likely to move or repair if they had a larger entitlement. In St. Joseph County, those with longer expected eligibility were more likely to move or repair.

In summary, we find that many of the same factors that influenced the response to initial

evaluation failure also influenced the response to failure on the annual evaluation, although fewer factors were significant for the later evaluation. Proportionately fewer households terminated and proportionately more repaired after annual evaluation failure; in addition, the same benefit measures encouraged continued participation, although not as strongly after annual as after initial evaluations. The major obstacles to participation after any evaluation failure remained occupancy and paint defects.

## V. CONCLUSIONS

Households that enrolled in the experimental allowance program could not receive payments until their dwellings were certified by the HAOs as meeting program standards for spaciousness, domestic equipment, and conditions affecting health or safety. In Sec. II, we showed how various household characteristics contributed to the probability that an enrollee's dwelling would fail its initial evaluation. In Sec. III, we showed how both household and housing characteristics affected the probability that a failed dwelling would be repaired, that the occupant would move to an acceptable dwelling, or that he would drop out of the program without ever receiving payments. In Sec. IV, we showed how the same set of factors affected the probability of failing an annual evaluation and the responses to such a failure.

This section combines the findings of the others to show how household and housing characteristics affected the chances that an enrollee would ever receive payments, as well as the chances that a recipient would lose his payments because his dwelling became substandard. It then discusses the policy implications of our findings.

We remind the reader that our study does not deal with other circumstances that also determined who received allowances. Some eligible households were unaware of the program or of their eligibility for assistance; others chose not to enroll. We will report elsewhere on the enrollment decision and integrate our findings with those of the present report. We begin here with enrollees whose dwellings were evaluated<sup>1</sup> and follow them to reciprocity or termination from the program.

### SUMMARY: WHO FAILS INITIAL HOUSING EVALUATIONS?

Of all households who enrolled in the housing allowance program and had their initial enrollment dwelling evaluated, about half failed the evaluation. The failure rate was almost 10 percentage points higher in St. Joseph County than in Brown County, and was especially high among St. Joseph County renters.

Nonwhite families and larger households had higher failure rates than other groups, controlling for other factors. Nonwhite families and larger households were more often renters; the race and household-size factors accounted for the especially high failure rate among St. Joseph County renters (nearly all households in Brown County are white). Other factors being the same, the elderly failed less. Poorer households, who were entitled to larger allowances upon certification, failed more. The effect of allowance entitlement was, however, smaller than that of either race, age, or family size.

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<sup>1</sup>Statistics in this report are based on a sample (see Sec. I) that excludes enrollees who never completed an initial housing evaluation (either on their enrollment dwellings or on some dwelling to which they subsequently moved). The exclusions for that reason amounted to about 6 percent of all enrollees in Brown County and 12 percent in St. Joseph County (a few additional cases were excluded for other reasons). Those enrollees of course never received payments.

Although a few renters were unable to get their landlords to agree to housing evaluations, most additional exclusions were cases in which the enrollee decided after all not to participate. In terms of motivation, they are similar to cases in which an eligible household decided not to enroll.

## **SUMMARY: WHAT DETERMINES RESPONSE TO EVALUATION FAILURE?**

Among households who failed the initial evaluation, almost 80 percent eventually qualified for payments, either by repairing the dwelling that failed or by moving to another that met program standards. Nearly all homeowners who qualified for payments after failing an evaluation did so by repairing; owners rarely moved to receive allowance payments. Renters in single-family houses were less likely to move and more likely to repair than those in multiple dwellings.

Generally, we learned that larger expected benefits from the allowance program encouraged the occupants of failed dwellings to either repair them or move; and that more, or more severe, housing defects discouraged repairs and had a mixed effect on moving. The mixed effect presumably was because some violations of program standards, such as overcrowding, were also perceived by enrollees as hardships they would like to remedy; whereas others, such as lead-based paint hazards, did not much concern them. Finally, all other things being equal, the elderly and those in small households were more likely to repair or move than were their opposites.

## **INTEGRATION: WHO QUALIFIES FOR ALLOWANCE PAYMENTS?**

With a few exceptions, the factors that increased the probability of an enrollee's dwelling failing its initial evaluation also increased the probability that such an enrollee would drop out rather than repair his dwelling or move. However, because both probabilities were well below unity, the combined effects on the chances that an enrollee would never receive payments were relatively small. Table 14 summarizes our findings for the factors whose combined effects were largest.

Overall, more than 90 percent of our sample of Brown County enrollees and about 87 percent of our sample of St. Joseph County enrollees eventually qualified for payments;<sup>2</sup> the least successful group was renters in St. Joseph County. But within those groups, certain household and housing characteristics made substantial differences in the probability of receiving payments; they are noted by their listing in the table.

Other things being equal, enrollees with lower incomes—and hence larger allowance entitlements—were more likely than those with higher incomes (lower entitlements) to fail the initial evaluation, presumably because they were less able to afford decent housing. However, those with large entitlements were also more willing to repair or move after an evaluation failure, presumably because the rewards of participation were greater. The first row of Table 14 shows a positive net effect of allowance entitlement on reciprocity for both sites and both tenure groups.

Among the factors that measure costs of participating in the program, the two that most affected response to dwelling failure were the paint and occupancy standards. Enrollees who failed one of the standards were much less likely to repair and much more likely to terminate than those who passed them. In the worst case, the participation rate of St. Joseph County renters was 6.5 percentage points lower for those who failed the paint standard than for those who passed. Homeowners in both sites who failed the occupancy standard were 2 to 3 points

<sup>2</sup>The sample excludes some enrollees who were never paid. During the first five program years in each site, 86 percent of all enrollees in Brown County and 82 percent in St. Joseph County received at least one payment.

Table 14

MAIN FACTORS AFFECTING WHETHER ENROLLEES RECEIVED PAYMENTS:  
BROWN AND ST. JOSEPH COUNTIES, BY TENURE

Factor Affecting Failure or Response	Values Compared	Change in Percent of Enrollees Receiving Payments			
		Brown County		St. Joseph County	
		Renter	Owner	Renter	Owner
<i>Participation Benefits</i> Allowance entitlement	Small to large	4.7	3.9	7.4	3.6
<i>Housing Defects</i> Occupancy	Pass to fail	-1.2	-2.6	-2.2	-1.7
Paint	Pass to fail	-1.6	-1.7	-6.5	-1.0
<i>Household Characteristics</i> Race of head	Nonwhite to white	(a)	(a)	2.1	1.9
Size of household	2 to 4 persons	-4.2	-3.0	-4.8	-3.3
Type of household: <sup>b</sup> Elderly couple	No to yes	2.4	.5	5.7	6.7
Elderly single person	No to yes	3.3	.9	4.9	4.2
Single parent	No to yes	1.1	-.1	2.1	-1.9
All cases: recipients as percent of enrollees		91.0	90.3	84.1	89.6

SOURCE: Computed from entries in appendix Tables C.2 through C.8.

NOTE: Entries give percentage point change in probability of receiving payments for indicated change in each factor's value, all others set at mean or median values. "Small to large" changes span interquartile ranges of values for relevant sample; see appendix Table C.9 for specific values. Only main factors affecting either probability of dwelling failure or probability of termination given failure are included; entries compound those probabilities.

<sup>a</sup>Less than 0.05 absolute value.

<sup>b</sup>Compared with nonelderly single persons.

less likely to participate in the program than those who passed. Enrollees with higher estimated repair costs for the conditions causing dwelling failure were less likely to participate in the program; but the differences in termination rates relating to different repair costs were less than the differences between termination rates for those passing or failing the occupancy and paint standards.

After controlling for other factors, whites and nonwhites generally responded to dwelling failure in much the same way. That is, their move, repair, and termination rates after dwelling failure were about the same. But nonwhites participated a little less because their failure rates were higher. From Table 14, we see that nonwhite enrollees' participation rates in St. Joseph County were about 2 percentage points lower than white enrollees' rates.

Large households failed housing evaluations more often, other factors being the same. They also terminated from the program in response to dwelling failure more frequently than smaller households. The participation rates of larger households were 3 to 5 percentage points lower than for smaller households across site and tenure. Larger households failed

somewhat more than others on condition standards and much more than others on the occupancy standard, and they were less likely to become recipients than small households with corresponding failures.

The program served the elderly especially well. They tended to fail less often, and when they did fail they were more likely than other households to remain in the program by moving or repairing—usually by repairing. In St. Joseph County, the elderly had participation rates about 5 percentage points higher than the nonelderly.

### **INTEGRATION: HOW DO ANNUAL EVALUATIONS AFFECT PARTICIPATION?**

Failure rates were substantially lower on first annual evaluations than on initial evaluations; repair rates following failure were higher and termination rates were lower. Differences in failure rates on annual evaluations according to household characteristics, however, were the same as for initial evaluations. That is, the elderly failed less often; larger households and nonwhite families failed more often.

The major factors that affected response to annual evaluation dwelling failure generally paralleled those for initial evaluations; the number of important factors was, however, smaller. The occupancy and paint standard effects in particular carried over to annual evaluations. The effects of household characteristics on the response to annual evaluation failure were moderated; that is, the differences in response between different groups were much smaller than for initial evaluation failure. Differences between the participation rates of renters and owners were not greatly widened as a result of the annual as compared with the initial evaluation. The main obstacles to participation—the occupancy and paint standards—were reinforced by annual evaluation outcomes and responses.

### **POLICY IMPLICATIONS**

The housing allowance program was designed to achieve two objectives: to ease housing expense burdens for low-income households, and to improve the quality of their housing. For those who became recipients, the allowance fulfilled the first objective. The initial and annual housing evaluations fulfilled the second by ensuring that all recipients occupied decent, safe, and sanitary dwellings.

However, about 16 percent (note 2, p. 25) of those who were eligible and showed their desire for help by enrolling never qualified for payments. On the evidence of this study, those dropouts appear to have concluded that the cost or trouble of meeting the housing standards outweighed the value of the prospective allowance payments. The housing of most, but not all, needed improving. Many among them also spent more than a fourth of their adjusted gross income for housing, despite its substandard quality. For the dropouts, the program failed to meet its objectives.

Could the program be modified for future application to help dropouts without relinquishing its purposes? Three possible modifications might help: (a) increasing the benefits of participation, (b) relaxing housing standards that are particularly difficult to meet, and (c) providing special help to those who are otherwise unable or unwilling to acquire adequate housing.

The first option entails high costs. Our data indicate that increasing allowance benefits

by \$100 annually (by about 11 percent during the period covered by the data) would increase the reciprocity rate among enrollees by 1 percentage point. But the increased benefits could not easily be restricted to those who would otherwise drop out. In the experiment, raising all recipients' benefits by \$100 annually would have added nearly \$950,000 to program costs for year 5. Given an 84 percent average reciprocity rate without the extra benefits, the allowance cost of converting one dropout to a recipient would approach \$10,000 per new recipient year.<sup>3</sup>

The second option seems more promising. Although the housing standards adopted by the HAOs (see Appendix A) reflect a general consensus among public health officials as to minimum standards for space, domestic equipment, and health or safety hazards, the specific standards are necessarily arbitrary, and none is well supported by a scientific assessment of the risks to occupants. Relaxing a few particularly onerous standards might yield a net social benefit by inducing enrollees whose dwellings were defective in both these and other respects to remedy at least the other defects. Our analysis identifies the occupancy and paint standards as the requirements that are most likely to dissuade enrollees from becoming recipients. Eliminating both would raise the reciprocity rate by about 4 percentage points overall.

However, relaxing the housing standards would also affect those who under current rules managed to meet the standards. About 60 percent of those living in overcrowded dwellings when they enrolled remedied that defect by either moving to larger dwellings or converting uninhabitable rooms to habitable ones. About 63 percent of those who failed the paint standard subsequently repaired the paint defects; others moved to dwellings without such defects. Although many of those who were overcrowded would have used the allowance to pay for larger homes even without an occupancy standard, we judge that few would have voluntarily remedied paint defects.

The third option is providing special assistance for enrollees who seem otherwise unable or unwilling to acquire acceptable dwellings. The assistance could consist of technical advice and encouragement; or it could include cash grants or allowance advances to help with repairs or moves. Surveys conducted by the HAOs indicate that about 14 percent of the enrollees who never qualified for payments would have valued the HAO's technical help with dwelling repairs or moving arrangements (Kingsley, Nataraj-Kirby, and Rizer, forthcoming, Sec. VII). Eighteen percent said they needed front-end financial help with those undertakings in order to qualify for payments. Two-thirds, however, appear to have dropped out because of changed household circumstances or general dissatisfaction with the program; well over half made no apparent attempt to qualify for payments.

Analysis of the circumstances of dropouts suggests that technical assistance might have increased the reciprocity rate among enrollees in each site by as much as 5 percentage points. However, that figure is a generous upper bound. The HAOs in fact offered group counseling on repairs and moving, but so few enrollees attended that the sessions were eventually discontinued. The St. Joseph County HAO experimented with follow-up casework for enrollees who had not qualified for payments, but the casework did not seem to increase the reciprocity rate for such enrollees.

Front-end financial assistance has often been urged by both enrollees and others to help with initial repairs or moving expenses. The HAOs did offer allowance advances to cover the security deposits required by landlords and utility companies, and over three-fifths of the movers availed themselves of that convenience. No advances were offered for repairs; but in

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<sup>3</sup>For each 100 enrollees, 84 would become recipients without the extra payment. Increasing each allowance by \$100 would cost \$8,400 annually. To convert one dropout to a recipient would require the normal allowance payment (about \$887) plus the \$100 extra payment, or a total of \$9,400.



St. Joseph County, both local government and private foundations helped a number of homeowner enrollees who faced substantial repair bills. Home improvement loans were also available from lending institutions. Shanley and Hotchkiss (1979) conclude that repair advances of up to \$500 might have increased participation by as much as 9 percent in Brown County and 17 percent in St. Joseph County. However, those figures include a generous estimate for nonenrollees who would have been induced to enroll by the prospect of ready cash. Among those who did enroll, the authors conclude that repair advances would have increased reciprocity by less than 2 percent in Brown County and 5 percent in St. Joseph County.

Again, the main obstacle to helping those who enroll but seem unable to qualify for payments is the difficulty of restricting the offer of help. If repair grants or loans were available, most enrollees would probably use them. Grants for all would clearly be an exorbitant price to pay for a few additional recipients. Advances to be recovered from future allowance payments would be much less expensive but administratively cumbersome and hard to recover from those who enrolled merely to obtain instant cash.

We conclude that although increased benefits, technical assistance, and front-end financing are all program modifications that would yield measurably higher reciprocity rates, none would be clearly cost-effective in relation to program objectives, primarily because the changes would almost necessarily apply to all enrollees rather than the few needing extra help or encouragement. The same argument applies to relaxed housing standards, with the possible exception of the occupancy or paint standard. In any event, an 84 percent reciprocity rate among enrollees is a considerable accomplishment for a conditional transfer program, reflecting the essential soundness of the present incentive structure.

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## Appendix A

### ITEMS CHECKED DURING HAO HOUSING EVALUATIONS

Before an enrollee could begin receiving allowance payments, and periodically after payments began, his dwelling was inspected for conformance with program standards regarding health and safety hazards, essential facilities, occupancy (having sufficient space for the occupants), and presence of lead-based paint (after January 1977). This appendix lists the 38 items against which the HAO evaluators checked a dwelling and briefly describes the hazards, structural features, and equipment of concern.

#### Health and Safety Hazards

##### EXTERIOR PROPERTY AREA

1. Sanitation and Storage

Heavy accumulations of litter, trash, garbage, or other debris that may harbor insects, rodents, or other pests, that are combustible, that hamper emergency access, or that create a health or safety hazard.

2. Grading and Drainage

Presence of hazardous conditions including topographic features and lack of soil permeability that allow drainage or seepage into the building or create standing water that might damage the structure or its contents or create unsanitary conditions.

3. Trees and Plant Material

Presence of hazardous conditions including heavy overgrowth that blocks natural light from the structure and impedes normal access; noxious plants that endanger the health of the occupants; or vines or trees that threaten the building or endanger its occupants.

4. Accessory Structures and Fences

Presence of hazardous conditions including accessory structures and fences with severe structural defects that are located close enough to the main building or to areas of normal human activity on the lot so their collapse would endanger the occupants.

##### BUILDING EXTERIOR

5. Foundation

Presence of hazardous conditions including foundations that have severe structural defects or that are penetrable by water such that the structural safety of the building is threatened.

6. Walls and Exterior Surfaces (building exterior)

Presence of hazardous conditions relating to the walls and exterior surfaces of the building including severe leaning, buckling, or sagging; major holes or missing sections; or excessive cracking such that there is danger of structural collapse or of significant damage to the interior of the structure from the elements.

7. Roofs (chimneys, gutters, downspouts)

Presence of hazardous conditions on the roof, chimney, gutters, or downspouts of the building, including sagging or buckling, major holes, or missing sections such that there is danger of collapse or of significant damage to the interior of the structure from the elements.

8. Stairs, Porches, and Railings

Presence of hazardous conditions including severe structural defects, broken or missing steps, or the absence of a handrail for six or more consecutive steps or the absence of railings around a porch that is 4 feet or more above the ground.

9. Windows

Presence of hazardous conditions including missing or broken window panes and heavily damaged or rotted sashes such that there is severe weather damage to the interior of the unit, loss of heat, or threats to safety.

10. Doors and Hatchways

Presence of hazardous conditions including missing or broken doors such that there is severe weather damage to the interior of the unit, loss of heat, or threats to safety.

#### BUILDING AND UNIT INTERIOR

11. Exits

Presence of hazardous conditions including no exit from the unit and less than two safe exits from the building leading to open space outside.

12. Sanitation and Storage

Presence of hazardous conditions including significant accumulations of litter, trash, garbage, or other debris that may harbor insects, rodents, or other pests, that are combustible, or that hamper emergency entrance or exit. Also includes unsafe storage of flammable materials.

13. Walls

Presence of hazardous wall conditions (in the unit or in public spaces in the building) including severe buckling, major holes or missing sections, or evidence of persistent moisture, dry rot, or insect damage such that there is a potential for structural collapse or other safety threats.

14. Ceiling

Presence of hazardous conditions including severe buckling, sagging, major holes or missing sections, or evidence of persistent moisture, dry rot, or insect damage such that there is a potential for structural collapse or other safety threats.

**15. Floors**

Presence of hazardous floor conditions in the unit and in public spaces in the building including severe buckling, noticeable movement under stress of walking, major holes or missing sections, or evidence of persistent moisture, dry rot, or insect damage such that there is a potential for structural collapse or other threats to safety. Bathroom and kitchen floors must be of properly installed impervious materials so as to prevent water leakage that could damage the structural system or create other threats to safety.

**16. Stairs and Railings**

Presence of hazardous conditions in the stairs and railings in the unit and in public spaces in the building outside the unit including severe structural defects, broken or missing steps, absence of a railing around open steps, or absence of a handrail for six or more consecutive steps.

**17. Toilet and Bath Facilities**

Presence of hazardous conditions including severely damaged, broken, or cracked fixtures that endanger the users or that may result in leakage or flooding. Includes major leaks around toilet base.

**18. Kitchen Facilities**

Presence of hazardous conditions including severely damaged or broken stove, sink, or refrigerator that endangers the users or that may cause gas or water leakage, fire, or electrical shock.

**19. Water Heater**

Presence of hazardous conditions including absence of a hot water heater or inadequate hot water, gas leakage, or danger of flooding. Appliance may not be hooked up, not functional, or broken or damaged, making it inoperable; the vent pipe may be seriously cracked or broken, allowing unexpended gases to escape into the unit; there may be improper or no venting for exhaust gases; and a temperature pressure valve may be lacking. It may be tagged by utility company as unsafe; partial or complete replacement may be necessary.

**20. Plumbing System**

Presence of hazardous conditions relating to the plumbing system (in the unit or in public areas in the building) including the absence of such a system or any condition in which clean water and waste are not distributed effectively to and from all fixtures in the unit to a public system or other disposal mechanism; also, where there are major cracks or broken pipes, improperly sealed joints, or other deficiencies that cause leakage or threats to health and safety.

**21. Heating System**

Presence of hazardous conditions in the heating system (in the unit or elsewhere in the building) including absence of an acceptable primary source of heat or any breakage or damage to the source of heat, ducts, or fixtures, such that heat is nonexistent or not adequately distributed to the unit or that there is a potential for fire or other threats to safety. Hazards include a vent pipe that is seriously cracked or broken allowing unexpended gases to escape into the unit; portable electric room heaters that

serve as primary sources of heat; unvented room heaters that burn gas, oil, or other flammable liquids.

22. **Electrical System**

Presence of hazardous conditions in the electrical system (in the unit, in public areas of the building, or in the exterior property area) including absence of an electrical system or exposed, uninsulated, or frayed wires; improper connections, insulation, or grounding of any component of the system; overloading of capacity such that there is the immediate hazard of electrocution or fire; or wires lying in or located near standing water or other unsafe places (includes electrical cables and equipment outside the building as well as all components of the electrical system within the unit).

### **Essential Facilities**

#### **KITCHEN FACILITIES**

23. **Ceiling Height**

The ceiling of the room in which kitchen facilities are located must be at least 6 feet 6 inches high over at least 35 square feet of room area.

24. **Natural Light**

There must be sufficient light in the kitchen, from either natural or artificial sources, to permit normal domestic activities.

25. **Ventilation**

There must be at least one openable window or other device that provides ventilation for the kitchen.

26. **Fixtures and Outlets**

The kitchen must have two separate, properly installed electric convenience outlets or one electric convenience outlet and one ceiling or wall electric light fixture with a safe switching device.

27. **Hot and Cold Sink**

The kitchen must contain a sink with hot and cold running water.

28. **Cooking Range**

The kitchen must contain a working cooking range consisting of at least one burner and an oven.

29. **Refrigerator**

The unit must have a working refrigerator.

#### **BATHROOM FACILITIES**

30. **Ventilation**

There must be an openable window or a mechanical system to provide ventilation for the bathroom.

31. Fixtures and Outlets

The bathroom must contain a properly installed electric convenience outlet or one ceiling or wall light fixture with a safe switching device.

32. Heating

The bathroom must have a permanent source of heat.

33. Flush Toilet

The bathroom must contain a working flush toilet.

34. Hot and Cold Sink

The bathroom must contain a working sink complete with hot and cold running water fixtures.

35. Hot and Cold Tub or Shower

The bathroom must contain either a bathtub or a shower with operating hot and cold running water fixtures.

36. Privacy

The toilet and bathtub or shower must have some form of enclosure to ensure privacy.

### Occupancy

37. Unit Size

A habitable room is defined as one that has the following features:

- Seventy square feet or more of floor area.
- Ceiling height of at least 6 feet 6 inches over at least 35 square feet of floor area.
- Natural light, from at least one window facing directly outdoors or onto a sun-porch, that is strong enough during daylight hours to permit normal domestic activities without artificial light.
- Adequate ventilation from at least one openable window or mechanical device.
- At least one properly installed and working electric convenience outlet.
- Adequate heat from a source other than a portable electric heater.
- No special adaptations for use as a kitchen, bathroom, or utility room.

In addition, a bedroom must have rigid walls, secured in position from floor to ceiling, including a doorway with a door, curtain, or other screening device. To pass the occupancy standard, there must be one bedroom for every two persons, except that seven or more persons require only four bedrooms. If three or more persons occupy the unit, there must be one habitable room in addition to the kitchen, bathroom, and bedrooms that serves as a general living area.

### **Lead-Based Paint**

**38. Lead-Based Paint Hazards (authorized January 1977)**

The hazard is defined as cracking, scaling, chipping, peeling, or loose paint that possibly contains dangerous amounts of lead and may hence endanger children under seven years of age who reside in or frequently visit the dwelling. All interior surfaces and exterior stairs, decks, porches, railings, windows, and doors that are readily accessible to children are of concern.



## Appendix B

### ESTIMATING DURATION OF ELIGIBILITY AND REQUIRED REPAIR COSTS

The values for two variables whose effect on enrollees' responses to evaluation failure we wished to measure were not directly available from the HAO data; nor did the HASE surveys provide the required information. We therefore estimated the values, as outlined below.

#### EXPECTED DURATION OF ELIGIBILITY

To estimate a household's expected duration of eligibility for the allowance program, we used data on household members' previous occupations and sources and amounts of income, obtained from the annual HASE household surveys. We assumed that those factors were related to the likelihood that an eligible household would be ineligible one year after the survey: a household with a substantial social security income, for example, would have a very low probability of being ineligible a year later, whereas one with a large rental income and previous professional employment would have a high probability of being so. We also assumed that the duration of eligibility would have a negative exponential distribution over the eligible population. Thus, the estimated probability of an eligible household's being ineligible after a year could be used to estimate the duration of eligibility.

The population for which we derived estimates consisted of households that participated in the household survey for at least two successive years and who were eligible for the program the earlier year. We defined nine occupation groups for that population: professional, managerial, sales, clerical, craftsmen, semiskilled (operatives), service workers (other than private household workers), nonfarm laborers, and private household workers. A household was counted as having been employed in a given group if one adult household member, man or woman, had been employed therein during the previous two years. All the occupation variables are indicator (dummy) variables.

We defined six categories for source of income: welfare; unemployment benefits; social security; non-social-security pensions; rents, royalties, interest, and dividends; and miscellaneous—workmen's compensation, veterans' disability, alimony and child support, educational stipends or scholarships, and regular cash contributions from persons not living in the household or from charitable organizations.<sup>1</sup> Six separate variables in the model represent the income categories, and six dummy variables indicate whether the household had any income from the source in question. Having two sets of variables made the model adaptable to extreme values in any single category.

Occupation group, source of income, and amount of income constitute the independent variables in the estimating procedure, which employs logit analysis; the dependent variable indicates whether eligibility status changed after one year. The analysis therefore provides

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<sup>1</sup>Wages and self-employment income, which compose earnings, are not included in any income category because amounts for those items were reported in the household survey as estimates of earnings for the following year rather than as actual earnings over the last one.

an estimate of the probability that an eligible household would become ineligible within a year. Calling that probability  $P$  and letting  $\lambda$  be the parameter for the negative exponential distribution, we have

$$\lambda = -\log(1 - P),$$

with  $1/\lambda$  the expected value of the duration of eligibility (the decision model in Sec. III uses the log of expected duration). Table B.1 reports the logit analysis results.

### **COST OF REQUIRED REPAIRS**

The variable used in Sec. III for cost of required repairs does not include estimates of the cost to repair occupancy defects; as explained earlier, those costs are too highly variable. Mean values for repair costs related to all other reasons for dwelling failure were calculated in McDowell (1979, 1980), as listed in Table B.2; the estimates are site-specific, renters and owners combined. The repair-cost variable was constructed by regressing the mean estimates for each repair item on dummy variables indicating the reason for a given evaluation failure.

Table B.1

LOGIT ANALYSIS RESULTS FOR PROBABILITY OF ELIGIBLE HOUSEHOLD  
BEING INELIGIBLE AFTER ONE YEAR

Variable	Brown County		St. Joseph County	
	Coefficient	t-statistic	Coefficient	t-statistic
Constant	-.62503	-3.71	-.97670	-3.98
Professional	1.1513	3.91	2.0630	4.97
Managerial	( $\alpha$ )	( $\alpha$ )	3.3209	3.10
Sales	.58686	1.61	-.32882	-.38
Clerical	1.0879	2.83	.94608	1.99
Craftsmen	1.1770	3.17	1.7020	2.89
Semiskilled	.52931	2.27	.41800	1.23
Service workers	1.1019	2.62	2.3524	4.60
Nonfarm laborers	.70280	2.05	.36903	.81
Welfare (amt.)	-.00031	-2.54	-.00082	-1.72
Unemployment benefits (amt.)	.00040	.79	-.00122	-2.67
Rents royalties, interest, dividends (amt.)	.00032	1.86	.00029	.72
Other (amt.)	.00013	1.40	.00054	2.28
Social security (amt.)	.00033	3.60	.00055	3.03
Non-social-security pension (amt.)	.00051	3.14	.00055	2.10
Welfare (dummy)	-.44757	-1.46	-.90306	-1.34
Unemployment benefits (dummy)	1.4943	2.85	2.7136	3.94
Rents, royalties, interest, dividends (dummy)	1.1801	6.72	.55360	1.74
Other (dummy)	-.43735	-2.00	-1.6153	-3.14
Social security (dummy)	-2.3196	-7.89	-3.3911	-5.62
Non-social-security pension (dummy)	-.57406	-1.72	.10665	.18
Size of sample	1,225		631	
Chi-square	468.90		296.58	

SOURCE: Tabulated by HASE staff from wave 4 household surveys for Brown and St. Joseph counties.

<sup>a</sup>The managerial employment category is combined with "professional" for Brown County because there were so few instances of managerial employment among eligibles.

Table B.2

## MEAN ESTIMATED REPAIR COST BY REPAIR ITEM

Item	Mean Estimated Cost (\$)	
	Brown County	St. Joseph County
Exterior property:		
Sanitation and storage	(a)	.08
Accessory structures and fences	14.44	72.13
Building exterior:		
Foundation	137.17	73.57
Walls	178.75	154.98
Roofs	(a)	245.07
Stairs, porches, railings	35.33	33.85
Windows	10.20	16.79
Doorways and hatches	7.77	13.93
Building and unit interior:		
Sanitation and storage	.00	.00
Walls	29.93	40.67
Ceiling	28.14	51.34
Floors	47.57	41.57
Stairs and railings	9.22	13.93
Toilet and bath facilities	8.46	25.24
Kitchen facilities	(a)	28.84
Water heater	4.79	31.38
Plumbing system	32.46	31.56
Heating system	(a)	59.41
Electrical system	22.95	138.96
Kitchen facilities:		
Ventilation	2.22	2.78
Bathroom facilities:		
Ventilation	9.90	4.44
Fixtures and outlets	(a)	4.43
Privacy	(a)	14.48
Paint standard	16.86	21.10

SOURCE: McDowell (1979, 1980).

<sup>a</sup>Fewer than 10 reported repairs.

**Appendix C**  
**SUPPLEMENTARY TABLES**

Table C.1

INITIAL EVALUATION OUTCOME BY RACE AND LIFE-CYCLE STAGE

Item	Outcome (%)					
	Brown County			St. Joseph County		
	Pass	Fail	Total	Pass	Fail	Total
<i>Race of Head</i>						
White	54	46	100	48	52	100
Other	36	64	100	34	66	100
<i>Life-Cycle Stage</i>						
Elderly couple	59	41	100	56	44	100
Elderly single person	65	35	100	54	46	100
Single parent	50	50	100	35	65	100
Nonelderly couple with children	37	63	100	36	64	100
Nonelderly single person	62	38	100	51	49	100

SOURCE: Tabulated by HASE staff from HAO records for Brown County through year 5 and for St. Joseph County through year 4.

Table C.2

LOGIT ANALYSIS RESULTS FOR OVERALL INITIAL EVALUATION  
FAILURE RATE: BROWN AND ST. JOSEPH COUNTIES

Factor	Brown County		St. Joseph County	
	Coefficient	t-statistic	Coefficient	t-statistic
Constant	7.198	2.88	21.145	5.72
Race of head	-.588	-4.72	-.319	-6.13
Elderly couple	-.142	-1.33	-.309	-3.61
Elderly single person	-.146	-1.87	.068	1.02
Single parent	.061	.81	.142	1.94
Nonelderly couple with children	.274	2.95	-.032	-.35
Allowance entitlement	.110	2.02	.130	2.51
Size of household	.214	9.07	.232	10.32
Tenure	.160	3.00	-.112	-2.47
Date of enrollment	-.099	-3.00	-.283	-5.78
Paint standard in effect	.207	2.07	.403	4.95
Enrolled during first year	(a)	(a)	-.236	-3.48
Size of sample	8,163		10,417	
Chi-square	533.62		593.39	

SOURCE: Tabulated by HASE staff from HAO records for Brown County through year 5 and for St. Joseph County through year 4.

<sup>a</sup>Variable not significantly related to failure rate for Brown County and therefore deleted from that analysis.

Table C.3

LOGIT ANALYSIS RESULTS FOR COMPONENTS OF INITIAL EVALUATION  
FAILURE RATE: BROWN COUNTY

Factor	Occupancy Failure		Condition Failure	
	Coefficient	t-statistic	Coefficient	t-statistic
Constant	11.895	2.79	3.605	1.43
Race of head	-.674	-4.30	-.560	-4.67
Elderly couple	-1.591	-4.50	-.056	-.50
Elderly single person	-.232	-.81	-.054	-.66
Single parent	-.484	-3.00	.324	4.28
Nonelderly couple with children	1.342	8.11	.286	3.09
Allowance entitlement	.047	.62	.121	2.25
Size of household	.419	15.46	.151	6.93
Tenure	-.729	-7.92	.300	5.62
Date of enrollment	-.197	-3.50	-.057	-1.70
Paint standard in effect	-.071	-.41	.293	2.89
Size of sample	8,163		8,163	
Chi-square	1449.29		399.49	

SOURCE: Tabulated by HASE staff from HAO records for Brown County through year 5.

Table C.4

LOGIT ANALYSIS RESULTS FOR COMPONENTS OF INITIAL EVALUATION  
FAILURE RATE: ST. JOSEPH COUNTY

Factor	Occupancy Failure		Condition Failure	
	Coefficient	t-statistic	Coefficient	t-statistic
Constant	8.848	1.25	18.099	4.85
Race of head	-.216	-2.78	-.400	-7.87
Elderly couple	.024	.10	-.243	-2.82
Elderly single person	-.297	-1.25	-.002	-.03
Single parent	-.724	-4.24	.304	4.22
Nonelderly couple with children	1.195	6.74	.090	1.01
Allowance entitlement	.231	3.11	.115	2.27
Size of household	.530	21.01	.150	7.33
Tenure	-.645	-8.40	-.017	-.39
Date of enrollment	-.171	-1.86	-.241	-4.95
Enrolled during first year	-.009	-.08	-.206	-3.10
Paint standard in effect	.077	.51	.470	5.80
Size of sample	10,417		10,417	
Chi-square	1868.03		524.14	

SOURCE: Tabulated by HASE staff from HAO records for St. Joseph County through year 4.



Table C.5

**DISCRIMINANT ANALYSIS RESULTS FOR RESPONSE TO INITIAL EVALUATION FAILURE:  
BROWN COUNTY RENTERS**

Variable	Discriminant Function for Indicated Response		
	Move	Repair	Terminate
Constant	-2897.5137	-2912.3530	-2915.5097
Race of head	13.6866	13.9064	13.5405
*Size of household	7.3085	7.5086	7.6148
Elderly couple	36.2416	36.6336	36.2555
*Elderly single person	24.5552	25.2340	24.6474
Single parent	48.4198	48.1961	48.0154
Nonelderly couple with children	66.6836	66.4295	66.3956
*Allowance entitlement	-36.3590	-36.1084	-37.3200
Rent discount	13.2752	13.4919	13.3075
*Occupancy defect	10.9026	8.8216	10.2199
Defective stairway or porch	15.5440	15.6698	15.7134
Defective plumbing or wiring	-10.3471	-10.3478	-10.4732
Other condition items	-19.5613	-19.4633	-19.7821
*Other defects	3.4856	2.8039	3.7399
Duration of residency	1.2594	1.2779	1.2723
*Paint standard in effect	-131.9762	-132.6108	-131.9431
Number of defects	.3387	.1952	.3390
Single-family house	4.2972	4.5872	4.4476
Duplex	-2.2925	-1.9530	-2.2720
Row house	-14.1598	-14.6243	-15.2827
Date of enrollment	75.4586	75.6671	75.7015
Duration of eligibility (ln)	22.0351	21.9291	21.8733
Cost of required repairs	.0223	.0207	.0221

SOURCE: Tabulated by HASE staff from HAO records for Brown County through year 5.

NOTE: 37.3 percent of cases were misclassified by model. Dropping all cost variables gives 41.0 percent misclassified; using only cost variables gives 38.4 percent misclassified.

\* Variable statistically significant at 95 percent confidence level or better.

Table C.6

DISCRIMINANT ANALYSIS RESULTS FOR RESPONSE TO INITIAL EVALUATION FAILURE:  
ST. JOSEPH COUNTY RENTERS

Variable	Discriminant Function for Indicated Response		
	Move	Repair	Terminate
Constant	-13225.8343	-13243.5415	-13235.7375
Race of head	.2342	.3150	.2793
*Size of household	8.2971	8.4173	8.4941
Elderly couple	95.6239	95.3980	95.0206
*Elderly single person	85.4220	86.2671	85.5881
*Single parent	139.4259	139.0422	138.8090
Nonelderly couple with children	130.5776	130.2402	130.5096
*Allowance entitlement	-42.9653	-42.9065	-43.7164
Rent discount	5.4141	5.4631	5.5985
*Occupancy defect	18.3950	17.0278	18.1535
*Defective stairway or porch	43.4804	43.4475	43.7426
Defective plumbing or wiring	-42.9959	-42.9764	-43.0974
*Other condition items	-22.2414	-22.6183	-22.4586
*Other defects	15.9530	15.6604	16.3391
Duration of residency	.4840	.4905	.4820
*Paint defect	-231.5756	-231.7402	-230.5719
Number of defects	-.8631	-.9167	-1.0014
*Single-family house	2.5228	2.9819	2.8019
Duplex	-40.5529	-40.0587	-40.4488
*Row house	-58.1505	-58.0073	-58.6892
Date of enrollment	342.6073	342.8635	342.7519
*Duration of eligibility (ln)	12.8916	12.8729	12.7751
*Enrolled during first year	394.3354	393.6536	393.8061
*Cost of required repairs	.1987	.1959	.2016

SOURCE: Tabulated by HASE staff from HAO records for St. Joseph County through year 4.

NOTE: 38.0 percent of cases were misclassified by model. Dropping all cost variables gives 43.0 percent misclassified; using only cost variables gives 40.8 percent misclassified.

\*Variable statistically significant at 95 percent confidence level or better.

Table C.7

LOGIT ANALYSIS RESULTS FOR RESPONSE TO INITIAL EVALUATION FAILURE:  
BROWN COUNTY OWNERS

Factor	Coefficient	t-statistic
Constant	3.847	.58
Race of head	.888	1.67
Size of household	-.061	-1.13
Elderly couple	-.070	-.18
Elderly single person	-.067	-.18
Single parent	.438	1.12
Nonelderly couple with children	-.295	-.75
Allowance entitlement	1.076	5.78
Occupancy defect	-1.517	-7.21
Defective stairway or porch	.662	3.19
Defective plumbing or wiring	.210	.82
Other condition items	.159	.69
Other defects	-.414	-1.39
Duration of residency ( $\sqrt{\text{yrs}}$ )	-.091	-1.85
Paint defect	-.767	-2.09
Number of defects	-.434	-3.84
Single-family house	.273	1.16
Duplex	-.075	-.09
Date of enrollment	-.038	-.45
Duration of eligibility (ln)	.025	.24
Cost of required repairs	-.002	-.97
Size of sample	1,335	
Chi-square	249.70 <sup>a</sup>	

SOURCE: Tabulated by HASE staff from HAO records for Brown County through year 5.

<sup>a</sup>Values for partial models are 73.97 when all cost variables are dropped, and 195.67 when only cost variables are used.

Table C.8

LOGIT ANALYSIS RESULTS FOR RESPONSE TO INITIAL EVALUATION FAILURE:  
ST. JOSEPH COUNTY OWNERS

Factor	Coefficient	t-statistic
Constant	-12.285	-1.40
Race of head	.004	.03
Size of household	-.074	-1.78
Elderly couple	.846	3.51
Elderly single person	.657	3.17
Single parent	-.148	-.69
Nonelderly couple with children	-.423	-1.83
Allowance entitlement	.813	6.08
Occupancy defect	-1.121	-7.58
Defective stairway or porch	.019	.14
Defective plumbing or wiring	-.081	-.42
Other condition items	-.167	-1.18
Other defects	-.583	-3.44
Duration of residency ( $\sqrt{\text{Yrs}}$ )	-.066	-1.93
Paint defect	-.613	-2.86
Number of defects	-.114	-1.77
Single-family house	-.004	-.02
Duplex	-.200	-.31
Date of enrollment	.183	1.62
Duration of eligibility (ln)	.040	1.02
Cost of required repairs	-.003	-2.61
Enrolled during first year	.308	1.66
Size of sample	2,716	
Chi-square	419.17 <sup>a</sup>	

SOURCE: Tabulated by HASE staff from HAO records for Brown County through year 5.

<sup>a</sup>Values for partial models are 211.05 when all cost variables are dropped, and 334.79 when only cost variables are used.

Table C.9

**INTERQUARTILE RANGE FOR FACTORS AFFECTING RESPONSE TO INITIAL EVALUATION  
FAILURE: BROWN AND ST. JOSEPH COUNTY ENROLLEES BY TENURE**

Factor	Interquartile Range			
	Renter		Owner	
	Lower Quartile	Upper Quartile	Lower Quartile	Upper Quartile
<i>Brown County</i>				
Allowance entitlement (\$)	575	1,195	429	1,075
Duration of eligibility (ln)	.07	.92	-.22	.97
Cost of required repairs (\$)	3.10	33.09	3.22	31.88
Number of defects	1	2	1	3
Duration of residency <sup>a</sup>	.43	2.24	1.52	4.53
<i>St. Joseph County</i>				
Allowance entitlement (\$)	668	1,623	426	1,018
Duration of eligibility (ln)	.66	2.26	.77	2.67
Cost of required repairs (\$)	14.19	52.14	13.82	42.37
Number of defects	1	3	1	3
Duration of residency <sup>a</sup>	.41	2.08	1.75	5.31

SOURCE: Tabulated by HASE staff from HAO records for Brown County through year 5 and for St. Joseph County through year 4.

NOTE: Interquartile range consists of middle 50 percent of all observations.

<sup>a</sup>For renters, number of years; for owners, square root of number of years.

Table C.10

LOGIT ANALYSIS RESULTS FOR FACTORS AFFECTING ANNUAL EVALUATION  
FAILURE RATE: BROWN AND ST. JOSEPH COUNTIES

Factor	Brown County		St. Joseph County	
	Coefficient	t-statistic	Coefficient	t-statistic
Constant	-.040	-.01	9.634	2.86
Race of head	-.399	-2.09	-.320	-4.15
Elderly couple	-.879	-4.34	-.668	-4.93
Elderly single person	-.622	-4.42	-.409	-3.79
Single parent	.311	2.45	.604	5.11
Nonelderly couple with children	.251	1.57	.251	1.62
Allowance entitlement	.087	.88	.287	3.13
Size of household	.154	4.84	.112	3.61
Tenure	-.140	-1.59	-.059	-.82
Date of enrollment	-.016	-.43	-.138	-3.12
Size of sample	4,235		5,247	
Chi-square	302.78		662.23	

SOURCE: Tabulated by HASE staff from HAO records for Brown County through year 5 and for St. Joseph County through year 4.

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