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HOUSING ALLOWANCES AND HOUSING IMPROVEMENT: EARLY FINDINGS

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PREFACE

This document was prepared for the Office of Policy Development and Research, U.S. Department of Housing and Urban Development (HUD). It analyzes dwelling repairs made by homeowners, tenants, and landlords in HUD's experimental housing allowance programs in Brown County, Wisconsin, and St. Joseph County, Indiana--what kind of repairs were made, how they were made, and their effect on housing conditions in the two counties.

The present study is a preliminary analysis of the extent and type of program-induced repairs, one facet of the program's effects on participants and nonparticipants alike. Most of the data come from administrative records collected during the first three years of program operations. Special consideration is given to the first eighteen months of data from a special repair and improvement report form instituted in January 1976.

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SUMMARY

This report is a preliminary analysis of repairs and improvements made by homeowners, tenants, and landlords in HUD's experimental housing allowance program, based on data covering the first three years of program operations. The program standards, which are administered by the housing allowance offices, require regular inspection and evaluation of enrollees' dwellings. The evaluations also gather information on repairs: *initial repairs* that an enrollee makes to qualify his dwelling under program standards, and *voluntary annual repairs* that he chooses to make but that are not required by the program.

INITIAL REPAIRS

More than half the program enrollees live in dwellings that are too small, have inadequate facilities, or present health or safety hazards. Two-thirds repair their dwellings, often at low cost, commonly doing the work themselves or enlisting friends or relatives. Despite being done by nonprofessionals, nearly all the repairs are acceptable.

The low cost of initial repairs results from individual initiative in meeting requirements, not mistakes in program design or management. The housing standards derive from existing and model housing codes, and the evaluations are consistently administered. Most of the noted defects violate local housing codes, which are only rarely enforced.

Repair costs do not appear to be the major barrier to housing improvement. The hazards detected in evaluations could usually be corrected without cash assistance, but enrollees are either unaware of the problems or are unconcerned about the consequences.

VOLUNTARY ANNUAL REPAIRS

Even after qualifying their housing, enrollees make voluntary repairs to their dwellings. Of high visibility and consumer appeal,

most such repairs are not responses to program standards, but instead extend the structural life of the dwelling or make it a more pleasant place to live (two criteria not included in the standards). They are not, however, sufficient to forestall deterioration of enrollees' dwellings, many of which fail later evaluations.

SPECIAL PARTICIPANT GROUPS

Members of special participant groups, including elderly, handicapped, and rural enrollees, successfully qualify their housing under program rules. Elderly and handicapped enrollees hire contractors more frequently than other groups, which increases their cash outlay. Rural households undertake an unusually large share of the work themselves. Voluntary repairs by those groups are comparable to repairs by other enrolled households.

PROGRAM EFFECTS

The program demonstrates that low-income households and their landlords are able and willing to remedy housing defects if given the means and motivation. Almost all initial repairs are program-induced. Enrollees voluntarily increase their repairs after receiving allowance payments, but only part of the change is attributable to the additional income provided by the allowance; the remainder is a behavioral effect.

Earmarked allowances produce a different result from an unearmarked transfer. Money alone is not sufficient to improve housing conditions, inasmuch as enrollees demonstrate a preference for repairs that enhance the appearance, comfort, or durability of a dwelling over those that promote health and safety. Regular enforcement of the standards is therefore necessary to detect and remedy defects that result from normal dwelling deterioration.

The allowance program involves occupants in maintaining and improving their housing; few other housing programs tap that pool of unskilled, but available, labor. Many disadvantaged households can make minor repairs, or get friends to help, if they are given an incentive. The extensive use of unpaid labor makes the value of the repairs much greater than the cash outlays would indicate.

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I. INTRODUCTION

By monitoring a program of housing allowances for low-income households, the Housing Assistance Supply Experiment (HASE) is accumulating the data base for a broad assessment of earmarked cash allowances as incentives to housing improvement. This report begins that assessment by analyzing the housing repairs and improvements undertaken by program enrollees. Drawing on administrative records from the program's early years, we examine the nature of defects discovered in enrollees' housing (which enrollees must correct in order to receive an allowance), how they correct the defects, voluntary repairs they make, and the durability of the improvements. The findings thus address the following specific questions about program effects:

- What portion of the observed repair activity is due to the allowance program?
- How much do the participants value the resulting housing improvements?
- How should the social value of those housing improvements be measured?
- Is the program's method of achieving housing improvement efficient compared with known alternatives?

Our final answers to those questions will be based on more data, more elaborate calculations, and formal models of participants' behavior. The present analysis identifies the issues for the next round of research and points up gaps in the data requiring additional fieldwork.

Though not yet comprehensive, the data available for this analysis are unusually detailed. We distinguish some 38 different housing defects detected in on-site evaluations of thousands of dwellings, both rented and owner-occupied. We classify repairs or improvements according to item (roof, water heater), type of

action (repair, replace, install, connect, paint), resources employed (type of labor or materials), and division of work and expense among the various parties (e.g., landlords and their tenants).

The remainder of this Introduction describes the experimental allowance program, the standards it sets for participants' housing, the procedures for enforcing those standards, and the housing defect and repair data that are byproducts of program administration.

SUPPLY EXPERIMENT

HASE is one of several elements of the Experimental Housing Allowance Program begun in 1972 by the Office of Policy Development and Research, U.S. Department of Housing and Urban Development (HUD). Specifically authorized by Congress, the program was undertaken to learn whether direct cash assistance to low-income households is a feasible and desirable way to help them secure decent housing in a suitable living environment; and if so, to help determine the best terms and conditions for such assistance and the most efficient and appropriate methods for its administration.

HASE primarily addresses issues of market and community response to the allowance program, but it also shows how participants are affected and how such a program might be administered. It entails operating a fullscale allowance program in each of two metropolitan areas, chosen for strong contrasts in their housing markets, for ten years; and monitoring both program operations and market responses for about five years. The experimental communities are Brown County, Wisconsin (whose central city is Green Bay), and St. Joseph County, Indiana (whose central city is South Bend).

ALLOWANCE PROGRAM

The allowance program is open to all families and most single persons in the experimental jurisdictions that are unable to afford the standard cost of adequate housing on the local market without spending more than a fourth of their adjusted gross incomes. Each enrolled household receives monthly cash payments equal to the "housing gap" thus calculated, provided that the housing unit it

occupies meets minimum standards of habitability, safety, and sanitation.

Both renters and homeowners may participate in the program, and participants may change tenure or place of residence (within the program's jurisdiction) without loss of benefits. Participating renters are responsible for locating suitable housing, negotiating with landlords over rent and conditions of occupancy, paying the rent, and seeing that their dwellings are maintained to program standards. Participating owners are entirely responsible for negotiating purchases and mortgage financing, meeting their obligations to lenders, and maintaining their properties.

In short, the experimental allowance program provides cash assistance that enables each participant to afford decent, safe, and sanitary housing, on the condition that he find such housing in the private market and see that its quality is maintained during his occupancy. Thus, the program relies heavily on the participant's initiative and on normal market processes. The amount of the allowance is usually much less than, and does not vary with, actual housing expenses. Since the marginal dollar spent ordinarily comes out of the participant's nonallowance resources, he has a motive to seek the best bargain he can find on the local market.

The allowance program is funded by a ten-year annual contributions contract between HUD and a local housing authority at each site. That authority in turn delegates program operations to a nonprofit corporation established by Rand at each site, the housing allowance office (HAO). The HAO enrolls eligible applicants, evaluates their housing, and disburses payments. The HAOs maintain complete administrative records on all those events.

HOUSING STANDARDS

The allowance program differs from income maintenance programs in that the assistance is conditioned on the enrollee's living in an acceptable dwelling. Households that meet the eligibility requirements can enroll in the program; but they will receive no allowance payments until their dwellings meet or exceed the housing standards

(the so-called *earmarking* requirement). The HAO housing standards were derived from the current housing codes in the two sites, the Building Officials and Code Administrators' model code, and the minimum housing standards developed by organizations such as the American Public Health Association. The standards require that the dwelling meet the following conditions:

Contain essential facilities in good working condition. The dwelling must have available, either communally or for the sole use of the client, an adequate kitchen and bathroom:

- The *kitchen* must have ceiling height of 6'6" or greater over at least 35 sq ft of floor area, adequate ventilation from at least one openable window or mechanical device, sufficient light from natural or artificial sources, two separate, operating electric wall outlets or switches, a sink with hot and cold running water, a cooking range with a working burner and oven, and a working refrigerator.
- The *bathroom* must have a permanent source of heat, a door or other means of enclosure, an openable window or ventilation device, an operating electric wall outlet or switch, a working flush toilet, and a sink and a bathtub (or shower) with hot and cold running water.

Be free from hazards to health and safety. The standards permit no health or safety hazards around the home. Evaluators check the operation of the heating, electrical, and plumbing systems, the soundness of the dwelling exterior and interior, and the condition of windows and doors. The standards require certain safety features, such as overload devices, and permit no accumulation of hazardous materials or trash.

- The *exterior property* should be well graded and have no hazardous structures or fences, accumulations of trash or garbage, or overgrown plants.
- The *building exterior* should have no hazardous conditions such as sagging, deteriorated, or incomplete foundations, walls, chimneys, or roofs (including gutters and drainspouts); windows and doors should be weathertight with no missing, broken, or rotted panes, panels, or frames; porches and stairways should have no broken or missing platforms or steps, and must have railings for porches 4 ft or more off the ground and handrails for six or more consecutive steps.
- The *building and unit interior* must have no significant accumulations of trash; there must be at least one exit from the unit and two from the building; ceilings, walls, and floors must be free from holes, buckling, dry rot, insect damage, or persistent moisture; bathrooms and kitchens must have no damaged or broken fixtures or appliances (including those not required under essential facilities); bathroom and kitchen floor coverings must be impervious to moisture; plumbing, heating, water heating, and electrical systems must be permanent, complete, well functioning, properly connected, insulated, sealed, vented, and incorporating ample safety or overload devices; stairways and railings must have a handrail around open steps or along six or more consecutive steps and be free from structural defects, including broken or missing steps; and (since January 1977) dwellings occupied or frequently visited by children under seven years of age should be free from lead-based paint hazards, including flaking, cracking, scaling, chipping, or loose paint on any accessible interior or exterior surfaces.*

*Appendix A discusses the handrail and lead-based paint requirements.

Provide essential space and privacy. There must be at least one bedroom for every two persons, up to a maximum of four required bedrooms. In addition, there must be a general-purpose room for households of three or more persons. All habitable rooms must have 70 sq ft or more of floor area, a ceiling height of at least 6'6" over 35 sq ft of the room, natural light from a window opening directly outdoors or onto a sunporch, adequate ventilation from an openable window or mechanical device, a working electric outlet, and a permanent source of heat; and cannot contain any special adaptations for use as a kitchen, bathroom, or utility room. In addition to those requirements, bedrooms must have rigid walls secured from floor to ceiling with a door or other means of enclosure.

The evaluators do not rate dwelling attractiveness. A well-equipped and suitably maintained dwelling, large enough for the occupants, will pass the evaluation regardless of its exterior or interior appearance. It is therefore impossible to predict whether a dwelling will meet HAO standards until an evaluation is completed. For example:

- A 200-year-old dwelling with a new tarpaper roof, plastic sheets in place of storm windows, a barren yard, and severely peeling paint could pass HAO standards (if children under seven years of age did not occupy or frequently visit the dwelling). Most building materials are acceptable so long as they meet specified performance criteria. There are no building standards that apply to building age or to sparse landscaping. Peeling paint may reveal underlying structural damage; but if there is no structural damage, and if children are not present, paint of any color or condition will meet program standards.

- o A 5-year-old brick building, with a tile roof, tight storm windows, no peeling paint, and well-manicured landscaping may still fail HAO standards because of hidden defects such as excessive basement seepage, unsafe wiring, or an improperly vented water heater.

Evaluations

Each enrollee's dwelling unit is evaluated when he enrolls, when he moves, and annually during his occupancy. We call these *initial*, *premove* or *postmove*, and *annual* evaluations. The evaluator uses a 38-point checklist, summarized above (and given fully in Appendix B), to rate the dwelling. If the dwelling passes the initial evaluation and the client's supporting documents (including a lease for renters) are in order, the enrollee may begin receiving allowance payments. If the dwelling fails any of the 38 standards, evaluators rate it as unacceptable. The enrollee receives written notification describing the nature and extent of the defects. Following an unacceptable evaluation report on his dwelling, an enrollee can make repairs, move to an acceptable dwelling, or forgo allowance payments. If the enrollee chooses to repair his dwelling, his current dwelling must pass a "deficiency" evaluation. If he chooses to move elsewhere to qualify for allowance payments, the new dwelling must also be evaluated.

Even after an enrollee begins receiving payments, his dwelling is evaluated at least every twelve months. Annual evaluations are scheduled at yearly intervals after initial enrollment. Evaluators complete a special evaluation if a recipient household moves. If the dwelling passes the most recent evaluation, if all documentation is complete, and if the household continues to occupy that dwelling, payments continue uninterrupted. If the dwelling is unacceptable, a recipient has 75 days to make the necessary repairs or move elsewhere before payments are suspended.* Any currently enrolled household that has had its allowance payments suspended for noncompliance with

*Each winter, starting November 1, exterior paint repairs may be delayed until May 15 or for 75 days, whichever is longer, before payments are terminated.

the housing standards may have them resumed by passing an evaluation after undertaking repairs or moving to another dwelling. A recipient who drops out of the program and then reapplies undergoes a reinstatement evaluation similar to the initial evaluation.

Repair Data

The HAOs maintain an automated record system that enables Rand to construct complete and reliable transaction histories for each client. Each record contains periodically updated information about the client's household characteristics, financial circumstances, and housing expenses; detailed reports on the physical characteristics of each dwelling he occupied while in the program; and a complete record of changes in program status, allowance entitlement, and payments.

Although the HAOs have conducted housing evaluations since the program began, they have collected repair and improvement information only since January 1976--after 18 months of program operation in Brown County and 12 in St. Joseph County. As of June 1977, they had collected repair information for 18 months (the period from January 1976 to June 1977 constitutes the "18-month repair study" referred to throughout this report). The repair information complements the evaluation reports with information about changes in enrollees' housing.

For purposes of analysis, we divide the repair information into two categories:* *initial repairs* and *voluntary annual repairs*. Initial repairs are those an enrollee must make for his dwelling to meet HAO standards and that the housing evaluator checks during a deficiency reevaluation. Such repairs remedy defects the housing evaluator noted in an initial evaluation, usually conducted a few weeks earlier. Voluntary annual repairs are ones occupants choose to make and that

*Throughout, this report uses *repair* to mean repairs, replacements, or improvements. Each activity is an important means of improving enrollees' dwellings. But because dwelling improvement, not just the means, is the focus of this report, we do not ordinarily distinguish between the three activities.

they report during the annual evaluations.* The HAOs do not require such repairs; the information is recorded only for research purposes.

The HAOs started collecting repair information after operations were well under way at the two sites; nevertheless, by June 1977 they had collected such information from 51 percent of the initial evaluations and 74 percent of the annual evaluations in Brown County; and 73 percent of the initial evaluations and 99 percent of the annual evaluations in St. Joseph County. Better than 94 percent of the evaluations conducted between January 1976 and June 1977 yielded repair information included in this analysis (see Table 1.1). Excluded

Table 1.1

RECORDS AVAILABLE FOR REPAIR ANALYSIS

Category	Brown County		St. Joseph County	
	Homeowners	Renters	Homeowners	Renters
Deficiency Reevaluations				
Records not used (reason):				
Ambiguous evaluation type	0	1	3	1
No report forms	13	18	47	46
No repairs reported[a]	7	35	62	109
Client refused evaluation[a]	0	1	1	3
Repairs unspecified[a]	0	3	3	0
Records used	536	1,056	1,617	1,885
Total	556	1,114	1,733	2,044
Annual Evaluations				
Records not used (reason):				
Ambiguous evaluation type	59	73	224	152
No report forms	43	50	14	1
No repairs reported[a]	337	908	529	741
Client refused evaluation[a]	2	3	7	3
Repairs unspecified[a]	14	24	11	7
Records used	957	690	1,546	564
Total	1,412	1,748	2,331	1,468

SOURCE: HAO records from January 1976 through June 1977.

[a]Records considered theoretically usable, although not actually used.

*A small fraction of these repairs may anticipate future deficiencies, but most are repairs that would not be currently required under program rules.

are slightly more than 200 evaluations from January 1976 that lack report forms and over 500 evaluations with ambiguously coded evaluation type. Very few enrollees refused to provide repair information or failed to specify repairs.

Each report form contains information for up to ten separate repairs. Some enrollees could not recall the cost of the repairs, so the housing evaluators, many of whom had experience in the construction trades, estimated the cash outlay. The sample of reported repairs could shrink up to a half if we excluded repairs with estimated costs; the shrinkage would be more severe for St. Joseph County, where evaluators estimated a greater proportion of the cash outlays, than for Brown County (refer to Table 1.2).

Because tenants are often unaware of repairs made to their landlords' buildings, and of what the repairs cost, renters generally provide much less reliable repair information than do homeowners.* We tested the plausibility and accuracy of both homeowners' and renters' reported repair cash outlays (the method is reported in Appendix C). Although the estimated costs are greater than the reported values, they seem reasonable. The estimates include more structural repairs and more repairs using paid labor, both of which are more costly kinds of repairs. The evaluators' estimates of cash outlays are included in all the repair analyses.

To check the reasonableness of large reported cash outlays, we had the HAOs manually examine each unusually expensive repair entry. They found two improperly coded entries for Brown County and five for St. Joseph County. Because miscoded entries make up only a small fraction of the total, we are confident that nearly all other large entries are valid, although we did not check with each respondent.

Retrospective reporting of repairs seems accurate for recalled items, but some repairs--especially small ones--are often forgotten. The reporting systems for initial and voluntary annual repairs require different periods of recall that differently affect completeness and

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*In this analysis the category *renters' repairs* includes repairs made by enrolled tenants as well as those made by their landlords.

Table 1.2

TYPE OF COST INFORMATION FOR REPORTED REPAIRS

Information	Brown County		St. Joseph County	
	Homeowners	Renters	Homeowners	Renters
Initial Repairs				
Client-reported	785	1,305	1,810	2,047
Evaluator-estimated	133	619	725	1,546
Total repairs	918	1,924	2,535	3,593
Voluntary Annual Repairs				
Client-reported	2,287	877	3,130	597
Evaluator-estimated	281	550	1,075	550
Total repairs	2,568	1,427	4,205	1,147

SOURCE: HAO records from January 1976 through June 1977.

accuracy. The elapsed time between an initial repair and the subsequent deficiency reevaluation is usually less than two months, as against twelve months for annual repairs.* We do not expect the accounting for either to be complete, but initial repairs should be easier to recall than annual repairs.

Whereas lapses in recall would reduce reported repair activity, duplicate reporting between two successive evaluations would increase it. Checking whether enrollees often reported the same repair in two successive evaluations, we found only 30 possible duplications. The data conclusively documented duplicate reporting in only five of the cases, less than 0.03 percent of the total number of repairs. Cash outlay for the potential duplicate reports totaled $990, a tiny sum compared with total repair cash outlays. We conclude that duplicate reporting is negligible.

*Annual evaluations are scheduled at yearly intervals after enrollment. Not all households will report a full twelve months of repair activity during that evaluation, however. Households who fail a previous evaluation, then undergo a deficiency reevaluation, report only repairs made after the deficiency reevaluation as voluntary repairs during the annual evaluation. The time during which the repairs could have been made thus ranges from six to twelve months.

The identifiable biases in the reporting are partially offsetting. Total repair cash outlays--the sum of cash outlays for all repairs--are based on evaluator estimates that may bias total repair costs upward or downward, and on incomplete reporting that may bias them downward. We cannot determine the direction of the net bias in estimated repair cost, but think it is relatively small for initial repairs and for homeowners' annual repairs. For renters' annual repairs, frequency and cost are both seriously understated.

For comparison, we match dwelling defects with repairs. The information on defects comes from the full analysis files through the second year of program operations in both sites (through June 1976 in Brown County and December 1976 in St. Joseph County). The periods of those records overlap the repair study by six months in Brown County and twelve months in St. Joseph County. Information about defects and repairs is coded according to two separate conventions; Appendix D shows the correspondence between defects and codes for repairs.

PLAN OF REPORT

The remainder of this report examines repairs undertaken by enrollees in the experimental housing allowance program. Section II summarizes the data on enrollees' housing defects and the actions they take to correct those defects to qualify for allowance payments. Briefly, we find that over half of all enrollees live in dwellings that do not meet program standards, but that most of the defects can be repaired inexpensively by amateur labor. Enrollees show considerable resourcefulness in avoiding the expensive alternative of contracting their home repairs. Even among those who drop out of the program rather than repair their homes, the cost of repairs does not seem to be the primary reason.

After qualifying for payments, participants must continue to maintain their homes. Section III summarizes the data on the repairs they make voluntarily. They tend to be expensive structural repairs, financed partly by the allowances. Although major repairs are often done by the owners or occupants of a dwelling, they make more use of contracted services for such repairs than for the initial repairs dis-

cussed in Sec. II. At least for homeowners, the data suggest a substantial increase in home maintenance activity due to participation in the program.

Throughout Secs. II and III, we compare renters and homeowners, two classes of participants whose relationships to their dwellings are so different that one might anticipate different responses to the incentives provided by the program. For example, renters whose dwellings are seriously defective usually find it easier to meet program standards by moving than by repairing; for homeowners, the option of moving is less attractive, for several reasons.

Section IV examines the housing circumstances and repair activity of three classes of participants who might be expected to have special problems with home maintenance: the elderly, the disabled, and those who live in the rural parts of our experimental sites. In general, we find that they do quite well at arranging program-required repairs and at subsequent home maintenance.

Section V addresses issues of allowance program effects. It first estimates the added repair expenditures that are attributable to the program. Next, it shows what parts of the experimental areas benefit from program-related repairs. Finally, it discusses the costs and benefits of using earmarking to induce repairs and improvements.

Section V thus integrates findings from earlier in the report, as well as raising some new issues. If most enrollees make initial repairs to qualify for payments, not because they perceive much direct benefit from the improvements, the case for public intervention to achieve housing improvement rests on its social value. We find that observers of the experiment are overready to assume that inexpensive repairs cannot have much social value; but developing better yardsticks promises to be difficult.

Section VI summarizes the important conclusions of the report and charts the path of our remaining research. It emphasizes the central finding of the report: that low-income households and their landlords are willing to solve their own housing problems--and are capable of doing so--if they are given the means and the motivation.

II. DWELLING REPAIRS TO MEET HAO STANDARDS

Many U.S. dwellings are poorly maintained, have obsolete or inadequate facilities, or contain hazards to health and safety. Having determined that such dwellings constitute a danger to the inhabitants and to society in general, local and national agencies have adopted initiatives to rehabilitate or eliminate defective housing.

Yet federally sponsored housing rehabilitation programs touch only a small fraction of the nation's substandard housing. Since the cost of repairs almost always exceeds the allocated funds, particular areas are usually "targeted" for concentrated attention. Much of the responsibility for making repairs falls on government officials, who estimate repairs, select salvageable buildings, hire contractors, and inspect the housing once repairs are completed. Repeated efforts are often required. Only a very few of the defective dwellings are ever repaired because of the great complexity and cost of the rehabilitation programs.

Most communities have not filled the gaps left by the federal programs. Dwelling defects almost always violate local housing codes, but few locales, for political or budgetary reasons, enforce the codes. The most common enforcement plan is to designate code-enforcement districts. Even so, it is not rare for entire districts of cities to be without any active federal or local housing repair program.

The housing allowance program promotes dwelling maintenance and repair by giving low-income households an incentive to occupy adequate housing. Most program enrollees living in unacceptable housing meet the program standards by repairing their dwellings. The HAO administrative files contain unusually detailed accounts of those repairs. The information allows us to challenge or verify common preconceptions about the difficulty and cost of repairing defecting housing. Our research casts light on four persistent questions about providing adequate housing:

- How many low-income households live in defective housing?
- What is required to bring defective housing to acceptable standards?
- Are low-income households capable of making the repairs themselves?
- Are repair costs the critical barrier keeping low-income households from repairing defects in their homes?

In reporting the repairs households make to qualify for allowance payments, we first examine how enrollees obtain acceptable housing. We then analyze the reasons for dwelling failure and the alternatives to undertaking repairs. For households who repair, we consider what they repair, how they undertake the repairs, and how much the repairs cost. Because the costs are surprisingly low, we question whether the program is working as intended; we dismiss several claims suggesting that low-cost initial repairs reflect mistakes in program design or management. Program experience demonstrates that initial repairs are durable, substantial remedies for housing dangers uncovered in reasonable but thorough dwelling evaluations. We conclude that homes with multiple defects can be repaired by amateur labor at low cost.

OBTAINING ACCEPTABLE HOUSING

After six months in the program, most enrollees occupy a cerfified dwelling. The three principal ways of obtaining certifiable housing are (1) living in a certifiable dwelling, (2) repairing a failed dwelling, or (3) moving to a certifiable unit. Most enrollees living in acceptable dwellings stay in them to receive allowance payments; households failing evaluations must either make repairs or move. The following paragraphs discuss what was wrong with enrollees' dwellings and what they did to qualify their housing during the first two program years.

Defects in Enrollees' Dwellings

About half the program enrollees lived in dwellings that were too small, had inadequate facilities, or contained health and safety hazards. Overall, defects were more common in St. Joseph County--particularly for renters. Those results support our preprogram expectation for dwellings in St. Joseph County to be in generally worse repair than those in Brown County.

Table 2.1 tallies the defects that led to evaluation failure.* Many dwellings failed because of only one of the 38 evaluation standards, but some failed for several reasons. About a sixth of the dwellings in each site had too few habitable rooms for enrollees' families;** renters lacked adequate living space more often than homeowners.

Inadequate kitchen and bathroom facilities were common. Incomplete bathroom facilities--such as missing or incomplete sinks, toilets, or bathing facilities--outnumbered kitchen defects by more than two-to-one. The most common kitchen failures were inoperable stoves, refrigerators, or sinks. Inadequate lighting or electrical, heating, or ventilating systems failed both kitchens and bathrooms. Particularly in St. Joseph County, renters' facilities were inadequate more often than owners'.

Almost three-fifths of the dwelling defects reflect hazardous conditions. Evaluators found inadequate interior stairways and railings in over a fourth of the dwellings evaluated in Brown County and in a third of those in St. Joseph County. Damaged windows were an important source of failure, particularly in St. Joseph County. Unsafe heating, electrical, plumbing, or water-heating systems disqualified many dwellings in both counties. Exterior hazards, slightly more common in Brown County than in St. Joseph County, included a

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*As noted earlier, information about dwelling deficiencies is available in the full set of audited analysis files. Those records include evaluations through the second year of program operations in both sites: through June 1976 in Brown County and December 1976 in St. Joseph County.

**Households may have additional space, such as an attic, that is not currently habitable.

Table 2.1

DEFECTS IN ENROLLEES' DWELLINGS

Type of Defect	Brown County				St. Joseph County			
	Number of Defects		Defects per 100 Dwellings[a]		Number of Defects		Defects per 100 Dwellings[a]	
	Homeowners	Renters	Homeowners	Renters	Homeowners	Renters	Homeowners	Renters
Inadequate Living Space								
Too few habitable rooms or bedrooms	292	486	15	18	431	658	13	23
Inadequate Facilities								
Kitchen (7 items)	89	169	5	6	287	459	8	16
Bathroom (7 items)	265	389	14	15	591	846	17	30
Hazardous Conditions[b]								
Exterior property area (4 items)	53	85	3	3	61	85	2	3
Building exterior:								
Stairs, porches, railings	129	148	7	6	98	101	3	3
Windows	123	256	7	10	459	560	13	20
Other (4 items)	56	112	3	4	127	173	4	6
Building interior:								
Stairs, railings	588	610	31	23	1,144	999	34	35
Other (7 items)	158	195	8	7	284	327	8	11
Utility systems (4 items)	200	307	11	12	249	474	7	17
All defects	1,953	2,757	104	104	3,731	4,682	109	164

SOURCE: HAO records through June 1976 for Brown County and December 1976 for St. Joseph County.

NOTE: Data base consists of complete initial evaluation records for 4,533 preenrollment dwellings in Brown County and 6,266 in St. Joseph County. The presence of any defect tabulated here caused the dwelling to be rated not acceptable. Renters include 52 living rent-free in Brown County and 102 in St. Joseph County.

[a]Because some entries cover more than one item on the evaluation form, "defects per 100 dwellings" is not necessarily equivalent to "percent of dwellings with indicated defect."

[b]Lead-based paint was added as a standard under hazardous condition in January 1977, after the end of year 3 in both sites.

variety of defects; dangerous exterior stairways and porches, loose siding or roofing, damaged foundations, and accumulated refuse prevailed. Evaluators noted several types of interior defects, too, such as damaged walls, ceilings, and floors, inadequate exits, excessive accumulations of refuse, and severely damaged bathroom or kitchen facilities.

Paths to Housing Certification

Households living in acceptable dwellings at enrollment are, not surprisingly, more likely to receive payments than those living in unacceptable dwellings. Households in acceptable dwellings need only file supporting documentation, including a lease for renters, and they will receive payments. Other enrollees face the additional, and possibly difficult, choice of either locating acceptable housing or repairing their dwelling.

Some enrollees are far more likely to already live in dwellings that meet program standards. Table 2.2 shows, for example, that Brown County households are more likely than those in St. Joseph County to live in acceptable dwellings, and that elderly households (single persons and couples) more frequently live in acceptable dwellings than other groups. Holding family composition constant, elderly renters are more likely than homeowners to live in dwellings meeting program standards; the effect of tenure is less straightforward for households with children.

Most households living in failed dwellings repair them, but the likelihood of making repairs diminishes as the number of dwelling defects increases, as shown in Table 2.3. Moreover, the more defects noted in a household's dwelling, the more likely the household is to withdraw from the allowance program, as the table shows. The number of defects does not affect the likelihood of moving, except for renters with four or more defects. Since most homeowners do not consider moving to be an alternative, they are more likely than renters to undertake repairs.

Overall, about half the enrollees live in dwellings that fail initial HAO evaluations. Among the enrollees whose preenrollment

Table 2.2

FREQUENCY WITH WHICH ENROLLEES' DWELLINGS PASS EVALUATIONS

Type of Household	Brown County			St. Joseph County		
	Dwellings Evaluated	Dwellings Passed		Dwellings Evaluated	Dwellings Passed	
		Number	Percent		Number	Percent
Homeowners						
Young couple with young children	376	165	44	331	144	44
Single head with children	305	143	47	748	316	42
Elderly couple	291	160	55	513	276	54
Elderly single person	535	311	58	1,286	625	49
All other	397	175	44	619	270	44
All types	1,904	954	50	3,497	1,631	47
Renters						
Young couple with young children	609	210	34	445	143	32
Single head with children	906	507	56	1,486	548	37
Elderly couple	116	65	56	69	38	55
Elderly single person	556	378	68	443	230	52
All other	598	311	52	522	218	42
All types	2,785	1,471	53	2,965	1,177	40

SOURCE: HAO records through June 1976 for Brown County and December 1976 for St. Joseph County.

Table 2.3

CLIENT RESPONSE TO INITIAL EVALUATION FAILURES

Number of Defects	Brown County					St. Joseph County				
	Number of Clients	Client Action after Initial Failure				Number of Clients	Client Action after Initial Failure			
		Repair (%)	Move (%)	Terminate (%)	Total (%)		Repair (%)	Move (%)	Terminate (%)	Total (%)
Homeowners										
1	422	87	1	12	100	825	88	(a)	12	100
2	213	81	0	19	100	324	78	1	21	100
3	91	67	1	32	100	136	63	2	35	100
4+	89	46	3	51	100	170	51	3	46	100
All	815	79	1	20	100	1,455	79	1	20	100
Renters										
1	517	67	16	17	100	544	73	11	16	100
2	266	60	17	23	100	290	55	17	28	100
3	133	52	18	30	100	171	52	16	32	100
4+	135	31	36	33	100	274	32	30	38	100
All	1,051	59	19	22	100	1,279	57	17	26	100

SOURCE: HAO records through June 1976 for Brown County and December 1976 for St. Joseph County.

[a]Less than 0.5 percent.

dwellings fail, over two-thirds repair them, about 10 percent move, and over a fifth terminate their enrollment. About 80 percent of all enrollees eventually obtain acceptable housing and receive allowance payments. Figure 1 illustrates the relationships.*

REPAIRING FAILED DWELLINGS

More than a quarter of all program enrollees repair their dwellings to qualify for allowance payments. The following pages show that enrollees and their landlords repair many of the dwellings at low cost. First, however, we assess the reliability and representativeness of the repair information.

The HAO learns about initial repairs during deficiency reevaluations. Table 2.4 shows that almost everyone undertakes some repairs before requesting reevaluations. We call those actions *initial repairs* because they usually occur at the onset of an enrollee's participation in the program; but they include some deficiency repairs that follow failed annual, premove, postmove, or reinstatement evaluations.

Most households undertake only one or two repairs. The number shown in Fig. 2 is related to the number of defects, but the correlation is not perfect. The percentage of households undertaking initial repairs declines as the number of deficiencies increases; few households therefore undertake great numbers of repairs.**

The number of repairs crudely reflects the extent of the repair job. Correcting some defects, such as those in the plumbing or electrical systems, may require a number of separate actions. And some repairs (such as installing a handrail) are much simpler than

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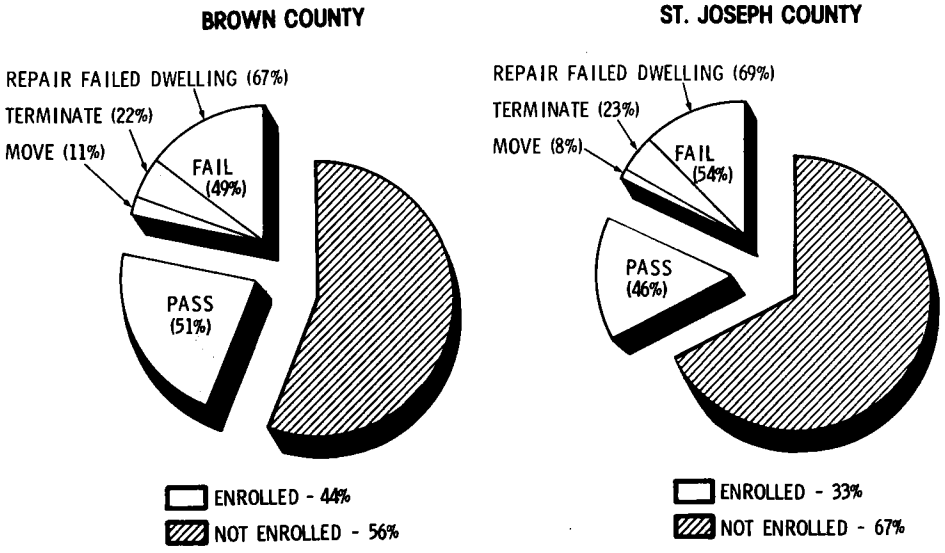
*The number of eligible households--7,963 in Brown County and 15,580 in St. Joseph County--was determined from the baseline survey of households. Enrolled households are those enrolled at the end of the second program year. A total of 1,866 Brown County and 2,734 St. Joseph County households either moved, repaired, or terminated by the end of the second year.

**The data base for the repair analysis is given in Table 1.1.



SOURCE: HAO records through June 1976 in Brown County and December 1976 in St. Joseph County.

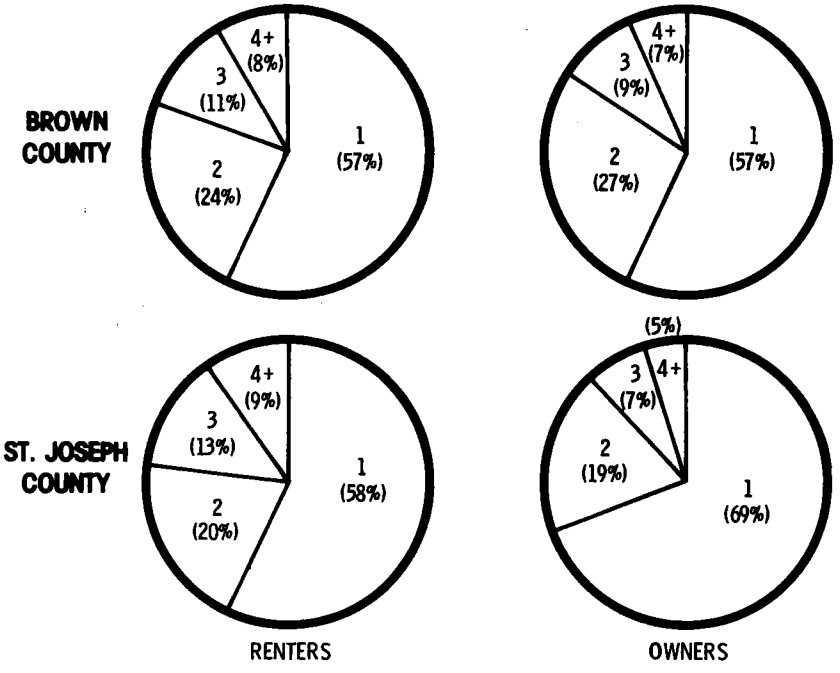
Fig. 1--Participation status of eligible households after initial evaluation

Table 2.4

NUMBER OF INITIAL REPAIRS

Type of Enrollee	Repairs Reported	Dwellings with Initial Repairs	Repairs per Dwelling Reevaluated
Brown County			
Homeowner	918	536	1.7
Renter	1,924	1,056	1.8
All cases	2,842	1,592	1.8
St. Joseph County			
Homeowner	2,535	1,617	1.6
Renter	3,593	1,885	1.9
All cases	6,128	3,502	1.8

SOURCE: HAO records from January 1976 through June 1977.



SOURCE: HAO records from January 1976 through June 1977.

Fig. 2--Percent of households making initial repairs, by number of repairs

others (such as repairing a buckling foundation).

Despite its imperfections, we consider the number of repairs to be a better measure of repair activity than total cash outlays for repairs. For one, many tenants do not know what repairs cost their landlords, but they often remember what was done.* Total cash outlays, on the other hand, are misleading because they do not include value for unpaid labor, even if repairs consist solely of unpaid labor.

What Is Done

Initial repairs (itemized in Table 2.5) range from clearing accumulated debris to re-siding and reroofing entire buildings. Most such repairs overcome health or safety hazards. With allowance

*Rand is currently interviewing a sample of HAO landlords to help resolve the incomplete repair and cash outlay reports for rental properties.

Table 2.5

ITEMIZED INITIAL REPAIRS

Item Repaired	Brown County		St. Joseph County	
	Home-owners (%)	Renters (%)	Home-owners (%)	Renters (%)
Handrail or steps	32	19	33	20
Window, door, or partition	29	35	30	35
Structural component[a]	13	15	13	13
Plumbing system	5	6	10	12
Heating system or vent	10	11	5	6
Electrical system	5	4	4	5
Refrigerator or range	(b)	2	1	3
Grounds or fence	6	8	4	6
Other	(b)	(b)	(b)	(b)
Total	100	100	100	100

SOURCE: HAO records from January 1976 through June 1977. Includes all repairs accounted in Table 1.1.

[a]Structural component repairs are wall, floor, ceiling, roof, foundation, or porch repairs. Category includes painting those items.

[b]Less than 0.5 percent.

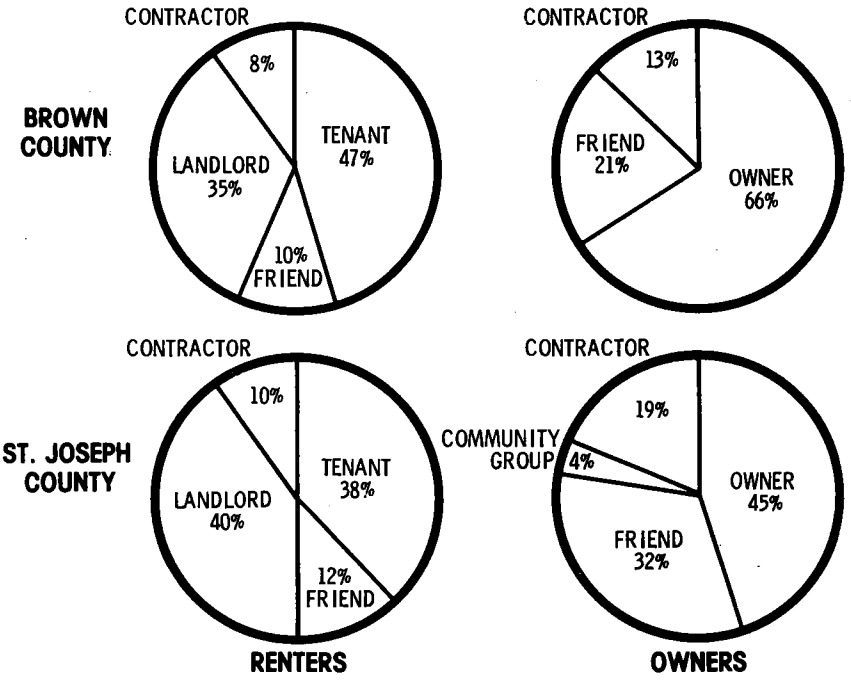
payments as an incentive, enrollees install handrails to forestall stairway accidents, replace broken windows to block drafts and reduce the possibility of injuries, seal leaky vent pipes to prevent asphyxiation, fix plumbing leaks to avoid water contamination, or repair walls and roofs to make them sound and weathertight. A few install cooking facilities, add fire exits, install full bathroom facilities, or completely rewire. Some undertake several such actions, and a few virtually rehabilitate an entire dwelling.

Most initial repairs are not apparent to passersby because they are made inside the home. Over 40 percent in Brown County and 60 percent in St. Joseph County are in the bathroom, kitchen, or other interior rooms. An additional 30 percent in Brown County and 20 percent in St. Joseph County are in the basement. Less than 30 percent touch the building exterior or the surrounding property, the most visible features of a dwelling.

Who Does the Work

Figure 3 shows that nonprofessionals--occupants and their friends--undertake most of the repairs to both owned and rented dwellings. Contractors are used more frequently in St. Joseph County than in Brown County, but in each county, friends of the occupant account for more labor than contractors do.

Whether to hire a contractor is partly determined by the type of housing defect. Enrollees tend to hire contractors for work such as plumbing, heating, or electrical repairs; whereas they allow nonprofessionals to tackle less-specialized tasks. If they are paying for the repairs themselves, enrollees have an incentive to avoid highly paid professionals and use low-cost or free labor. Many low-income households, in fact, make repairs without assistance. And landlords themselves often make repairs to overcome health and safety hazards once tenants inform them about the defects.



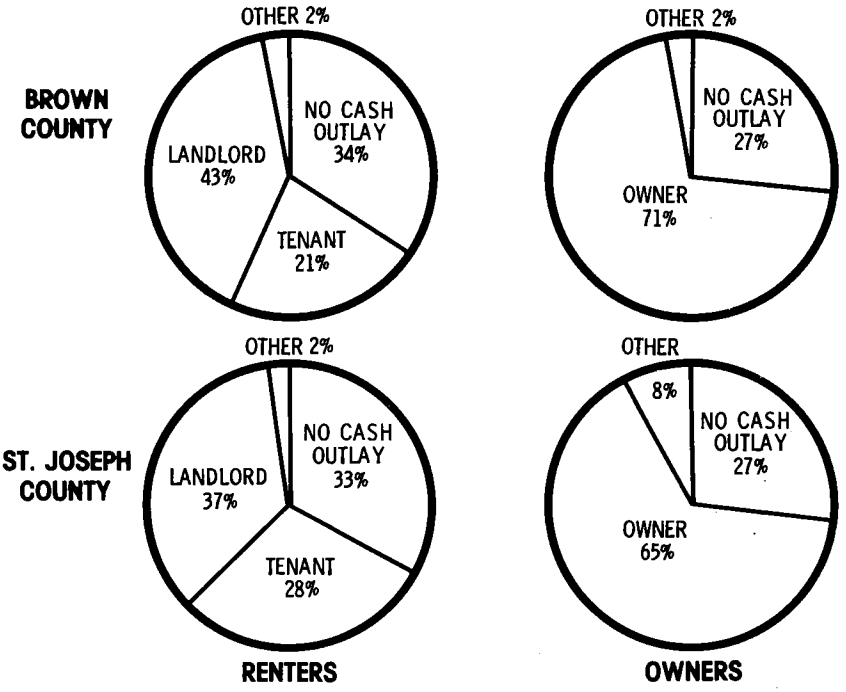
SOURCE: HAO records from January 1976 through June 1977.

Fig. 3--Who does the work for initial repairs?

Who Pays for Repairs

Funds for initial repairs come from a variety of sources, illustrated in Fig. 4. The use of nonprofessional labor is so widespread that a quarter to a third of the initial repairs require no cash outlay. Landlords and tenants each pay substantial shares of the total repair bill for rental properties. Homeowners pay for almost all the purchased labor or materials themselves. St. Joseph County homeowners are the main group tapping other funds, chiefly government grants and loans and donations from relatives and friends. (Appendix E describes the grant and loan programs.)

Only 3 percent of the Brown County and one percent of the St. Joseph County renters report that they and their landlords shared the cost of initial repairs. The amount of the cash outlay has little bearing on who paid the bill; evaluation reports show that both tenants and landlords pay for initial repairs costing hundreds of dollars.



SOURCE: HAO records from January 1976 through June 1977.

Fig. 4--Who pays for initial repairs?

Few enrollees seek outside financial assistance for those repairs. The annual HASE surveys of market intermediaries indicate that neither Brown County nor St. Joseph County lenders receive many requests for home improvement loans, despite the banks' approval of almost 50 percent of the applications.* Personal savings are apparently a far more important source of funds than commercial loans. Other sources, such as gifts or government grants, pay for about 2 percent of the initial repairs.

Cash Outlay

Most initial repairs are inexpensive remedies for dwelling defects. As Table 2.6 shows, three-fourths of the repairs entail cash outlays of less than $25 in Brown County and $30 in St. Joseph County. The median cash expense for both renters and homeowners in both sites is $10. The mean amounts, influenced by occasional high-cost repairs, vary by site and tenure from $40 to $80.

About a fourth of the repairs in each site are made without cash expenditure, using unpaid labor and materials on hand. A dwelling that fails because of a leaking water tap, paint-sealed windows, or unsafe storage of flammable materials can readily be repaired by the occupant with ordinary household tools and a few minutes' work, for example. Some repairs, such as clearing accumulated rubbish, might entail several hours or even a day of unpaid labor without requiring new materials.

At the other extreme, a few enrollees (including both renters and homeowners) report cash outlays of several thousand dollars. Expensive repairs usually remedy HAO-designated defects but include improvements beyond the HAOs' requirements--for instance, remodeling a kitchen or bathroom that failed the evaluation because of leaking plumbing or a defective electrical outlet. A few evaluations reveal

*Sammis B. White, *Market Intermediaries and Indirect Suppliers: First Year Report for Site I*, The Rand Corporation, N-1087-HUD, forthcoming, p. 6; and *Market Intermediaries and Indirect Suppliers: First Year Report for Site II*, The Rand Corporation, N-1101-HUD, forthcoming, p. 35.

Table 2.6

RANGE AND PER-DWELLING CASH OUTLAY FOR INITIAL REPAIRS

Type of Enrollee	Range (percentile) in $				Outlay per Dwelling ($)			
					All Evaluated Dwellings		Repaired Dwellings Only	
	0	25	75	100	Median	Mean	Median	Mean
Brown County								
Homeowner	0	3	24	6,000	10	55	10	55
Renter	0	0	23	5,000	7	38	8	39
St. Joseph County								
Homeowner	0	3	29	10,319	10	78	11	81
Renter	0	2	30	3,030	10	35	10	37

SOURCE: HAO records from January 1976 through June 1977. Includes all repairs accounted for in Table 1.1.

a major hazard or incipient structural failure that had escaped the notice of the owners or occupants; the expenditure of several thousand dollars to repair such defects may not be inspired by the prospect of receiving allowance payments, but the action is nonetheless prompted by the allowance program.

Enrollees who use other sources of funding (the "other" slice in Fig. 4) often report extremely inexpensive or extremely costly repairs. For example, most donated repairs are simply actions performed by unpaid labor at virtually no cost. (Many enrollees who make repairs themselves do just as well, though.) In contrast, the few initial repairs financed by government grants and loans have median and mean cash outlays of $350 and $487 per repair action--a median 35 times as large as that for the enrolled population as a whole and an average of six times as large. One reason for the higher costs is that government-paid repairs almost always include paid labor.

As noted earlier, cash costs are an imperfect yardstick for measuring repairs because they exclude unpaid labor. Only 12 percent of the Brown County and 19 percent of the St. Joseph County repairs involve paid labor of any sort, from either a contractor or a nonpro-

fessional laborer. The lower three-quarters of the distribution consists almost exclusively of payments for materials.

Valuing unpaid labor at any modest wage rate implies that repair costs would be far greater than reported outlays. The HAOs are currently collecting information about unpaid labor used in repairs. Early findings suggest that unpaid labor will at least double the value of initial repairs.

EVALUATING HAO HOUSING STANDARDS

Observers have questioned whether significant housing improvement can be achieved for only $10. Does the HAO somehow enroll only those whose housing is already in excellent condition, except for trivial maintenance failures? Are the HAO's housing standards themselves trivial, ignoring important defects that are common in deteriorated dwellings? Is the evaluation superficial? Are repairs made only by enrollees whose housing defects are minor, the others dropping out of the program?

We conclude that none of those explanations accounts for the facts. The extensive use of unpaid labor is one reason cash repair costs are so low. The more important reason is simply that most housing defects of public concern are easily and inexpensively remedied with amateur labor and readily available materials. If that conclusion is correct, it undermines the premises of housing improvement programs that offer large grants and loans for housing rehabilitation. Below, we examine the evidence.

Are Standards Appropriate?

Rand based the HAO housing standards on model housing codes, existing ordinances in the two site counties, safety literature, and government housing standards, including those used in the census. The HAO housing standards most closely resemble the model codes and existing ordinances, but the standards meet or exceed almost all requirements in any of the sources.

The HAO standards, when different from local housing codes, are generally more stringent. Very few buildings that pass HAO evaluations

would fail a local code inspection, but many dwellings that meet local codes would fail HAO evaluations. The major *differences* between the standards are as follows:

Item	HAO Standards	Local Codes
Refrigerator	Present and in working condition	No provision
Cooking range	Present and in working condition	No provision
Bedroom doors or curtains	Required for privacy	No provision
Site grading	Proper drainage required	No provision, Brown County
Trees and plants	Overgrowth prohibited	No provision
Lead-based paint	Flaking prohibited on exterior and interior walls accessible to children under seven years of age	No provision
Ventilation	Adequate ventilation required--from either an openable window or a mechanical device	At least one openable window measuring 10 percent of floor area
Ceiling height	6'6" over half of each room	7' or more over half of each room
Floor area	70 sq ft per room	Vary with household size
Handrails	Required for six or more permanent steps	No requirement in Brown County; required for stairs with two or more steps in St. Joseph County
Exits	One required from the unit, two from the building	Every outside door should be easily openable from the inside without a key
Basement bedrooms	Two exits required, one of which can be through a window at least 5 ft square, with no dimension smaller than 12 in.	Two exits, Brown County; no requirement, St. Joseph County

Local housing codes are seldom enforced systematically; local inspectors usually respond only to specific complaints. Since most of the defects noted by HAO evaluators also violate local codes, the level of code enforcement in the sites is apparently low.

One way of evaluating the HAO standards is to compare them with another set of housing standards. The Demand and Supply Experiments of the experimental housing allowance program employed different definitions of "adequate" housing. The standards for Abt Associates' Demand Experiment came almost exclusively from model codes, whereas the Supply Experiment incorporated the prevailing housing codes in the two experimental counties as well. The Demand Experiment emphasized lighting and ventilation by requiring a specific ratio of window area to floor area in each room; the Supply Experiment made detailed provisions for stairways and porches, such as the handrail requirement.

The standards have been compared by the Urban Institute.* Housing evaluators from each experiment jointly rated a common sample of housing units using their respective housing standards. Despite the differences in the definition of "adequate" housing, the evaluators agreed on the overall outcome in about 70 percent of the joint evaluations. That congruence confirms our belief that the HAO standards reinforce accepted housing inspection practice.

Even so, the HAO standards contain some debatable elements. Despite the close congruence between HAO standards and local housing codes, some clients have claimed that the standards are too restrictive. The handrail requirement for six or more consecutive steps is probably the most contested provision, but it is in fact more lenient than the present South Bend code.

The HAO standards are occasionally altered to accommodate new evidence about dwelling safety, to clarify existing regulations, or to answer special needs. For example, fears that the ceiling height

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*Joseph J. Valenza, *Program Housing Standards in the Experimental Housing Allowance Program: Analyzing Differences in the Demand and Supply Experiments*, The Urban Institute, Paper 216-30, 1977, p. x.

regulations were too restrictive for some mobile homes and newer dwellings led to a reduction in the minimum standards from 7' to 6'8", and then later to 6'6". Concern generated by a serious fire in Brown County (not in an enrollee's home) prompted the requirement that basement sleeping quarters have an outside exit.

There is nevertheless some ambiguity in the notion of adequate housing. We cannot claim that the HAO standards are the ideal set of housing requirements, but they do reflect tested housing inspection theory and practice. The standards impress us with their consistency across applications and their flexibility in accommodating different dwelling types and construction techniques.

Are Evaluations Thorough?

The HAO housing evaluation encompasses an entire dwelling. Well-trained evaluators, using explicit standards, inspect every interior room, the basement, the building exterior, and the surrounding property. HAO supervisors report that most evaluations take approximately 25 minutes, although large or seriously deteriorated dwellings may take 40 minutes or more to evaluate.

The evaluators pay special attention to hidden, complicated, or specialized features that may escape residents' attention. They check the electrical outlets in every room and the circuit breaker or fuse box. They follow the vent pipes to see if they are properly routed and sealed. They check the presence and condition of safety features such as water-heater release valves and electrical fuses. Searching for signs of structural damage, they look into built-in cabinets and behind doors; and they check for structural weaknesses. They also inspect every window.

HAO evaluation supervisors randomly reevaluate dwellings. The cumulative error rate--dwellings given incorrect overall ratings--is only 3 percent. The two HAOs exchange staff to perform cross-site quality control comparisons; the error rate has been only slightly greater. We conclude that the 20 evaluators in the two sites effectively and consistently administer the housing standards.

HAO inspection practices are equal or superior to those made for national housing programs such as Federal Housing Administration mortgage insurance, public housing, or Section 8 existing housing. Some programs use checklists of standards, as does the HAO, but no other program consistently inspects every dwelling every year. Moreover, the HAO standards are extremely explicit, and accordingly leave little to an individual evaluator's discretion.

Does the Allowance Program Benefit Only Well-Housed Enrollees?

Any resident of Brown or St. Joseph County may apply to the allowance program. Income, assets, and family composition determine whether a household is eligible to enroll. Although enrollment does not depend on initial housing conditions, enrollees must locate acceptable housing before they can receive allowance payments.

If enrollees' housing problems are typical for low-income households in general, the housing allowance program would provide sufficient means and motivation for overcoming most of the nation's housing problems. If, however, households with the worst housing fail to apply, housing deficiencies in the low-income population would be more serious and resistant to correction than program experience indicates.

We can measure the share of defective dwellings affected by the allowance program by comparing estimates of the total number of substandard dwellings with the number of dwellings inspected and failed by the HAO. In Table 2.7, the number of substandard dwellings evaluated is the number of failed initial evaluations during the first two years of the program. The counts of substandard dwellings come from the screening surveys that Rand conducted before commencing program operations.

There is no direct correspondence between the screening survey questions and the HAO checklist, but the correlation is high enough that the survey results provide a benchmark against which to calculate the percentage of substandard dwellings in the two counties

Table 2.7

SHARE OF ALL DWELLINGS AND ALL SUBSTANDARD DWELLINGS EVALUATED BY THE HAO

Site and Tenure	All Dwellings			Substandard Dwellings Only		
	County Total	Units Evaluated		County Total	Units Evaluated	
		Number	Percent		Number	Percent
Brown County						
Homeowner	34,775	1,892	5	(a)	970	(a)
Renter	13,443	2,654	20	2,702	1,287	48
St. Joseph County						
Homeowner	58,710	3,535	6	5,284	1,896	36
Renter	16,943	2,831	17	4,168	1,701	41

SOURCE: HASE screening surveys; baseline surveys of tenants, homeoenrs, and landlords; and HAO management information reports through June 1976 for Brown County and December 1976 for St. Joseph County.

[a]Not available, but recoverable.

that the HAO has evaluated.* The comparison shows that the HAO, although it has evaluated only a small fraction of all dwellings, has inspected between one-third and one-half of the counties' substandard dwellings (refer to the table). As more dwellings are evaluated later in the program, those fractions will surely rise.

To validate our estimates, we measured the number of evaluated dwellings containing specific defects as a ratio of the weighted number of households reporting those defects in either the 1970 census or the annual HASE surveys of homeowners and renters. The validation figures, although less precise than those from the screening survey comparison, suggest that the HAOs have evaluated an even greater share of dwellings with serious housing problems.

One problem in comparing HAO data with other counts of substandard dwellings is that there are differences in the way the information

*The screening survey included questions about number of habitable rooms; complete (and not shared) plumbing and kitchen facilities; electricity, heating, and ventilation in habitable rooms and bathrooms; and heating system vents.

is collected. For one thing, HAO information is gathered by trained evaluators, whereas most surveys rely on unverified respondent reports. For another, most information from other sources reflects a reporting period of a few months to a year; in contrast, the HAOs collect continuous information, with many reporting periods overlapping two calendar years. Furthermore, there is the durable problem of arriving at an accurate count of the pool of all defective dwellings. We will not be surprised if more data and further research prove the ratios given in Table 2.7 to be underestimates.

Do Repair Costs Inhibit Participation?

We originally believed that excessive repair costs would be the main obstacle blocking enrolled households from receiving allowance payments. Knowing what it cost enrollees to undertake different categories of initial repairs, we partially tested our hypothesis by calculating the likely repair bills for dwellings that were not repaired. Expected repair costs were surprisingly low for unrepaired dwellings. If our calculations are correct (we are refining them based on more detailed information), repair costs alone do not explain why more households do not qualify their housing.

In calculating the hypothetical costs, we first linked initial repairs (organized in 32 categories) to the 38 deficiency standards (the correspondence is given in Appendix D). The HAOs collect detailed information about dwelling repairs, primarily for research purposes, on a form that is entirely converted into machine-readable records. Evaluators keep written notes about each defect including the item, location, and severity of the problem, but the machine records include only general summary ratings for each standard.*

We next determined standard cash outlays for repairing each defect. We used homeowners' reports rather than renters' because the latter's are often incomplete. Without knowing what procedure--repair,

*The HAOs began providing more detailed information about deficiencies in September 1978.

replacement, installation, etc.--was appropriate, or whether paid labor or materials were required, we estimated a single standard value for each deficiency.*

We estimated the total cost of bringing a dwelling up to HAO standards as the sum of the standard repair costs for each noted defect. The estimates are rough in that enrollees are least likely to repair or report serious or costly variants of the defects; for example, a house might require repairs to 12 windows, whereas the average repair cost might apply to enrollees who repaired only one or two windows. Some standards, such as No. 8, "stairways, porches, and railings," include several features, each of which might require repairs in a seriously defective dwelling. In addition, households who do not repair might use a more costly mix of repair factors than those who do. Consequently, the estimates understate the cost of qualifying defective housing.

We then determined if a client's next action after initial evaluation failure was to undertake repairs, move to another dwelling, or terminate enrollment. Table 2.8 shows that estimated repair costs are greater for households who do not repair (i.e., who move or terminate). Interestingly, there is little difference between households who move and those who terminate. Although the differences between households who repair and those who do not are significant at the 0.01 level, no amount significantly exceeds the average monthly allowance payment of about $73. Those findings, while preliminary, suggest that few households require front-end financing for inexpensive repairs.

Evidence on why households--particularly those who never receive payments--allow their enrollment in the program to terminate also supports the notion that repair costs are not an important barrier to receiving allowances. During the first two years of program operations, 680 clients in Brown County and 1,039 in St. Joseph County

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*That value is similar to the mean in a regression equation. Once we have additional information on defects, we can employ full regression analysis described in Appendix F to predict repair costs for those items.

Table 2.8

ESTIMATED COST OF INITIAL REPAIRS BY ACTION AFTER EVALUATION FAILURE

Action	Estimated Cost ($)			
	Brown County		St. Joseph County	
	Homeowners	Renters	Homeowners	Renters
Repair	22	24	38	42
Move	(a)	37	(a)	83
Terminate	48	36	75	72

SOURCE: HAO records through June 1976 for Brown County and December 1976 for St. Joseph County.

NOTE: Estimates are based on individual deficiency reports and a standard cost for repairing each deficiency. Standard costs are modeled from homeowner repair records. Entries are based on initial evaluation deficiencies for 771 owners and 957 renters in Brown County; and 1,379 owners and 1,147 renters in St. Joseph County.

[a]Too few cases for estimation.

terminated their enrollment without ever receiving payments. The HAO termination records do not always indicate why households terminate, but only 10 percent of the terminees in Brown County and 3 percent in St. Joseph County reported that problems in meeting the housing standards motivated their decision. The percentages were higher for owners than renters, and holding tenure constant, higher for the elderly than for the nonelderly; nevertheless, housing problems did not account for even as little as one-fifth of the terminations in any category.

A remaining problem is that the HAOs often lose contact with households who enroll and never receive payments. Consequently they never learn about obstacles the households encounter. The St. Joseph County HAO and Rand are independently collecting relevant information. Early findings from the HAO survey suggest that repair costs are only

one of several factors, including client motivation, that reduce the percentage of enrollees who receive payments.*

We believe that many enrolled households determine that the physical, mental, and pecuniary costs of obtaining acceptable housing exceed the perceived program benefits. Enrollees could make that decision because (1) The expected allowance payments could be insufficient motivation for taking action--some enrollees would receive as little as $10 per month for as few as six months. (2) The expected repair or moving costs might exceed the benefits, however large, particularly if enrollees paid for professional help in making the required changes. (3) Enrollees might not consider the full value of the benefits when weighing costs against benefits; compliance costs are often a one-time expense, whereas allowance payments last for months or years. (4) Despite a desire to qualify for payments, some enrollees lack sufficient incentive, interest, ability, cash reserves, or credit to resolve the housing problems that prevent them from qualifying. The number of households terminating without receiving payments is comparatively small, however. More than four out of five households successfully, sometimes after several attempts, have qualified their housing.

Are Low-Cost Repairs Durable?

Knowing that most initial repairs are low-cost and made by participants, one might wonder if the defects are properly and durably corrected. Evaluators check the repairs during deficiency reevaluations to answer just that question. And they come back after a year to see whether the dwelling, including all previous repairs, still meets program standards.

The durability of initial repairs rests on the outcome of the annual evaluations. If dwellings fail annual evaluations for the same reasons they failed the initial evaluation a year earlier, the initial repairs would seem temporary rather than durable improvements.

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*Judy Broecker, consultant to the St. Joseph County HAO, performed this analysis.

If dwellings fail for new reasons, some components other than those initially repaired must in the meantime have deteriorated below HAO standards.

To analyze the quality of initial repairs, we matched evaluation records according to client and housing identifying codes, in correct temporal order. We used audited defect records through year 2 in St. Joseph County, and unaudited (but current) records through year 3 in Brown County. Repair information came from the 18-month repair study. Data from the two sources overlapped 18 months in Brown County (January 1976 through June 1977) and 12 months in St. Joseph County (January 1976 through December 1976). The record matching probably excluded households with short program histories, such as temporarily unemployed and mobile households, but included a representative sampling of other enrollees.

Recurring defects do not always mean that an initial repair failed, largely because of the multiplicity of items in each standard. For example, if a household repaired the one rotten window out of ten in its dwelling, it would then qualify under the checklist standard for windows. A subsequent annual evaluation failure under the same standard would not signify that the previous repair had deteriorated--another window might have decayed, or any of the ten could have newly broken panes. None of the 38 items is free from this problem; the durability estimates accordingly overestimate the rate at which repaired items become defective.

All qualifications aside, Table 2.9 shows that only about 10 percent of initial repairs recur as defects in annual evaluations up to a year later. Recurring defects are more common--although infrequent in all groups--for renters than for homeowners, and more frequent in St. Joseph County than in Brown County. Initial repairs done by contractors are no more durable than those by nonprofessionals. For owners, recurring defects violate several different housing standards; problems with windows account for more than half the recurrences for renters.*

*Window defects are often fixed at no cost by freeing stuck or sealed window frames.

Table 2.9

INITIAL REPAIRS RECURRING AS ANNUAL EVALUATION DEFECTS

Type of Enrollee	Records Matched	Recurring Defects (Records)	
		Number	Percent
Brown County			
Homeowner	94	5	5
Renter	149	15	10
St. Joseph County			
Homeowner	80	8	10
Renter	111	17	15

SOURCE: HAO records from January 1976 through June 1977 in Brown County and December 1976 in St. Joseph County.

We therefore conclude that most initial repairs are lasting dwelling improvements, and that the transition from acceptable to unacceptable conditions is usually the result of normal deterioration rather than careless or improper repairs.* Although most households bring their dwellings up to HAO standards with only some unpaid labor and a small cash outlay, that effort cannot ensure that other features of the dwelling will continue to meet the standards. The cost and inconvenience of making repairs is therefore a recurring burden for many allowance recipients. Just as a little effort can generally bring a dwelling into conformance with program standards, a little neglect can allow it to deteriorate below them.

SUMMARY

About half the program enrollees live in dwellings that are too small, have inadequate facilities, or present health or safety hazards.

*Durable initial repairs do not necessarily add to the life of a dwelling. Repairs such as sealing a leaky heating vent or replacing a broken window improve health or safety hazards--they do not directly extend the useful life of the furnace or the window frames. Most actions that add to the life of a dwelling are often voluntarily done as annual repairs--the subject of Sec. III.

Most of the hazards could be corrected without cash assistance, but the enrollees are either unaware of the problems or unconcerned about the consequences. Housing evaluations have identified thousands of defects overlooked by local code enforcement authorities.

The allowance program provides an incentive for repairing substandard homes. During the first two years of program operations, over 3 percent of the dwellings in both Brown and St. Joseph counties were improved as a consequence of the program. Households who chose to move elsewhere also improved their housing.

Repair costs do not appear the main barrier to housing improvement. Initial repairs are surprisingly inexpensive, because participants and their landlords do most of the work; the repairs are also durable. We are still investigating why all households do not repair their dwellings.

III. VOLUNTARY DWELLING REPAIRS

It is commonly believed that low-income households and their landlords maintain their dwellings only minimally. Since many allowance recipients make initial repairs to qualify their housing, one might suppose that few of those households, or their landlords, would make voluntary repairs (ones not required to correct defects) in the year following certification. HAO administrative records strongly contradict such preconceptions, however.

As part of the recertification process that authorizes an enrollee to continue receiving allowance payments, one year after the enrollment interview and at yearly intervals thereafter the HAO reevaluates each current enrollee's dwelling. In a procedure identical to the initial evaluation, a housing evaluator checks all parts of the dwelling and its property to determine if the unit still passes the 38-point checklist. If the unit fails the annual evaluation, payments are suspended unless remedial action is taken within 75 days.*

Over 70 percent of the recipient homeowners and 40 percent of the renters report some voluntary repairs in the annual evaluation. The repairs often remedy structural defects such as deteriorated walls, floors, ceilings, or roofs. Surprisingly, many are expensive--partly because of the extent of the work, and partly because more paid labor is used. Some are so large or costly that households stage them over several years.

This section considers the repairs enrollees report during annual evaluations. It investigates which households undertake the repairs, what items are repaired, and how much the repairs cost. It then discusses their importance in forestalling future evaluation failure.

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*With the exception noted on p. 7.

ANNUAL REPAIRS

Repairs reported during the annual evaluation, called *voluntary annual repairs*, are not required, but the evaluator records information about them for research purposes. The reporting period for annual repairs extends up to 12 months for households who passed their last regularly scheduled (initial or annual) evaluation, or a somewhat shorter period for households requesting additional (deficiency, premove, or postmove) evaluations. Since enrollment interviews are evenly scheduled, the reporting period seldom coincides with a calendar year.

Our information comes from the 18-month repair study. Reported repairs were made up to one year earlier (between January 1975 and June 1977), but each record reflects one year's repair activity. Since some enrollees had two annual evaluations during the study, they furnished information about two reporting periods, each lasting approximately a year.

The procedure for collecting data about annual repairs is similar to that used for initial repairs. The evaluator asks about any repairs made to the dwelling in the past year. Because of the long recall period, enrollees are most likely to remember large or costly repairs, and those most recently completed. The method thus results in a low count of total repairs. Estimates of voluntary annual repair activity should therefore be considered lower bounds on the true amounts.*

More than half the enrollees reported undertaking voluntary annual repairs in the year prior to the annual evaluation. Table 3.1 shows that nearly twice as many homeowners as renters make such repairs. As with other repairs, renters often are unaware of annual repairs made by their landlords, but they describe all known repairs whether they or their landlord initiated them. Once we obtain a full

*Fewer than 0.2 percent of enrollees report the same repair (at approximately the same cost) in two years' annual evaluations. Anecdotal evidence from the evaluators suggests that the reverse is far more common: households think a repair is more than a year old and fail to report it.

Table 3.1

NUMBER OF VOLUNTARY ANNUAL REPAIRS

Type of Enrollee	Repairs Reported	Dwellings with Annual Repairs	Repairs per Dwelling	Repairs per Repaired Dwelling
Brown County				
Homeowner	2,568	957	2.0	2.6
Renter	1,427	690	.9	2.0
All cases	3,995	1,647	1.5	2.4
St. Joseph County				
Homeowner	4,205	1,546	2.0	2.7
Renter	1,147	564	.9	2.0
All cases	5,352	2,110	1.6	2.5

SOURCE: HAO records from January 1976 through June 1977.

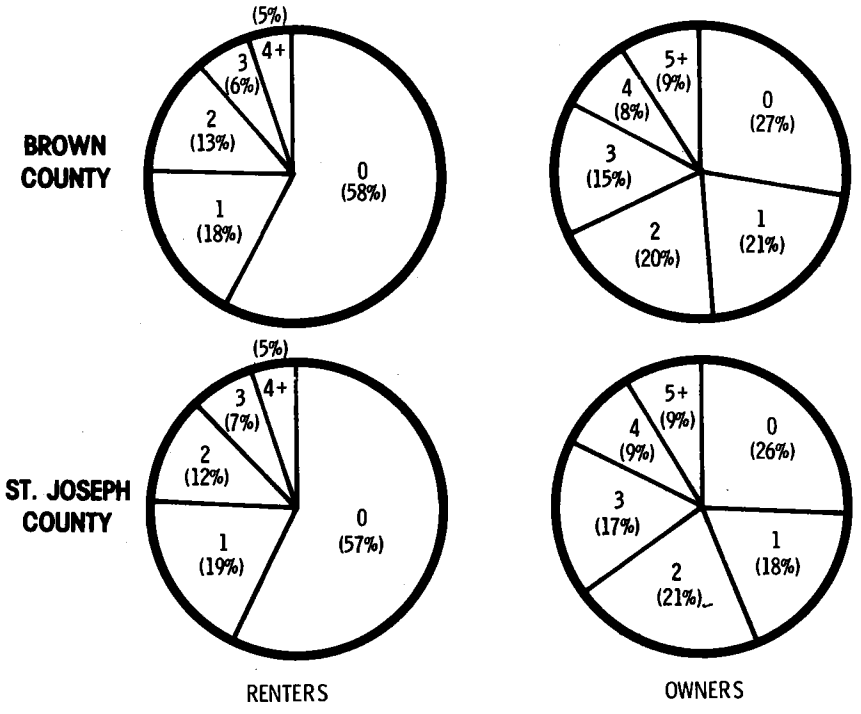
count of landlords' repairs, the gap between homeowners' and renters' reports should narrow.

Enrollees who report any repair activity make on the average 2.5 separate repairs per dwelling (see Fig. 5). We suppose that enrollees let several repairs accumulate, then do them all at once. For example, a household might wait several years to repair the roof. Once the ladders are against the roof, they might also paint the gables and repair the gutters.

What Is Done

Structural components are the most frequently repaired items, as Table 3.2 shows, representing over half of all voluntary annual repairs. Unlike initial repairs (compare Table 2.5), enrollees make comparatively few voluntary repairs to handrails, steps, windows, or doors, or to refrigerators or ranges (the only portable parts of a dwelling the HAOs evaluate).

The emphasis of annual repairs on structural components and plumbing suggests only part of the difference between initial and annual repairs. Even when the same item is repaired, voluntary annual repairs are usually more difficult and more expensive. As an example, the most frequent initial repair to windows is prying open one that



SOURCE: HAO records from January 1976 through June 1977.

Fig. 5--Percent of households making voluntary annual repairs, by number of repairs

is stuck, whereas more common annual repairs to windows are replacing a sash or installing storm windows.

Voluntary annual repairs are also highly visible. Over one-third are made to the exterior of a dwelling, or to the surrounding property,* another third, to the bathroom, kitchen, or livingroom. Basements, the most frequent site of initial repairs, account for less than 10 percent of the annual repairs. Enrollees apparently remedy most of the basement hazards in initial repairs, then concentrating their efforts on the parts of the dwelling they most frequently use.

*Painting accounted for a quarter of the voluntary annual repair actions in both counties. Some doubtlessly improved the appearance of enrollees' dwellings, but much of it was part of complicated structural repairs such as repairing or re-siding walls. Painting, often an expensive repair, retards many forms of structural decay, and (for households with children) helps prevent lead-based paint poisoning.

Table 3.2

ITEMIZED VOLUNTARY ANNUAL REPAIRS

Item Repaired	Brown County		St. Joseph County	
	Home-owners (%)	Renters (%)	Home-owners (%)	Renters (%)
Handrail or steps	3	3	3	3
Window, door, or partition	10	9	10	13
Structural component[a]	54	58	49	50
Plumbing system	13	12	20	22
Heating system or vent	4	3	5	3
Electrical system	3	4	3	3
Refrigerator or range	2	4	2	1
Grounds or fence	6	4	5	3
Other	5	3	3	2
Total	100	100	100	100

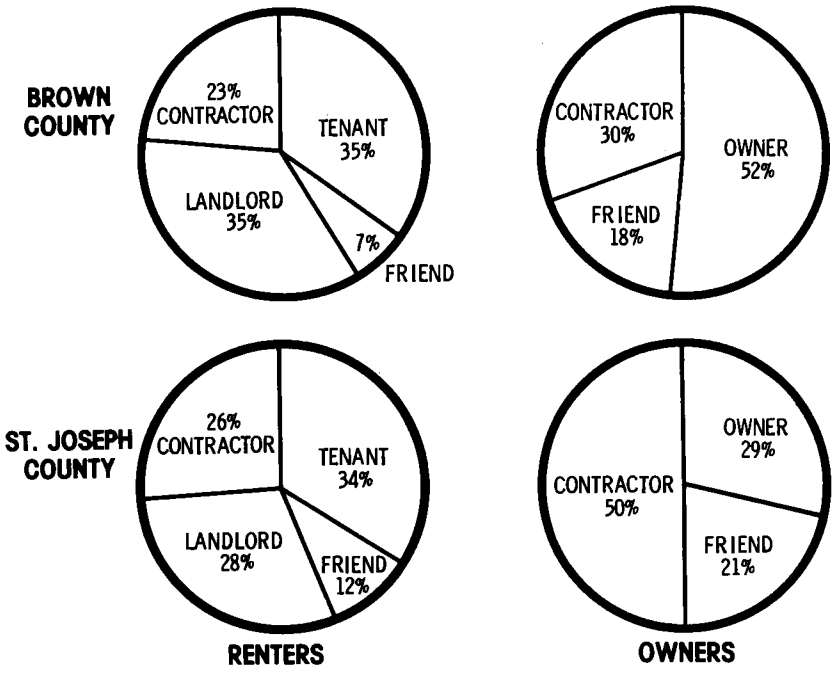
SOURCE: HAO records from January 1976 through June 1977. Includes all repairs accounted in Table 1.1.

[a]Structural component repairs are wall, floor, ceiling, roof, foundation, or porch repairs. Category includes painting those items.

Those findings suggest that few voluntary repairs fix items that would fail subsequent evaluations. For example, the two categories representing about 70 percent of the annual repairs (plumbing and structural components) account for only slightly more than 20 percent of the initial repairs. In addition, annual repairs commonly replace or install an item, whereas initial repairs usually repair it. That evidence, with the findings cited above, suggests that no more than 10 to 15 percent of the repairs made voluntarily would have been required by later evaluations.

Who Does the Work

Despite the complexity of voluntary annual repairs, occupants and landlords undertake much of the work themselves. Figure 6 shows that contractors are hired for a larger share of the voluntary than of the initial repairs. Even so, nonprofessionals perform half to three-fourths of all annual repairs, including more of the work on



SOURCE: HAO records from January 1976 through June 1977.

Fig. 6--Who does the work for voluntary annual repairs?

rental properties than on owner-occupied homes. Landlords, often having developed extensive repair skills themselves, are less likely to hire outside contractors.

Owners, particularly those in St. Joseph County, employ contractors to complete annual repairs more frequently than do other groups. Elderly households and households headed by single persons with children own a high percentage of those dwellings, and they probably require more assistance in undertaking heavy repairs. Even so, nonprofessionals complete half the St. Joseph County repairs for owner-occupied dwellings and 70 percent in Brown County.

Although occupants can accomplish many voluntary annual repairs, they are more likely to seek assistance for difficult, dangerous, or inconvenient repairs, especially to plumbing. Determining the added cost of a contractor is not as easy as comparing reported cash outlays, because contractors typically make more substantial repairs.

Part of the difference in the cash outlays is due to the greater difficulty of the repair, and part to the payment for labor.*

Cash Outlay

Voluntary annual repairs cost much more than initial repairs. As Table 3.3 shows, half the homeowner recipients in Brown County spend more than $105 for annual repairs, and homeowners in St. Joseph County spend about $125; figures for initial repairs (compare Table 2.6) are one-tenth as large, $10 to $11. Because not everyone makes annual repairs each year, the median cash outlay for homeowners undertaking repairs the year preceding the annual evaluation is about double that for all homeowners. Renters, and their landlords, to the extent we know of their repairs, spend less--both in terms of cash outlays for all dwellings evaluated and for dwellings repaired.

There is a wide variance in the cash outlays enrollees report for annual repairs. Many actions involve substantial cash outlays, the greatest amounts exceeding $20,000. The interquartile range for annual repairs (the middle half of the repair cash outlays) occupies a range ten times that for initial repairs.

Who Pays for Repairs

Almost all voluntary annual repairs require cash outlays (Fig. 7). Landlords and tenants each pay for many of the repairs to their dwellings, but fewer than 5 percent of the renter enrollees report that they and their landlord shared the cost of repairs. As with initial repairs, some landlords apparently pay for almost all the repairs to their properties, while others rely on their tenants for those repairs.

Substantial repair expenses require ready funds, and several government programs offer assistance to low-income households. Although

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*The only information we have about the difficulty of repairs comes from the repair report form, which records what was repaired and whether labor or materials were required. The payment for labor appears in the regressions for initial repairs (Appendix F) as the subtraction element for no paid labor. Similar regressions for annual repairs suggest that the overall cash outlay depends as much on the payment for labor as on the difficulty of the repair.

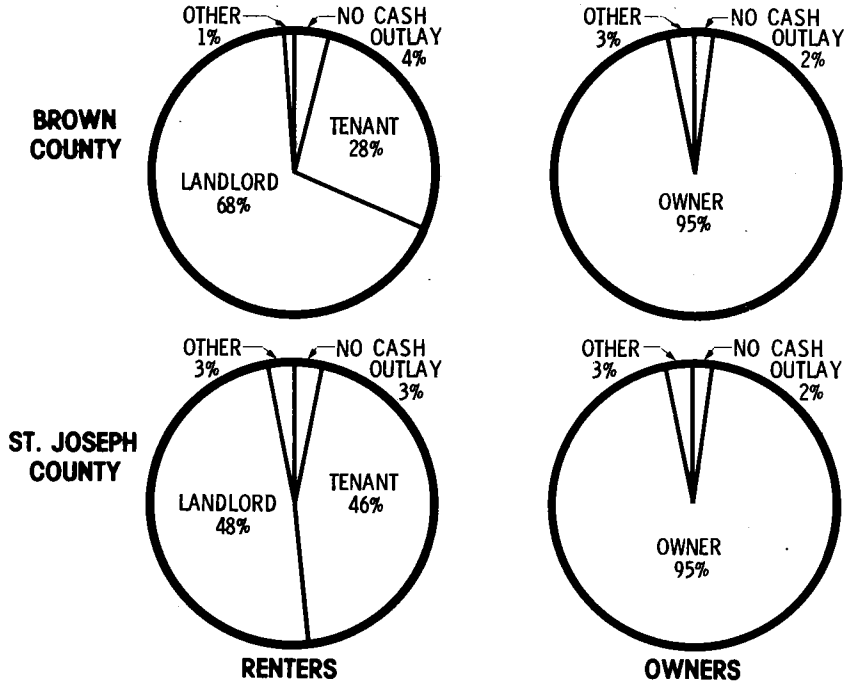
Table 3.3

CASH OUTLAY FOR VOLUNTARY ANNUAL REPAIRS

Type of Enrollee	Range (percentile) in $				Outlay per Dwelling ($)			
					All Evaluated Dwellings		Repaired Dwellings Only	
	0	25	75	100	Median	Mean	Median	Mean
Brown County								
Homeowner	0	0	355	10,000	105	324	210	437
Renter	0	0	46	10,500	(a)	88	65	202
St. Joseph County								
Homeowner	0	0	412	10,088	125	347	250	467
Renter	0	0	65	20,123	(a)	116	75	269

SOURCE: HAO records from January 1976 through June 1977. Includes all repairs accounted in Table 1.1.

[a]Less than 50 percent repaired.



SOURCE: HAO records from January 1976 through June 1977.

Fig. 7--Who pays for voluntary annual repairs?

Green Bay (in Brown County) and South Bend and Mishawaka (in St. Joseph County) have grant and loan programs, partially financed with Community Development Block Grant entitlements, we found that few allowance recipients use those funds.

Government funds are used for only a small fraction of the repair actions, but they account for more of the cash outlays. Nine homeowners--three in Brown County and six in St. Joseph County--report undertaking voluntary annual repairs using government funds. The cash outlay averaged $375 in Brown County and $513 in St. Joseph County; it was almost always for contracted repairs and included hired labor. Removing such repairs, which are inconsequential compared with other reported voluntary repairs, from our calculations would not change the mean and median cash outlay per repaired dwelling.

Some enrollees, mostly the elderly, receive housing repairs as gifts from relatives and friends. Brown County renters report 12 voluntary annual repairs as gifts, and St. Joseph County renters report 17. Homeowners report 43 gift repairs in both Brown and St. Joseph counties. Compared with other voluntary annual repairs, gift repairs are slightly less expensive. The average Brown County cash outlay is $72; in St. Joseph County it is $117. There is not much difference between homeowners and renters in Brown County, but homeowners pay more in St. Joseph County. Cash outlays almost exclusively pay for materials rather than labor, except for St. Joseph County homeowners, who are much more likely than other groups to hire contractors.

Most enrollees undertaking voluntary annual repairs have not received financial assistance from friends, relatives, or the government, nor have they applied for commercial loans. If trends continue, less than one in twenty enrollees will apply for outside financing. The inescapable conclusion is that enrollees pay for most voluntary annual repairs with cash on hand, or they expect to pay in installments. Some enrollees reportedly set aside part of their allowance payment for home repairs and improvements, despite the fact that the HAOs make no such requirement. Whatever the source of funds, most recipient homeowners, and many recipient renters, manage to make several voluntary repairs a year.

DWELLING DETERIORATION

Some voluntary repairs make a dwelling more livable (most annual repairs are located in highly accessible parts of the dwelling); others extend the life of the dwelling (over half the annual repairs are to structural parts of the building). Many such repairs have high "consumer appeal" because they are visible improvements. Nevertheless, most voluntary repairs do not forestall future evaluation failure; defects are often present when the evaluator returns a year later.

Almost all annual evaluations are failed because of health or safety hazards. The source of the hazards may be apparent only after a thorough evaluation of the dwelling. We suspect that many households pay little attention to such hazards, perhaps reasoning that remote or unseen hazards cannot be serious. We have evidence that households ignore the consequences when there is a small, but not inconsequential, probability of a large loss. Whatever the reasons, comparatively few recipients or their landlords voluntarily repair health or safety hazards.

We are not surprised that so many hazards are not remedied before the next evaluation. If the repairs are little valued, an enrollee would likely purchase other, more preferred, goods or services. Moreover, the allowance program offers few incentives to repair possible safety defects. Recipients have up to 75 days to make required repairs before losing their allowance payments; by waiting until defects are cited, they can avoid making repairs not in fact required by the HAO.

The threat of losing allowance payments because of an unacceptable evaluation is apparently more important than the threat of danger or harm in influencing recipients to repair some hazards. Enrollee households, like other consumers, surely seek what they determine to be the best value for their money. To many, that means visible, durable, or glamorous goods. Remodeling a kitchen, installing a shower, or paneling a room appeals to many; replacing a defective fuse box, repairing damaged vent pipes, or sealing leaks in the basement does not.

Evaluation Failures

Despite the fact that more than four out of ten renters and seven out of ten homeowners report undertaking voluntary annual repairs, the dwellings for many of those same households fail the annual evaluation. As shown below, the failure rate for annual evaluations is surprisingly high and varies by location and tenure:

	Percent of Brown County Annual Evaluations	Percent of St. Joseph County Annual Evaluations
Homeowners	19.8	33.9
Renters	20.8	43.8

The failure rates are high for all groups, regardless of whether they report voluntary annual repairs. In Brown County, homeowners who report voluntary annual repairs fail one percent less often than those who do not; in St. Joseph County, they fail 6 percent less often. Renters reporting voluntary annual repairs fail about 3 percent *more* often in both sites. There is considerable self-selection in whether or not a household or landlord decides to repair a dwelling, and we cannot judge whether those households would fail more or less often if they did not undertake voluntary annual repairs. The small differences in annual evaluation failure rates between groups of clients are not nearly as important as the high proportion of dwellings failing the annual evaluation, whether or not they were repaired.

The items repaired, not the cash outlays, seem to have the greatest influence on annual evaluation outcomes. There is almost no correlation between total repair cash outlays and evaluation result. Households who report repairing structural items such as walls, floors, foundation, or porches fare better at the next annual evaluation than households who report repairing plumbing or electrical systems; perhaps the structural repairs are more durable, whereas the others represent delayed maintenance to utilities.

Recurring Repairs

Regardless of evaluation success, many households report having undertaken the same class of repairs in two successive housing evaluations. There are two possible explanations. First, some parts of a dwelling might be extremely nondurable or require periodic maintenance. Second, extensive or costly repairs might be undertaken in stages as money and time become available.

Homeowners are more likely than renters to have an initial repair recur as a subsequent annual repair (they are also much more likely to undertake annual repairs in any given year), and there is almost no difference between enrollees in the two sites (see Table 3.4). Windows account for over 40 percent of the recurring repairs, walls an additional 20 percent. Handrails, accounting for almost a quarter of the recurring repairs in St. Joseph County, are far less common as repairs in Brown County.

Initial repairs followed by annual repairs involve items repaired to qualify housing for allowance payments. The median cost of the prior initial repair actions is low, approximately $1 in Brown County, and $5 in St. Joseph County. The subsequent median annual repair costs are about ten times as great in both counties. If enrollees remake previous repairs, they choose a more expensive path the second time. They may not be repairing the same items, either; almost all

Table 3.4

INITIAL REPAIRS RECURRING AS ANNUAL REPAIRS

Type of Enrollee	Records Matched	Recurring Repairs (Records)	
		Number	Percent
Brown County			
Homeowner	113	20	18
Renter	172	14	8
St. Joseph County			
Homeowner	419	70	17
Renter	352	24	7

SOURCE: HAO records from January 1976 through June 1977.

the repeated repairs involve items (such as windows) that occur in many parts of the dwelling. Even so, enrollees tend to make new, more durable repairs to parts of the dwelling that proved troublesome in a previous evaluation.

Annual repairs recurring in two subsequent housing evaluations (Table 3.5) are much more common than initial repairs recurring as annual repairs. Homeowners and renters report about the same incidence of repeated annual repairs in Brown County; but in St. Joseph County, homeowners report four times as many as renters. Wall repairs account for over 45 percent of the repeated annual repairs. The remaining distribution is diffuse, with no other repair action accounting for more than 10 percent of the total.

Recurring annual repairs require about the same mean and median cash outlays. The emphasis of the repairs on walls suggests that enrollees may repair one or more rooms in one year and the remainder in subsequent years. The low incidence of repeated repairs to heating, plumbing, and electrical systems suggests that few households make recurring repairs to troublesome utilities. We conclude that recurring voluntary annual repairs are commonly undertaken in stages, such as repainting the interior of a house.

Table 3.5

RECURRING ANNUAL REPAIRS

Type of Enrollee	Records Matched	Recurring Repairs (Records)	
		Number	Percent
Brown County			
Homeowner	284	78	27
Renter	267	66	25
St. Joseph County			
Homeowner	389	170	44
Renter	198	20	10

SOURCE: HAO records from January 1976 through June 1977.

SUMMARY

After qualifying their housing for allowance payments, many households, or their landlords, voluntarily make annual repairs. Of high visibility and consumer appeal, most such repairs extend the structural life of the dwelling or make it a more desirable place to live. Many involve substantial money and effort. Owners and occupants occasionally hire professionals, but more often than not, they do the work themselves.

Undertaking annual repairs is voluntary and does not affect an enrollee's allowance payment; enrollees or their landlords make the repairs to increase their satisfaction or financial rewards from their dwellings. Enrollees commonly break large jobs into several smaller projects.

Having crossed the threshold to receiving allowance payments, many households allocate a significant fraction of their augmented income to improving their housing beyond HAO requirements. But few enrollees voluntarily repair items that the HAOs, and presumably society, judge important for their health, safety, and well-being. The voluntary repairs owners and occupants make are often insufficient to check deterioration, and many recently repaired dwellings fail annual evaluations. That finding underscores the importance of annual evaluations to ensure that enrollees' dwellings, regardless of voluntary repairs to them, do not develop serious defects.

IV. REPAIRS BY SPECIAL PARTICIPANT GROUPS

Public programs that benefit one segment of the population may at the same time slight others. We have seen that most HAO enrollees qualify their housing and also voluntarily repair it; but we may still wonder whether the allowance program successfully reaches all subgroups of the population. Unfortunately, we will not have all the pertinent enrollment and termination information about special groups until HASE participation research is farther along. In the meantime, we have monitored the repair reports of three participant subgroups commonly supposed to have serious housing problems: the elderly and the handicapped, who often cannot do repairs themselves and so must rely on others; and rural householders, who, while usually ablebodied, are likely to live in buildings lacking basic facilities such as plumbing. This section compares the repairs reported by the three groups with those of the entire enrolled population.*

ELDERLY ENROLLEES

The elderly, many of whom have diminished physical abilities and rely on small, fixed incomes, might be presumed to have difficulty maintaining their dwellings. Although they are less likely than the nonelderly to live in dwellings failing the initial evaluation, the elderly respond to HAO-reported housing defects in about the same ways as do their nonelderly counterparts. The few differences relate to how the work was done, not to what was done. For example, the elderly are less likely to do repair work themselves, but to depend on friends and contractors (see Table 4.1).

Since they rely more on contractors, we would expect the elderly to make higher cash outlays for initial repairs. Table 4.2 demonstrates

*This section considers how these special groups repair their dwellings, and does not comment about the participation rates, or the likelihood that the households will drop out of the program without receiving payments. Those qualifications are important because special groups in bad housing may never apply to the program or may drop out without ever qualifying.

Table 4.1

SOURCE OF LABOR FOR INITIAL REPAIRS BY ELDERLY AND NONELDERLY ENROLLEES

Type of Enrollee	Number of Cases	Source (%)					
		Enrollee	Landlord	Friend	Contractor	Other	Total
Brown County							
Homeowner:							
Elderly	311	48	--	33	18	1	100
Nonelderly	607	76	--	14	10	1	100
Renter:							
Elderly	211	30	46	7	17	(a)	100
Nonelderly	1,713	50	33	10	7	(a)	100
St. Joseph County							
Homeowner:							
Elderly	1,367	32	--	39	23	6	100
Nonelderly	1,168	59	--	22	14	4	100
Renter:							
Elderly	378	22	47	18	11	2	100
Nonelderly	3,215	42	37	10	10	1	100

SOURCE: HAO records from January 1976 through June 1977.

NOTE: Percentages may not add exactly to 100 because of rounding.

[a]Less than 0.5 percent.

Table 4.2

CASH OUTLAY FOR INITIAL REPAIRS BY ELDERLY AND NONELDERLY ENROLLEES

Type of Enrollee	Brown County			St. Joseph County		
	Number of Cases	Cash Outlay ($)		Number of Cases	Cash Outlay ($)	
		Median	Mean		Median	Mean
Homeowner:						
Elderly	189	10	59	921	12	93
Nonelderly	347	10	53	700	10	67
Renter:						
Elderly	131	9	58	246	10	23
Nonelderly	929	8	36	1,639	11	39

SOURCE: HAO records from January 1976 through June 1977.

that while the elderly pay more for initial repairs, the difference is not nearly as much as might be expected. Administrative records show that the elderly have fewer, and presumably less serious, housing deficiencies, which holds down their repair costs. The elderly pay more per item, but since they do not buy the most expensive items, their overall expenditures for initial repairs are not always higher than those for the nonelderly.

In addition, many elderly households voluntarily repair their dwellings. The main differences between voluntary annual repairs undertaken by the elderly and those undertaken by nonelderly households are who does the work and what it costs. As for initial repairs, the elderly are more likely than the nonelderly to hire contractors (see Table 4.3), which results in higher cash outlays for the elderly.

HANDICAPPED ENROLLEES

Handicapped enrollees would presumably have even more difficulty than the elderly in undertaking repairs. To study the issue, we first attempted to list all handicapped HAO enrollees. Although the requisite information had not been transcribed into machine-readable

Table 4.3

SOURCE OF LABOR FOR VOLUNTARY ANNUAL REPAIRS BY ELDERLY AND NONELDERLY ENROLLEES

Type of Enrollee	Number of Cases	Source (%)					
		Enrollee	Landlord	Friend	Contractor	Other	Total
Brown County							
Homeowner:							
Elderly	1,426	40	--	24	36	1	100
Nonelderly	1,142	67	--	10	23	(a)	100
Renter:							
Elderly	422	23	39	10	28	(a)	100
Nonelderly	1,005	43	32	5	20	(a)	100
St. Joseph County							
Homeowner:							
Elderly	2,845	24	--	20	55	2	100
Nonelderly	1,360	42	--	16	40	2	100
Renter:							
Elderly	312	22	28	11	38	(a)	100
Nonelderly	835	44	26	9	19	2	100

SOURCE: HAO records from January 1976 through June 1977.

NOTE: Percentages may not add exactly to 100 because of rounding.

[a]Less than 0.5 percent.

format, we identified several hundred handicapped individuals by the assets and deductions listed on their applications.

Because they are mostly nonelderly households receiving Supplemental Security Income (SSI), they probably underrepresent the whole population of handicapped individuals, which also includes those injured in their work or over age 62. Nevertheless, the group chosen is the most interesting for our purposes, in that its members have more severe, long-term handicaps and therefore face the most formidable barriers. We further selected handicapped enrollees living alone, because they would presumably have the greatest difficulty of all in undertaking initial repairs. That stringent set of criteria finally selected 242 handicapped clients in Brown County and 238 in St. Joseph County.

We found little evidence that handicapped clients have difficulty undertaking initial repairs. Given that handicapped enrollees are much more likely to be renters than homeowners, the distribution of repairs is similar to that for other households. For the analysis group, friends and contractors undertook more repairs than the handicapped persons did. Landlords paid for most repairs to rented dwellings; the few homeowners paid almost all their repair bills themselves. The table below shows that average cash outlays for repairs to handicapped renters' dwellings are somewhat higher than those for renters as a whole:

	Brown County ($)	St. Joseph County ($)
Handicapped renters	45	108
All renters	39	37

Even so, it does not appear that making initial repairs is a major obstacle to handicapped enrollees who qualify their dwellings.

The most noteworthy finding is that voluntary repairs undertaken by handicapped enrollees are virtually indistinguishable from those of other enrollees, even so far as including many costly repairs. Handicapped homeowners, a fairly small group concentrated in St. Joseph County, reported more repairs involving less paid labor and

smaller cash outlays. But the sample is not large enough to determine whether they attempted less serious repairs or if they were simply more economical.

RURAL ENROLLEES

Housing in rural areas, compared with that in cities, is more likely to have inadequate plumbing, heating, or electrical service. We therefore expected that some rural households might have special difficulties qualifying their housing for allowance payments. Administrative records, however, reveal only small differences between the rural and urban enrollees in Brown County and almost no differences in St. Joseph County.

The Brown County population is unusual both in composition and in its initial repair actions. There are four rural homeowner enrollees in Brown County for every rural renter enrollee, a ratio far greater than in St. Joseph County, or for the urban enrollees in Brown County.

Brown County rural enrollees (mostly farmers) report few initial repairs to structural items. Rural plumbing must be better than we imagine because they also report few plumbing repairs. Reports of handrail and step repairs, on the other hand, are surprisingly frequent. Otherwise, the type and incidence of initial repairs are similar to those in urban Brown County.

Rural enrollees in Brown County perform most of the repairs themselves--almost 60 percent of the renters and 77 percent of the owners undertake initial repairs unassisted. Since about three-quarters of the repairs require cash outlays only for materials, the mean cash outlays on the part of both owners and renters are somewhat lower than for the rest of the enrolled population in the county, as is shown below:

	Homeowners ($)	Renters ($)
Rural enrollees	43	21
All enrollees	55	39

Rural enrollees make many voluntary annual repairs, too. Moreover, they personally do up to three-quarters of the work. In Brown County, that effort eliminates much of rural renters' need for contractors, and reduces the overall cash outlays. The efforts of St. Joseph County rural enrollees reduce their reliance on friends and relatives; however, since the helpers are usually not paid anyway, total cash outlays are unaffected.

SUMMARY

Bringing a dwelling up to HAO standards is easier for some households than for others. We expected three participant groups to have a difficult time qualifying their housing: elderly and handicapped households, who face special problems because of their diminished physical abilities, and whose incomes are small and fixed; and rural enrollees, who are likely to live in poor quality housing lacking basic facilities and safety features. But we found that members of each group have succeeded in qualifying their housing, and have also voluntarily undertaken repairs.

That finding does not imply that the groups easily meet program standards. Elderly and handicapped enrollees hire contractors, which increases their cash outlay, and rural households undertake an unusually large share of the work themselves. It is not clear how representative our findings are for the entire populations of elderly, handicapped, and rural households. But it is interesting that after qualifying their housing, many members of the groups have voluntarily undertaken annual repairs comparable to those of other households.

V. PROGRAM EFFECTS

Housing programs in the United States have characteristically operated under the assumption that the only way to provide safe, decent, and sanitary housing to the poor is for the government to supply it. HUD, for example, continues to finance new housing construction and substantial rehabilitation of older housing, even though the concomitant costs restrict the benefits to a small part of the nation's poor. Moreover, many new housing projects have deteriorated under management and tenant neglect such that they are now no improvement over the slums they replaced.

The housing allowance program was conceived as an alternative or complement to conventional housing supply programs. In contrast to them, it assumes low-income households can solve their own housing problems if guaranteed a reliable and adequate source of rent money or housing payments. Part of our evaluation of the experiment is to contrast its effects with those of conventional housing programs.

Compared with the allowance program, the effects of other housing programs are easy to identify. Most of the cost goes into materials, which are lasting and visible. Since labor is also paid for, the cost of construction is a good surrogate for increases in the housing stock.

The allowance program, however, is difficult to evaluate from a "brick and mortar" perspective. Housing allowances are paid directly to enrollees, who themselves decide how to spend the funds. Some money repays the owner or occupant for initial dwelling repairs. A great deal more is spent on voluntary repairs that go beyond program requirements. Nevertheless, the total cost of those repairs constitutes only a small fraction of allowance payments. As noted earlier, costs alone are not a good surrogate for additions to the housing supply because unpaid labor is ignored in the cash cost accounting.

This section estimates the added repair expenditures due to the allowance program, locates program-related repairs in the experimental sites, and discusses the costs and benefits of earmarking as an inducement to added repairs.

EFFECTS ON REPAIR EXPENDITURES

Because of its standards and the incentives to meet them, the allowance program could greatly affect enrollees' repair strategies, including decisions about whether and when to repair. Preliminary estimates suggest that enrollees are indeed induced to spend a substantial fraction of their allowance payments on repairs they otherwise would not undertake.

To estimate the program's effect on repairs, we first estimate repair cash outlays through June 1978, using both program counts and reported outlays. The program counts come from the HAOs' weekly management information reports. Repair information comes from the January 1976 to June 1977 repair study described earlier. Average values for the repair study are used to calculate the volume of repair activity during periods when the repair information was not being collected. Finally, we compare HASE figures with those obtained from U.S. Census tabulations.

The cumulative cash outlay for participants' repairs through June 1978 is estimated in Table 5.1. We calculate the total value of initial repairs as the number of deficiency evaluations multiplied by the mean reported cost of undertaking initial repairs. For annual repairs, we multiply the number of recipient years by mean annual repair expenditure.*

As the table shows, the cash volume of initial repairs is small compared with annual repairs. Owners and occupants spend almost 20 times as much voluntarily after they start receiving payments as they are required to spend to qualify their housing.

Many enrolled households would have at least some repair expenditures even without the program. To calculate repair expenditures that are surely program-induced, we assume that they include all initial repairs, those being the kinds of repairs households rarely perform

*We include a range of estimates because renters provide proven but as yet unmeasured undercounts of repair expenditures. The low estimates are based on an average of homeowners' and renters' reports; the high estimates are based solely on homeowners' reports. The true value for all households surely lies between the two bounds.

Table 5.1

ESTIMATED REPAIR COSTS FOR PARTICIPANTS

Type of Repair	Brown County		St. Joseph County	
	Low ($000)	High ($000)	Low ($000)	High ($000)
Initial	82	102	153	216
Voluntary	1,908	3,197	2,937	3,952
All	1,990	3,299	3,090	4,168

SOURCE: HAO records from January 1976 through June 1977, and HAO management information reports through June 1978.

without some urging. Program-induced voluntary repair expenditures are estimated by subtracting enrolled homeowners' annual repair expenditures from those of other low-income homeowners, then multiplying the number of recipient years (through June 1978) by the difference in annual repair expenditures per year.* The added outlay, cumulative through four years of program operations in Brown County and three and a half years in St. Joseph County, is shown below:

	Brown County ($000)	St. Joseph County ($000)
Initial repairs	44	136
Voluntary annual repairs	285	240
Total	329	376

Voluntary repairs compose most of the increase in repair expenditures--87 percent of the total in Brown County, 64 percent in St. Joseph County. The proportions will probably rise as more annual recertifications are done. The disparity between the sites is mostly attributable to the greater difference between the annual repair

*Our estimation procedure assumes there are no invalidating differences between the housing consumption patterns of participant and nonparticipant low-income homeowners. We know that assumption is not entirely true because of self-selection bias, although current work suggests that it may not be very important.

expenditures of recipients as against all low-income homeowners in Brown County.

Cash outlays for program-induced repairs represent about 11 percent of the allowance payments to homeowners in Brown County, and about 7 percent in St. Joseph County. Those figures suggest that repairs take some priority in the households' investment decisions.

It is perhaps surprising that initial repairs are so reasonable, and voluntary repairs so costly. Initial repairs, while individually inexpensive, nevertheless constitute a significant investment over the entire program. Moreover, that investment will rise as more households enroll and as current enrollees fail annual evaluations and make remedial repairs. Voluntary annual repairs, while fewer in number, account for the bulk of program-induced repair expenditures. We will follow voluntary repair activity to see if the pattern continues into later program years.

The final yardstick of repair activity is a national study of the annual cash outlays for repairs to owner-occupied homes.* The national sample comes from the U.S. Census Construction Reports, and includes households of all incomes. We compare all households interviewed in the census and the HASE studies. Figure 8 shows only a modest difference between the voluntary repair expenditures of program participants and homeowners in the sample.

GEOGRAPHIC EFFECTS

Without arguing whether money spent in the central city, where housing deterioration is greater, is "worth more" than that spent elsewhere, we investigated what portions of the metropolitan area benefited most from the repair cash outlays. We also considered whether the concentration of repair activities had fostered any indirect effects on neighborhood quality, but with inconclusive results.

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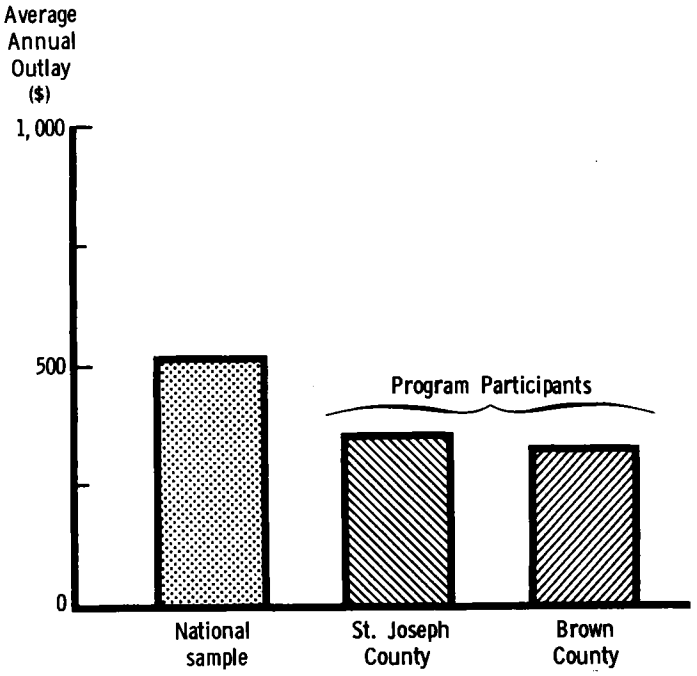
*U.S. Department of Commerce, Bureau of the Census, *Construction Reports: Residential Alterations and Repairs*, Report C50-77-5, Table 10.



SOURCE: HAO records from January 1976 through June 1977 and U.S. Bureau of the Census, report C50-77-5, Table 10.

Fig. 8--Annual cash outlays for repairs to owner-occupied homes

Program repairs, rather than being evenly dispersed within each experimental site, are concentrated in the central city. Table 5.2 distributes program-related repair activity in St. Joseph County, the site with the greater geographic differences. We have broken the county into five areas: central South Bend, South Bend fringe, Mishawaka, suburbs, and rural county.

The participation rate for each district is the number of participating households divided by the total number of households. The rate is much higher in central South Bend than elsewhere in the county. Because higher participation leads to larger expenditures for program-related repairs, it is hardly surprising that almost two-thirds of the total repair expenditures were made in central South Bend. An additional sixth were spent in the South Bend fringe, bringing South Bend's total to almost five-sixths of the county's total program-related repair expenditure.

Similarly, cash outlay per participant is highest in central

Table 5.2

GEOGRAPHIC DISTRIBUTION OF PROGRAM-RELATED REPAIRS IN ST. JOSEPH COUNTY

Area	Participation Rate[a] (%)	Repair Outlay	
		Total ($000)	Per Participant ($/yr)
Central South Bend	14	694	237
South Bend fringe	6	178	214
Mishawaka	6	100	136
Suburbs	3	70	123
Rural county	3	39	205
All areas	7	1,081	206

SOURCE: HAO records from January 1976 through June 1977.

NOTE: The period actually covered by the reported repair outlays is from January 1975 to June 1977. See Sec. I for explanation of reporting system.

[a]Based on 5,256 participant households as of January 1976.

South Bend and in the South Bend fringe. The high outlay per participant and the high participation rate in central South Bend further concentrate the effect there. Enrollees thus direct the bulk of the repair expenditures to the most blighted part of the county.

The concentration of repaired buildings may be reaching critical thresholds for affecting certain neighborhoods. Nearly 5 percent of the dwellings in each site had been repaired under the allowance program at the close of the second year of program operations, and in some central city neighborhoods, the figure exceeded 10 percent. The percentages will probably rise as more enrollees join the program in its later years. Nevertheless, we are uncertain about the possibility of measuring neighborhood effects. The surveys of neighborhoods may not detect those effects because the change, unless very large, may be obscured by observation error. Until later surveys are completed, we can only say that the allowance program may induce neighborhood upgrading, particularly in the central city.

EARMARKING EFFECTS

The allowance program offers two inducements to increased repair activity: (1) cash payments that enable recipients to increase their overall expenditures, including those for housing, and (2) the earmarking requirement--that households occupy adequate housing. Requiring allowance recipients to occupy certifiable dwellings encourages repairs that owners and occupants might otherwise not make. Although the cash costs of initial repairs are small, the contributions to health and safety are important.

Do the advantages of using housing standards to earmark allowance payments outweigh the costs? Evaluating an enrollee's dwelling is time-consuming and expensive for the HAO. The Rand Field and Program Operations Group (FPOG) has determined that each housing evaluation costs $30 in Brown County and $33 in St. Joseph County. Amortizing enrollee intake costs over a three-year period of expected recipiency, FPOG determined that housing inspections add $70 per year to $146 in other administrative costs. Those figures raise a number of questions about the benefits and costs of earmarking.

- *Do the number and value of housing improvements justify the HAO's spending $70 per recipient year evaluating dwellings?*

Considering the $8 to $11 median initial repair cash outlay per household reporting repairs, and that only half the new enrollees and a third of the continuing ones make initial repairs each year, the answer would be no. But enrollees contribute considerable free labor that adds to the value of the cash outlays. The value of that unpaid labor, when measured, will close the gap between repair costs and earmarking costs.

Increased annual repair expenditures seem to go beyond an income effect. To the extent that the housing evaluations make enrollees more conscious of their housing, enrollees may value housing repairs more highly than they did before joining the program. Holding income constant, enrollees might therefore choose to increase their level of voluntary repair expenditures.

- *Can necessary housing improvements be otherwise achieved at less public cost?*

The allowance program was charged with both promoting improvements in enrollees' housing and reducing the financial burden of living in adequate housing. The average enrollee's cash outlay of $228 for annual repairs is small when compared with the average allowance of $875 per year and annual administrative costs of $216. But only $70 of the administrative costs are directly attributable to the first goal, improving the quality of enrollees' housing. And housing quality is not measured in cash outlays alone, but in its contribution to inhabitants' health, safety, and welfare. Alternatives to the allowance program would repair specified defects at lower overall program cost (such as directly contracting for those repairs), but the alternatives would not lessen the housing burden, the second goal.

- *Does the burden of making repairs prevent most enrollees living in failed dwellings from receiving payments?*

We have determined that undertaking initial repairs is not an obstacle to many enrollees. Occupants of seriously defective dwellings often move to another dwelling, an action that provides enrollees with better housing. Even in light of expanded studies on the subject, there is little evidence that the burden of undertaking repairs is substantially larger for enrollees not receiving payments than for recipients. Analysis so far suggests that lack of motivation is as important as lack of money in explaining why more enrollees do not qualify their dwellings for allowance payments.*

- *What are the alternatives to earmarking by housing standards?*

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*See *Fourth Annual Report of the Housing Assistance Supply Experiment*, The Rand Corporation, R-2302-HUD, May 1978, pp. 130-131.

If earmarking provisions were removed, the allowance program would become a general income-maintenance program. Most of the enrollees currently not receiving payments would immediately qualify for allowances. The HAOs could reduce their staffs and realize significant savings in administrative costs as well as increases in program disbursements.

To the extent that there is an income effect, recipients' annual repair expenditures would continue to be greater than those of comparable households not enrolled in the program. Most, if not all, repairs made to qualify dwellings for the allowance program would not be undertaken. Without regular inspections, health and safety hazards would likely multiply. Recipients could afford to keep their housing in good condition, but most enrollees are unaware of or attach little importance to the hazards identified by the housing evaluators. Cash grants without earmarking would provide sufficient means, but no incentive, for enrollees to occupy dwellings large enough for their families, complete with essential facilities in good working order, and free from hazards to health and safety.

Another alternative would be to earmark according to housing cost. Administrative procedures would be simplified, and some households currently unable to qualify their housing would immediately meet program standards. Some "good shoppers" currently receiving payments would be forced to either pay more for housing or lose their payments. Landlords would have an incentive to charge rents at the HAO threshold without paying much attention to maintenance. Tenants would have less incentive to undertake repairs on their own. Low-income homeowners would be likely to spend more on basic housing and less on maintenance and improvements.

We question whether any changes to the current earmarking provisions would be well-advised, particularly during the remainder of the experimental period. The addition of a single housing standard, that for possible lead-based paint hazards, has seriously affected the program operations (see Appendix A). The importance of the earmarking provisions will be investigated more fully in later research.

SUMMARY

The allowance program directly encourages increased repair activity. Almost all initial repairs are allowance-induced because society at large considers the improvements important. Initial repairs constitute the most easily identifiable program effect; enrollees and their landlords spend much more per voluntary repair, however.

In St. Joseph County repairs are concentrated in central South Bend, although it is too early to say whether the program has induced neighborhood upgrading.

The earmarking requirement ensures that enrollees' dwellings meet the program's standards of habitability. The combined cash cost of inspecting dwellings for adherence to the standards and of making required repairs is surprisingly reasonable. Moreover, cash grants without earmarking would not achieve the desired result of providing safe, decent, and sanitary housing, since higher expenditures alone do not guarantee adequate housing.

VI. POLICY IMPLICATIONS AND DIRECTIONS FOR FUTURE RESEARCH

Enrollees' responses to the allowance program's offer of cash benefits conditioned on occupancy of standard housing have important implications for federal housing policy, with respect to both policy objectives and means for implementing them. Housing assistance policy should distinguish three aspects of the housing conditions of low-income households:

- o Inadequate or hazardous facilities that endanger the occupants of a dwelling.
- o Cosmetic improvements and domestic conveniences that appeal to the occupants.
- o Maintenance and repairs that would extend the useful life of a dwelling.

Both public objectives and private interests may differ with respect to those aspects of housing quality. Since achieving the public objective requires cooperation from the owners and occupants of residential structures, the incentive structure of a housing assistance program must be carefully tuned to obtain the desired results.

In the experimental housing allowance program, health, safety, and occupancy standards are used to earmark allowance payments. Our data show that health and safety hazards are common but easily and inexpensively remediable. However, they also suggest (subject to more analysis) that the occupants of hazardous dwellings are not much concerned about the hazards. Given unrestricted income transfers, the recipients would not be inclined to search out and repair those hazards. Instead, they would be inclined to make cosmetic improvements and add domestic conveniences. Moreover, expenditures on such improvements would compete in the household's budget allocation with expenditures for nonhousing goods and services, the greatest share of the transfer going to nonhousing consumption.

Extending the useful life of a dwelling through maintenance and repair expenditures beyond those needed to remedy health or safety hazards is not necessarily in the public interest. Capital consumption may be the best social policy for circumstances in which a future change in land use is desirable or unavoidable. But even though the public interest would be served by preserving housing capital, a rental tenant has little reason to care whether his dwelling could be made to last longer. To secure that outcome, the landlord must be persuaded that reinvestment in the building will be profitable.

Ideally, federal housing assistance policy should specify its objectives with respect to a given group of households or dwellings, design a program whose incentive structure promotes those objectives, and score program outcomes according to their efficiency in meeting the objectives. For both tenants and homeowners, housing allowances have demonstrated their effectiveness at remedying health and safety hazards that persist in violation of municipal codes, but the financial transfer greatly exceeds the cost to the recipient of remediation. In addition, early findings suggest that a significant fraction of the transfer is voluntarily spent for cosmetic improvement and domestic conveniences. Homeowners also undertake repairs that extend the useful lives of their dwellings, spending measurably more for that purpose than they would have absent the transfer. But we do not so far see evidence that giving allowances to tenants persuades landlords to reinvest in rental properties. If the program has that effect, it is indirect, through its effects on the aggregate demand for housing services and thereby on landlords' expectations about future demand.

FUTURE RESEARCH

Much of our future research will fill gaps in our repair narrative, some will tighten our initial analysis, and the remainder will determine the effects of time on repair activity. The following paragraphs describe our proposed research and the possible implications for national housing policy:

- We are modeling voluntary repair expenditures of homeowners to determine the effect of allowance payments. More precise modeling should confirm that enrolled homeowners spend more on voluntary repairs than is explained simply by their change in income. Analysis will consider the particular factors that affect repair expenditures as well as the broader dynamics of repair decisionmaking.
- Rand is now fielding a special survey of HAO clients' landlords on repairs the landlords undertook in 1978. We will compare those accounts with tenants' reports to measure tenant underreporting of repair cash outlays. The information will be used to calculate the amount of induced repairs for rental properties (similar to the calculations we presently have done only for homeowners).
- The HAOs have funded a special survey of eligible enrollees who do not receive payments. Information about their housing will help determine why they let their enrollment lapse rather than qualifying their housing. The study will determine whether the requirement for certifiable housing is the critical barrier.
- Rand is coding verbatim accounts of housing deficiencies to determine the extent of housing defects in dwellings that are not repaired. Using estimated item repair costs, we can determine what it would cost to repair those dwellings, and whether repairs are not undertaken because of prohibitive costs. The information will illuminate why some failed dwellings were repaired and others not, as well as allowing estimates of the likely repair costs for all enrollees' dwellings.
- With several years of audited HAO files, we will be able to trace individual clients' repair histories. We can

both measure the "lumpiness" (unevenness over time) in repair expenditures, and combining several years' repair reports, look at smoother expenditure trends. That information will enable us to determine whether enrollees exhibit an initial spurt in voluntary repair expenditures which then drop back to preenrollment levels, or whether repair expenditures rise and then remain constant.

- We also plan to trace the history of dwellings, to learn both how quickly and how seriously enrollees' dwellings deteriorate and what is needed to keep them at HAO standards (and also to determine critical provisions of the standards).
- Finally, we will review the major findings of this report to determine if they remain valid later in the allowance program. We predict that additional data may slightly change the program statistics, but barring major changes in program operations, the overall findings will be verified.

INTERIM CONCLUSIONS

Although we are only midway through our research agenda, several conclusions seem inescapable. First, the reward of receiving allowance payments has without a doubt stimulated occupants and owners to repair their housing. The cash costs of those repairs, while significant, do not convey the full measure of the repairs, which must take unpaid labor into account.

Further, the allowance program involves occupants themselves in maintaining and improving their housing; few other housing programs have tapped that resource. Elderly persons, single-parent families, and handicapped persons often cannot undertake extensive renovation of their dwellings; yet such allowance program enrollees or their friends have replaced broken windows, sealed faulty heating vents, or replaced worn stairway treads. Overall, the program has demonstrated that low-income households and their landlords are willing to solve their housing problems--and capable of doing so--if they are given the means and the motivation.

Appendix A

HOUSING REQUIREMENTS AND SAFETY

In formulating the HAO housing standards, Rand examined housing inspection precedent as well as actual housing research. Having found few empirical studies of housing safety, Rand based the standards largely on inspection practice and model housing codes. The standards are not wholly objective, but reflect accepted judgments about controlling household risks.

We examined the HAO standards, provision by provision, for the kind of evidence on which they are based--scientific research, accumulated experience, or reasonable assumptions. This appendix considers two controversial standards, the handrail requirement and the lead-based paint restrictions. The handrail requirement has some statistical backing. The lead-based paint restriction is well defined, but the hazard poorly documented. Yet both standards have been implemented in the public interest.

HANDRAIL REQUIREMENT

The HAOs fail an unexpectedly high number of dwellings because of the stairway and handrail requirements. Roughly 1 in 3 dwellings evaluated in each site fails because of interior handrail or step deficiencies. A much smaller proportion, about 1 in 20, fails because of exterior stairways, porches and railings. Because the HAO combines overall stairway and handrail ratings when transcribing them into machine-readable records, we do not know exactly how many of the failures are due explicitly to absent or unsafe handrails. The housing evaluators report that handrail deficiencies predominate, and repair data support that testimony.

The stairway and handrail regulations are straightforward. Interior stairways are rated unacceptable if they have severe structural defects, including broken or missing steps. In addition, a stairway with six or more steps must have a handrail mounted parallel

to the slope of the steps. There must be a handrail around an open stairwell. Exterior stairways and porches are rated jointly; the stairway requirements are similar to those for interior stairways. A porch that is more than 4 ft above grade must have a railing.

Statistics on stairway accidents help justify the requirements. Stairs are associated with about 12 percent of the accidental deaths and 12 percent of the injuries that occur in and around the home.* Although there are a variety of contributing causes for stairway falls, properly installed handrails reduce the hazard from all causes.

The contribution of handrails to stairway safety has not been estimated. General evidence suggests, however, that requiring handrails on stairways is a reasonable and inexpensive way to alleviate one of the many home safety hazards. The St. Joseph County housing code is even more demanding than the HAO's in that it requires handrails for all interior or porch stairways of two or more risers. The required cash outlays are low; median installation and repair expenditures are $9.31 for exterior stairs and $8.20 for interior stairs. The benefits of the requirement almost surely outweigh such negligible costs.

LEAD-BASED PAINT REGULATION

Lead-based paint became an issue in the late 1960s, when national attention focused on slum children dying from eating flakes of lead-based paint in their homes. Congress subsequently passed legislation in 1971, 1973, and 1976 to prevent lead-based paint poisoning. As amended, those acts "...prohibit the use of lead-based paint in residential structures constructed or rehabilitated by the Federal Government, or with Federal assistance in any form...."**

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*U.S. Department of Health, Education, and Welfare, National Health Survey, *Persons Injured and Disability Days by Detailed Type and Class of Accident, United States, 1971-72*, U.S. Government Printing Office, January 1976; and Metropolitan Life Insurance Company, *Statistical Bulletin*, March 1973.

**Public Law 93-151, Sec. 401, *U.S. Code Congressional and Administrative News*, p. 2429 (1973).

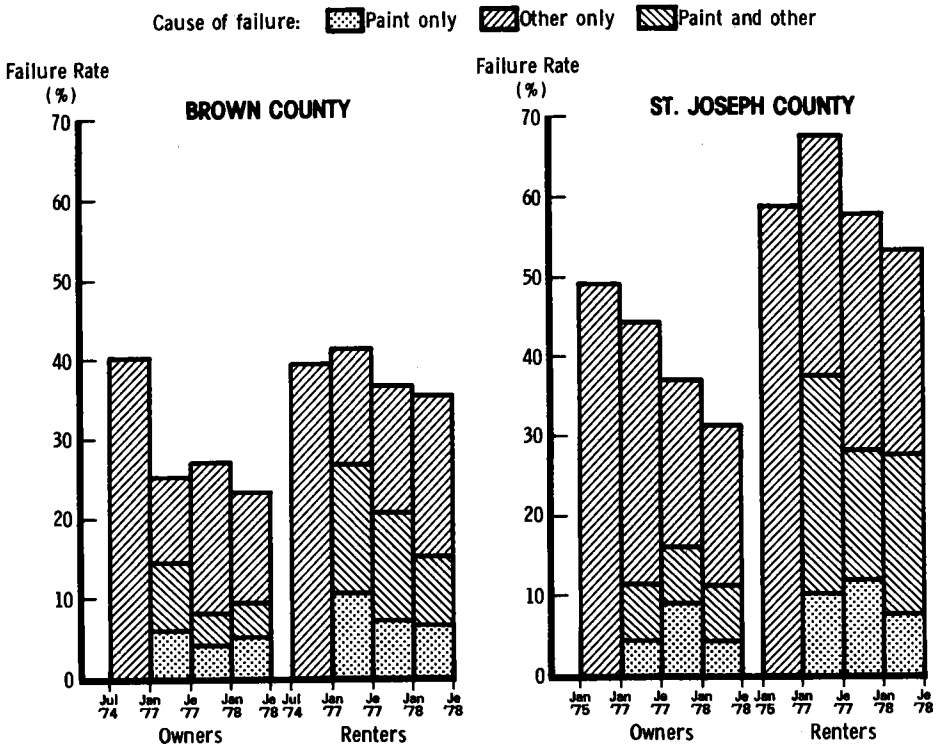
The HAOs began without any paint regulations. Defective paint would cause a dwelling to fail only if the underlying walls, ceilings, or other features had deteriorated below program standards. After discussions, HUD instructed the HAOs to enforce a new housing standard regarding lead-based paint on 3 January 1977.

The standard defined "defective paint condition" as cracking, scaling, chipping, peeling, or loose paint on any interior or exterior surface accessible to children under seven years of age. Defective paint of *any* extent was judged sufficient to fail a dwelling where a child under seven resided or was a frequent visitor; other dwellings with similar conditions but without children could be rated acceptable.

Lead poisoning is widely documented; the role of lead-based paint in such poisonings is not yet resolved, however. Inquiries into the concentrations of lead sufficient for poisoning and the sources of environmental lead are still under way, even though the lead-based paint regulations have long been in force. Consequently, the HAO restrictions control some of the poisoning risks, but do not eliminate all possible sources.

Figure A.1 illustrates evaluation outcomes since the standards were introduced. The bars show failures attributable to lead-based paint hazards alone, for lead-based paint and other deficiencies, and for other deficiencies alone.

The failures have gone down, as one would expect, as the ratio of initial to all evaluations has decreased. The failures would have dropped much more steeply with time if the lead-based paint standards had not been implemented, however. Overall, 5 to 10 percent of the evaluations in each site were judged unacceptable solely because of lead-based paint deficiencies. Lead-based paint was rated as a deficiency in about 10 percent of the evaluations for Brown County homeowners, and in 20 percent of the evaluations for renters in that site. The failure percentages were half again as large for all St. Joseph County dwellings because flaking paint is far more common in the older and more deteriorated housing in that site.



SOURCE: HAO monthly information reports from July 1974 through June 1978.

Fig. A.1--Evaluation failures since lead-based paint standard introduced

The change in program standards reduced the number of people in the program receiving payments, and increased the reported repair costs. Since households are now required to make more paint repairs to meet HAO standards, the annual repairs they might otherwise have performed may be restricted. And since painting is among the least durable repair actions, continued repair work and expense may be necessary to conform to HAO paint standards.

Appendix B

38-POINT DEFICIENCY CHECKLIST

The housing evaluators inspect dwellings to determine if they meet the HAO standards regarding

- o Hazards to health and safety.
- o Essential facilities.
- o Occupancy (sufficient space for inhabitants).
- o Lead-based paint.

The checklist used to rate dwellings is reproduced below.

* * * * *

HAZARDS TO HEALTH AND SAFETY

EXTERIOR PROPERTY AREA

Sanitation and Storage

1. *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 create a safety or health hazard.

2. Grading and Drainage

   Presence of hazardous conditions including cases in which topography and the absorptive capacity of the soil cause drainage or seepage into the building or standing water that might damage the structure of its contents or create unsanitary conditions.

3. Trees and Plant Material

   Presence of hazardous conditions including cases in which the property is so heavily overgrown that natural light is blocked from the structure and normal access is impeded; the presence of noxious plants that endanger the health of the occupants; or vines or trees that threaten to damage the building or endanger its occupants.

4. Accessory Structures and Fences

Presence of hazardous conditions including cases in which such structures and fences have severe structural defects and are located close enough to the main building or to areas of normal human activity on the lot that their potential collapse endangers the occupants.

BUILDING EXTERIOR

5. Foundation

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

6. Walls and Exterior Surfaces (building exterior)

Presence of hazardous conditions on 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 a danger of structural collapse or of significant damage to the interior of the structure from the elements.

7. Roofs (chimneys, gutters, and 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 a danger of collapse or 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 (6) or more consecutive steps or the absence of railings around a porch which is four feet or more from the ground.

9. Windows

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

10. Doors and Hatchways

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

BUILDING AND UNIT INTERIOR

11. Exits

Presence of hazardous conditions including lack of one exit from the unit and at least two safe exits from the residential building leading to open space outside of the building.

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. Unsafe storage of flammable materials.

13. Walls

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

14. Ceiling

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

15. Floors

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

16. Stairs and Railings

Presence of hazardous conditions of the stairs and railings in the unit and public spaces in the building outside of the unit including severe structural defects, broken or missing steps, absence of railing around open steps, or absence of a handrail for six (6) 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. Major leaks around base of toilet.

18. Kitchen Facilities

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

19. Water Heater

Presence of hazardous conditions including the absence of a hot water heater or inadequate hot water, gas leakage, or danger of flooding. Not hooked up; not functional; broken or damaged making unit inoperable; vent pipe seriously cracked or broken allowing unexpended gases to escape into the unit; improper or no venting for exhaust gases; lack of temperature pressure valve. Tagged by utility company indicating unsafe. Partial or complete replacement 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 a plumbing 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; where there are major cracks or broken pipes, improperly sealed joints, and other deficiencies that cause leakage and threats to health and safety.

21. Heating System

Presence of hazardous conditions in the heating system (in the unit or 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 non-existent or not adequately distributed to the unit or that there is a potential for fire or other threats to safety; vent pipe seriously cracked or broken allowing unexpended gases to escape into unit; portable electric room heaters serving as primary sources of heat; unvented room heaters that burn gas, oil, or other flammable liquids are used as heating facilities.

22. Electrical System

Presence of hazardous conditions in the electrical system (in the unit, in public areas in the building, or in the exterior property area) including absence of an electrical system or exposed, non-insulated, or frayed wires; improper connections, insulation, or grounding of any component of the system; or the overloading of capacity such that there is the immediate hazard of electrocution or fire. Wires lying in or located near standing water or other unsafe places. This covers electrical cable

and equipment outside of 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 the kitchen facilities are located must be at least 6' 6" high over at least 35 square feet of room area.

24. Natural Light

There must be sufficient light in the kitchen, either from 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 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

The definition of a habitable room is one that has:

- seventy square feet or more of floor area
- ceiling height of at least 6' 6" over at least 35 square feet of floor area
- natural light from at least one window facing directly outdoors or onto a sunporch 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:

- o rigid walls, secured in position from floor to ceiling, including a doorway with a door, curtain, or other screening device.

Pursuant to these definitions, there must be a minimum number of habitable rooms that varies depending on the total number of persons residing in the unit. There must be one bedroom for every two persons, except that seven or more persons only require four bedrooms. If there are three or more persons occupying the unit, there must be one habitable room in addition to the kitchen, bathroom, and bedrooms to serve as a general living area.

LEAD-BASED PAINT

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

Cracking, scaling, chipping, peeling, or loose paint, which possibly contains dangerous lead content, may endanger children under seven years of age who reside in or frequently visit the dwelling. This provision includes all interior surfaces, and exterior surfaces such as stairs, decks, porches, railings, windows, and doors which are readily accessible to these children.

Appendix C

VERIFYING REPORTED CASH OUTLAYS FOR REPAIRS

Our analysis plans require that reported cash outlays be reliable. This appendix considers two questions that, if answered affirmatively, would lessen data reliability: (1) Could costly repair reports result from data entry errors? (2) Do evaluators' repair estimates differ systematically from enrollees' reported costs? The following paragraphs answer those questions, with some qualifications, and demonstrate why the data are suitable for our research plans.

CHECKING REPORTS OF COSTLY REPAIRS

After segregating repairs by tenure and evaluation type, we eliminated all but those in roughly the upper 10 percent of reported cash outlay. The thresholds were as follows:

$30 for renters' initial repairs.
$50 for owners' initial repairs.
$250 for renters' annual repairs.
$500 for owners' annual repairs.

The criteria yielded an analysis sample of 396 repairs for Brown County and 695 for St. Joseph County.

Most of the repairs have ample justification for their high cost, being roof or wall repairs. Contractors assisted in 54 percent of the Brown County repairs and 58 percent of those in St. Joseph County. The HAOs verified the costs by checking the actual evaluation forms. From penciled evaluator comments, they determined that only two of the Brown County and five of the St. Joseph County entries for repair cash outlays had been miscoded. The cleaning procedure increased our confidence in the accuracy of the unusually high values, a group of records that we looked at with special interest during the remainder of the investigation.

COMPARING ESTIMATED WITH REPORTED VALUES

HAO evaluators are instructed to estimate the cost of all repairs for which the enrollee, or his designated representative, cannot recall the cash outlay. Analysis combining estimated and reported costs might be biased if the estimates were either uniformly higher or uniformly lower than the reported costs.

Table C.1 shows that the estimated repair cash outlay is much higher than the average for all repairs (estimated and reported). As a class, repairs with estimated repair costs include more than their share of costly repairs (structural or contractor-assisted). In addition, over four-fifths of the Brown County and two-thirds of the St. Joseph County estimates for rental property were for repairs made by landlords. Since landlord-initiated repairs are generally more extensive and costly than those initiated by tenants, those fractions help explain why the estimates, as a whole, have higher averages. Nevertheless, those factors do not account for all the difference between estimated and reported repair costs. Evaluators may incorporate excessive paid labor costs in the estimates, but the data do not support that conjecture. We hope that later evidence will clarify the issue.

Table C.1

COMPARISON OF EVALUATOR-ESTIMATED REPAIR COSTS WITH ALL REPAIR COSTS (ESTIMATED AND REPORTED)

Type of Enrollee	Cash Outlay ($)			
	Evaluator-Estimated Only		Estimated and Reported	
	Median	Mean	Median	Mean
Initial Repairs				
Brown County				
Homeowner	16	212	10	55
Renter	20	72	8	39
St. Joseph County				
Homeowner	20	155	11	81
Renter	20	54	10	37
Voluntary Annual Repairs				
Brown County				
Homeowner	241	823	210	437
Renter	111	275	65	202
St. Joseph County				
Homeowner	181	528	250	467
Renter	75	276	75	269

SOURCE: HAO records from January 1976 through June 1977.

Appendix D

CORRESPONDENCE BETWEEN HOUSING DEFECTS AND REPAIR CODES

Our analysis matches a dwelling defect with its consequent repair. Defects are noted as violations on the 38-point checklist (Appendix B); repairs are coded according to the item repaired, the type of repair, location, maker, payer, and cost. The relationship between a defect and its repair code is therefore indirect. Table D.1 gives the correspondences between defects and repair codes. Figure D.1 is a sample housing evaluation form.

Table D.1

CORRESPONDENCE BETWEEN HOUSING DEFECTS AND REPAIR ACTIONS

Defect (Deficiency Checklist Item)[a]	Repair Codes[b]			Repair Description
	Item Repaired	Type of Repair	Location	
Exterior property:				
Sanitation and storage	16	4	1, 2	Clear exterior litter
Accessory structures	9	any	any	Repair accessory structures
Building exterior:				
Foundation	11	any	any	Repair foundation
Walls	30	any	2	Repair exterior walls
Roofs	21	any	any	Repair roof or eaves
Stairs, porches, railings	12, 19, 24	any	1, 2	Repair exterior steps, porches, or handrails
Windows	32	any	any	Repair windows
Doorways and hatches	5	1, 2, 7, 8	2	Repair doors
Building interior:				
Sanitation and storage	16	any	0, 3, 4, 5, 6, 7, 8	Clear interior litter
Walls	30	any	0, 3, 4, 5, 6, 7, 8	Repair interior walls
Ceiling	02	any	0, 3, 4, 5, 6, 7, 8	Repair interior ceilings
Floors	10	any	0, 3, 4, 5, 6, 7, 8	Repair floors
Stairs and railings	12, 24	any	0, 3, 4, 5, 6, 7, 8	Repair interior steps and handrails
Toilet and bath facilities	1, 22 23, 25	1, 2, 4, 5 6, 7, 8, 9	4	Repair bathtub, shower, bathroom, sink, or toilet
Kitchen facilities	3, 20, 23	1, 2, 4, 5 6, 7, 8, 9	3	Repair cooking range, refrigerator, or kitchen sink
Water heater	29, 31	any	any	Repair water heater or vent pipes
Plumbing system	18	any	any	Repair plumbing system
Heating system	13, 14, 15	any	any	Repair heating system
Electrical system	6, 7	any	0,1,2,5,6,7,8,9	Repair electrical system
	8	any	any	
Kitchen facilities:				
Ventilation	5, 32	3, 5	3	Open or install door or window
	28	1, 2, 3	3	Repair or install vent fan
Bath facilities:				
Ventilation	5, 32	3, 5	4	Open or install door or window
	28	1, 2, 3	4	Repair or install vent fan
Fixtures and outlets	6, 7	any	4	Repair fixtures or outlets
Privacy	4,5	any	4	Provide bathroom privacy
Occupancy:				
Unit size	4, 5, 7, 14	any	0, 5, 6, 7, 8	Repair window, door, heating, or electrical system to meet room standards

SOURCE: Tabulated by HASE staff.

[a] Includes all deficiency items that more than ten households failed and repaired.

[b] Numbers refer to codes on evaluation form (see Fig. D.1).

SECTION VI
HOUSING UNIT IMPROVEMENTS: FOR ANNUAL REEVALUATIONS AND REEVALUATIONS ONLY (EVALUATION TYPES 4 and 5)

37. Have there been any unit improvements made since the last evaluation? YES ☐ NO ☐

A. Log of Unit Improvements

LINE NO. 12/15	ITEM 12/17	TYPE 12/19	LOCATION 12/20	WHO MADE IMPROVEMENT? 12/21	WHO PAID? 12/22	OUT-OF-POCKET COST 12/23	COST BREAKDOWN 12/28
01							
02							
03							
04							
05							
06							
07							
08							
09							
10							

Item That Was Worked On
01 Bathtub
02 Ceiling
03 Cooking range
04 Curtain/partition
05 Door
06 Electrical fixtures
07 Electrical outlets
08 Electrical system
09 Fences/accessory structures
10 Floors
11 Foundation
12 Handrails
13 Heat, furnace
14 Heat, room heater
15 Heating system
16 Litter/broken glass
17
18 Plumbing system
19 Porch
20 Refrigerator
21 Roof
22 Shower
23 Sink
24 Steps
25 Toilet
26 Trees/plants
27 Unit size, enlarge or add rooms
28 Vent fan
29 Vents/vent pipes
30 Walls
31 Water heater
32 Windows
50 No changes made
51 Several repairs, but client did not specify
55 Other
60 Client would not volunteer information

Type of Improvement
1 Repair
2 Replace
3 Install
4 Pick up, clear, move
5 Pry open
6 Utility Connected
7 Paint
8 Insulation
9 Other

Location of the Improvement
1 Exterior property area
2 Building exterior
3 Kitchen(s)
4 Bathroom(s)
5 Other room(s)
6 Building interior
7 Unit interior
8 More than one location
9 Other
0 Basement

Who Made the Improvement
1 Homeowner
2 Renter (all or most)
3 Landlord (all or most)
4 Contractor (all or most)
5 Relative/ friend of client
6 Community Group
7 Other
8 Shared Renter/ Landlord

Who Paid for the Improvement
1 Homeowner
2 Renter (all or most)
3 Landlord (all or most)
4 Relative/ friend of client
5 Community Group
6 Government Grant/Loan
7 Other
8 Shared Renter/ Landlord
0 No Cost

Cost Breakdown
1 Materials only
2 Labor only
3 Materials/Labor combination

B. Summary of Unit Improvements

TOTAL OUT-OF-POCKET COST ESTIMATE . . . 13/17 ☐☐☐☐☐

Fig. D.1--Sample housing evaluation form

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Appendix E

REPAIR ASSISTANCE PROGRAMS

Some allowance program enrollees have completed repairs they might not otherwise have undertaken because of two repair assistance programs: community development grants and loans to help finance the repairs, and "handyman" programs that help do the work. This appendix describes the programs as they operated in the experimental sites during the first three years of the allowance program.

COMMUNITY DEVELOPMENT

Green Bay (Brown County) and South Bend and Mishawaka (St. Joseph County) all have special housing programs, some of which are funded through Community Development Block Grant allotments. Residents have applied for both housing allowances and the special grants and loans. A household occasionally first receives a special grant or loan, improves its dwelling, and then applies for a housing allowance to reduce its budgetary burden. Some allowance recipients in both counties have applied for the special funding to make further improvements to their homes, despite South Bend city regulations that discourage it.

The client overlap between the special housing programs and the housing allowance program is much greater in St. Joseph County than in Brown County. Each city offers unique variants of the special programs. South Bend currently operates five municipal rehabilitation programs:

- *Project Rehabilitation* is a voluntary program that upgrades homes in approved target areas to minimum code standards at no cost to the residents.
- The *Guaranteed Loan Program* provides home improvement loans at 9 percent interest to persons living in specified census tracts who are unable to obtain funds through normal lending institutions.

- *Project Rebate*, limited to certain geographic areas in the city, reimburses homeowners and landlords for 15 to 40 percent of the cost of repairs to their properties.
- *Nonprofit Group Rehabilitation* provides grants of up to $5,000 per dwelling for nonprofit groups rehabilitating homes.
- The *Section 312 Loan Program*, funded directly by HUD, offers 3 percent home improvement loans to low-income households living in federally approved target areas.

South Bend previously offered three other programs that have been discontinued:

- The *Emergency Repair Program* provided grants to individuals in all parts of the city to help remedy emergency deficiencies such as plumbing and heating defects.
- The *HAO Referral Program* for the elderly offered housing rehabilitation loans and grants to elderly households who were eligible for housing allowances but lived in dwellings not meeting HAO housing standards.
- The *Neighborhood Development Program* was funded out of revenue-sharing funds during 1974 and 1975 and, similar to the later Rehabilitation Grants Program, offered grants of approximately $5,000.

South Bend's neighboring city of Mishawaka uses most of its community development funds for *Infrastructure Improvement Programs* concentrated in a number of urban renewal projects. The city also issues home rehabilitation grants to homeowners within those areas.

Green Bay offers only one program funded through its Community Development Block Grant allotment--the *Housing Rehabilitation and Loan Grant Program*. That program offers grants of up to $2,000 and loans for up to $5,000 (or a combination of both for a maximum of $7,000) to homeowners whose dwellings violate city housing codes. Green Bay has also committed money to the *Section 312 Loan Program*, but none of the few applications has met HUD regulations.

REPAIR ASSISTANCE SERVICES

Social service agencies in the two counties provide a number of programs that assist some enrollees in undertaking repairs:

- *Real Services* makes repairs for eligible applicants, aged 60 or over, giving priority to households requiring emergency repairs or who are enrolled in the housing allowance program. The program donates free labor. The applicant is expected to pay for materials, although in some circumstances other funds are available.
- The *Family and Children's Center* in Mishawaka provides repair services for applicants who receive AFDC or SSI payments or elderly housekeeping assistance.
- *RENEW, Inc.*, is a nonprofit corporation that provides low-cost housing to the poor by rehabilitating existing homes. Church-based, RENEW advocates homeownership as a means of uplifting the poor. The group purchases sound but inexpensive homes, rehabilitates them, using mostly volunteer labor, then sells them at no profit to carefully selected families who could not otherwise afford a home.

Brown County had two repair assistance services during the period. The Council of Churches Acting Responsibly Ecumenically, *Co-Care*, and the Northeast Neighborhood Association, *NENA*, sponsored repair programs for elderly homeowners with incomes below the labor department guidelines for poverty. Teams of youth were hired at the minimum wage to paint and make small repairs. Qualifying homeowners paid only for materials.

Appendix F

REPAIR COST ESTIMATES

For purposes of our analyses we estimated two sets of standard repair costs:

- o Average repair cash outlays to overcome defects violating any of the 38 HAO housing standards.
- o Predicted repairs--considering the item repaired, how it was repaired, and whether labor or materials were required.

The first set is appropriate for considering what it would cost unspecified enrollees to repair their dwellings and qualify for allowance payments; the second set is more appropriate for determining what a specific enrollee might have to pay to overcome a particular housing problem. The following paragraphs describe the two estimation procedures and present the results.

DEFECT REPAIR COSTS

Table F.1 projects repair costs for overcoming the deficiencies on the 38-point checklist in Appendix B. When a standard does not appear in the table, there were too few cases for estimation. If repairs to overcome the violation of a standard were uncommon in the 18-month period studied, we assume they will continue to be uncommon.

CASH OUTLAY REGRESSIONS

We determined the financial burden for households undertaking repairs according to the kind of repair, how it was performed, whether labor or materials were needed, and whether the household was elderly. A regression technique predicted the independent effect of each factor. We estimated initial repair cost regressions in both sites for each of the major categories of repair items.

Table F.1

DEFECT REPAIR COST PROJECTIONS

HAO Standard	Predicted Repair Cash Outlay ($)					
	Brown County			St. Joseph County		
	Mean	Median	Standard Error	Mean	Median	Standard Error
Exterior property:						
Sanitation and storage	(a)	(a)	(a)	.08	.04	.08
Accessory structures and fences	14.44	8.00	4.00	72.13	15.50	41.59
Building exterior:						
Foundation	137.17	3.50	134.77	73.57	5.00	62.99
Walls	178.75	30.50	121.03	154.98	29.75	49.31
Roofs	--	--	--	245.07	77.50	87.45
Stairs, porches, railings	35.33	8.50	9.30	33.85	10.13	9.12
Windows	10.20	3.50	3.38	16.79	4.87	4.10
Doorways and hatches	7.77	4.67	2.82	13.93	2.50	7.64
Building and unit interior:						
Sanitation and storage	0.00	0.00	--	0.00	0.00	--
Walls	29.93	15.00	6.98	40.67	9.60	11.48
Ceiling	28.14	5.50	12.85	51.34	9.00	23.19
Floors	47.57	50.00	12.47	41.57	15.50	10.50
Stairs and railings	9.22	6.90	.69	13.93	9.50	1.93
Toilet and bath facilities	8.46	1.25	3.48	25.24	8.00	5.84
Kitchen facilities	(a)	(a)	(a)	28.84	6.00	9.89
Water heater	4.79	.45	1.85	31.38	1.50	8.59
Plumbing system	32.46	18.75	14.81	31.56	3.50	10.98
Heating system	(a)	(a)	(a)	59.41	4.50	40.20
Electrical system	22.95	4.00	13.90	138.96	5.00	49.95
Kitchen facilities:						
Ventilation	2.22	.43	1.88	2.78	.31	1.59
Bath facilities:						
Ventilation	9.90	.44	3.19	4.44	.10	1.29
Fixtures and outlets	(a)	(a)	(a)	4.43	2.63	2.44
Privacy	(a)	(a)	(a)	14.48	.22	9.27
Occupancy: Unit size[b]	12.19[b]	6.67[b]	3.21	23.99[b]	9.75[b]	5.14

SOURCE: HAO records from January 1976 through June 1977.

[a]Fewer than 10 reported repairs.

[b]Includes only repairs to existing rooms.

The Model

The functional formula is

$$C_K = A + B_1L + B_2M + B_3R + B_4I + B_5P + B_6O + B_7EM$$
$$+ B_8ER + B_9EI + B_{10}EP + B_{11}EO + e,$$

where C is the cash outlay for repair K, with K ranging from 1 to 32 for the following categories of repaired items:

01	Bathtub	17	(Not used)
02	Ceiling	18	Plumbing system
03	Cooking range	19	Porch
04	Curtain partition	20	Refrigerator
05	Door	21	Roof
06	Electrical fixtures	22	Shower
07	Electrical outlets	23	Sink
08	Electrical system	24	Steps
09	Fences, accessory structures	25	Toilet
10	Floors	26	Trees/plants
11	Foundation	27	Unit size--enlarge or add rooms
12	Handrails	28	Vent fan
13	Heat, furnace	29	Vent, vent pipes
14	Heat, room heater	30	Walls
15	Heating system	31	Water heater
16	Litter, broken glass	32	Windows

A is how much labor and materials cost a nonelderly household to undertake a repair for item K. L takes on a value of 1 if no paid labor is involved, and M if there are no cash outlays for materials. R represents an item that is replaced, not repaired; I, P, and O represent items that are installed, painted, or otherwise altered. Because other research had suggested that the elderly are generally less efficient purchasers of repair services, we included an elderly component E that interacts with the other variables.

Data Selection and Weighting

Homeowners' accounts of repair costs are more complete than renters'. To avoid a consequent downward bias in the repair cost predictions, we considered only information from the 543 Brown County

and 1,683 St. Joseph County homeowners with deficiency reevaluations. Although estimated costs are therefore strictly applicable only to homeowners, they are likely to be the upper bounds on cash outlays for rental properties.

A weighted regression technique accommodated both the central distribution of the cash outlays and the occasional outlying values. The data included several outliers that we wanted neither to delete--because they probably contained useful information--nor give equal weight--because they would unduly influence the regression results. For example, comparatively few households spent thousands of dollars on initial electrical, plumbing, or structural repairs; we do not expect that others will spend that much, but we do not want to discard the information that a few did report such large expenditures. The weighting procedure allows us to include the data, but does not allow them to unnecessarily skew the results.

We developed a scheme that gradually reduces the influence of a data point the more distant it is from the center of the distribution:

$$C = BX + e,$$

where C represents the dependent variables, X is the vector of independent variables, and e is the residual error. We ran the regression from 5 to 15 times for each equation, depending on how many iterations it took for the coefficients to stabilize--that is, to change little between iterations. After each regression the program computed weights that were used on the immediately following regression:

$$Weights = \begin{cases} K & if \ \left|Y_j - XB\right| \leq K \\ K^2 / \left|Y_j - X_j b\right| & if \ \left|Y_j - X_j b\right| > K \end{cases},$$

where $K = 2\sigma$,

σ = the standard error of the regression,

Y_j = the dependent variable for the jth observation,

X_j = the independent variables for the jth observation.

Regression Results

Table F.2 lists the regression coefficients, estimates, and statistics for all 62 regressions. It is instructive to follow one example that demonstrates the estimation procedure, and illustrates its limitations.

Consider a common item--window repairs.* We expect that certain variables might influence the repair costs: whether the repair required labor and materials, whether the repair was extensive or minor, and whether the enrollee was a thrifty purchaser of repairs. The following equation shows the general specification and the sign we anticipate for each coefficient:

$$C_{32} = A - B_1L - B_2M + B_3R + B_4I - B_5P - B_6O + B_7EM + B_8ER + B_9EI + B_{10}EP + B_{11}EO + e.$$

According to the equation, a nonelderly household that repairs its windows using both paid labor and materials would pay amount A. That amount would be smaller if either no paid labor (L) or paid materials (M) were required. Replacing (R) or installing (I) a window would probably cost more than repairing it; painting (P) or performing other (O) repairs would likely cost less. We anticipate that the elderly are less thrifty purchasers of repairs; the interaction with E allows for factor price differentials between elderly and the nonelderly enrollees.

The regression considered reports for 465 initial window repairs. The program computed coefficients and weights in ten iterations of computations before reaching a stable set of numbers. After ten iterations, the coefficients were:

*Data are for St. Joseph County.

Table F.2

REGRESSION COEFFICIENTS FOR INITIAL REPAIR COST REGRESSIONS

Item Repaired	Intercept	Independent Variables											Statistics		Standard Deviation
		L	*M*	*R*	*I*	*P*	*O*	*EM*	*ER*	*EI*	*EP*	*EO*	R^2	*F*	
						Brown County									
Ceiling	37.50	-5.00	+6.00	--	+2.50	-38.50	--	--	--	--	--	--	.37	.24	47.21
Curtain, partition	5.00	-9.38**	+3.82	--	--	--	--	+2.48	--	--	--	--	.26	2.64*	8.70
Door	19.97*	-6.12	-15.34*	+28.87**	+15.11*	-1.86	+1.49	-.07	--	-7.14	--	--	.45	2.68*	12.88
Electrical outlets	30.00*	-9.41	-20.59**	-6.41	--	--	--	+12.59	--	-12.00	--	--	.66	3.92*	9.73
Electrical system	5.00**	-1.71**	-3.14**	--	-.57	--	--	-.28	--	--	--	--	.86	15.00**	.67
Fences	40.31**	-10.48**	-31.52**	--	--	+14.69*	+1.70	-.38	--	--	--	--	.76	10.83**	10.66
Handrails	16.97**	-8.57**	-7.75**	-.65	-.39	-4.22	--	+.13	--	-1.33	--	--	.33	15.12**	6.45
Heating	3.67**	-3.67	--	--	--	--	--	--	--	--	--	--	.65	1.86	2.08
Plumbing fixtures	35.96**	-.15	-34.04**	-8.86	+54.04**	+1.09	--	+.84	--	--	--	--	.80	9.51**	16.80
Plumbing system	20.00**	+17.00**	--	+30.00	+150.00	--	--	-37.00	--	--	--	--	.96	24.40**	13.78
Porch	62.00	-131.12**	-17.00	+151.33	+99.39	-38.89	+86.12	-66.33	--	--	--	--	.62	3.44*	61.31
Steps	73.08	-18.58	-57.22	-12.86	+17.28	-9.36	--	-.63	+44.02	-30.58	--	--	.26	1.03	54.34
Structural elements	205.11**	-120.34	-125.16**	-61.03	-44.95	-75.95	--	-174.93	--	-110.16	+428.89	--	.65	1.65**	170.04
Vent fan	58.50**	-19.00	-39.50**	--	--	--	--	-13.50	--	-3.50	--	--	.86	9.83**	11.74
Vent pipes	8.42**	-1.88**	-6.68**	+9.35**	+3.27	--	--	-.28	-4.35	+1.80	--	--	.46	7.66	4.58
Walls	78.13**	-45.07*	-28.75	-4.30	-39.38	-6.65	--	-6.10	--	--	-25.06	--	.23	1.67*	46.06
Windows	10.31**	-6.66*	-3.18	+1.08	-3.13	-1.16	-.47	+.26	+2.03	+4.26	--	+.26	.13	2.21*	10.85

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Appliances	66.09**	-52.90	-13.19	--	--	--	-10.97	-17.19	-16.09	+58.59	--	+3.94	.44	.55	81.07
Bathtub	31.50**	-13.21	-14.43	--	+2.57	--	+.77	-4.63	--	--	--	--	.55	1.92	13.63
Ceiling	74.68	-3.31	-66.19	+6.50	--	-4.07	--	-9.89	+89.11	--	-.61	--	.37	2.30	65.83
Curtain, partition	15.00**	-18.42**	+4.67	+180.33**	--	--	--	-2.56	--	--	--	--	.58	19.87**	23.03
Door	22.47	-9.02*	-17.97	+22.71**	+5.68	+.83	+3.51	+2.76	-21.97	+15.06	-6.09	--	.48	2.64*	16.69
Electrical fixtures	21.59**	-5.15	-13.66	+1.49	-6.27	--	--	-3.34	--	+14.01	--	--	.54	2.30	10.61
Electrical outlet	52.50*	+29.42	-23.08	--	--	--	--	--	--	-22.25	--	--	.72	3.85*	14.64
Electrical system	129.40*	-104.40	-25.00	+870.60*	--	--	--	--	+93.29	-228.50	--	--	.71	5.12**	328.61
Fences	75.03	-20.32*	-27.56	--	--	-31.87	--	-54.32	--	--	+68.45**	--	.69	7.72**	29.35
Floors	46.00	+48.32*	+7.75	+161.75	+10.08	+10.08	+10.08	+20.15	-164.65**	-60.47	-58.47	-22.47	.55	2.08	45.00
Foundation	245.00**	-12.50**	-232.50**	--	--	--	--	--	--	--	--	--	.49	.49	205.14
Handrails	21.07	-10.97**	-8.66**	+.54	-1.80	+.38	--	-2.79	--	+3.32	--	--	.39	50.65**	9.10
Heat, furnace	30.86*	-21.35	-27.93	--	--	--	+27.47	+18.32	--	--	--	--	.40	1.70	28.29
Heating system	25.29*	-20.68	-9.68	-7.29	--	--	+15.24	-13.60	--	--	--	+3.45	.45	.95	19.10
Plumbing system	53.98**	-17.34	-40.74**	--	--	--	+35.73	+5.43	--	--	--	-37.06	.22	2.54*	45.86
Porch	125.00**	-26.00	-99.00	--	+75.00	-11.00	--	--	--	--	--	--	.79	5.24*	42.58
Roof	163.50*	-250.00	+86.50**	+538.98	--	--	--	--	--	--	--	--	.71	8.10**	189.93
Sink	51.44**	-.16	-49.28**	+27.94*	+121.45**	--	+90.79**	+4.02	+35.50*	--	--	--	.71	10.42**	37.11
Steps	183.66**	+.23	-185.51**	+161.21*	-9.87	+6.85	--	+50.44	-199.26*	-49.08	--	--	.41	2.83*	91.81
Toilet	31.51	-9.00	-18.50	-4.00	+35.75	--	--	-6.00	+62.24	--	--	--	.55	2.41	30.74
Vent fan	33.50**	-14.77**	-20.43*	-22.50	+4.27	--	--	-3.40	--	+12.41	--	--	.51	2.07**	20.50
Vent pipes	11.99**	-6.60**	-5.40*	+.01	-1.60	--	--	-.34	+1.67	+2.96	--	--	.78	9.83**	3.09
Walls	154.12**	-31.83	-170.40**	-54.12	+47.39	+44.03	+133.98*	-5.28	+239.67	--	+25.01	--	.39	7.06**	104.63
Water heater	25.70**	-10.42**	-23.35**	+171.64*	+97.65*	--	+24.72	+6.36	-68.58*	+226.65**	--	-25.82	.88	28.19**	32.13
Windows	21.96	-7.74**	-14.61**	+2.22	+15.90	+.92	+.18	-1.83	-.21	+40.46**	+5.08	+2.22	.30	17.44**	15.16

SOURCE: Tabulated by HASE staff using HAO records from January 1976 through June 1977.
NOTE: * = significant at 95 percent level of confidence; ** = significant at 99 percent level.

$$C_{32} = \underset{(1.97)}{21.96} - \underset{(2.35)}{7.74L}{}^{**} - \underset{(2.53)}{14.61M}{}^{**} + \underset{(2.92)}{2.22R} + \underset{(8.70)}{15.90I} + \underset{(3.32)}{.92P}$$

$$+ \underset{(3.24)}{.18Q} - \underset{(2.66)}{1.83EM} - \underset{(3.89)}{.21ER} + \underset{(11.68)}{40.46EI}{}^{**} + \underset{(9.65)}{5.08EP}$$

$$+ \underset{(3.55)}{2.22EO} + e$$

$R^2 = .30$

$F^2 = 17.44^{**}$

Standard error of the estimate = 15.61.

The initial repair costs for windows in any dwelling in our sample can be estimated by summing the intercept, here $21.96, with the remaining terms, which vary depending on the dwelling and its occupants. Most of those terms have coefficients with the desired sign and magnitude, but we expected *P* and *O* to have negative coefficients and *EM* and *ER* to have positive coefficients. However, the coefficients are small, and a small variation in the data could therefore reverse their direction.

Since the coefficients are estimates from a sample, they are subject to sampling variability. The number in parentheses under each coefficient is its standard error, a measure of sampling variability. Only the coefficients of *L*, *M*, *I*, *EI*, and the intercept are large compared with their standard errors. In the other instances the standard error is almost as large as, or larger than, the coefficient. Under those circumstances, we should not be surprised if a different sample drawn from the same population showed no relation between the variation being explained and the characteristics used to explain it. We indicate a small possibility of variation between samples (95 percent level of confidence, or alternatively, .05 level of significance) by a single asterisk below the standard error; two asterisks indicate an extremely remote possibility (99 percent level of confidence).

The large standard errors for the independent variables do not necessarily hamper prediction. They indicate that correlation between

the variables has confounded the influence of one on the other. For example, if almost all replacements involved only materials but no labor, and almost all repairs to windows involving no paid labor were window replacements, those two variables would probably explain the same variation, and the standard errors of each would be correspondingly large. Correlation of independent variables, or *multicollinearity*, confuses issues of variation, but does not necessarily lessen the model's ability to estimate repair costs.

We calculated three statistics to describe the regression equations. The standard error of the estimate indicates that using the equation to estimate repair costs for buildings in our sample would yield results within $15.61 of the reported values 68 percent of the time. The coefficient of determination (R^2) tells what proportion of the variance in repair costs is explained by the regression. The low R^2 for initial window repairs indicates that the regression explains only 30 percent of the variation; but even that percentage is good considering the range of important variables for which information is completely lacking: how many windows, what size windows, whether a contractor was involved, and the variability of homeowners' repair reports. The F-statistic compares the amount of variance explained by the dependent variables with the unexplained variance, indicating whether the data are compatible with all coefficients equal to zero. The double asterisks indicate that the F value of 17.44 is too large to be explained by chance alone.

Finally, we used plots of the predicted values against their residuals to determine if particular data points had an undue influence on the fitted regression equations. The weighting scheme described earlier accommodated cases with dependent variable outliers, but not those with independent variable outliers. An example is if only one elderly person had a leaded glass window installed at a cost of several thousand dollars. The regression equation would predict that elderly households would spend thousands of dollars to have windows installed, an outcome that is not likely. In fewer than ten cases, we deleted data points because the independent variable outlier had produced such unlikely results.

Predicted Repair Cash Outlays

We reviewed the regression coefficients, statistics, and residual plots produced by each regression to see that the techniques were properly carried out and that they produced credible results. The regressions yielded comparatively high standard errors and low coefficient of determination (R^2) statistics. The high standard errors indicate that our predictions are not very precise; the low R^2s indicate that the independent variables explain less than half the variation in the dependent variable.

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