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The Housing Modifications for Disabled Elderly Households

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Abstract

Based on data from the 1995 American Housing Survey (AHS), this study explores the types and prevalence of home modifications for U.S. households with disabled elderly individuals. Among disabled elderly households who express a need for an accessibility feature in their homes, about three out of four have at least one home modification. Typically, however, only half of disabled elderly households have the modification that they explicitly state they need.

Disabled elderly households who have home modifications have characteristics that are significantly different from those without such features. The portrait varies, however, depending on the modification need examined. Among disabled elderly households who perceive a need for at least one home modification, those in the Midwest and West, in newer units, with higher incomes, with white college-educated heads, and with older elders are significantly more likely than others to have a home modification. When logit models that control for multivariate effects are estimated on the 1995 AHS data, the regional location, structure age, education, and race variables remain significant.

Limitations in the 1995 AHS data provide only tentative estimates of the extent of unmet housing modification needs among disabled elderly households, and only a rough picture of who has these unmet needs. These estimates are a useful beginning, however, towards efforts to better understand the housing demands of a quickly growing part of the population. Insight into this particular market can be further advanced with better survey data that more clearly identifies elderly disabilities and the types of physical accommodations they truly require. Issues that policy-makers may wish to explore include the costs of providing home modifications to a population that already experiences high housing cost burdens.

The Housing Modifications for Disabled Elderly Households

by

Josephine Louie

Introduction

Are elderly people with disabilities living in homes that accommodate their disabilities? Are their homes equipped with features that serve their current and future health needs? Over the next several decades, the elderly population in the United States is expected to grow tremendously as the Baby Boom generation enters retirement ages. A larger number of older persons should increase the number of persons with disabilities, since older people are more likely to have disabilities than those who are younger. Many older people's disabilities affect their physical mobility. Whether senior people can continue to access the important parts of their homes and whether their homes allow them to function safely and completely should become increasingly salient issues for homebuilders, health care providers, and public policy-makers.

To date, very little research has been conducted on the physical condition and overall accessibility of the housing stock for older people with disabilities. Using data collected in 1990 from the National Health Interview Survey on Assistive Devices (NHIS-AD), several researchers have reported estimates of the number of elderly people in the U.S. who live in homes with accessibility features such as handrails, ramps, and raised toilets (LaPlante, Hendershot, and Moss, 1992). More recently, the 1995 American Housing Survey (AHS) included a supplement of questions asking households outside of group quarters whether individuals in the unit experienced difficulty with a variety of different physical or sensory activities. The survey also asked whether their units contain a list of different accessibility features or home modifications, and whether someone in the unit needs a specific home modification.

This study examines the data collected in the home modifications supplement to the 1995 AHS for households with elderly people (those aged 65 or above). Much of the data presented in this paper has not been published previously, since neither HUD (which sponsors the survey) nor the U.S. Bureau of the Census (which collects the data) has issued the official results from the supplement. The first section of this paper draws heavily on the 1995 AHS to

examine the number of households around the country with disabled elderly members, the number with specific accessibility features or home modifications, and the gap between households with perceived modification needs and those who actually have their needed features. To further explore the extent of unmet housing needs among disabled elderly households, this study also investigates how many disabled elderly households lack home modifications that could be useful for their difficulties.

The second part of this paper uses other data collected from the 1995 AHS to paint a portrait of elderly households with needed home modifications. Without controlling for the overlapping influences of different housing and demographic variables, this section presents cross tabulations of the survey data to describe the general sorts of households that are most likely to live in homes that accommodate people with disabilities. This information can also help indicate which types of elderly households are least likely to live in accessible units, and which are therefore in greatest need of more suitable living environments.

The third section of this study aims to isolate the key variables influencing the likelihood of elderly households having a needed home modification. Logit analyses were performed on the 1995 AHS data for groups of disabled elderly households expressing needs for different accessibility features. Results from the models provide insight into which household characteristics significantly affect the likelihood of having home modifications, controlling for the effects of other demographic and housing variables. Finally, the paper ends with a summary of findings as well as questions that emerge from the data.

I. Disabled Elderly Households and their Housing Modifications

According to the U.S. Census Bureau's Survey of Income and Program Participation (SIPP), there were over 31 million people aged 65 or over in the U.S. in 1994. Over half, or 52 percent, were classified as having some kind of disability.¹ This share stands in striking contrast to the much smaller proportion (21 percent) of the total population with disabilities. Based on figures from the Census Bureau, therefore, a majority of elderly people in the U.S. in the mid-1990s had some sort of disabling condition.²

Already high, the number of disabled elderly people should rise even further over the next several decades. The Census Bureau projects that the number of elderly will nearly double by the year 2030. If age-specific disability rates were to remain constant over the next 30 years, the sheer growth in the number of elderly people would fuel a significant rise in the number of older persons with disabilities. Increasing life expectancies and growth in the population of those aged 85 or over would help contribute to larger numbers of disabled seniors, because physical frailties become more prevalent with age (Figure 1). Countering such growth are advances in health care and improved public health levels. While some previous research has shown that disability rates for elderly persons have held relatively steady over time (Kaye, et al, 1996), other research has found that the rates have fallen slightly from the early 1980s to mid-1990s (Cutler and Sheiner, 1999). Even if elderly disability rates do show some decline in the upcoming decades, the absolute growth that is projected for the elderly population should continue to augment the numbers of seniors with disabilities.

With a likely rise in the disabled elderly population, questions concerning elderly health care and living arrangements emerge with increasing urgency. The quality and suitability of housing for older people fall squarely within these concerns. Many disabled elderly people live in homes that become more difficult to navigate or even impede daily activities as they become more infirm. Indeed, many of the disabilities elderly people

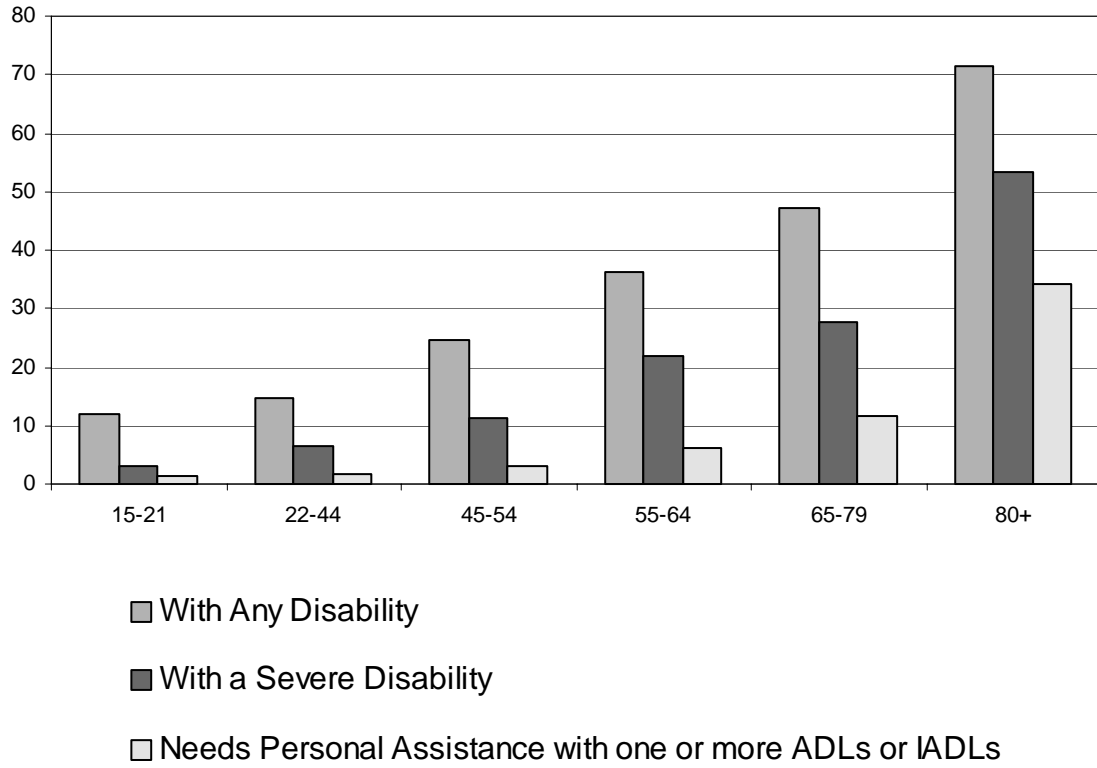
¹ According to some sources, disability figures from the Census Bureau may underestimate the total number of people in the population with disabilities. The Census Bureau includes in its counts people identified through its population surveys and government disability programs. Some argue that these sources undercount the total disabled population (Mace, 1998).

² Throughout this paper, the terms "elderly," "seniors," and "older people" will be used interchangeably to refer to people aged 65 or above. The term "elderly household" will also be used to refer to households with at least one person who is aged 65 or above.

Figure 1

Share of U.S. Population with Disabilities

Percent, by age



experience affect their mobility and dexterity, leading to direct implications for how homes serving this population should be designed. Few estimates have been made of how many housing units occupied by disabled elderly people contain accessibility modifications, and whether there are unmet accessibility needs within the private residential stock. Following is a summary of some of these earlier estimates and further measurements of unmet home modification needs using data from the 1995 American Housing Survey (AHS).

Disabilities within Households

The sorts of disabilities elderly people have are varied and range in frequency.³ The Survey of Income and Program Participation (SIPP), conducted by the U.S. Bureau of the Census, defines people as “disabled” if any of the following conditions hold:

- they use a wheelchair or are long-term users of a cane, crutches, or a walker;
- they have difficulty performing one or more functional activities, activities of daily living, or instrumental activities of daily living.⁴

Some of the terms used by the SIPP in its disability definition have very specific meanings. “Functional activities” include seeing words or letters, hearing normal conversations, speaking so that one is understood, lifting and carrying 10 pounds, climbing stairs without resting, or walking three city blocks. “Activities of daily living” (ADLs) include getting around inside the home; getting in or out of a bed or chair; taking a bath or shower; dressing; eating; or using the toilet, including getting to the toilet. “Instrumental activities of daily living” (IADLs) include going outside the home, perhaps to shop or visit a doctor; keeping track of money and bills; preparing meals; doing light housework, such as washing dishes or sweeping a floor; or using the telephone. The Census Bureau designates some individuals as “severely” disabled: those who are *unable* to perform one or more functional activities, need

³ Throughout this paper, the terms “disability,” “impairment,” and “physical limitation” will be used interchangeably. Other studies have noted, however, that some of these terms have been given precise definitions. Indeed, the International Classification of Impairments, Disabilities, and Handicaps (ICIDH) defines an “impairment” as “any loss or abnormality of psychological, physiological, or anatomical structure or function.” A “disability” prevents a person from performing “essential components of everyday living.” A “handicap” hinders “the fulfillment of a role that is normal for that individual.” (LaPlante, Hendershot, and Moss, 1992)

⁴ People are also defined as disabled if they are limited in their ability to do housework; if they are 16 to 67 years old and are limited in their ability to work at a job or business; if they are receiving federal benefits based on an inability to work; or if they have one or more of the following conditions: a learning disability, mental retardation or another developmental disability; Alzheimer’s disease, or some other type of mental or emotional condition.

personal assistance with an ADL or IADL, use a wheelchair, or are long-term users of a cane, crutches, or a walker.⁵

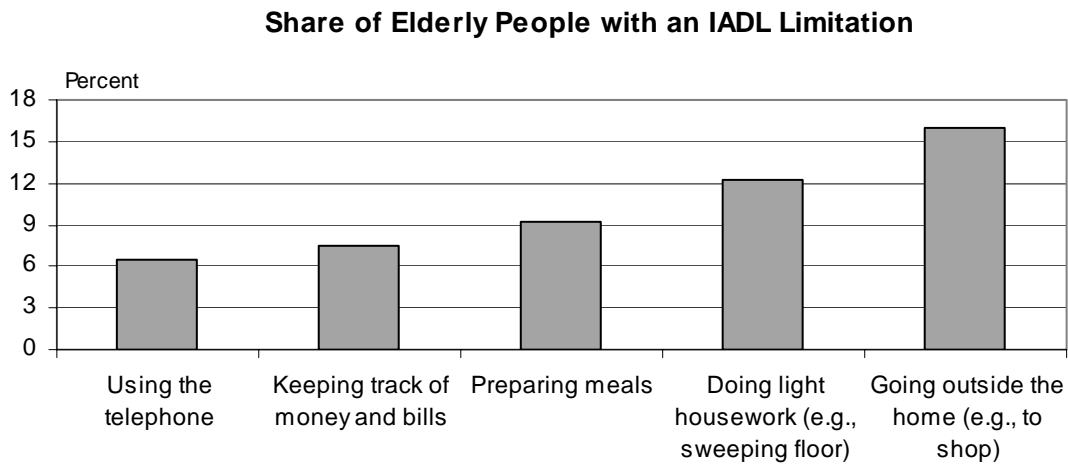
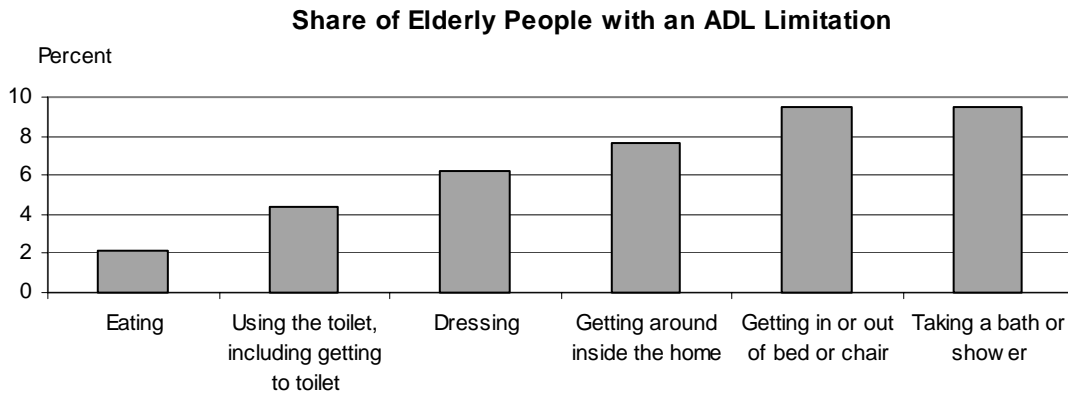
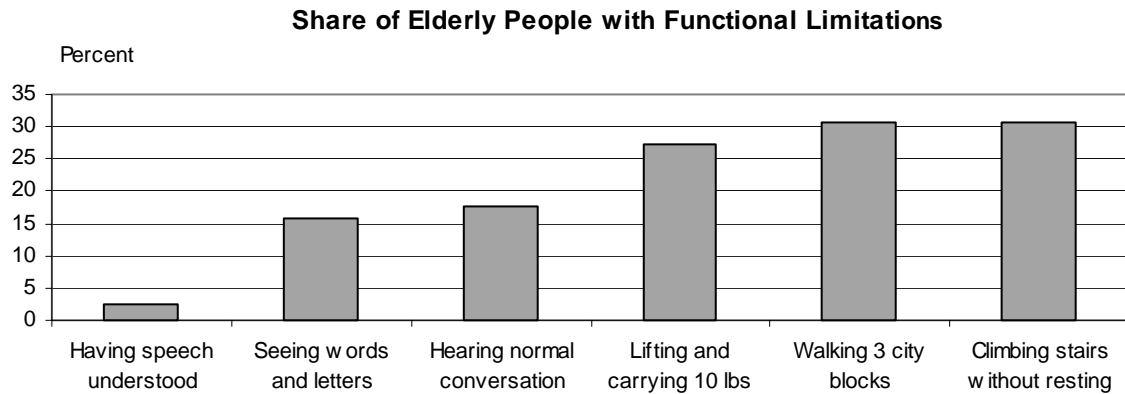
Based on data collected from the 1991-1992 SIPP, the sorts of limitations that are most frequent among the elderly are those activities that demand physical strength and agility. While 2 percent of elderly have difficulty speaking so that their speech is understood, about 30 percent of elderly have difficulty walking three city blocks or climbing stairs without resting (Figure 2). While 2 percent of elderly have trouble eating, almost 10 percent have difficulty getting in or out of a bed or chair. And while 6.5 percent have difficulty using the telephone, 16 percent have difficulty going outside of the home to perform tasks such as shopping.

Other research has shown similar patterns in the frequency of different disabilities among older people. Tabulations of the 1993 Assets and Health Dynamics Among the Oldest-Old (AHEAD) survey, a longitudinal database compiled by the Institute for Social Research at the University of Michigan, show that 34 percent of people aged 70 or older report difficulty walking several blocks (Schafer, 1999). A third of this older population also reports difficulty lifting ten pounds, and over 30 percent state trouble in moving heavy objects. Smaller proportions of this older population report difficulty with less physically demanding tasks. About 5.2 percent have problems using their telephones, around 5.4 percent state they need help with eating, and under 9 percent have difficulty picking up a dime.

The 1995 AHS included a supplement to collect information on disabilities within American households and the sorts of physical modifications housing units contain. Although the AHS did not collect information on household members that can be used to duplicate the SIPP's or the AHEAD's definitions of disability levels, it did collect data on some of the same activities measured by these other surveys.

⁵ Those with severe disabilities are also those who have a developmental disability or Alzheimer's disease; are unable to do housework; are receiving federal disability benefits; or are 16 to 67 years old and are unable to work at a job or business.

Figure 2



Specifically, the AHS asked if anyone in the household has difficulty with any of the following activities:

- entering and exiting the home
- getting around inside the home, such as:
 - going up and down the steps
 - opening and closing or going through any doors of the home
 - moving between rooms
 - reaching the bathroom facilities, including tub, shower, toilet or sink
 - reaching the kitchen facilities, including sink, stove, refrigerator, and kitchen cabinets
- cooking and preparing food
- feeding oneself
- bathing, getting in and out of the tub or shower
- grooming and dressing
- doing housework and laundry tasks
- seeing, even while wearing glasses or contact lenses
- hearing even a normal conversation even when wearing a hearing aid

And,

- does anyone in this household use or need special modifications, equipment, or the assistance of another person around the home because of a physical limitation.

Assessments of how the disabilities data from the AHS compares with published data from other sources, like the SIPP, are difficult because the unit of analysis for the AHS is the household while for the SIPP it is the person. Comparisons are also difficult because the questions asked in each survey were slightly different. For example, the SIPP counts the number of people who have difficulty “climbing stairs without resting;” the AHS collects data that can be aggregated to count the number of households with someone who has difficulty “going up and down steps.”

It is possible that the AHS underestimates the level of different disabilities within the elderly population. The AHEAD survey (which allows analysis at the household level) suggests that 35 percent of households with a person age 70 or older have at least one ADL.

In a rough comparison, AHS data suggest that 25 percent of a similar group of households have at least one of the disabling conditions measured in the survey. The AHS may underestimate disabilities in the population because the goal of the survey was to collect an accurate count of households and their housing characteristics, rather than an accurate count of people and their demographic characteristics.⁶

Despite data comparability issues and a possible undercount of disabilities, findings from the AHS reflect findings from other surveys: the most prevalent disabilities among the elderly involve activities requiring higher levels of physical strength and mobility. While slightly over 1 percent of all households containing an elderly person have an elderly member who has difficulty feeding himself or herself, over 9 percent of households with an elderly person contain an elderly member who has difficulty going up and down steps (Figure 3). About 3 percent of elderly households have an elderly person who has trouble opening and closing or going through doors; over 8 percent, in contrast, have an elderly person who has difficulty doing housework and laundry tasks. In total, a little over a fifth of all elderly households have an elderly person with at least one of the disabling conditions measured by the AHS.

Modifications in Housing Units

Organizations studying accessible home design recommend a variety of physical changes in the homes of individuals who cannot move around their living spaces easily or safely. The Center for Universal Design suggests a number of home modifications that can help accommodate some of the more prevalent disabilities within the population at large and among older people in particular. These features include: adding a chair-lift to stairs; replacing stairs with ramps; widening doorways or adding offset hinges; lowering cabinets; installing more elevated toilets; adding grab bars to the bath tub or toilet; or installing alerting devices for the hearing or visually impaired (1992). Other organizations suggest modifications such as replacing drawer knobs with loop handles; replacing knob faucets with

⁶ An under count may also arise because the AHS survey supplement recorded a maximum of three people in any household with any type of disability. In a recent publication of proceedings from a national forum on disabilities and housing, the Director of the Housing and Demographic Analysis Division at HUD acknowledged that the supplement probably underestimates the number of households with various disabilities (NIDRR, 1998, p. 20).

Figure 3: Households With Disabled Elderly People

| | <u>Number (000s)</u> | <u>Share (%)</u> |
|---|--------------------------|----------------------|
| Total Households with Elderly People | 22,790 | 100.0 |
| Households with Elderly People Who Have Difficulty: | | |
| entering and exiting the home | 1,586 | 7.0 |
| going up and down steps | 2,095 | 9.2 |
| opening and closing or going through doors | 647 | 2.8 |
| moving between rooms | 873 | 3.8 |
| reaching bathroom facilities (tub, shower, toilet, sink) | 1,134 | 5.0 |
| reaching kitchen facilities (sink, stove, refrigerator, kitchen cabinets) | 794 | 3.5 |
| cooking and preparing food | 1,255 | 5.5 |
| feeding themselves | 268 | 1.2 |
| bathing, getting in and out of the tub or shower | 1,864 | 8.2 |
| grooming and dressing | 881 | 3.9 |
| doing housework and laundry tasks | 1,874 | 8.2 |
| seeing, even with glasses or contacts | 1,568 | 6.9 |
| hearing normal conversation, even with hearing aid | 1,612 | 7.1 |
| Households where an elderly person needs special modifications, equipment, or assistance of another person around the home because of a physical limitation | 1,815 | 8.0 |
| Households where an elderly person has any disability | 5,028 | 22.1 |

Notes: Any disability is defined as having any of the difficulties listed in the table, including the need for special modifications, equipment, or personal assistance. An elderly person is aged 65 or over.

Source: Joint Center tabulations of the 1995 American Housing Survey.

levers; installing adjustable closet poles and shelves; or adding seat-lifts in showers or tubs (Adaptive Environments Center, 1996).

Researchers have emphasized the benefits that home accessibility features can bring to both those with disabilities and those without impairments. LaPlante, Hendershot, and Moss (1992) argue that carefully designed environments can provide aid to those with physical or mental deficits. Some design features accommodate assistive technology devices such as wheelchairs or canes. Some home designs aim specifically to reduce barriers within the home to improve convenience and safety. These authors note that barrier-free design can benefit even those without disabilities, for people in homes with such design are better able to accommodate disabled visitors. Others have also argued that almost everyone is subject to a disabling condition as one ages. Everyone is therefore likely to benefit eventually from a home with accessibility modifications (Center for Universal Design, 1997).

Previous studies have tried to estimate the number of people in the country who live in homes with special features designed for disabled persons. LaPlante, Hendershot, and Moss examined data collected in 1990 from the National Health Interview Survey on Assistive Devices (NHIS-AD). According to their work, almost 3 million elderly people had some type of accessibility feature in their home (Figure 4). Over 1.8 million had handrails, over three-quarters of a million had a raised toilet, and over half a million had a ramp in the home. For almost all of the features investigated, the majority of elderly with the feature were aged 75 years or over. Ramps displayed a different pattern: the distribution of people with a ramp was more heavily weighted towards younger rather than older people. Similarly, the data showed that people under age 65 were more likely to have extra-wide doors⁷ than those age 65 or over.

The 1995 AHS collected data from households with disabled persons on housing modifications to the unit. Specifically, the survey asked these households whether the home had any of fourteen specified features such as ramps, handrails, or flashing lights. All such items were labeled by the AHS as home “modifications”-- the AHS did not distinguish between those features that had been installed by the household and those that had already existed within the unit when the household moved in. The survey also asked whether anyone

⁷ The term "extra-wide" was not defined in the NHIS-AD survey. Respondents therefore used their own interpretations of the term when providing their survey responses.

Figure 4: Elderly People with Home Accessibility Features, by Age

| | Number (000s) | | | Share (%) | | |
|--|---------------|------------|--------------|--------------|------------|--------------|
| | <u>65-74</u> | <u>75+</u> | <u>Total</u> | <u>65-74</u> | <u>75+</u> | <u>Total</u> |
| Any type of home accessibility feature | 1,284 | 1,667 | 2,951 | 43.5 | 56.5 | 100.0 |
| ramps | 321 | 267 | 588 | 54.6 | 45.4 | 100.0 |
| extra-wide doors | 249 | 263 | 512 | 48.6 | 51.4 | 100.0 |
| elevator or stair-lift | 97 | 173 | 270 | 35.9 | 64.1 | 100.0 |
| handrails | 778 | 1,086 | 1,864 | 41.7 | 58.3 | 100.0 |
| raised toilet | 276 | 505 | 781 | 35.3 | 64.7 | 100.0 |
| adapted door locks | 86 | 148 | 234 | 36.8 | 63.2 | 100.0 |
| lowered counters | 22 | 62 | 84 | 26.2 | 73.8 | 100.0 |
| slip-resistant floors | 25 | 27 | 52 | 48.1 | 51.9 | 100.0 |
| other home accessibility feature | 293 | 330 | 623 | 47.0 | 53.0 | 100.0 |

Source: LaPlante, Hendershot, and Ross, 1992.

in the household received the help of another person for their limitation, or was assisted by equipment or devices such as a walker or motorized cart. If the household lived in a multi-unit or multi-family structure, then it was asked a shorter but similar list of questions about accessibility features in the building. The housing features and assistive devices surveyed for individual housing units are listed in Figure 5, and the items queried for multi-family buildings are shown in Figure 6.

Figure 5 further shows the numbers of households around the country with disabled elderly who have accessibility modifications in their homes. In this table and in all following discussions of 1995 AHS data, “disabled” will refer to any person in a household who has one of the physical limitations measured in this survey. “Disabled elderly household” will refer to any household with a person aged 65 or over who can be classified as disabled. According to the 1995 AHS, there are over 5 million households with a disabled elderly person. Similar to the findings published from the NHIS-AD survey, the modifications that appear most frequently among these households are extra handrails or grab bars. Almost 1.5 million

households with disabled elderly people have these items, forming almost 29 percent of the total. All together, almost 45 percent of households with disabled elderly people have at least one of the home modifications surveyed by the AHS. The incidence of any one of the specified housing modifications is fairly low, never surpassing 30 percent of households with a disabled elderly person.

A much higher share of disabled elderly households (over 60 percent) have either the help of another person or an assistive device.⁸ Almost 39 percent receive personal assistance, and almost 47 percent have a cane, walker, or crutches. The data also show that the population of disabled elderly households with personal help or an assistive device is generally more likely to have a home modification than all households with disabled elders. About 13 percent of the former group have ramps, 36 percent have extra handrails or grab bars, and 13 percent have extra-wide doors or hallways. In contrast, 9 percent of all disabled

⁸ In this paper, the term “assistive device” refers to any of the equipment aids surveyed by the AHS in its 1995 modifications supplement (see Figure 5). Other studies note that “assistive technology” is the term most preferred by disability-related organizations when referring to equipment that helps people with their physical impairments. Others have defined “assistive technology” to include “devices that enhance the ability of an individual with a disability to engage in major life activities, actions, and tasks” (LaPlante, Hendershot, and Moss, 1992).

Figure 5: Home Modifications in Disabled Elderly Households

| | Number of Households (000s) | Share of Total (%) |
|--|-----------------------------------|--------------------------|
| Total households with disabled elderly people | 5,028 | 100.0 |
| Home has: | | |
| Any home modification | 2,258 | 44.9 |
| ramps | 484 | 9.6 |
| elevators or stair-lifts | 267 | 5.3 |
| extra handrails or grab bars | 1,454 | 28.9 |
| extra-wide doors or hallways | 491 | 9.8 |
| door handles instead of knobs | 306 | 6.1 |
| push bars on doors | 108 | 2.1 |
| modified wall sockets or light switches | 167 | 3.3 |
| modified sink faucets or cabinets | 185 | 3.7 |
| bathroom designed for easier accessibility such as for wheelchair use | 503 | 10.0 |
| kitchen designed for easier accessibility such as for wheelchair use | 378 | 7.5 |
| raised lettering or braille | 57 | 1.1 |
| specially equipped telephone | 376 | 7.5 |
| flashing lights | 71 | 1.4 |
| any other modification | 53 | 1.0 |
| Someone in the household has: | | |
| Any help or assistive device | 3,100 | 61.6 |
| help of another person with their limitation | 1,943 | 38.6 |
| a cane, walker or crutches | 2,352 | 46.8 |
| wheelchair | 833 | 16.6 |
| motorized or electric cart | 94 | 1.9 |
| any other device | 213 | 4.2 |

Notes: "Disabled" is having any difficulty with any of the physical activities measured by the 1995 AHS (see Figure 3).

Source: Appendix 3.

Figure 6: Building Modifications in Multi-family Structures with Elderly Households

| | Number of Households <u>(000s)</u> | Share of Total <u>(%)</u> |
|--|--|------------------------------------|
| Total households with disabled elderly in multifamily buildings | 1,106 | 100.0 |
| The household's building has: | | |
| Any building modification | 770 | 69.6 |
| ramps | 217 | 19.6 |
| handrails | 544 | 49.2 |
| automatic doors | 114 | 10.3 |
| handicap parking | 301 | 27.2 |
| elevators with audio cueing or braille | 140 | 12.7 |
| accessibility for people with physical limitations to public use facilities, such as the lobby, laundry room and storage areas | 291 | 26.3 |

Notes: "Disabled" is having any difficulty with any of the physical activities measured by the 1995 AHS (see Figure 3).

Source: Appendix 4.

elderly have ramps, 29 percent have extra handrails or grab bars, and 10 percent have extra-wide doors or hallways.

As might be expected, the incidence of building-wide accessibility modifications for disabled elderly households living in multi-family structures is relatively high. Almost 70 percent of the 1.1 million disabled elderly households in multi-family structures live in buildings with ramps, handrails, automatic doors, handicap parking, specially equipped elevators, or features allowing access to public facilities within the building (Figure 6). Other tabulations of the AHS show that while 41 percent of all disabled elderly households in single-family units have at least one accessibility feature in their individual unit, the share is 57 percent for those in multi-family units.

The high incidence of modifications in multi-family buildings may arise because nearly 67 percent of multi-family units were built in or after 1960, and over a fifth of these units were built after 1979 (see Appendix 1). Although individual states around the country have traditionally had their own laws regulating accessible residential construction, the federal government passed minimum standards in the mid-1970s governing the accessible design and construction of all federally owned or financed residential buildings.⁹ In 1988, the federal government also passed amendments to the Fair Housing Act of 1968 to prevent discrimination in housing against people with disabilities. Included in these amendments were additional accessibility requirements for multi-family residential structures built after 1991. The existence of these federal statutes and the relatively recent construction of many multi-family units may help contribute to the relatively high shares of multi-family buildings and units with accessibility features.

It is worth noting that the 1.1 million disabled elderly households living in multi-family structures form only a small share -- 22 percent -- of the total population of households with a disabled elderly member. The great bulk of this total population (over 70 percent) lives in single-family homes, and almost a quarter of their units were built before 1940 (Appendix 1). Consistent with reports that a vast majority of elderly people wish to age in place (AARP, 1996), AHS data show that only 8 percent of disabled elderly households moved from 1994 to

⁹ Section 504 of the Rehabilitation Act of 1973 was established to help insure that large multi-family buildings or others supported in some way with public resources would be accessible to people with physical handicaps. The Act states that all residential structures financed or constructed in whole or in part by the federal government after 1973 must conform to the Uniform Federal Accessibility Standards.

1995--compared to 27 percent of all other households.¹⁰ Those who do move are more likely to live in newer multi-family or manufactured units than those who do not move. Disabled elderly households who have recently moved are more likely than other recent movers to live in units built since 1980 and in manufactured housing. These findings suggest that the few disabled elderly households who do move may often do so to live in more accessible environments.

Modification Needs within Disabled Elderly Households

The 1995 AHS core data highlight a number of basic differences between households with disabled elderly people and the total population of households. Households with disabled older members are more likely than all households to be owners, in non-metropolitan areas, and a larger share (24 percent) live in older units built before 1940 than across the total population of households (20 percent). A slightly higher share of disabled elderly households live in single-family units than all households (71 percent vs. 68 percent). Households with disabled seniors experience slightly worse overall housing conditions than total households: they are more likely to shoulder a housing cost burden (32 percent vs. 27 percent) and to live in units that are rated as either moderately or severely inadequate (9 percent vs. 7 percent). Indeed, the distribution of disabled elderly households across the housing stock mirrors the concentration of inadequate units around the country. Inadequate units are more likely than adequate units to be in non-metropolitan areas (34 percent vs. 28 percent), and they are much more likely than adequate units to have been built before 1940 (34 percent vs. 23 percent).

The adequacy measure used by the AHS evaluates the condition of the overall structure and physical systems within the unit; it does not include, however, an assessment of whether the physical characteristics of the unit accommodate the specific disabilities of the residents of the unit. It is possible to use data from the 1995 AHS supplement to generate different estimates of how well the housing stock of disabled elderly households meets household needs. First, the supplement asks whether households with disabled individuals have specific modifications, and whether people in the household need those modifications for their physical limitations. Tabulations of these expressions of need provide one approach towards measuring how well suited the existing stock is for households with disabled elderly,

¹⁰ Because the AHS does not survey households in group quarters, the survey does not capture disabled elderly

and the extent to which there may be a mismatch between existing housing demands and the current supply.

Analysis of these data suggests that the need for housing modifications among households with disabled elderly is significant, and for many modifications, the need is extensive. Figure 7 summarizes these results. Based on the portion of AHS data made available for analysis,¹¹ about 638,000 households with disabled elderly individuals (and without non-elderly disabled people) express the need for a ramp in the unit; less than half of those households actually have a ramp.¹² Some of the housing modifications that are most frequently cited as needed but absent within the home are hardware-related and are often relatively easy to install. About 111,000 households with disabled elderly express a need for push bars on doors, but over 80 percent do not have them. About 95,000 households express a need for modified sink faucets or cabinets; almost 74 percent do not have them. The modifications that are most often present among households who need them are extra handrails or grab bars: about 1.3 million households with disabled elderly express a need for these items, and over 68 percent of those households have those items.

It is not immediately clear why certain hardware modifications, such as handrails or grab bars, are more often present in households who need them, while other hardware items, such as push bars on doors, are so often absent. It is possible that awareness of the utility of certain modifications is higher than for others, and that the survey process itself may have suggested to households a need for certain modifications that they did not previously consider. Alternatively, many households may try to avoid either visible indications of disabilities within the household or structural additions that may evoke the feel of institutional settings. Under the latter hypothesis, push bars or modified sinks may have greater institutional connotations than other modifications. Those modifications or aids that are more often used are then only those that are absolutely necessary (such as wheelchairs, canes,

households who move from private residences to nursing homes or other facilities for older people.

¹¹ The 1995 AHS microdata that is available to the public for analysis reports only the first seven modifications (out of a possible fourteen) noted as needed by each household (Codebook for the American Housing Survey Volume 2: Supplement for 1984-96, August 8, 1997).

¹² Households with non-elderly disabled people were excluded from the analysis to ensure that those with an expressed need for a modification were elderly. AHS data available for analysis otherwise do not allow one to easily identify whether an elderly or non-elderly household member has the need for specified home modifications.

Figure 7: Disabled Elderly Households Expressing Modification Needs

| | Total Households (000s) | Unit has modification | |
|---|-------------------------------|-----------------------|-----------------------|
| | | Number (000s) | Share of Total (%) |
| A disabled elderly person needs: | | | |
| Any unit modification | 2,145 | 1,585 | 73.9 |
| ramp | 638 | 314 | 49.2 |
| elevator or stair-lift | 305 | 171 | 55.9 |
| extra handrails or grab bars | 1,309 | 893 | 68.3 |
| extra-wide doors or hallways | 309 | 160 | 51.7 |
| door handles instead of knobs | 193 | 87 | 45.2 |
| push bars on doors | 111 | 22 | 19.8 |
| modified wall sockets or light switches | 95 | 30 | 31.6 |
| modified sink faucets or cabinets | 130 | 34 | 26.4 |
| bathrooms designed for easier accessibility | 486 | 237 | 48.7 |
| kitchens designed for easier accessibility | 207 | 98 | 47.6 |
| raised lettering or braille | 53 | 13 | 24.1 |
| specially equipped telephone | 455 | 280 | 61.6 |
| flashing lights | 73 | 27 | 36.9 |
| any other structural modification | 50 | 17 | 34.9 |
| Help or an assistive device | 2,775 | 2,585 | 93.1 |
| help of another person with limitation | 1,781 | 1,580 | 88.7 |
| cane, walker, or crutches | 2,016 | 1,894 | 94.0 |
| wheelchair | 608 | 551 | 90.7 |
| motorized or electric cart | 97 | 32 | 33.1 |
| any other device | 157 | 116 | 73.6 |

Notes: Excludes households with non-elderly disabled individuals. The totals for the individual modifications exclude cases where there was no response to whether the modification is present. Households who express a need for any modification are counted as having one as long as a modification exists in the unit, even if the modification is not the one specifically needed. Similarly, households who express a need for help or an assistive device are counted as having such assistance as long as they have the aid of any of the sub-items listed, even if it is not the one specifically needed.

Source: Joint Center tabulations of the 1995 American Housing Survey.

ramps for people with serious mobility impairments), or aids that remain more discreet after installation (like specially equipped telephones).¹³

The data indicate generally lower shares of households who need but are without personal help or assistive devices. Only 6 percent of the 2 million households with a disabled elderly person who needs a cane, walker, or crutches do not have any of those aids. Less than 10 percent of all households with disabled elderly people who need a wheelchair lack a wheelchair. And a relatively low share (11 percent) of households with an elderly person requiring personal assistance for a physical limitation lack such help.

It is possible that needed personal help is frequently received because others in the household can provide such help, or because personal assistance to disabled elderly can offer positive human interactions and a range of other benefits that assistive devices or home modifications cannot. Some assistive devices may be more prevalent than others for cost reasons: motorized or electric carts, for instance, are expensive pieces of technology compared to crutches or wheelchairs. Unlike the low shares of households without those more basic assistive devices, over two-thirds of disabled elderly households who need a motorized cart do not have one.

The individual benefit that a personalized assistive device brings to a disabled person can probably help explain why the shares of disabled elderly households who need and have assistive devices are higher than the shares for home modifications. Someone who has difficulty walking due to an injured hip probably has a more urgent need for a cane than for a ramp (which would only assist the person in a limited area and might be of only marginal benefit if the person did not have the more basic aid of the cane). The costs for disability aids may also help explain why households are more likely to have assistive devices when needed than home modifications. Basic assistive devices such as crutches, walkers, or canes generally cost less than \$100 apiece, while some of the most basic home modifications (such as installing a single grab bar on a gypsum or metal stud wall) typically start at \$200. While

¹³ Some research on the use of assistive devices by older people suggests that many elderly are concerned about the social stigma or negative social judgments that can be attached to different assistive aids. Psychological attitudes towards these aids appear to influence their acceptance, continued use, or abandonment (see Gitlin, 1995). With some evidence that older people may reject certain assistive devices for psychological reasons, it is likely that many may similarly reject different accessibility modifications to the home.

it may cost between \$300 to \$600 for a basic manual wheelchair, it can cost up to \$10,000 to install a straight 60-foot ramp outside a home.¹⁴

Medicare benefits may also contribute to the greater prevalence of personal help and assistive devices over home modifications when these aids are needed. The program covers home health care for limited periods of time if such care is deemed medically necessary. The program also covers up to 80 percent of the costs for durable medical equipment (such as canes, crutches, walkers, patient lifts, and wheelchairs) when such equipment is prescribed by physicians and is necessary for mobility. Disabled elderly households typically cannot turn to Medicare to help fund accessibility modifications for the home; instead, they must pay for home adaptations with their own savings, or through loans or local grants targeted towards home improvements.

Because the 1995 AHS supplement collects data on both a range of disabilities people have within households and a list of specific modifications present within units, the survey allows a second method for estimating the extent of unmet modification needs across the country. One can match different home modifications with physical limitations measured by the AHS, under the assumption that specific modifications are either necessary or greatly beneficial to those with the corresponding disabilities. For instance, one could assume that households with an elderly person who has difficulty going up and down steps either need or would greatly benefit from a ramp, an elevator or stair-lift, or extra handrails or grab bars within the home. Those who have difficulty with steps and who do not have any of the noted modifications may experience significant hardship living and functioning within their homes. To present a more speculative gauge of the extent of unmet housing needs for disabled elderly people in the country, this paper compares the number of households with elderly who have difficulty with specific activities to the number of disabled elderly households who lack an inferred set of appropriate housing modifications.

The results of these tabulations are shown in Figure 8. Over 1.5 million households have an elderly person who has difficulty entering and exiting stairs; almost half, or 783,000 of those households have at least one of the following: a ramp, elevators or stair-lift, extra handrails or grab bars, extra-wide doors or hallways, door handles instead of knobs, or push bars on doors. Close to half (44 percent) of those with elderly members who report trouble

¹⁴ Cost data are estimates from on-line medical suppliers and the Means ADA Compliance Pricing Guide, 1994.

Figure 8: Disabilities and Helpful Home Modifications

(Households with Elderly People)

| <u>An elderly person has difficulty with:</u> | <u>Number (000s)</u> | <u>Home has at least one of the following modifications:</u> | <u>Number (000s)</u> | <u>Share with Modifi- cation(s) (%)</u> |
|---|--------------------------|---|--------------------------|---|
| <i>mobility activities</i> | | | | |
| entering and exiting | 1,586 | ramps, elevators/stair-lift, extra handrails/grab bars, extra-wide doors/hallways, door handles Instead of knobs, push bars on doors | 783 | 49.4 |
| going up and down the steps | 2,095 | ramps, elevators/stair-lift, extra handrails/grab bars | 862 | 41.2 |
| opening and closing or going through doors | 647 | ramps, extra handrails/grab bars, extra-wide doors/hallways, door handles instead of Knobs, push-bars on doors | 347 | 53.6 |
| moving between rooms | 873 | ramps, elevators/stair-lift, extra handrails/grab bars, extra-wide doors/hallways, door handles Instead of knobs, push-bars on doors | 474 | 54.2 |
| reaching bathroom facilities (tub, shower, toilet, sink) | 1,134 | bathroom designed for easier accessibility, modified wall sockets/light switches, modified sink faucets/cabinets, extra handrails/grab bars | 545 | 48.0 |
| bathing, getting in and out of tub or shower | 1,864 | bathroom designed for easier accessibility, extra handrails/grab bars | 826 | 44.3 |
| in wheelchair or electric cart in multi-story homes (no non-elderly disabled) | 584 | ramps, elevator/stairlift, extra wide doors/hallways, or bathrooms or kitchens designed for easier accessibility | 287 | 49.2 |
| <i>reaching/grabbing/handling activities</i> | | | | |
| reaching kitchen facilities (sink, stove, refrigerators, cabinets) | 794 | kitchen designed for easier accessibility, modified wall sockets/light switches, modified sink faucets/cabinets | 112 | 14.1 |
| cooking and preparing food | 1,255 | kitchen designed for easier accessibility, modified wall sockets/light switches, modified sink faucets/cabinets | 160 | 12.7 |

other difficulties

| | | | | |
|-----------------------------------|-------|---|-----|------|
| seeing, even when wearing glasses | 1,568 | raised lettering or braille | 21 | 1.4 |
| hearing, even when wearing aid | 1,612 | specialty-equipped telephone, flashing lights | 265 | 16.4 |

Note: Helpful home modifications are those home accessibility features collected in the 1995 AHS that are inferred in this study to be useful to elderly people reporting the noted disabilities.

Source: Joint Center tabulations of the 1995 American Housing Survey.

bathing have bathrooms designed for easier accessibility or extra handrails or grab bars. Over 49 percent of those elderly persons in wheelchairs or electric carts who live in multi-story homes have ramps or other modifications in the home that might be necessary to accommodate their disabilities. Indeed, about half of all households with elderly people who have difficulty with mobility-related activities have modifications that could be useful for their impairment.

These findings suggest that a half or more of households with mobility-impaired elderly members do not have any of the modifications that this study infers would be either necessary or highly useful. Of course, it is possible that a wheelchair-bound elderly person in a 2-story home does not need a ramp, a stair-lift, or any of the other modifications listed in Figure 8. The unit of the elderly person may have an entrance without steps, and the elderly person may be able to function very well within the spaces of the home's first floor. The data from the 1995 AHS do not provide enough detail to allow us to understand the specific circumstances within each home, and whether all the disabled elderly households who do not have any of the inferred modifications truly suffer from physical design inadequacies within the home. However, the data do suggest that large shares of elderly disabled households are without modifications that could help provide greater accessibility around the home. Depending on the disability, these shares could be well over 50 percent.¹⁵

The data show that even larger shares of households may not have helpful home modifications for those elderly people who have difficulty handling, grabbing, or reaching for objects. Almost 800,000 households have an elderly person who has difficulty reaching kitchen equipment like the sink, stove, refrigerator, or kitchen cabinets. Over 1.2 million households have an elderly person who claims difficulty cooking and preparing food. Under 15 percent of each group of households have modifications listed within the AHS that might be most applicable to those with such difficulties. Specifically, 682,000 households (86 percent) with an elderly person who cannot easily access kitchen equipment have units without kitchens designed for easier accessibility, modified wall sockets/light switches, or modified sink faucets/cabinets. About 87 percent of households with an elderly person who cannot easily cook have units without the same possible modifications.

While it is true that modified wall sockets or light switches might not help an elderly person overcome difficulty with cooking, such modifications might at the very least help make the use of kitchen appliances easier. Similarly, a kitchen that is “designed for easier accessibility such as for wheelchair use” might not help someone who cannot handle a heavy pot. At the very least, however, it might have some spatial or hardware changes (such as lowered counters, more efficient floor plans, or lighter cabinet doors) that accommodate the general frailty and loss of maneuverability that often accompany those with declining strength and manual skills.

Roughly 16 percent of the 1.6 million households with elderly people who have difficulty hearing have a specially equipped telephone or flashing lights to help them function within their home. This share is higher than the less than 2 percent with sight-impaired elderly who live in homes with raised lettering or braille. It is possible that households are less likely to have raised lettering or braille because special reading and/or tactile skills are required to make these modifications truly useful. It is also possible that elderly with seeing and hearing difficulties often feel that they can function within the familiar surroundings of their home without modifications, or that they have other assistance (like canes or guide dogs) that make home modifications relatively less critical. Alternatively, the phrasing of the sight and hearing impairment questions in the AHS may not adequately capture those households with the serious problems that braille and special phones are designed to aid.¹⁶

A final effort to measure the disparities between elderly people’s accessibility needs and the modifications within their homes compares data on disabled elderly households in multi-family buildings (a sub-population within the total universe of households with disabled elderly) with data on building-wide modifications. These results are shown in Figure 9. Following the pattern found and discussed earlier in this paper, relatively high shares of disabled elderly households in multi-family structures have building-wide modifications. In general, between 60 and 75 percent of the 150,000 to 420,000 households with elderly people noting different physical impairments have ramps, handrails, automatic doors, handicap parking, elevators with audio cueing or braille, or access to public facilities within multi-unit

¹⁵ The disabilities with the higher inferred modification rates may have these rates partly because a larger number of modifications was counted as appropriate. We use this particular analysis to approximate the share of disabled elderly households with helpful modifications, not to make precise measurements.

Figure 9: Disabilities and Building Modifications
(Households with elderly people in multifamily structures)

| <u>An elderly person has difficulty:</u> | <u>Number</u> <u>(000s)</u> | <u>Number</u> <u>(000s)</u> | <u>Share</u> <u>(%)</u> |
|--|--------------------------------|---|----------------------------|
| | | <u>With Any</u> <u>Building</u> <u>Modification</u> | |
| entering and exiting | 271 | 167 | 61.6 |
| going up and down the steps | 419 | 281 | 67.0 |
| opening and closing or going through doors | 150 | 100 | 66.6 |
| moving between rooms | 193 | 126 | 65.5 |
| reaching bathroom facilities (tub, shower, toilet, sink) | 238 | 167 | 70.1 |
| reaching kitchen facilities (sink, stove, refrigerator, cabinets) | 181 | 139 | 76.8 |
| cooking and preparing food | 263 | 179 | 67.8 |
| bathing, getting in and out of tub or shower | 404 | 285 | 70.5 |
| seeing, even when wearing glasses | 359 | 253 | 70.6 |
| hearing, even when wearing aid | 308 | 220 | 71.4 |

Notes: Any building modification includes ramps, handrails, automatic doors, elevators with audio cueing or braille, handicap parking, accessibility for people with physical limitations to public use facilities such as the lobby, laundry room and storage areas.

Source: Joint Center tabulations of the 1995 American Housing Survey.

¹⁶ The AHS simply asks if anyone in the household has "difficulty seeing, even when wearing glasses or contact lenses," or "problems hearing even a normal conversation even when wearing a hearing aid."

buildings. While some of these households may still lack accessibility modifications in their own units, relatively large shares have features that can help them navigate around the public spaces of their buildings.

Admittedly, the tabulations presented here may overstate the accessibility inadequacies and difficulties some disabled elderly people face as they live in their units. The data report households' perceptions of need for home modifications. Many of these perceptions could have been exaggerated, in part because "need" was not defined in the survey questionnaire, and in part because respondents were asked about modification needs after a long series of questions on household members' disabilities. Estimates of need based on households without modifications that were inferred as helpful could also be exaggerated. The open-ended nature of the AHS questions identifying disabilities ("Does anyone in the household have difficulty moving between rooms?") and the often vague descriptions of possible home modifications ("kitchens designed for easier accessibility such as for wheelchair use") may have contributed to inaccurate pairings between disabilities and "helpful" accessibility features. Without more detail on disabilities, it is difficult to say with certainty whether particular home modifications would be truly helpful for a person's specific physical limitation.

Despite these possible sources of error, AHS data suggest that sizable numbers of elderly households lack useful home modifications for people with disabilities. Over 50 percent of all households with a disabled elderly person have none of the housing modifications measured by the AHS, and over a third do not have the help of another person or an assistive device. Typically, no more than half of the households with disabled elderly members who report needs for different housing modifications have those items. Similarly, no more than half of elderly disabled households in most cases have home modifications that could be beneficial for their specific disabilities. Home modifications for the disabled are present throughout the country, but evidence suggests that significant needs remain unmet.

II. Characteristics of Households with Needed Home Modifications

The previous section noted that many elderly households need housing modifications but do not have them. This section uses simple univariate cross-tabulations of the 1995 AHS data to examine the characteristics of households with disabled elderly people who have housing modifications. Specifically, the incidence of home modifications is compared across the categories of five housing-related variables: tenure; urban location; region; the year the structure was built; and structure type. Incidence levels are also compared across nine demographic variables: age of the oldest person in the household; household income; race, education level, marital status, and sex of household head; household living arrangement; whether a disabled household member receives assistance from another person; and the number of disabled elderly people in the household.

Without controlling for the correlation among individual demographic and housing characteristics, the data tabulations in this section present a broad overview of the sorts of households that are equipped with needed home accessibility features. The converse of these data help to paint a general portrait of households who live in units that remain under-equipped for disabled individuals. These households may live without necessary modifications because they were initially unaware of the utility of different features, or are unable to find or tailor their homes to accommodate older people with disabilities.

The analysis in this section focuses on households who perceive and explicitly state that an elderly person within the unit needs a specific home modification. To maximize sample sizes in the disaggregated tabulations, this study examines housing type and demographic differences among those households with the most commonly expressed modification needs. Specifically, this section examines disabled elderly households who express a need for ramps, extra handrails or grab bars, bathrooms designed for easier accessibility, and a specially equipped telephone, as well as the overall group of disabled elderly households who express a need for any one of the fourteen modifications measured by the AHS. Following the methodology used in the first section of this paper, the tabulations exclude elderly households with disabled non-elderly members.¹⁷

¹⁷ Tabulations were also calculated and examined for groups of elderly households with different physical limitations and sets of home modifications that could be deemed as useful (see Figure 8). Because their household characteristics did not vary greatly from those who explicitly stated their modification needs, their data are not reported.

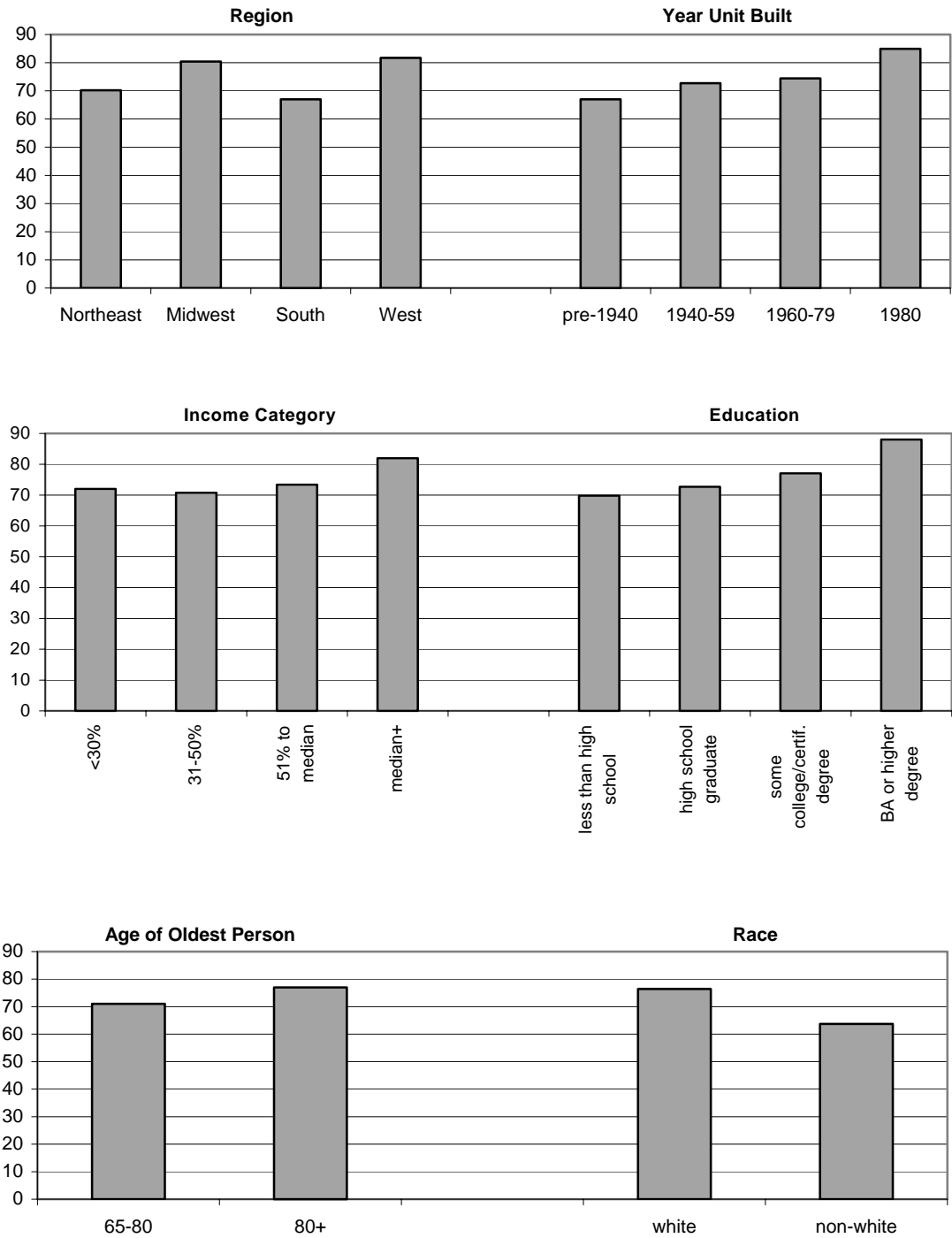
As reported earlier, almost 74 percent of the 2.1 million disabled elderly households who express a need for any one of the fourteen home modification types have a modification (although the feature may not be the one that the household states it needs).¹⁸ Using two-sample tests of proportions for all pairs of percent figures across variable categories, this share does not change significantly by the tenure of the household (owner vs. renter), by urban location (center city vs. suburb vs. non-metropolitan area), or by the structure type of the unit (single family vs. multi-family vs. manufactured). In contrast, it appears that the share of disabled elderly households who have a home modification when one is needed does vary significantly by region and the year the structure was built. Without controlling for the associated effects of other demographic or housing variables, disabled elderly households in the Midwest (80 percent) and West (82 percent) are significantly more likely than those in the Northeast (70 percent) and South (67 percent) to have a modification when one is expressly needed. In general, units built in or after 1980 are significantly more likely to have a home modification when one is needed (85 percent) than units built in any earlier time period (Figure 10, top).

These findings support some conjectures and undermine others that one might posit towards the relationship between various housing variables and the incidence of necessary home accessibility modifications. One could hypothesize that newer units are more likely than older units to have necessary accessibility features, largely because federal laws establishing fair housing guidelines and regulations requiring the construction of accessible features in government-supported buildings were instituted in more recent decades.¹⁹ Univariate tabulations of the 1995 AHS data seem to support this hypothesis. Knowledge of the history of federal regulations and tabulations of the data presented in the first section of this paper might also suggest that units in multi-family structures would be more likely than single-family units to have accessibility modifications when they are expressly needed. Interestingly, the data do not seem to support this latter hypothesis. The first section of this study noted that multi-family buildings display relatively high incidences of building-wide

¹⁸ In these calculations, many households who both express a need for a modification and have one may not have the feature that is expressly needed. These households were examined to explore how many units are equipped in some way to accommodate people with disabilities, even if the unit could still serve a disabled occupant better with additional modifications.

¹⁹ See footnote 9 and discussion on page 16.

Figure 10: Elderly Households with any Home Modification
Percent of Disabled Elderly Households Who Express any Modification Need
(2.1 Million Households)



accessibility features as well as modifications within individual units. However, disabled elderly households in multi-family units are no more likely than others to have at least one home modification when they perceive a need for one.

The standards for significance used in testing the differences between incidence levels were generally set at a one-tailed level, with $p < .05$.²⁰ Because one could generally posit a direction in the percent of households with modifications across a variable's categories, a one-tailed test was typically used for all housing and demographic variables examined. This standard was raised to a two-tailed level with $p < .05$ when testing for differences across regions and urban locations. The standards were raised in these cases because it is difficult to propose in advance which regions or locations might be more likely to have home modifications.²¹ The fact that significant regional differences do emerge is therefore quite striking, raising further questions about what other housing or demographic influences the regional variable is capturing in this uncontrolled analysis.

Tabulations of the data also show that the incidence of having a home modification when a disabled elderly household needs one varies significantly across several demographic variables. While 88 percent of disabled elderly households with a college-educated household head have a modification when one is needed, only 70 percent of those with less than a high school education have one. About 82 percent of disabled elderly households with an expressed modification need and with income greater than the local median have an accessibility feature in their homes. The share is ten points lower (72 percent) for those with income less than 30 percent of the local median. White households are significantly more likely than minority households to have a modification when one is needed (76 percent vs. 64 percent). Households with people aged 80 and above are also more likely than those without such older people to have a modification (77 percent vs. 71 percent).

²⁰ To get meaningful t-statistics, proportion tests were conducted by using percent figures from the weighted data and sample sizes from the unweighted data.

²¹ Laws regulating construction standards and disability accessibility guidelines have traditionally varied widely across states. With such variation, it is difficult to generalize at regional or metropolitan levels which areas might be more likely to require and thus have a larger number of homes with accessibility features. Furthermore, it is possible to argue that more recent accessibility guidelines passed at the federal level could help establish greater uniformity in the incidence of home modifications across all areas of the country. Based on these observations, a two-tailed hypothesis test positing no significant differences across region and urban location seemed most appropriate.

These results accord with prior inferences one could make about the relationship between income, education, race, and age with the incidence of home modifications. Those with higher incomes are probably more likely to have a modification because they have more resources to either install home modifications or to move to homes that are equipped with such features. Those with higher levels of education may have the higher incomes needed to make changes to the home, or they may have greater access to the information that is required to understand the availability and benefits of different home modifications. It makes sense that households with older seniors are more likely to have accessibility features, since older people typically suffer from more serious disabilities. And because racial discrimination exists in other areas of the housing market,²² it is not surprising to find racial differences in the incidence of home modifications as well.

There are other inferences that one could make about the likelihood of certain types of disabled elderly households to have accessibility modifications in the home. One could imagine that disabled elderly people living alone would be more likely to live in a home with an accessibility modification, since they have no other people living with them who could provide assistance for their disability. If personal assistance and home modifications relate to each other as substitutes, then those who receive the help of another person for their disability might be less likely to have a home accessibility feature. Married households may thus be less likely to have home modifications because an elderly household head who is married may have the personal assistance of a spouse. Elderly people with a greater number of disabilities, or with more severe physical limitations, might be more likely to live in homes with accessibility modifications. Similarly, more disabled elderly people in a household might trigger a higher need and thus a higher likelihood of an accessibility feature in the home. Female-headed elderly households might be less likely than male-headed households to have home modifications because they typically have lower incomes and might find it more difficult to make changes to the home.²³

²² Various studies provide evidence of race-based discrimination in the mortgage market, for instance. See Munnell, et al., 1996, and Ladd, 1998.

²³ Many older women may come from generations where male family members typically oversaw home repairs and renovations, and women gained little experience in these areas.

As it turns out, tabulations of the 1995 AHS data do not support most of these propositions. Differences in the incidence of having at least one home modification among those who need one do not vary significantly across living arrangement, presence of personal assistance, number of disabled elderly, family marital status or sex of household head.²⁴ And because the AHS did not ask any questions on the degree of difficulty any one person might have with different physical activities, it was not possible to include a variable that measures the severity of an elderly person's disability.²⁵

Tabulations of elderly households with needed ramps, extra handrails or grab bars, accessible bathrooms, and specially equipped telephones show similar housing type and demographic patterns to those displayed by households with any modification. Like Figure 10, Figures 11 through 14 illustrate how the incidence of a home modification varies across different types of households who express need for the specific modification. Again like Figure 10, these charts only display those variables with significant differences across variable categories.

To note some of the findings presented in the figures, elderly households in units built after 1980 are about twice as likely as those in units built before 1940 to have a ramp (80 percent vs. 41 percent) when one is perceived by the household as necessary. Elderly households in newer units are also at least twice as likely to have a bathroom designed for easier accessibility when one is needed (77 percent vs. 37 percent) or a special phone (84 percent vs. 42 percent). Units in the Midwest and West more often have extra handrails and grab bars, accessible bathrooms, and special phones than units in the Northeast and South (among households who express these modification needs). Similarly, disabled elderly households with higher incomes are more likely than others to have these same features. For example, almost 80 percent of disabled elderly households with income above area median have extra handrails or grab bars when they are needed. In contrast, only 63 percent of those with extremely low incomes (less than 30 percent of area median) have these items when explicitly needed.

²⁴ In this analysis, family marital status was defined as a dummy variable indicating whether there is a spouse of the household head within the household.

²⁵ While another important variable in this analysis may be the number of disabilities displayed by any one elderly person, such a variable was not created or examined in part because detailed person-level information is often unreliable in the household-based AHS.

From these tabulations, the portrait that emerges of disabled elderly households who have the home modifications they say they need is at best still rough. Among disabled elderly households who perceive a need for at least one home accessibility feature, certain households

Figure 11

Characteristics of Households with Ramps

Percent of disabled elderly households who express need for the modification

[638,000 households]

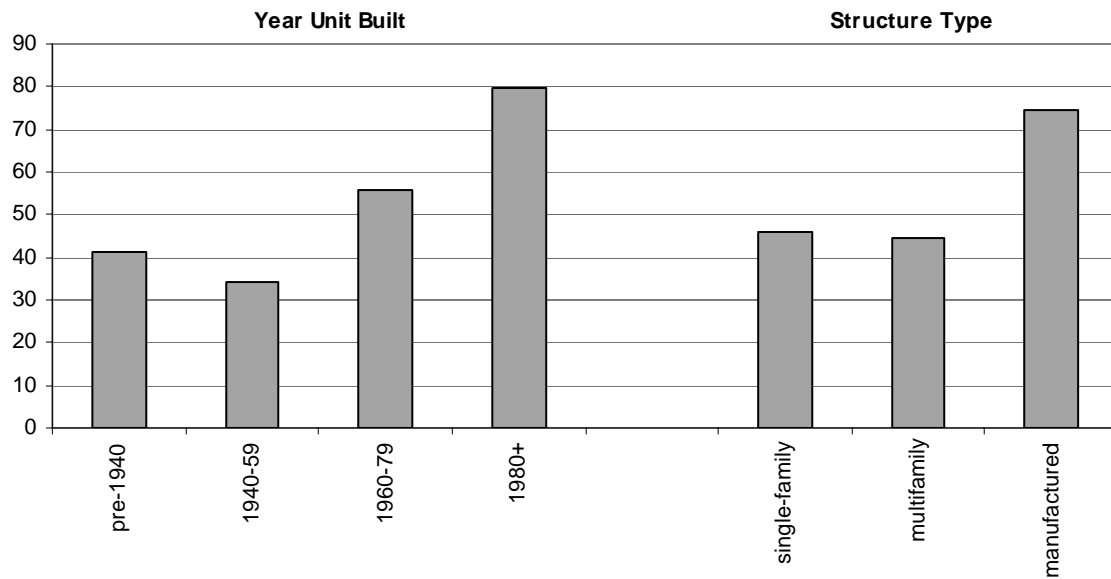
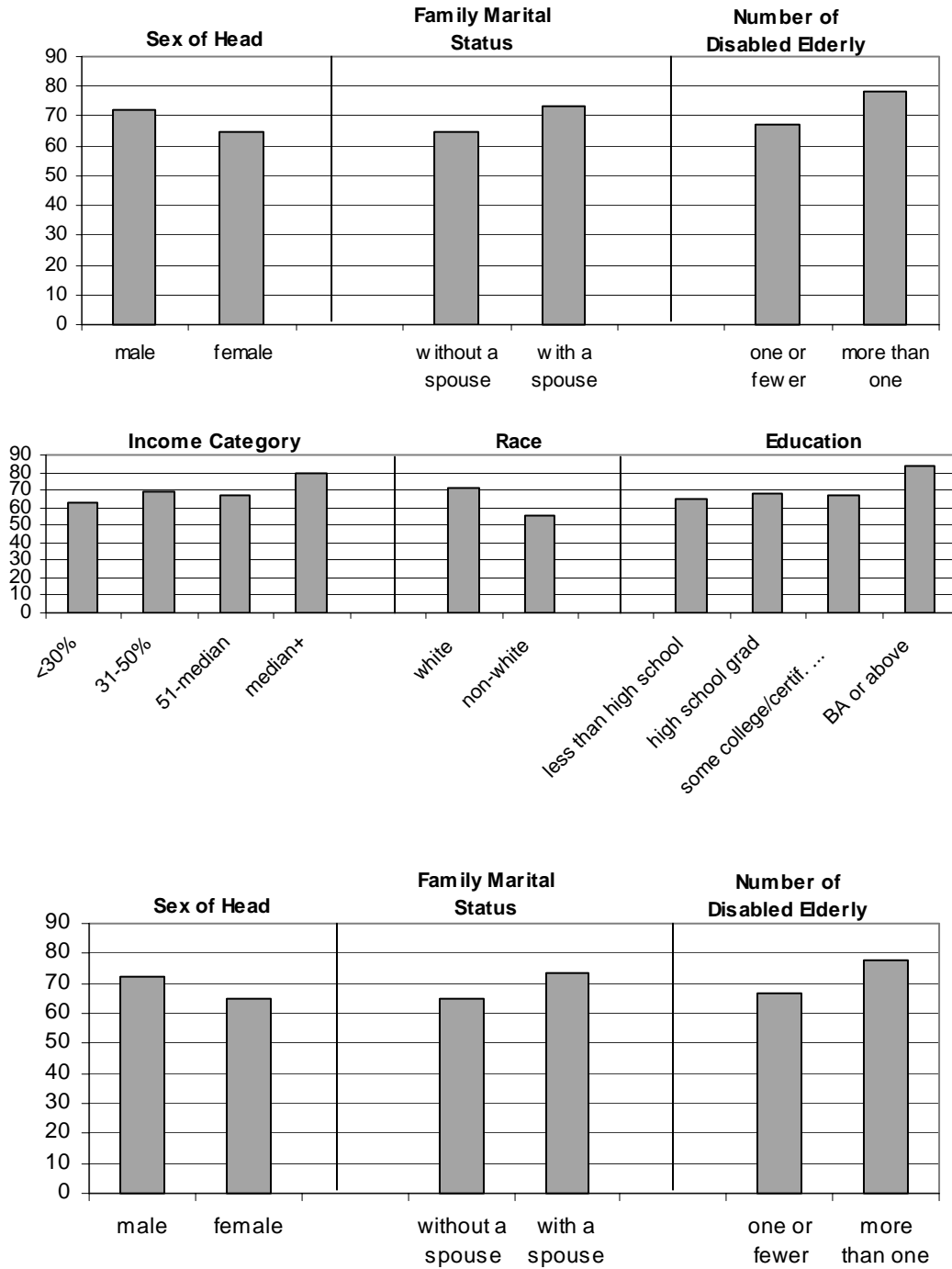


Figure 12: Characteristics of Households with Extra Handrails or Grab Bars

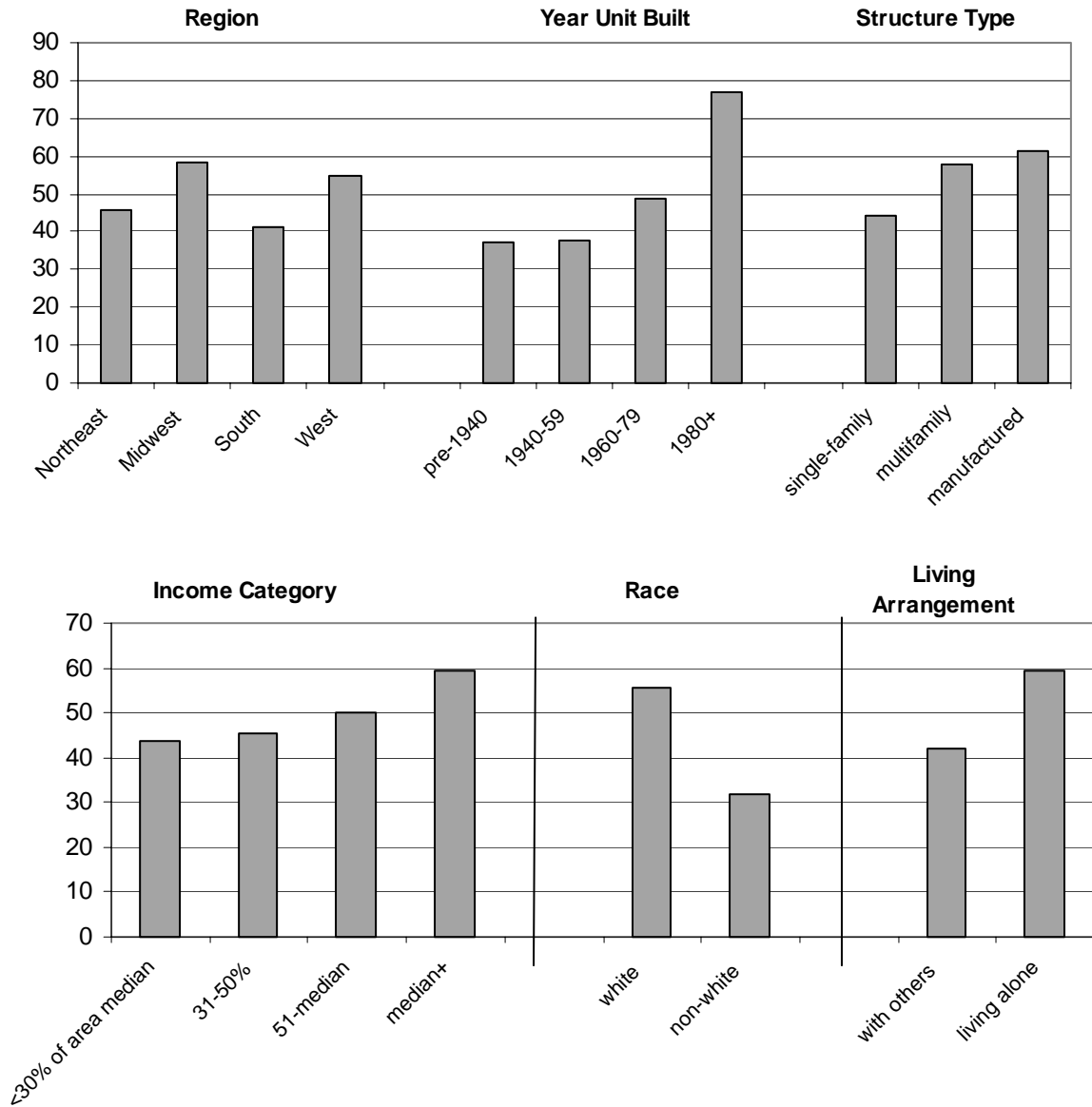
Percent of disabled elderly households who express need for the modification



Notes: Only those characteristics with statistically significant results shown. Urban location and region subcategories are held to two-tailed levels of significance of $p < .05$. All other categories are held to one-tailed levels of significance of $p < .05$.

Source: Joint Center tabulations of the 1995 American Housing Survey.

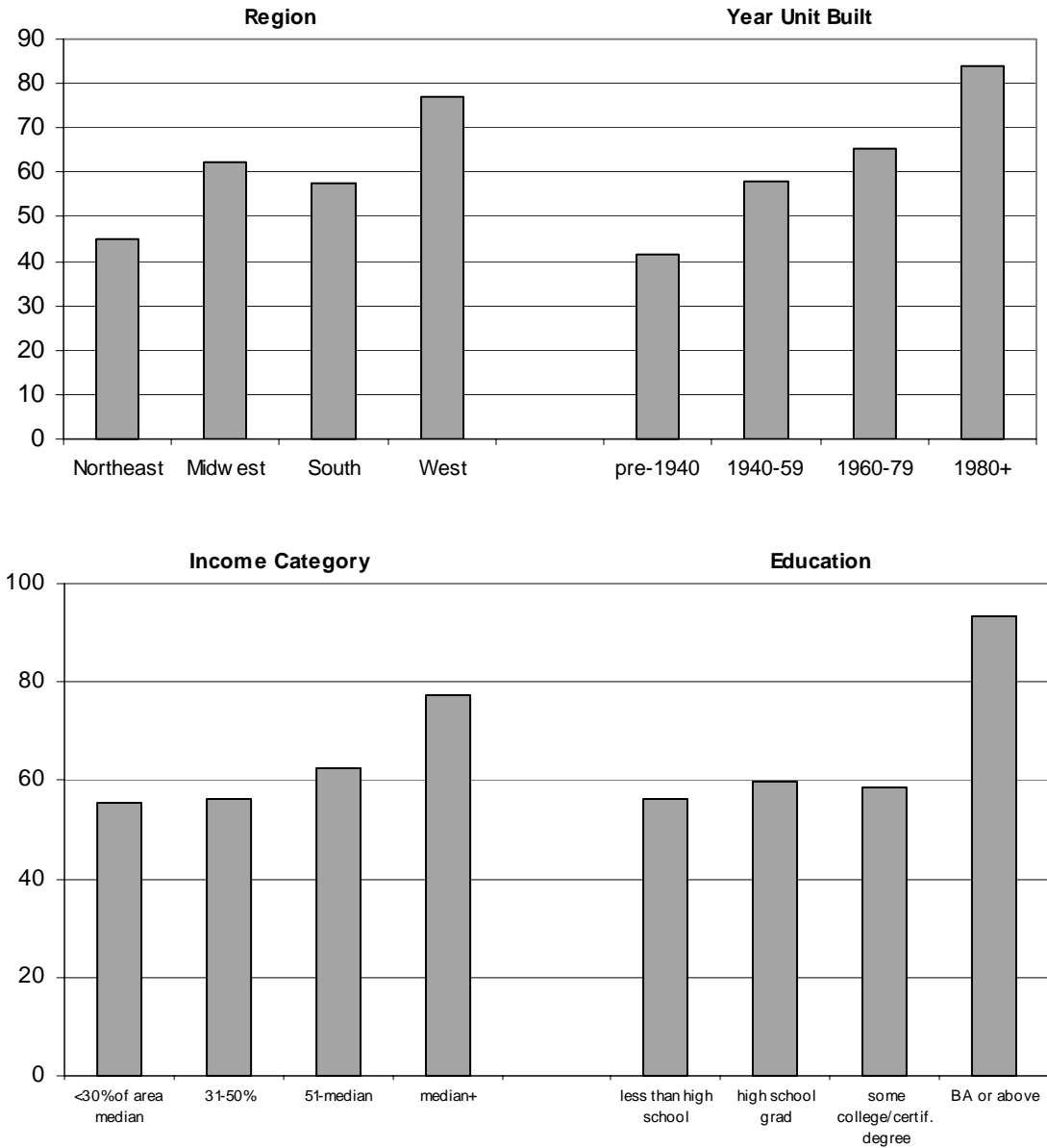
Figure 13: Characteristics of Households with Bathrooms Designed for Easier Accessibility
Percent of Disabled Elderly Households who Expressed the Need for the Modification
486,000 Households



Notes: Only those characteristics with statistically significant results shown. Urban location and region subcategories are held to two-tailed levels of significance of $p < .05$. All other categories are held to one-tailed levels of significance of $p < .05$.

Source: Joint Center tabulations of the 1995 American Housing Survey.

Figure 14: Characteristics of Households with Specially Equipped Phones
Percent of disabled Elderly households who express need for the modification
455,000 households



Notes: Only those characteristics with statistically significant results shown. Region subcategories are held to two-tailed levels of significance of $p < .05$. All other categories are held to one-tailed levels of significance of $p < .05$.

Source: Joint Center tabulations of the 1995 American Housing Survey.

(those in the Midwest, West, in newer units, with higher incomes, more education, older seniors, and white household heads) are generally more likely than others to have an accessibility modification in the home. Among households who express needs for specific home modifications, the significant characteristics of those who actually have their needed features vary according to the need expressed. While race, family marital status, and metro location appear to have a significant effect on whether a disabled elderly household has extra handrails or grab bars, they do not have a significant effect on the incidence of ramps or specially equipped phones. Disabled elderly households in manufactured units appear to be significantly more likely than those in single-family units to have ramps or accessible bathrooms. Structure type is not significantly related to the incidence of extra handrails, grab bars, or specially equipped phones.

The variables that emerge most often as significant across all groups of disabled elderly households who need and have home modifications are the household's regional location, the year the unit was built, and the income level of the households. Most commonly, disabled elderly households with higher incomes, in newer units, and in the Midwest or West are more likely than others to have the home modification they say they need. These findings accord with what one might reasonably expect, although why such strong regional differences emerge is not immediately clear. It is possible that the higher incidence of modifications among elderly households in the West arises in part because the West has large shares of newer construction that must conform to more recent accessibility rules. It is possible that incidence levels are higher in the Midwest because states in that region have some of the highest proportions of people age 85 or older. Indeed, the Census reports that five Midwestern states (Iowa, North Dakota, South Dakota, Nebraska, and Kansas) had the nation's highest shares of population age 85 or older in 1993 (U.S. Bureau of the Census, 1996). Higher concentrations of the oldest elderly households in the Midwest might contribute to greater awareness of frail elderly needs and greater services for this population, including services for home modifications.

The converse of these data suggest that those disabled elderly households who are less likely to have a needed home modification are those in older units located in the Northeast and South, and those with lower incomes. Those who live in center cities, have lower levels of education, or are minorities, female, or unmarried are more likely than others to lack extra

handrails or grab bars when they are expressly needed. These findings match what one might expect beforehand if these variables accurately capture those households with the lower means for and general access to needed modifications.

The varying results of disabled elderly households who have the modifications they need may arise from different interpretations of need by survey respondents, since “need” was not defined in the survey questionnaire. The AHS also did not include a measure for the severity of elderly peoples’ disabilities, hampering any potential effort to evaluate households’ opinions of need against reported physical limitation levels.²⁶ Finally, the rough and shifting picture of who has necessary home modifications may arise because the effects of other variables were not held constant when examining the influence of any one household characteristic on the likelihood of having a home modification. The next section presents an analysis that adjusts for these effects.

III. Key Predictors of Accessibility Modifications in Disabled Elderly Homes

The statistics discussed previously highlighted the housing and demographic characteristics of disabled elderly households that are more likely to have necessary home modifications. Each characteristic was examined, however, without controlling for the impact of other characteristics. In the absence of such control, some housing and demographic characteristics may appear to influence modification rates because they are acting as proxies for the effect of other variables. For instance, minority households may be less likely to have necessary home modifications for disabled elderly members not because the home modification market discriminates by race, but because many minorities typically have lower household incomes and education levels than whites. Income and education, rather than race, may therefore be the prime indicators of having a needed home modification. This section uses logit analysis to identify which variables significantly affect the likelihood of having necessary home modifications, holding the effects of all other variables constant.

²⁶ The SIPP, for example, differentiates levels of disability by asking people if they have difficulty performing certain activities (disabled) or if they are unable to perform those same activities (severely disabled). Studies have noted, however, that efforts in other surveys to collect valid data on levels of individual disability and degree of need for assistance have been unsuccessful (see Rodgers and Miller, 1997.)

Several logit equations were estimated, and the results are shown in Appendix 5.²⁷ The same modification categories discussed in the last section were used as response variables, and similar housing and demographic variables were used as explanatory variables. Some of the housing and demographic variables presented in the previous section were re-categorized or transformed, however, for the logit analyses. For instance, the age of the oldest person in the household was presented as two categories: between 65 and 80 years old, and 80 years old or older. To take advantage of the level of detail available in the AHS, age of the oldest senior was entered as a continuous variable in the logit models. A household's income level was previously presented in relative terms, with the household's area median income as the basis for comparison. In the logit models, the household's reported income was entered as a single continuous variable. To control for the different costs of living that arise in different parts of the country, a separate variable designating the household's area median income was included.²⁸ This proxy variable assumes that areas with higher median income levels have higher living costs.

Again to capture the level of detail available in the survey, the models included a variable identifying the total number of people in the household, rather than the household categories "elderly living alone" and "elderly living with others." Similarly, the models included a variable counting the total number of disabled elderly people in the home. Education level was simplified into three categories: those without a high school degree (the implicit comparison group in the logit models), those with a high school diploma and some higher education, and those with a college degree or even higher levels of education. Building age was simplified into three categories: units built before 1940 (the comparison group), units built from 1940 to 1979, and units built in 1980 or after.

Like the findings from the descriptive tabulations, the logit results show that the likelihood of having any home modification (among households with an elderly person who needs one) is significantly higher in the Midwest and West than in the South. The incidence rates are higher for the Midwest at a 95 percent confidence level, and for the West at a 99 percent confidence level—controlling for the effects of tenure, urban location, structure type,

²⁷ In addition to the five logit models shown in the appendix, seven other logit models were estimated for elderly households with different disabilities and home modifications that were inferred as helpful. The results of these models generally support the findings for households with expressed home modification needs. The additional models are therefore not presented in this paper.

and a range of demographic variables. While the effects of all these other variables are held constant, the data show that structure age has a significant relationship with the likelihood of having any home modification when one is needed. At a 99 percent confidence level, units built in 1980 or after are more likely to have modifications among disabled elderly households with accessibility needs than units built before 1940. In addition, households with older seniors, with more education, and with white household heads are all more likely to have a home modification. In contrast to the findings in the last section, household income does not significantly affect the likelihood of having a needed modification once controls for other variables are set in place.

An illustration of how these variables affect the probability of having a home modification is shown in Figure 15. Using the coefficients from the logit results, the probability of a representative disabled elderly household who both expresses a need for a modification and has one is 62.4 percent. In this illustration, a representative household is one with an elderly person with an expressed need for a modification and who lives in a single-family unit in a Southern suburb. The unit is owner-occupied and was built before 1940. There are two people in the household; the oldest person is 79 years old, and the household head is white, female, without a high school degree, and without a spouse. The household has an annual income of \$14,500 and is in an area where the median income for a family of four is \$41,800. There is one disabled elderly person in the unit who receives help for the disability.

The structure age, region, and household education level for this representative household were chosen to help illustrate the statistically significant changes in the probability of having home modifications when these specific variables take on different values. The other characteristics, such as race, family marital status, and tenure were chosen because the largest shares of the target population (households with an elderly person expressing a need for a modification) have these characteristics. The age of the oldest person, the household income, the area median income, and the number of people in the household are all median figures for the target population.

Based on the logit results, the probability that a representative household will have a home modification for an elderly person's disability rises from 62 percent to almost 74

²⁸ These data are the HUD-adjusted area median family income levels, for a family of four.

Figure 15: Probability of Having Any Home Modification

Among disabled elderly households expressing a need for a modification (percent)

| | |
|--|------|
| For a representative household | 62.4 |
| For a representative household | |
| in the Midwest | 73.5 |
| in the West | 74.7 |
| in a unit built in 1980 or after | 79.5 |
| where the oldest person is 85 years old or older | 65.2 |
| where the household head has a college degree or even higher education | 64.8 |
| with a minority household head | 51.1 |

Notes: A representative household was chosen to be an owner-occupied unit in a Southern suburb, in a single-family unit built before 1940. The oldest person in the household is 79 years old; there are two people in the household, and the household head is white, female, without a high school degree, and without a spouse. The household has an annual income of \$14,500 and is in an area with a median income of \$41,800 for a family of four. There is one disabled elderly person in the unit who receives help for the disability. The structure age, region, and education level were chosen to help illustrate the statistically significant effects that these variables have on the probability of home modifications. Other characteristics were chosen because large shares of the target population (households with an elderly expressing a need for a modification) have these characteristics. The age of the oldest person, the household income, the area median income, and the number of people in the household are all median figures for the target population.

Percentages shown for households with the various characteristics noted in the table are for households with the same profile as the representative household, except for the one characteristic highlighted. The additional percentages shown are different from the base case at statistically significant levels. The percentages were calculated from the coefficients shown in Appendix 5.

percent if the same household were located in the Midwest. The probability would rise to an even higher 75 percent if the same household were located in the West. If the representative household were in a unit built after 1980 rather than before 1940, the probability that the unit would have a home modification would rise from 62 percent to almost 80 percent. If the age of the oldest person in the representative household rose from 79 to 85 years, then the probability of having a modification would rise to 65 percent. A college degree or graduate education leads to a slightly higher probability as well, but if the household head is a minority, then the probability drops to 51 percent.

Logit models were also estimated for each of the four subcategories of households with an expressed need for a ramp, extra handrails or grab bars, an accessible bathroom, or a specially equipped phone. The logit estimates modeling the likelihood of having one of these specific modifications vary from the estimates for having any modification, and they also produce sets of statistically significant variables that are different from those found in the last section (Figure 16). Among those who need ramps, the likelihood of having a ramp is higher if one lives in the Northeast and West than if one is in the South. A higher area median income significantly lowers the likelihood of having a needed ramp; female household heads and households with spouses are also significantly less likely than male heads and those without spouses to live in units with needed ramps. The variable that displays the highest level of significance is the year the unit was built: at a 99 percent confidence level, units constructed in 1980 or after are more likely than those built before 1940 to have a ramp when a disabled elderly household needs one. All of these variables emerge as significant in the logit model, while only structure type and structure age were significant in the previous section's tabulations.

Controlling for other variables, the likelihood of having extra handrails or grab bars among disabled elderly households who expressly need these items is significantly higher in the Midwest than in the South; higher for households with at least a college degree; and lower for minorities. These findings match the patterns found in the descriptive tabulations in the previous section. Once controls are set for other housing and demographic variables, however, metro location, income, sex and family marital status, and the number of disabled

elderly people in the household no longer have a significant effect on the likelihood of having extra handrails or grab bars.

Figure 16

Summary of Significant Logit Results

| <u>Variable</u> | <u>With Any Modification</u> | <u>With Ramp</u> | <u>With Extra Handrails or Grab Bars</u> | <u>With an Accessible Bathroom</u> | <u>With a Specially Equipped Phone</u> |
|---------------------------|----------------------------------|----------------------|--|--|--|
| Region | | | | | |
| Midwest vs. South | + | ns | + | + | ns |
| West vs. South | + | + | ns | ns | + |
| Northeast vs. South | ns | + | ns | ns | ns |
| Built in 1980 or after | + | + | ns | + | + |
| Oldest age in household | + | ns | ns | ns | ns |
| Household income | ns | ns | ns | + | ns |
| Area median income | ns | - | ns | ns | ns |
| College degree or higher | + | ns | + | ns | + |
| Minority household head | - | ns | - | - | ns |
| Female household head | ns | - | ns | ns | ns |
| With a spouse | ns | - | ns | ns | ns |
| Number of disabled elders | ns | ns | ns | ns | - |

+ = statistically significant higher likelihood of having the indicated modification

- = statistically significant lower likelihood of having the indicated modification

ns = not significant in this model

Note: Statistical significance is $p < .10$.

Source: Appendix 5.

The logit estimates show that holding all else constant, the likelihood of having an expressly needed accessible bathroom among disabled elderly households is higher in the Midwest than in the South. The likelihood is also higher for units built in or after 1980 than for those built before 1940, higher for households with more income, and lower for minorities. These variables, which were found to be significant for accessible bathrooms in the previous section, remain significant even after controls are introduced. Other variables (structure type and the number of disabled elderly people in the household) no longer have a significant relationship with accessible bathrooms once controls for other variables are established.

Among disabled elderly households who need a specially equipped phone, those in the West, in units built in or after 1980, and with at least a college education are significantly more likely than those without high school degrees and in Southern, pre-1940 units to have such equipment (holding all else equal). Income (which was a significant variable in earlier tabulations) is not significant in the logit analysis. It is interesting to note as well that the number of disabled older people in a household has a significant relationship with the likelihood of having a specially equipped phone when an elderly person expresses a need for one. Surprisingly, however, the relationship is opposite to what might be expected: the likelihood of having a special phone falls (rather than rises) as the number of disabled elderly increases. This variable did not emerge as significant for specially equipped phones in the previous section.

In general, four variables in the logit models appear most often as significant among households with expressed modification needs. Regional location appears to have a significant effect on having a necessary modification for the five household groups examined, although the regional variations are not the same for all groups. Elderly households in the Midwest who say they need extra handrails or grab bars, an accessible bathroom, or any modification are significantly more likely than similar households in the South to have the needed modification or any accessible feature. Elderly households in the West who express a need for a ramp, a specially equipped phone, or any modification are significantly more likely than similar households in the South to have the needed or any modification. Age of the housing unit also appears to strongly affect the probability of having a needed modification:

units built after 1980 are typically more likely than those built before 1940 to have a needed feature (except for extra handrails or grab bars, for which structure age is not significant).

Higher education levels and race also affect the likelihood of necessary home modifications in three of the five groups studied. The findings suggest that even after controlling for the effects of other variables, the likelihood of having at least one modification when one is needed, or having extra handrails, grab bars, or a specially equipped phone when they are needed, rises with a college degree. This pattern may occur if higher education helps to promote a pre-survey awareness of modifications' benefits or better access to the information and resources required to make home modifications. The racial gap that is visible in other areas of the housing market shows up in the home modification arena as well. Minority elderly households are significantly less likely than whites to have a needed modification, holding the effects of other variables constant.

After controlling for the effects of a range of housing type and demographic characteristics, many variables typically have no effect on the likelihood of having specific home modifications when they are needed. These include household tenure, metro location, structure type, the oldest age in the household, household income, area median income, sex and family marital status of the household head, the number of people in the household, and the presence of personal assistance for a disability. The signs on the coefficients for some of these variables also do not consistently fall in the directions that one might predict in advance. For instance, one might expect that households with older elderly members would have a greater likelihood of having a ramp when one is needed; the sign on the age coefficient, however, is negative. As another example, households in areas with higher median income levels are likely to experience higher costs of living. The installation of home modifications in such areas is therefore likely to be more expensive, perhaps lowering the likelihood that a household will have a needed modification (when income is held constant). The sign on the area median income coefficient for households needing extra handrails or grab bars, however, is positive.

It is finally worthy to note that the overall fit of the different logit models to the data is low. The pseudo R-squared statistic is 0.134 for the model of households with elderly people who need specially equipped phones, and drops to 0.05 for the model of households with any expressed need and any modification. An important omitted variable in our models may be

the severity of an elderly person's disability: the more serious an impairment, the more likely a household has a home modification. The AHS did not collect this information, however, leaving our models with possibly poor proxy variables (like age of the oldest elder), which in turn possibly lower our fit statistics and bias the coefficients for some of the other variables.

Mirroring the outcome of the analysis presented in the last section, the findings generated from the logit models in this section are mixed. The key indicators of having a necessary home modification depend on which modification or set of modifications is needed. Most commonly, however, disabled elderly households are significantly more likely to have an accessibility feature when needed if they live in the Midwest or West rather than the South, if they are in newer units, and if the household head is white and college-educated. Curiously, significant regional differences consistently emerge in the logit estimates, while a disabled elderly household's metropolitan location generally does not seem to matter when other variables are held constant. And household income, which was a significant variable in many of the uncontrolled tabulations, is typically an insignificant variable in the logit estimates.

Summary

Are elderly people with disabilities living in homes that accommodate their physical limitations? Analysis of the 1995 AHS home modification supplement suggests that almost 75 percent of the 2.1 million households with a disabled elderly person have at least one home accessibility feature when the household perceives a need for one. However, not all of these households have the feature that they need. In most cases, no more than half of disabled elderly households have the home modification that they explicitly claim they require. This finding holds for households who need features such as ramps, extra-wide doors or hallways, and bathrooms or kitchens designed for easier accessibility. The share who have the features they need is slightly higher for certain modifications, such as extra handrails or grab bars; the shares of disabled elderly households who need and have personal assistance or an assistive device are even higher. In general, however, half or more of disabled elderly households lack accessibility features that households believe would aid an existing elderly member with a disability.

Tabulations of the 1995 AHS also suggest that roughly half of disabled elderly households have at least one of a set of modifications that could be helpful for those with

mobility-related disabilities. For example, 49 percent of households with elderly people who have difficulty entering or exiting the home have an accessibility feature that could assist them with their disability. Household ramps, elevators or stair lifts, extra handrails or grab bars, extra-wide doors or hallways, door handles instead of knobs, and push bars on doors could all be considered modifications that would be helpful to such people.

The shares of households with home modifications that could be helpful for elderly people with impaired reaching or grabbing abilities are considerably lower. Less than 15 percent of households with elderly who have difficulty accessing kitchen facilities (such as the sink, stove, refrigerator, and cabinets) have any of the modifications surveyed by the AHS that could be helpful. These features include a kitchen designed for easier accessibility, modified wall sockets or light switches, and modified sink faucets or cabinets. Similarly small shares of disabled elderly households with hearing or sight problems have home modifications that could be helpful for their difficulties: under 17 percent of those with difficulty hearing have specially equipped phones or flashing lights, and under 2 percent of those with trouble seeing have raised lettering or braille inside the home.

Those disabled elderly households who live in multi-family structures appear relatively well-equipped with accessibility features in the public spaces of their buildings. Indeed, between 60 and 70 percent of these households have items such as building ramps, automatic doors, and handicap parking. Multi-family units with disabled elderly households are also more likely to have at least one modification than single family units. The high incidence of modifications in multi-family structures may arise in part because large shares of these buildings were constructed in more recent decades, when government regulations on accessible construction for federally supported buildings came into effect. Interestingly, however, disabled elderly households in multi-family units are no more likely than others to have at least one home modification when they explicitly state a need for one.

The vast majority of disabled elderly households do not live in multi-family units, however. Instead, most are in older single-family homes, and they are more likely than the total population of households to live in non-metropolitan areas. These households experience housing cost burdens in greater shares than others, and they more often live in units that are inadequate. These housing problems exist alongside the large shares who lack accessibility modifications that household members feel they need. While some households

may move to newer multi-family buildings that are in better condition and are more accessible than their current units, most act upon a preference to age in place and move less than the population at large. These trends suggest that a large population--including the half million disabled elderly households in inadequate units and the over half a million without a home modification when one is needed--have difficulty living in and maintaining their homes. These numbers are likely to grow as the elderly population expands in the coming decades.

Results from univariate cross tabulations of the 1995 AHS data suggest that certain types of disabled elderly households are more likely to have home modifications than others, but these characteristics vary depending on the specific need the household expresses. For instance, among those who express a need for a ramp, households in newer or manufactured units are more likely than others to have a ramp. In contrast, married, male-headed, white, more highly educated suburban households in the Midwest or West with higher incomes and more disabled elders in the unit are significantly more likely to have extra handrails or grab bars than other households when such items are expressly needed. Among those households who express a need for at least one modification, those in the Midwest and West, in newer units, with higher incomes and education, with older elders and white household heads are more likely than others to have a modification. Most commonly, region, structure age, and household income emerge as variables that have a significant relationship with the incidence of necessary modifications.

When controls were set in logit analyses of the 1995 AHS data, the variables that emerge as significant once again vary according to the subgroup of households examined. Some of the same variables that emerged as significant in the uncontrolled tabulations emerged as significant in the controlled analysis. Holding the effects of other variables constant, disabled elderly households in the Midwest or West, in newer units, with higher levels of education, and with white household heads are significantly more likely to have many of the home modifications perceived by the household as necessary. Other variables, such as income and structure type, do not emerge as significant predictors in the logit models.

The data therefore suggest that some of the key indicators of having a necessary home modification are region, structure age, education, and race. Because income loses its significance in many of the logit models, a conclusion one can draw is that lack of knowledge

about home modifications, rather than lack of resources, is a bigger obstacle when serving the accessibility needs of disabled elderly households.

Additional findings call for further investigation. Regional location arises very frequently as a significant predictor of having either a needed or helpful home modification. Region is a broad variable, however, that typically represents an assortment of other unmeasured variables ranging from regional accessibility laws, political party dominance, or area weather. Further research could explore other variables that might explain region's significant effects. Does the geographic concentration of elderly people affect the likelihood of having a home modification? Does the number of retirement communities in a particular area have a significant effect?

Another area that warrants further investigation is the need for home modifications in multi-family structures compared to single family units. Data from the 1995 AHS suggests that multi-family units are more likely to have home modifications, but at the same time, disabled elderly households in multi-family units are no more likely than those in single family homes to report at least one modification when one is explicitly needed. Are households in multi-family homes with modifications more likely than others to perceive that they do not need the modifications that they have? Even though larger shares of multi-family units have accessibility modifications, are disabled elderly households in unequipped multi-family units more likely than those in single family units to perceive that they need a modification?

It would be interesting to explore further the mobility of disabled elderly households. When do such households install home modifications, and when do they move to more accessible environments? If they do move, which households move to other units in the private residential stock, and which ones move to more accessible spaces within homes or institutions designed specifically for seniors?

An important issue that this study does not investigate is the impact the varying costs of home modifications may have on the likelihood of having a feature. Given that disabled elderly households already experience higher housing cost burdens than all households in the population, the question emerges of how additional housing amenities such as accessibility modifications can be added to the housing stock of elderly households in affordable ways.

Better survey data would clearly help address some of these questions and provide stronger estimates of the elderly disability levels and home modification needs. The AHS data may underestimate the level of disabilities among US households in part because it lacks detail on standard disability types and focuses little on the characteristics of every individual in the household. Survey data with more detailed measurements of disabilities (such as those used by the SIPP) and reported for all household members would help remedy these issues. The survey also allows only tentative estimates of home modification need levels in part because definitions of “need” were left to the subjective interpretation of household respondents. Clearer definitions of “need” (perhaps established through examples) would help. Does an elderly person require a modification to execute essential life functions? Does an elderly person require a modification to remove a hazardous condition? Is a feature needed for life-sustaining activity, or rather for convenience? Data that distinguishes reports of need by medical professionals from those in the household itself might also be useful if available.

Acknowledging these data limitations, this study finds from the 1995 AHS that many--and often a majority--of disabled elderly households have unmet needs for specific home modifications. Those with these needs appear to be disproportionately minorities, in the South and Northeast, in older units, and with less education. The picture of households who are in greater need is only beginning to emerge, and how to address their needs will become ever more challenging as the elderly population grows.

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Appendix 1

Housing Characteristics by Elderly, Disabled, and Building Type: 1995

Thousands of Households

| | | | With Disabled | | | |
|-----------------------|--------|--------------|-----------------------|---------------------------------|-------|--------------|
| | All | With Elderly | With Disabled Elderly | Elderly in Multi-unit Buildings | All | With Elderly |
| Total | 97,691 | 22,791 | 5,028 | 1,106 | 100.0 | 100.0 |
| Tenure | | | | | | |
| Owner | 63,541 | 17,891 | 3,734 | 186 | 65.0 | 78.5 |
| Renter | 34,150 | 4,900 | 1,294 | 920 | 35.0 | 21.5 |
| Region | | | | | | |
| Northeast | 19,200 | 5,046 | 1,064 | 367 | 19.7 | 22.1 |
| Midwest | 23,662 | 5,450 | 1,178 | 280 | 24.2 | 23.9 |
| South | 34,233 | 7,935 | 1,809 | 245 | 35.0 | 34.8 |
| West | 20,596 | 4,359 | 978 | 213 | 21.1 | 19.1 |
| Urban Location | | | | | | |
| Center City | 30,243 | 6,497 | 1,533 | 557 | 31.0 | 28.5 |
| Suburb | 45,864 | 10,200 | 2,068 | 366 | 46.9 | 44.8 |
| Non-Metro | 21,583 | 6,094 | 1,428 | 183 | 22.1 | 26.7 |
| Year Structure Built | | | | | | |
| pre-1940 | 19,308 | 4,940 | 1,214 | 221 | 19.8 | 21.7 |
| 1940-59 | 19,886 | 6,292 | 1,403 | 148 | 20.4 | 27.6 |
| 1960-79 | 35,299 | 8,090 | 1,682 | 482 | 36.1 | 35.5 |
| 1980+ | 23,198 | 3,469 | 728 | 255 | 23.7 | 15.2 |
| Structure Type | | | | | | |
| Single-family | 66,372 | 16,630 | 3,572 | --- | 67.9 | 73.0 |
| Small Multi-family | 14,102 | 2,155 | 482 | 482 | 14.4 | 9.5 |
| Large Multi-family | 11,056 | 2,585 | 624 | 624 | 11.3 | 11.3 |
| Manufactured | 6,161 | 1,421 | 351 | --- | 6.3 | 6.2 |
| Unit Quality | | | | | | |
| Adequate | 91,320 | 21,390 | 4,592 | 1,041 | 93.5 | 93.9 |
| Moderately Inadequate | 4,348 | 921 | 285 | 43 | 4.5 | 4.0 |
| Severely Inadequate | 2,022 | 481 | 151 | 22 | 2.1 | 2.1 |
| Housing Cost Burdens | | | | | | |
| Not burdened | 71,200 | 16,060 | 3,413 | 498 | 72.9 | 70.5 |

| | | | | | | |
|---------------------------------|--------|-------|-------|-----|------|------|
| Moderately burdened | 15,430 | 3,734 | 877 | 303 | 15.8 | 16.4 |
| Severely burdened | 11,070 | 3,002 | 738 | 305 | 11.3 | 13.2 |
| <hr/> | | | | | | |
| With building modification | 1,284 | 793 | 770 | 770 | --- | --- |
| With housing modification | 3,400 | 2,368 | 2,258 | 625 | --- | --- |
| With assistive device | 4,022 | 2,760 | 2,654 | 596 | --- | --- |
| <hr/> <hr/> | | | | | | |
| Number of Rooms (mean) | 5.7 | 5.5 | 5.4 | 3.8 | --- | --- |
| Number of Bathrooms (mean) | 1.5 | 1.4 | 1.3 | 1.1 | --- | --- |
| Size of Unit (mean square feet) | 1,677 | 1,686 | 1,608 | 812 | --- | --- |

Note: Elderly is age 65 or over. Disabled is having difficulty with mobility, personal activities, seeing, hearing, or needing personal care. Small multifamily is 2-9 units; large is 10 units or more. Moderately inadequate defined by the AHS as one or several problems with the unit's plumbing, heating, upkeep, hallways, or kitchen systems. Severely inadequate defined as two or more serious problems with the same building systems, including electrical service. Moderately burdened defined as paying between 30 and 50 percent of household income for gross monthly housing costs. Severely burdened defined as paying over 50 percent of household income for gross monthly housing costs.

Housing modification and assistive device data were collected by the AHS only for households with disabled members. Building modification data were collected only for households in multifamily buildings. Percentages with housing modifications and assistive devices are for the household populations with disabled elderly people. The percent with a building modification is shown only for the multifamily household with disabled elderly members.

Source: Joint Center tabulations of the 1995 American Housing Survey.

Appendix 2

Household Characteristics by Elderly, Disabled, and Building Type: 1995

Thousands of Households

| | | | | | Pe | |
|------------------------------|--------|--------------|-----------------------|---|-------|--------------|
| | All | With Elderly | With Disabled Elderly | With Disabled Elderly in Multi-unit Buildings | All | With Elderly |
| Total | 97,691 | 22,791 | 5,028 | 1,106 | 100.0 | 100.0 |
| Income Category | | | | | | |
| Less than 30% of median | 14,262 | 5,085 | 1,449 | 536 | 14.6 | 22.3 |
| 31-50% of median | 11,978 | 4,678 | 1,183 | 251 | 12.3 | 20.5 |
| 51%-median | 28,285 | 7,484 | 1,497 | 227 | 29.0 | 32.8 |
| Median or above | 43,166 | 5,544 | 899 | 91 | 44.2 | 24.3 |
| Race | | | | | | |
| White | 75,154 | 19,171 | 4,143 | 871 | 76.9 | 84.1 |
| Black | 11,535 | 2,111 | 577 | 141 | 11.8 | 9.3 |
| Hispanic | 7,757 | 1,038 | 226 | 80 | 7.9 | 4.6 |
| Other | 3,245 | 471 | 82 | 14 | 3.3 | 2.1 |
| Education | | | | | | |
| Without high school degree | 18,790 | 7,991 | 2,139 | 516 | 19.2 | 35.1 |
| High school degree | 30,641 | 7,308 | 1,537 | 314 | 31.4 | 32.1 |
| Some college or other degree | 25,182 | 4,097 | 843 | 185 | 25.8 | 18.0 |
| College or graduate degree | 23,078 | 3,395 | 510 | 91 | 23.6 | 14.9 |
| Age of Oldest Person | | | | | | |
| Under 65 | 74,899 | -- | -- | -- | 76.7 | -- |
| 65-79 | 16,854 | 16,854 | 2,813 | 569 | 17.3 | 73.9 |
| 80+ | 5,937 | 5,937 | 2,216 | 537 | 6.1 | 26.1 |
| Sex of Household Head | | | | | | |
| Male | 61,620 | 12,206 | 2,465 | 336 | 63.1 | 53.6 |
| Female | 36,070 | 10,586 | 2,563 | 770 | 36.9 | 46.4 |
| Household Size | | | | | | |
| One person | 24,067 | 9,029 | 2,050 | 736 | 24.6 | 39.6 |
| Two people | 31,931 | 10,193 | 2,111 | 290 | 32.7 | 44.7 |
| Three or more people | 41,693 | 3,570 | 867 | 80 | 42.7 | 15.7 |
| Marital Status of Head | | | | | | |
| Married | 52,402 | 10,251 | 2,085 | 203 | 53.6 | 45.0 |
| Widowed | 11,496 | 8,954 | 2,161 | 590 | 11.8 | 39.3 |

| | | | | | | |
|-----------------------|--------|-------|-------|-----|------|------|
| Divorced or Separated | 17,529 | 2,281 | 545 | 222 | 17.9 | 10.0 |
| Never Married | 16,264 | 1,306 | 238 | 90 | 16.6 | 5.7 |
| Living Arrangement | | | | | | |
| Alone | 24,067 | 9,029 | 2,050 | 736 | 24.6 | 39.6 |
| With spouse only | 20,541 | 7,745 | 1,502 | 153 | 21.0 | 34.0 |
| With other relatives | 45,459 | 5,201 | 1,280 | 154 | 46.5 | 22.8 |
| With non-relatives | 7,623 | 817 | 196 | 63 | 7.8 | 3.6 |

Note: Elderly is age 65 or over. Disabled is having difficulty with mobility, personal activities, seeing, hearing, or need measured by the 1995 AHS. Median income levels are calculated at the metropolitan level for families of four. Income household income relative to the area median, adjusted for family size. Hispanics can be of any race. Other races American, Pacific Islander, and all other races not shown separately.

Source: Joint Center tabulations of the 1995 American Housing Survey.

Appendix 3

Home Modifications by Elderly Disability

(Thousands of households with elderly people)

| | <u>Difficulty with:</u> | | | | | | |
|--|--|----------------------------------|---|-----------------------------|-------------------------------------|------------------------------------|-------------------------------|
| | <u>Entering & Exiting the Home</u> | <u>Going Up & Down Steps</u> | <u>Opening & Closing or Going through Doors</u> | <u>Moving Between Rooms</u> | <u>Reaching Bathroom Facilities</u> | <u>Reaching Kitchen Facilities</u> | <u>Cookin Prepa F</u> |
| Total Households | 1,586 | 2,095 | 647 | 873 | 1,134 | 794 | 1, |
| <u>Home Has:</u> | | | | | | | |
| Any modification | 856 | 1,038 | 389 | 515 | 682 | 476 | |
| ramps | 264 | 283 | 150 | 183 | 225 | 163 | |
| elevators/stairlifts | 74 | 113 | 55 | 71 | 68 | 50 | |
| extra handrails/grab bars | 603 | 708 | 268 | 343 | 473 | 311 | |
| extra-wide doors or hallways | 153 | 196 | 88 | 105 | 140 | 111 | |
| door handles instead of knobs | 67 | 118 | 40 | 58 | 70 | 34 | |
| push bars on doors | 16 | 41 | 18 | 23 | 23 | 14 | |
| modified wall sockets/ light switches | 25 | 69 | 22 | 30 | 44 | 27 | |
| modified sink faucets/cabinets | 36 | 58 | 24 | 29 | 44 | 42 | |
| bathrooms designed for easier accessibility | 206 | 247 | 100 | 137 | 195 | 134 | |
| kitchens designed for easier accessibility | 105 | 176 | 54 | 87 | 118 | 88 | |
| raised lettering or braille | 16 | 34 | 20 | 22 | 20 | 16 | |
| specially equipped telephone | 105 | 126 | 46 | 72 | 86 | 54 | |
| flashing lights | 18 | 28 | 20 | 17 | 23 | 15 | |
| any other modification | 19 | 20 | 7 | 17 | 29 | 20 | |
| no modification | 681 | 998 | 244 | 340 | 430 | 301 | |
| <u>Household Has:</u> | | | | | | | |
| Any help or assistive device | 1,364 | 1,575 | 584 | 802 | 991 | 704 | 1, |
| help of another person | 1,006 | 1,036 | 483 | 622 | 776 | 586 | |
| cane, walker, crutches | 1,058 | 1,230 | 400 | 609 | 734 | 497 | |
| wheelchair | 608 | 577 | 355 | 428 | 477 | 363 | |
| motorized or electric cart | 56 | 55 | 42 | 37 | 51 | 37 | |
| any other device | 113 | 105 | 72 | 79 | 96 | 76 | |
| no help or assistive device | 192 | 490 | 54 | 63 | 133 | 85 | |

Note: Totals include home modification, help, or assistive device not reported.

Source: Joint Center tabulations of the 1995 American Housing Survey.

Appendix 3 Continued

Home Modifications by Elderly Disability, con't.

(Thousands of households with elderly people)

| | <u>Difficulty with:</u> | | | | | N Sp Modifica or Equip |
|--|-------------------------|------------------------------------|--|---------------|----------------|---------------------------------|
| | <u>Bathing</u> | <u>Grooming & Dressing</u> | <u>Doing Housework & Laundry</u> | <u>Seeing</u> | <u>Hearing</u> | |
| Total Households | 1,864 | 881 | 1,874 | 1,568 | 1,612 | 1 |
| <u>Home Has:</u> | | | | | | |
| Any modification | 1,062 | 509 | 1,005 | 667 | 720 | 1 |
| ramps | 270 | 156 | 278 | 132 | 123 | |
| elevators/stairlifts | 110 | 62 | 125 | 82 | 91 | |
| extra handrails/grab bars | 732 | 362 | 668 | 443 | 410 | |
| extra wide doors or hallways | 226 | 98 | 241 | 142 | 155 | |
| door handles instead of knobs | 113 | 46 | 123 | 92 | 114 | |
| push bars on doors | 31 | 9 | 49 | 41 | 33 | |
| modified wall sockets/ light switches | 80 | 28 | 78 | 46 | 41 | |
| modified sink faucets/cabinets | 89 | 34 | 71 | 55 | 38 | |
| bathrooms designed for easier accessibility | 277 | 127 | 279 | 142 | 131 | |
| kitchens designed for easier accessibility | 176 | 77 | 202 | 108 | 102 | |
| raised lettering or braille | 26 | 19 | 33 | 21 | 23 | |
| specially equipped telephone | 137 | 77 | 146 | 145 | 248 | |
| flashing lights | 24 | 14 | 27 | 16 | 44 | |
| any other modification | 37 | 16 | 36 | 8 | 14 | |
| no modification | 764 | 353 | 830 | 849 | 829 | |
| <u>Household Has:</u> | | | | | | |
| Any help or assistive device | 1,602 | 818 | 1,591 | 954 | 817 | 1 |
| help of another person | 1,220 | 712 | 1,229 | 621 | 486 | 1 |
| cane, walker, crutches | 1,248 | 583 | 1,169 | 759 | 627 | 1 |
| wheelchair | 632 | 439 | 583 | 257 | 220 | |
| motorized or electric cart | 65 | 27 | 54 | 19 | 31 | |
| any other device | 112 | 71 | 93 | 63 | 82 | |
| no help or assistive device | 252 | 55 | 271 | 591 | 746 | |

Note: Totals include home modification, help, or assistive device not reported.

Source: Joint Center tabulations of the 1995 American Housing Survey.

Appendix 4

Building Modifications by Elderly Disability

(Households with elderly people in multifamily structures)

Elderly Person has Difficulty with:

| | <u>Entering & Exiting the Home</u> | <u>Going Up & Down Steps</u> | <u>Opening & Closing or Going through Doors</u> | <u>Moving Between Rooms</u> | <u>Reaching Bathroom Facilities</u> | <u>Reaching Kitchen Facilities</u> | <u>Cooking Prepar Fo</u> |
|------------------|--|--|---|-------------------------------------|---|--|----------------------------------|
| Total Households | 271 | 419 | 150 | 193 | 238 | 181 | 2 |

Building has:

| | | | | | | | |
|---|-----|-----|-----|-----|-----|-----|---|
| Any modification | 167 | 281 | 100 | 126 | 167 | 139 | 1 |
| ramps | 40 | 74 | 38 | 50 | 58 | 53 | |
| handrails | 116 | 209 | 64 | 86 | 119 | 100 | 1 |
| automatic doors | 25 | 33 | 15 | 22 | 28 | 19 | |
| handicap parking | 60 | 96 | 28 | 47 | 70 | 46 | |
| elevators with audio cueing or braille | 32 | 52 | 24 | 33 | 41 | 29 | |
| access to public facilities | 44 | 82 | 26 | 48 | 55 | 45 | |
| no modification | 104 | 138 | 50 | 66 | 71 | 42 | |

| | <u>Bathing</u> | <u>Grooming & Dressing</u> | <u>Doing Housework & Laundry</u> | <u>Seeing</u> | <u>Hearing</u> | <u>Ne Spec Modificatio or Equipm</u> |
|------------------|----------------|------------------------------------|--|---------------|----------------|--|
| Total Households | 404 | 167 | 459 | 359 | 308 | 3 |

Building has:

| | | | | | | |
|---|-----|-----|-----|-----|-----|---|
| Any modification | 285 | 110 | 319 | 253 | 220 | 2 |
| ramps | 81 | 40 | 106 | 71 | 60 | |
| handrails | 200 | 78 | 234 | 160 | 160 | 1 |
| automatic doors | 46 | 17 | 58 | 29 | 37 | |
| handicap parking | 114 | 35 | 119 | 93 | 82 | 1 |
| elevators with audio cueing or braille | 48 | 27 | 56 | 49 | 50 | |
| access to public facilities | 110 | 32 | 118 | 75 | 82 | 1 |

| | | | | | | |
|-----------------|-----|----|-----|-----|----|---|
| no modification | 119 | 57 | 140 | 105 | 88 | 1 |
|-----------------|-----|----|-----|-----|----|---|

Source: Joint Center tabulations of the 1995 American Housing Survey.

Appendix 5

Expressed Modification Needs: Logit Regression Results

| Response Variables: | With any Modification | With Ramp(s) | With Extra Handrails or Grab Bars | With an Accessible Bathroom | With a Specially Equipped Phone |
|------------------------|-----------------------|---------------------|-----------------------------------|-----------------------------|---------------------------------|
| Explanatory Variables: | | | | | |
| Owner | 0.076 (0.348) | -0.537 (-1.438) | -0.199 (-0.721) | 0.125 (0.303) | -0.172 (-0.367) |
| Center city | -0.128 (-0.504) | 0.263 (0.560) | -0.338 (-1.029) | -0.248 (-0.484) | 0.673 (1.172) |
| Suburb | 0.007 (0.027) | 0.424 (0.915) | -0.067 (-0.205) | 0.045 (0.082) | 0.482 (0.900) |
| Northeast | 0.212 (0.925) | 0.910** (2.054) | -0.045 (-0.146) | 0.600 (1.079) | -0.349 (-0.690) |
| Midwest | 0.516** (2.475) | 0.079 (0.207) | 0.659** (2.450) | 0.897** (1.997) | 0.303 (0.677) |
| West | 0.575*** (2.622) | 0.611* (1.671) | 0.234 (0.860) | 0.498 (1.130) | 0.847* (1.765) |
| Built 1940-79 | 0.223 (1.277) | 0.023 (0.072) | -0.228 (-0.999) | 0.362 (0.905) | 0.608 (1.559) |
| Built 1980+ | 0.847*** (2.726) | 1.777*** (2.990) | 0.416 (1.086) | 1.726*** (2.942) | 1.574* (2.206) |
| Single-family | 0.010 (0.040) | 0.255 (0.523) | 0.057 (0.181) | -0.070 (-0.147) | -0.053 (-0.099) |

| | | | | | |
|--|----------------------|-----------------------|----------------------|----------------------|----------------------|
| Mobile home | 0.184 (0.449) | 0.852 (1.340) | 0.335 (0.659) | -0.662 (-0.680) | 0.452 (0.512) |
| Oldest age in household | 0.020* (1.954) | -0.014 (-0.751) | 0.010 (0.781) | 0.004 (0.227) | 0.009 (0.398) |
| Household Income | 1.9E-06 (0.502) | 3.0E-06 (0.539) | 7.8E-06 (1.516) | 1.8E-05** (2.563) | -6.0E-06 (-0.518) |
| Area median income | -4.6E-06 (-0.305) | -5.0E-05* (-1.678) | 1.7E-05 (0.782) | -2.7E-05 (0.837) | -4.6E-05 (-1.475) |
| High school graduate, some college | 0.131 (0.834) | -1.498 (-0.522) | 0.003 (0.016) | -0.115 (-0.349) | 0.007 (0.020) |
| College degree or higher | 1.021*** (3.258) | -0.367 (-0.722) | 0.789** (2.073) | -0.491 (-0.946) | 2.282* (2.558) |
| Minority head of household | -0.461** (-2.509) | -0.519 (-1.586) | -4.596** (-1.972) | -0.746** (-2.031) | -0.638 (-1.298) |
| Female head of household | -0.223 (-1.120) | -0.715** (-2.167) | -0.179 (-0.709) | 0.347 (0.890) | 0.075 (0.174) |
| Number of people in household | -0.097 (-1.336) | -0.042 (-0.356) | -0.125 (-1.278) | -0.142 (-1.037) | 0.315 (1.007) |
| With a spouse | -0.039 (-0.177) | -0.751** (-2.082) | 0.102 (0.356) | 0.291 (0.669) | -0.268 (-0.502) |
| With personal assistance for disabled person | -0.021 (-0.143) | 0.082 (0.285) | -0.283 (-1.468) | -0.335 (-1.000) | -0.077 (-0.221) |
| Number of disabled older people | 0.071 (0.305) | -0.505 (-1.289) | 0.392 (1.226) | -0.633 (-1.154) | -0.890* (-1.763) |

| | | | | | |
|------------------|--------------------|--------------------|--------------------|------------------|------------------|
| Constant | -0.635 (-0.577) | 4.785** (2.410) | -0.424 (-0.298) | 0.169 (0.072) | 1.377 (0.574) |
| <hr/> | | | | | |
| Pseudo R-squared | 0.050 | 0.102 | 0.070 | 0.122 | 0.134 |
| N | 1029 | 304 | 623 | 241 | 217 |

Notes: The regression in the first column was run on all households with disabled elderly who expressed a need for any modification, excluding households with a non-elderly disabled person. The other regressions were run on the sample of households who expressed a need for the noted modification. These latter regressions also exclude households with non-elderly disabled people, and cases where there was no response to whether the modification was present. Z-scores are presented beneath the coefficients in parentheses. Asterisks denote two-tailed levels of significance: *p<.10; **p<.05; ***p<.01. Education and family marital status variables refer to the household head.

Source: Joint Center analysis of the 1995 American Housing Survey.