

N-1306-HUD

June 1980

EFFECTS OF THE HAO LEAD-BASED  
PAINT HAZARD STANDARD

James L. McDowell

Jane  
Just what  
you've always  
wanted to  
read. Please  
return.  
Jill

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HOUSING ASSISTANCE SUPPLY EXPERIMENT

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A RAND NOTE

*This Note was prepared for the Office of Policy Development and Research, U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT, under Contract No. H-1789. Its views and conclusions do not necessarily reflect the opinions or policies of the sponsoring agency.*

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**Rand**  
SANTA MONICA, CA. 90406

THE UNIVERSITY OF CHICAGO  
DIVISION OF THE PHYSICAL SCIENCES  
DEPARTMENT OF CHEMISTRY

RESEARCH REPORT  
NO. 1000  
BY  
J. H. GOLDSTEIN AND  
R. F. STEIGER

1955

PREFACE

This note was prepared for the Office of Policy Development and Research, U.S. Department of Housing and Urban Development (HUD), under contract H-1789, Task 2.16.3. It describes the housing allowance office's paint standard and analyzes the extent and cost of repairs for lead-based paint hazards in HUD's experimental housing allowance programs in Brown County, Wisconsin, and St. Joseph County, Indiana.

The present study is part of an analysis of the type, extent, cost, and validity of program-induced repairs, which affect all participants in the housing allowance program. Most of the data come from administrative records collected during the first four years of program operation, with special consideration given to the first eighteen months of data from a special repair and improvement report form instituted in January 1976.

This study is timely because it allows us to determine the incremental program effect of adding a requirement to the housing standards, and because it provides information about paint defects in a wide cross-section of dwellings.

C. Lance Barnett, Sinclair Coleman, John Mulford, and Tom Kingsley reviewed the draft and offered helpful suggestions. Jan Newman prepared the draft typescript and tables; Jean Houston prepared the final text and tables. Judy Rasmussen edited the report and supervised its production.



SUMMARY

Public concern about health hazards from lead-based paint led to federal legislation (enacted in 1971, 1973, and 1976) limiting the lead content of newly manufactured paint, authorizing financial assistance to local lead-poisoning prevention programs, establishing a federal research program, and directing the U.S. Department of Housing and Urban Development (HUD) to eliminate lead-based paint hazards on HUD-assisted properties.

In July 1976, HUD issued regulations pursuant to this last provision of the law; and in January 1977, the housing allowance offices (HAOs) of Brown County, Wisconsin, and St. Joseph County, Indiana, adopted a paint hazard standard that applied the HUD regulations to the dwellings of about 10,000 renters and homeowners enrolled in an experimental housing allowance program.

The HAOs do not determine the lead content of paint on a participant's dwelling. Rather, they identify conditions under which lead-based paint, if present, would constitute a hazard to the occupants. A dwelling fails the HAO's evaluation if it contains cracking, scaling, chipping, or loose paint (with or without lead content) of any measurable size on any interior surface or any exterior surface within five feet of the ground; but only if children under 7 years of age are occupants or frequent visitors to the dwelling.

About half the dwellings evaluated had paint defects, but only a tenth of the owner-occupied homes and a fourth of the rented dwellings had both paint defects and small children in residence. In the latter case, the program participant had either to repair the paint defect or move to qualify for a monthly housing assistance payment. About 65 percent of those whose dwellings failed made the indicated paint repairs at an average cash cost of \$28 for homeowners and \$11 for renters. About 5 percent dropped out of the program for no other apparent reason than inability or reluctance to repair a paint defect, and unrepaired paint defects were a contributing cause for termination by another 8 percent.

These findings indicate that, absent an explicit test for lead content (impractical until recently), elimination of lead-based paint hazards in all dwellings occupied by low-income families would initially entail paint repairs to half their homes; other program data indicate that recurring repairs would be needed for many such dwellings. The low cost per dwelling of these repairs reflects nearly total reliance on unpaid labor; if the repairs were made by paid labor (say, under contract to a public agency), the costs per dwelling would be about \$210 in 1978 dollars.

Estimates of costs to remove all lead-based paint hazards in the nations's housing stock range from \$28 to 32 billion for removing these hazards or covering them with nonpaint overlays, to \$2 billion for scraping and repainting flaking or peeling paint (regardless of lead content). Data from the experimental allowance program confirm that the \$2 billion estimate is appropriate for commercially contracted repairs; but the experiment also shows that the occupants of most dwellings with paint hazards can repair those hazards without professional assistance. The cash cost of such "amateur" repairs is about a tenth that of professional repairs.

The evidence available on the actual incidence of hazardous lead levels in residential paint suggests that these estimates would not be much reduced if only dwellings whose flaking paint contained lead were treated. However, recent research on the incidence of lead poisoning among children casts doubt on the theory that ingestion of paint chips is a prime cause. The nationwide elimination of lead-based paint hazards may entail a benefit to public health that is far outweighed by its cost.

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### LEAD-BASED PAINT HAZARDS

Lead and its compounds are highly toxic, accumulating in the body by combining with blood and the bones. The poison affects the whole body, but it especially attacks the nervous system and the gastrointestinal tract. Individual susceptibility to lead poisoning varies, and symptoms of headaches, dizziness, and visual disturbances can develop slowly or suddenly. Individuals exhibit different combinations of symptoms (or none at all) with varying concentrations of lead in their blood. Overall, however, increasingly severe adverse responses are associated with high doses of lead.\* Especially in children, extreme levels of lead poisoning can cause permanent brain damage.

Lead poisoning, which is comparatively rare, is most common among industrial workers who have direct exposure to it, and among children. It is known that children with *pica*, a compulsion to chew on nonfood substances, sometimes ingest lead by eating chips of lead-based paint; a single chip about the size of a fingernail contains about 100 times the usual adult daily intake of this metal.\*\*

In the 1930s, public health officials became concerned about the hazards of lead-based paints. In 1931, Baltimore began a longterm, intensive campaign to control lead poisonings by (a) providing free blood lead-level determinations, (b) prohibiting the use of paints with high lead concentrations, and (c) publicizing the dangers inherent in lead-based paints. As more evidence accumulated, other cities adopted one or more of those provisions. Some cities had inspectors visit dwellings once elevated blood lead-levels were detected, but few jurisdictions systematically participated in the removal of lead-based paint.

In 1955, concern about lead poisoning prompted paint manufacturers to observe a voluntary standard that reduced the permissible level of lead in paint. Compliance was spotty. Lead-based paint was readily

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\* J. Julian Chisolm, M.D., "Dose-Response Relationship for Lead," *Highlights of the Midwest and Eastern Regional Conferences on Childhood Lead Poisoning*, American Academy of Pediatrics, New York, 1972, p. 10.

\*\* U.S. Department of Health, Education, and Welfare, *Lead Poisoning in Children*, DHEW Publication No. (HSM) 73-1011, U.S. Government Printing Office, Washington, D.C., 1974, p. 4.

available on store shelves in the early 1970s, and even today, samples are probably stored in basements and garages across the country.

#### REGULATING LEAD-BASED PAINT

Regulation of lead-based paint remained a local issue until 1971, when Congress passed PL 91-965, the Lead-Based Paint Poisoning Prevention Act (since amended). The amended Act (a) established a maximum level of lead permissible in paint, (b) directed HUD to eliminate lead-based paint hazards on HUD-assisted properties, (c) authorized federal funding to assist localities in undertaking lead poisoning prevention programs, and (d) established a federal research program to determine the causes, extent, and prevention of lead-based paint poisoning.

In July 1976, HUD issued a revised set of regulations governing the elimination of lead-based paint hazards that required, among other things, that paint hazards be eliminated from assisted housing "by the most practicable means."<sup>\*</sup> After reviewing research about the health hazards of lead-based paint, Rand worked with HUD to devise an approach that would bring the experimental housing allowance program into compliance with the new regulations.

#### PREVIOUS RESEARCH

When the lead-based paint hazard standard was formulated for the experiment, no single source of information described the likely magnitude of the hazard in the two experimental sites. Studies were performed by municipalities and health centers, and statistics were collected by federal agencies and health institutions, but none individually nor all collectively adequately described hazards that would likely be encountered in county-wide open enrollment programs.<sup>\*\*</sup>

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<sup>\*</sup> This provision was added to the Code of Federal Regulations effective 13 July 1976. See U.S. Code of Federal Regulations, "Lead-Based Paint Poisoning in Certain Residential Structures," 24CFR35, U.S. Government Printing Office, Washington, D.C., April 1, 1979, pp. 121-127.

<sup>\*\*</sup> The ideal source of information would have been a large-scale program testing the lead content of paint in all of a community's dwellings, and a companion blood lead-level determination for all residents of the community.

Some groups, such as the ongoing lead poisoning control program in New York City, inspect dwellings after establishing a positive determination of elevated blood lead-levels.\* Information from those inspections, however, could not reliably suggest how much lead-based paint evaluators might encounter in an open enrollment experiment.

Other housing-based studies surveyed entire blocks of dwellings. One program in Baltimore found more than 1 percent lead (in dried paint film) in more than 70 percent of the dwellings tested.\*\* Similar studies are usually conducted in high risk areas (the parts of cities where the potential for lead poisoning is greatest) and do not represent a sampling of housing conditions in the communities.

With few reliable or applicable statistics to guide them, the HAOs adopted the paint hazard standard and collected statistics of their own. This study does not measure the incidence of elevated blood lead-levels or the incidence of actual lead-based paint. Instead, it describes the implementation of the HAO standard, which uses commonly available technology to control a presumed health hazard.

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\* Vincent Guinee, M.D., "The New York Experience," *Highlights of the Mideast and Eastern Regional Conferences on Childhood Lead Poisoning*, American Academy of Pediatrics, New York, 1972, p. 23; New York City Department of Health, *Lead Poisoning Control Program--1978 Annual Report*, New York, p. 2.

\*\* *Facts About Lead and Pediatrics*, Lead Industries Association, Inc., New York, 1969, p. 4.

## II. THE HOUSING ALLOWANCE PROGRAM

The Housing Assistance Supply Experiment (HASE) is part of the Experimental Housing Allowance Program undertaken by HUD's Office of Policy Development and Research. The program is designed to help HUD decide whether direct financial assistance to low-income households is a feasible and desirable way of helping them secure decent housing, and if so, to determine the best conditions for such assistance and the most efficient methods for administering it.

HASE is studying market and community response to housing allowances by operating a fullscale allowance program in each of two metropolitan housing markets: Brown County, Wisconsin (whose central city is Green Bay), and St. Joseph County, Indiana (whose central city is South Bend). The allowance program has been operating in Brown County since June 1974, and in St. Joseph County since December 1974.

Any low-income household unable to afford adequate housing without spending more than a fourth of its adjusted gross income is eligible for the program.\* Both renters and homeowners may participate, and participants may change tenure or residence within the community without loss of benefits. About one in five households in each site is eligible, and almost half of those eligible enroll in the program. About 80 percent of all enrollees eventually obtain acceptable housing and receive payments. The experimental housing allowance program provides cash assistance that enables each participant to afford decent, safe, and sanitary housing, on the condition that he find such housing and maintain its quality.

### HAO DWELLING EVALUATIONS

Enrollees' dwellings are evaluated several times during their participation in the program: (a) initial--when enrollees enter the program; (b) pre or postmove--when they move or contemplate moving to

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\*Before the summer of 1977, single persons under 62 years of age, unless handicapped or displaced by a federal program, were ineligible.

another residence; (c) annual--at yearly intervals after their enrollment; (d) reinstatement--when enrollees reenter the program after dropping out; and (e) deficiency--when enrollees repair any defect that caused their dwelling to fail a prior evaluation.

A housing evaluator visits a new enrollee's home initially to determine if the dwelling meets HAO standards, and if not, to list the deficiencies that make the dwelling unacceptable. About half of those enrolled already live in dwellings that meet program standards. Of the enrollees whose dwellings fail their first evaluation, most undertake the necessary repairs and then request a reevaluation; the remainder either move to acceptable housing instead of making repairs on their dwellings or drop out of the program. Once qualified, dwellings are inspected annually to ensure that they continue to meet HAO standards.

#### THE DATA BASE

Most of the data here come from administrative records collected during the first four years of program operation, with special consideration given to the first 18 months of data collected by the HAOs on repairs and improvements made to enrollees' dwellings. Specifically, information here comes from two HAO sources referred to as the housing evaluation study and the housing repair study.

The housing evaluation study looks at the results of housing evaluations conducted in the two sites during the first four years of program operation in Brown County and during the first three years in St. Joseph County. These time periods extend beyond January 1977, when the lead-based paint hazard standard was implemented. About 42 percent of the evaluations in Brown County and about 45 percent of the evaluations in St. Joseph County (see Table 1) occurred after January 1977.

The housing repair study is based on an augmented dwelling evaluation form that records enrollees' repairs reported during evaluations conducted over the 18-month period between January 1976 and June 1977. About 37 percent of those evaluations in Brown County and about 45 percent of the evaluations in St. Joseph County occurred after the lead-based paint standard was implemented in January 1977.

Table 1

DATA BASE FOR HOUSING REPAIR AND EVALUATION STUDIES:  
BROWN AND ST. JOSEPH COUNTIES

Type of Record	Brown County		St. Joseph County	
	Number	Percent of Total	Number	Percent of Total
<i>Housing Evaluation Study</i>				
All evaluations <sup>a</sup>	21,974	100	24,920	100
Evaluations after January 1977 <sup>b</sup>	9,249	42	11,318	45
<i>Housing Repair Study</i>				
All repair logs <sup>c</sup>	4,707	100	7,196	100
Repair logs after January 1977 <sup>b</sup>	1,753	37	3,204	45

SOURCE: Tabulated by HASE staff from HAO administrative records.

<sup>a</sup>From June 1974 through June 1978 in Brown County; from December 1974 through December 1977 in St. Joseph County.

<sup>b</sup>Effective date of lead-based paint regulation.

<sup>c</sup>From January 1976 through June 1977 in both counties.

PROGRAM STANDARDS

The HAO housing evaluations determine whether an enrollee's dwelling has adequate habitable space, essential domestic facilities, and health or safety hazards.

Evaluators check the number and sizes of rooms against the size of the enrollee's household to determine whether the household is overcrowded. The rooms must be equipped with adequate heating, lighting, ventilation, and they must have privacy in the bathrooms.\*

In checking for essential domestic facilities, evaluators determine the presence and working condition of specified items in the bathroom and kitchen. Required items include a toilet, sink, and tub (or shower) in the bathroom, and a refrigerator, stove, and sink in the kitchen. Both rooms must have adequate electrical service, and the plumbing must have hot and cold running water served by an adequate, sanitary sewer.

\*For details on the HAO housing standards, see James L. McDowell, *Housing Allowances and Housing Improvements: Early Findings*, The Rand Corporation, N-1198-HUD, September 1979, pp. 3-6.

The final category on the evaluator's checklist, hazards to health and safety, is the longest and most detailed. The evaluator determines whether there are adequate safety features (such as electrical overload devices, handrails, and an adequate number of emergency exits), and whether there are unsafe or unsanitary conditions (such as dangerous stairs and rodent infestations). In addition, since January 1977, the evaluator has explicitly checked for lead-based paint hazards, using a clear and detailed definition of what constitutes an unacceptable paint condition.\*

#### THE PAINT HAZARD STANDARD

Local, state, and federal regulations have defined and redefined what constitutes lead-based paint hazards. Federal standards regulate the lead content in new paint, whereas local standards establish what constitutes dangerous levels of lead on painted surfaces.\*\*

Prior research by the National Bureau of Standards demonstrated that laboratory methods of determining lead content in dried paint were time consuming, expensive, and required expert technicians. Portable methods such as spot tests or X-ray florescent devices either damaged painted surfaces or did not accurately measure the low levels of lead specified in many local codes.\*\*\*

The HAO regulations do not entail determining lead content; instead, they identify conditions under which lead-based paint, if present, would constitute a hazard to a dwelling's occupants. A dwelling will fail the evaluation if it has *both* of the following:

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\* Since the inception of the experiment, seriously deteriorated paint has caused dwellings to fail evaluations. Prior to 1977, however, criteria for paint deficiencies were not clear and only a handful of dwellings failed for that reason.

\*\* A common standard is two milligrams of lead per square centimeter of surface.

\*\*\* Irwin H. Billick and V. Eugene Gray, *Lead-Based Paint Poisoning Research: Review and Evaluation 1971-1977*, U.S. Department of Housing and Urban Development, Washington, D.C., July 1978, pp. 19-20.

After the HAO paint standard was proposed and adopted, HUD contractors produced and tested prototype lead detection devices that promised improved accuracy. The manufacturer later supplied these devices to purchasers, and its first production run was sold out.

- o Cracking, scaling, chipping, or loose paint of any measurable size\* on any interior surface or on exterior surfaces within five feet of the ground (i.e., readily accessible to children);
- o Children under 7 years of age as occupants or frequent visitors to the dwelling.\*\*

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\* An area the size of a penny is large enough to constitute a violation.

\*\* Although this provision was not included in the HUD regulations, HUD and Rand agreed that it satisfied the intent of the Act by protecting children from lead-based paint hazards. (Unlike most other HUD programs, the HAOs collect information about family composition.)

III. INCIDENCE OF PAINT DEFECTS

Participants' dwellings in Brown and St. Joseph counties have a high incidence of cracking, scaling, and chipping paint (see Table 2). Defective paint is commonly found in all types of dwelling evaluations for owners and renters in the two counties. The incidence of defective paint varies by the type of evaluation and is generally higher in initial evaluations. Defective paint was more common for owners than it was for renters, and it was more common in St. Joseph County than it was in Brown County. Overall, defective paint was found in about 45 percent of the evaluated dwellings in Brown County and in about 60 percent of those dwellings in St. Joseph County.

Table 2

INCIDENCE OF PAINT DEFECTS IN PARTICIPANTS' DWELLINGS

Type of Evaluation	Percent of Dwellings with Paint Defects			
	Brown County		St. Joseph County	
	Owners	Renters	Owners	Renters
Initial	52	50	67	66
Deficiency	36	39	43	39
Move	42	43	58	68
Annual	49	45	66	70
Reinstatement	42	48	71	66
Total	47	44	60	59

SOURCE: Tabulated by HASE staff from HAO records from January 1977 through June 1978 in Brown County and December 1977 in St. Joseph County.

NOTE: The types of evaluation are explained on pp. 5-6.

LOCATION AND EXTENT OF PAINT DEFECTS

Paint defects were far more common on the outside of dwellings than on the inside. About 92 percent of the dwellings with defective paint in Brown County, and 84 percent in St. Joseph County had peeling or flaking paint on the outside of their homes. A substantial percentage of the dwellings had paint defects both indoors and outdoors: about 20 percent in Brown County, and double that figure in St. Joseph County. Only 8 percent of the dwellings in Brown County and 16 percent of those in St. Joseph County had paint defects exclusively indoors.

Exterior paint defects are usually extensive. When present, more than 75 percent of the defects cover 5 or more square feet, and of this almost one-quarter usually includes an area of more than 100 square feet. The exterior paint defects that cause a house to fail an evaluation commonly involve a single large surface such as the entire side of the house or scattered strips over a wide area, such as the siding trim.

By contrast, interior paint defects are generally confined to only one or two rooms. In Brown County, more than half of the dwellings with interior paint defects had them in only one room; 20 percent had them in two rooms, and smaller percentages had paint defects in three or more rooms. Interior paint defects were somewhat more common in St. Joseph County, but 55 to 60 percent of the dwellings had paint defects in only one or two rooms.

Defective interior paint generally affects small surfaces. More than 75 percent of the defective interior surfaces in Brown County, and 80 percent of those in St. Joseph County involved defective paint over an area smaller than 5 square feet. Less than 3 percent of dwellings fail the evaluation for surfaces larger than 100 square feet. Although it is common for the outside of a dwelling to fail because of large areas of peeling paint, it is far more common for the inside to fail because of a small flaking or peeling section of a window sill, corner of a room, or a door frame.

IV. DWELLING FAILURES

Many dwellings with defective paint do not fail the paint standard because children under seven are not in residence. Table 3 shows that of the evaluated dwellings with defective paint, only 17 to 51 percent (depending on site and tenure) failed the paint standard. Therefore, although about one-half of the dwellings had defective paint either inside or outside, only a portion actually failed because of it--about 15 percent in Brown County, and about 20 percent in St. Joseph County (higher in both cases for renters than for owners).

The standard is selective; it singles out participants who are most susceptible to lead poisoning: households with small children. The HAO standard implies that it does not make sense to penalize a household for having flaking paint when its members are unlikely to eat the paint flakes.

Table 3

DWELLING FAILURES DUE TO PAINT STANDARD

Category	Percent of All Dwellings Evaluated			
	Brown County		St. Joseph County	
	Owners	Renters	Owners	Renters
<i>Failed Paint Standard</i>				
Defective paint, child present	12	18	10	30
<i>Passed Paint Standard</i>				
Defective paint, no child present	35	26	50	29
Acceptable paint, child present	17	30	9	23
Acceptable paint, no child present	36	26	31	18

SOURCE: Tabulated by HASE staff from HAO records from January 1977 through June 1978 in Brown County, and December 1977 in St. Joseph County.

The paint standard is not similarly selective in pertaining only to dwellings painted with lead-based paint. As stated earlier, the standard prohibits defects in any paint, whether or not it includes lead.

The HAO paint inspection does not fully ensure that children in HAO-approved units will not have access to lead-based paint. Undetected but intact lead-based paint may remain on window sills, door frames, or banisters where children could chew on it. (It has been determined, however, that children must ingest lead-based paint over a prolonged period before lead content in the blood is dangerously increased. \*) Moreover, peeling paint (possibly lead-based) can develop on other surfaces between annual inspections. Unfortunately, it is difficult to imagine that any administratively feasible procedure, short of total removal of all lead-based paint, would remove *all* danger of lead poisoning. \*\*

#### INCREASE IN DWELLING FAILURES

Approximately two-thirds of the dwellings that fail the paint hazard standard also failed for other reasons; the paint standard alone caused the remaining third to fail. Overall, four to eight percent of all dwellings evaluated since January 1977 failed evaluations solely because of the lead-based paint standard, and an additional eight to twenty-two percent failed for lead-based paint hazards in addition to other defects.

Many dwellings, already qualified under program rules, failed the first annual evaluation after the lead-based paint standard was implemented. Nearly half of all dwellings failing annual evaluations during the first six months of 1977 failed (partly or solely) because of defective paint conditions.

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\* U.S. Department of Health, Education, and Welfare, *Lead Poisoning in Children*, p. 4.

\*\* Removal of lead-based paint is not widely advocated because of high costs and lead poisoning hazards for workers removing the paint.

V. ENROLLEE RESPONSE

PAINT REPAIRS

Most households living in failed dwellings repair their housing and qualify for allowances. To repair an HAO paint hazard, a household must thoroughly scrape away the defective paint, pick up any fallen paint chips, and (with the exception of exterior masonry foundations) repaint the affected area with two coats of paint. The HAOs do not rate the aesthetics of repairs, but most enrollees repaint to match the original colors, or they repaint an entire section of the wall.

Correcting paint defects is usually inexpensive, but the costs are not trivial. From January to June 1977, costs averaged \$10 to \$31, depending on site and tenure:

	<u>Brown County</u>		<u>St. Joseph County</u>	
	<u>Owners</u>	<u>Renters</u>	<u>Owners</u>	<u>Renters</u>
Number of deficiency repair actions.....	126	349	231	595
Average cash outlay.....	\$23	\$13	\$31	\$10

Many of those repairs included cash outlays for materials only, and not for the value of unpaid labor supplied by the occupant, friends or relatives, and (in the case of rental properties) the landlord. Yet some enrollees pay higher costs because they pay for labor as well as materials. In the two counties those costs sum to \$42,000 per year and represent almost one-quarter of all cash outlays for initial repairs.

Almost all paint hazard repairs satisfactorily meet program standards. Unacceptable paint repairs were most common for renters in St. Joseph County, where about 5 percent of the deficiency reevaluations detected unresolved paint problems.\* Elsewhere less than 2 percent of the reevaluated dwellings failed because of remaining paint defects.

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\* We were surprised that the percentage was so low because evaluators report that enrollees find paint defects one of the most complex housing standards to understand.

After qualifying for allowance payments, many households spend part of their recently augmented incomes on making voluntary repairs to their dwellings, almost four-tenths of which involve painting:\*

	<u>Brown County</u>		<u>St. Joseph County</u>	
	<u>Owners</u>	<u>Renters</u>	<u>Owners</u>	<u>Renters</u>
Number of voluntary repair actions .....	368	258	576	159
Average cash outlay ...	\$62	\$33	\$96	\$51

The cash outlays for voluntary paint repairs are greater than those for required repairs. However, voluntary painting often is not enough to keep a dwelling in compliance with the paint standard; households who voluntarily painted during the year failed just as often as those who did not.\*\*

TERMINATIONS

Although most enrollees whose dwellings fail the paint standard repair the paint defects in order to qualify for payments, some either move or terminate their enrollments. Of those who failed the first evaluation after implementation of the paint standard (Table 4, upper panel), 63 percent had repaired and 13 percent had terminated by close of file. Others moved, but the data currently available do not enable us to distinguish movers from those who had yet to act.

Among the terminees, 60 percent dropped out of the program for no other apparent reason than inability or reluctance to repair paint defects, and unrepaired paint defects were a contributing cause for termination by another 40 percent. Renters were as likely as homeowners to terminate after such a failure; and although the data do not distinguish moves from no action, we are confident that renters are more likely than homeowners to move because of paint defects.

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\* See McDowell, *Housing Allowances*, pp. 42-55.

\*\* Households reporting voluntary paint repairs whose dwellings failed the annual evaluation most likely failed because of other interior or exterior surfaces that were not recently painted.

Table 4

CLIENT RESPONSE TO DWELLING FAILURES DUE TO PAINT DEFECTS

Client Response	Percent of Cases, by Response to Paint Defect				
	Brown County		St. Joseph County		Total
	Owners	Renters	Owners	Renters	
<i>Failed First Evaluation after Paint Standard was Implemented</i>					
Repaired paint defect	69	56	72	61	63
Did not repair/terminated because of:					
Paint and other defects	8	6	7	9	8
Paint defects only	6	7	4	5	5
Other response <sup>a</sup>	17	31	17	25	24
All cases	100	100	100	100	100
<i>Failed Subsequent Evaluation of Same Dwelling</i>					
Repaired paint defect	73	65	75	64	66
Did not repair/terminated because of:					
Paint and other defects	7	8	6	10	9
Paint defects only	7	4	7	4	5
Other response <sup>a</sup>	13	23	12	22	20
All cases	100	100	100	100	100
<i>Number of Cases</i>					
Failed first evaluation	80	249	249	633	1,211
Failed subsequent evaluation	110	288	202	657	1,257

SOURCE: Tabulated by HASE staff from HAO housing evaluation records from January 1977 through June 1977; and from HAO client characteristics files and management information reports from January 1977 through December 1977.

NOTE: Entries are the synthesis of records from three separate data bases. Repair information was annualized to conform to the other data sources.

<sup>a</sup>Moved or action pending at close of file.

The response patterns do not differ systematically by site.\* And, as the lower panel of the table shows, the responses to failure were about the same in first and subsequent evaluations.

In the first year following adoption of the paint standard, 124 enrollees, lacking only paint repairs to qualify, terminated their enrollments. Failing the paint standard was a contributing factor in

\* Recall from Sec. IV (Table 3) that paint failures were more common in St. Joseph than in Brown County; and in both counties were more common for renters than owners. Here, we consider only the responses given a paint failure.

another 204 terminations during 1977. These two classes of terminations amount to 1.4 and 2.2 percent respectively of the average active enrollment during that year. About half of the terminees had previously qualified their dwellings (before the paint standard was adopted) and so had been receiving payments; the others were new enrollees.

VI. COMPARISON TO OTHER LEAD-BASED PAINT ABATEMENT PROGRAMS

The HAO's method of controlling lead-based paint hazards is only one way of approaching the problem. Under HUD sponsorship, the National Bureau of Standards examined several methods of controlling these hazards and estimated the cost of implementing a national lead-based paint abatement program.

The lead-based paint abatement techniques examined by the Bureau included removing paint with heat guns, infra-red devices, solvent stripping, hand scraping, and covering the affected surfaces with cement, plaster, gypsum, fiberglass, plywood, or vinyl.\*

The average estimated cost of abating lead-based paint hazards from the interiors of pre-1940 single-family dwellings ranged from \$370 to \$2,866, depending on the region. (The most costly estimate was for the East North Central Region, the one that contains both HASE experimental sites.)\*\* The cost of remedying paint hazards in other dwelling types was estimated to be up to 50 percent less than those for older single-family homes.\*\*\* Another report published by the Bureau states that lead levels are considerably higher on exterior surfaces than on interior surfaces, so these figures surely underestimate the cost of abating all hazards.†

HUD considered another less costly lead-based paint abatement method that called for the scraping and removal of all loose or flaking

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\* Robert E. Chapman and Joseph G. Kowalski, *Guidelines for Cost Effective Lead Paint Abatement*, U.S. Department of Commerce, National Bureau of Standards, Washington, D.C., 1979, Chapter 3.

\*\* Robert E. Chapman and Joseph G. Kowalski, *Lead Paint Abatement Costs: Some Technical and Theoretical Considerations*, U.S. Department of Commerce, National Bureau of Standards, Washington, D.C., 1979, p. 22.

\*\*\* Irwin H. Billick and V. Eugene Gray, *Lead Based Paint Poisoning Research*, U.S. Department of Housing and Urban Development, Washington, D.C., 1976, Tables 4-9.

† Douglas R. Shier and William G. Hall, *Analysis of Housing Data Collected in a Lead-Based Paint Survey in Pittsburgh, Pennsylvania, Part I*, U.S. Department of Commerce, National Bureau of Standards, Washington, D.C., 1977, p. 55.

paint regardless of lead content. Unlike the HAO paint hazard standard, that method considered only interior hazards and did not take family composition into account. The estimated costs of implementing that method ranged from \$34 to \$225 per dwelling, depending on structure type and age.\*

Average cash outlays for interior and exterior paint repairs in the allowance program were \$28 per dwelling for homeowners and \$11 for renters. Cash costs were low because allowance recipients did most of the work themselves. Housing evaluators in the program estimate that if the repairs were made by paid labor, the average cost would exceed \$210 per dwelling.

#### Nationwide Cost Estimates

Nationwide, the cost of eliminating lead-based paint hazards by removing the hazards or covering them with nonpaint overlays is \$28 to \$35 billion, and those figures include only the removal of interior hazards.\*\* The nationwide cost of removing immediate lead-based paint hazards, having contractors scrape and repaint flaking or peeling paint regardless of lead content, is \$2 billion.\*\*\* Encouraging occupants to do the work themselves, as in the allowance program, would reduce the cash costs to the range of \$.2 to \$.3 billion.

However, a comparison of nationwide and allowance program costs for eliminating lead-based paint hazards must be qualified. The defects repaired in the allowance program are a combination of interior and exterior defects, and are not directly comparable to the other paint abatement methods. Overlays of cement, plaster, fiberglass, plywood, or paint are not permanent remedies and require reapplication at various intervals. Costs of such reapplication are not included in these initial estimates. Moreover, not all households are capable of or willing to make these repairs; approximately one-third of the enrollees in the allowance program whose dwellings failed the paint standard moved or terminated their enrollment rather than undertake paint repairs.

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\* Billick and Gray, pp. 46-49.

\*\* Chapman and Kowalski, *Guidelines for Cost Effective Lead Paint Abatement*, p. 4.

\*\*\* Billick and Gray, Tables 4-11.

Nonetheless, the two-thirds of allowance recipients who failed the paint hazard standard repaired their dwellings at a surprisingly low initial cash cost. And although there may be differences between the condition of allowance-assisted and nationwide housing stock, it is likely that the cash savings would remain substantial.

## VII. CONCLUSIONS

### PROGRAM STATISTICS

Almost half of the dwellings evaluated in Brown County and about three-fifths of those in St. Joseph County had some paint defects. Only a fifth to a sixth in each site had both paint defects and small children in residence. Most defective dwellings pass because the HAO standard only prohibits paint defects in dwellings occupied by children.

Program statistics suggest, however, that the paint hazard standard has increased the cost of participation and reduced the number of program recipients. Most enrollees successfully repair paint defects, and the cost of the repairs is low because the use of unpaid labor is prevalent. Others apparently have found the cost of qualifying their dwellings, in terms of money and effort, too great.

### PROGRAM IMPLICATIONS

Now that enforcement of the HAO paint standard has become routine, it is appropriate to consider the costs and benefits of the required repairs. The costs consist of cash outlays for repairs and allowance payments not received. The required repair costs summed to approximately \$42,000 in 1977. During that year, 124 households dropped out of the program solely because of the standard.

The benefits are more difficult to estimate: Short of measuring the changes in blood lead-levels among occupants of repaired dwellings, which the experiment has not done, we cannot estimate the number of people whose health was improved as a result of the standard. However, lead poisoning has not been a major problem in the one county that has lead screening statistics.\*

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\* Prior to implementing the standard, the HAOs collected information about the incidence of lead poisoning in the two counties. The one available study measuring blood lead-levels is by Susan R. Colgrove, R.N., "Green Bay Lead Poisoning Survey," Department of Public Health, Green Bay, Wisconsin, May 1976. This study determined that "a very low percentage of children living in high risk housing" (two out of 169 children tested) had excessive levels of lead in their blood (meeting or exceeding 60 µg. per 100 milliliters of whole blood). The study concluded that "lead absorption and/or lead poisoning is not a major public health problem in Green Bay."

Today we know more about elevated levels of lead in blood than we did in 1976. For example, the incidence of deaths due to lead poisoning in children is probably much lower than the 1972 national estimate of 200 deaths per year.\* Recently, the sources of lead poisoning in children have been reassessed: A New York City study showing continuing decreases (with seasonal variation; levels peak in July and August) in the lead content of children's blood suggests that atmospheric lead released through the combustion of leaded gasolines may have been the principal source of ingested lead.\*\* A recent HEW study reports that 45 percent of the children with elevated lead-levels in their blood had no detectable lead-based paint hazards in their homes.\*\*\*

More enlightened policy depends on better information about the sources, consequences, and prevention of lead poisoning. In response to a federal regulation, the HAOs adopted a monitoring and correction program for a poorly defined problem. Compared to other lead-based paint abatement programs, the HAO's paint hazard standard is a low-cost method of controlling lead poisoning. Even so, the current standards are interim measures that produce unknown benefits at known costs: higher cash outlays for repairs and fewer enrollees receiving payments.

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\* See Irwin H. Billick and V. Eugene Gray, *Lead-Based Paint Poisoning Research: Review and Evaluation 1971-1977*, U.S. Department of Housing and Urban Development, Washington, D.C., July 1978, p. 77.

\*\* Ibid., p. 75.

\*\*\* See U.S. Department of Health, Education, and Welfare, *Morbidity and Mortality Weekly Report*, Vol. 26, No. 6, U.S. Government Printing Office, Washington, D.C., February 11, 1977, p. 49.

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