The Living Conditions of Elderly Americans

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Purpose: This article profiles the housing settings of frail elderly individuals, whether their homes are facilitating or impeding their ability to live in the community, and the change in disability and housing status before and after passage of the 1990 Americans with Disabilities Act. Design and Methods: The analysis relies primarily on statistical analysis of the 1995 national American Housing Survey (AHS), with supplementary analysis of the 1978 AHS. Results: In 1995, roughly 14% of elderly individuals had a “housing-related disability,” 49% had at least one dwelling modification, and 23% had an unmet need for modifications. Because half those with dwelling modification also reported unmet need, the match between disabling condition and modification, and not the presence of modifications, is key. Multivariate results indicate that although unmet need is greater among the poor, lack of modifications is not. Prevalence of modifications nearly doubled between 1978 and 1995. Overall unmet need declined, but some needs were less likely to be met in 1995 than 1978. Implications: The analysis highlights the importance of information about housing for understanding the care and service needs of elderly individuals and provides a compelling argument for a minimum dataset on their housing and neighborhood environments.

Key Words: Housing, Dwelling modifications, Unmet needs

Housing is an “orphan issue” in health and long-term care policy. Although special residential settings such as assisted living and life-care communities have received considerable media coverage and piqued the curiosity of researchers and policymakers, the focus of attention is primarily on the services these settings provide to residents, not their housing component. There is little known about the potential role of “regular” housing in a broad range of health-related outcomes from morbidity to independent living and overall quality of life.

Housing may be a significant player in health outcomes for disabled elderly individuals for at least three reasons. First, physically safe and adequate housing is a rudimentary requirement for the health and safety of all occupants. The effect of the basic physical conditions of the dwelling may apply with added force to disabled elderly individuals, who are likely to spend more time in the home and are potentially less able to compensate for inadequate conditions, thereby being at additional risk for accidents. Second, housing may play a role in either facilitating or impeding home and community-based care access and quality. Because the individual’s home is the setting in which home-based, long-term care services are delivered, characteristics of the setting may affect how, or what, care is provided, or even whether it is feasible to provide care at all (Newman, 1985, 1995). A third possible link between housing and health is via neighborhood conditions. Included here are both social conditions, such as crime and disorder, and physical conditions, such as conveniently located services, stores, and transportation. Some home- and community-based care providers report that they are concerned about their ability to deliver high quality care in unsafe neighborhoods (Scharer, Berson, & Brickner, 1990). The same concerns for safety might also deter a disabled older person from venturing into the neighborhood to seek needed goods and services, and poor transportation could impede access to more distant sources of assistance.

This article takes advantage of a one-time supplement on disability and housing modifications to the 1995 American Housing Survey (AHS; U.S. Bureau of the Census, 1995), the main national survey on the nation’s housing stock, to examine the housing settings of community-resident disabled elderly individuals and the manner in which their residential environments may be facilitating, or impeding, their ability to live a safe and full life in

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the community. I then use a similar survey supplement to the AHS collected in 1978 (U.S. Bureau of the Census, 1978a) to examine changes in the prevalence of dwelling modifications and unmet need for dwelling modifications by disabled elderly individuals before and after passage of the Americans With Disabilities Act (ADA) in 1990.

Conceptual Framework

The Institute of Medicine’s model of disability provides a useful framework for considering the role of housing in the lives of the disabled (Institute of Medicine, 1991). The framework recognizes that whether a person is able to perform an activity depends not simply on the characteristics of the person but also on the physical environment. It acknowledges that risk factors include those in the environment and that identifying such factors is essential to preventing further risk. It also accommodates the notion that quality of life, such as the ability to live as independently as possible in the community, can affect a disabled individual’s ability to cope with a disability and to thrive. Finally, the model allows for the possibility that environmental modification is not only an important form of disability prevention but may also influence the individual’s response to disabling conditions and therefore outcomes.

The demands and conditions of the physical environment, then, partly determine the extent to which functional limitations will be disabling; that is, whether the organic problem underlying the functional limitation will, in fact, limit the individual’s activities. One analyst uses the term environmental modification to categorize this particular approach to mediating the gap between functional limitation and disability (Agree, 1999). Environmental modification includes changes in the residence, such as by installing architectural enhancements to reduce the demands of the physical environment. But it is not only modifications that may play a role and, instead, the full array of housing features pertaining to a safe, physically adequate, and affordable home in a decent neighborhood should be considered. Therefore, this analysis considers physical housing quality, housing affordability, and neighborhood quality along with environmental modification to form a more comprehensive set of characteristics that may mediate between functional limitation and disability.

Past Research

Much of what we know about the effects of housing and neighborhood features on health-related outcomes for the disabled comes from the literature on frail elderly individuals. Two studies (Agree, 1999; Verbrugge, Rennert, & Madans, 1997) found that the use of assistive devices is associated with lower self-reports of disability compared with the receipt of personal care after taking level of disability into account. The role of dwelling modifications per se was not addressed, however. Gitlin, Miller, and Boyce (1999) reported significant improvements in bathing self-care and less need for bathing personal care among a sample of African American female frail elderly individuals living alone who received bathroom equipment through a bathroom modification program in the Philadelphia region. In a clinical trial, Mann, Ottenbacher, Fraas, Tomita, and Granger (1999) found a greater decline in functional status in the control group 18 months after the treatment group received necessary devices and modifications. This study does not separate the effects of devices from those of modifications, however. Newman, Struyk, Wright, and Rice (1990) examined the effects of a wide range of features including dwelling modifications on the chances that a frail older person will enter a nursing home versus the ability to provide informal or formal care to the older person in the community. The findings differed depending on whether the primary caregiver was an informal or formal care provider. Some informal caregivers—spouses, for example—appear to be aided in their caregiving by the presence of special dwelling modifications in the home. These modifications include such features as grab bars, ramps, or specially equipped bathrooms. In addition, a small number of environmental features, such as adequate space in the dwelling, played a significant role in the efficacy of formal, paid care in the home. Recent research suggests that dwelling modifications may bridge deficits in functioning and substitute for personal care, thereby reducing costs of formal care as well as the burden on family caregivers while preserving—if not increasing—quality of life (Agree & Freedman, 2000). In earlier work, Noelker (1982) and Sussman (1979) studied a limited number of environmental attributes such as privacy and space and concluded that the absence of these attributes appeared to impede informal caregiving. Using national data from the 1978 American Housing Survey on a cross-sectional sample of elderly individuals, Newman (1985) classified households into separate risk groups based on health limitations and examined their distributions across housing characteristics that would make it difficult, if not impossible, to accommodate long-term care service delivery in the home (e.g., size, physical deficiencies, presence of elevator). The results suggested that a substantial fraction of the frail elderly population who might be able to remain in the community with in-home and community-based care are living in housing and neighborhoods that either impede efficient delivery of these services or preclude their delivery altogether. Finally, the Institute of Medicine Committee on a National Agenda for the Prevention of Disabilities explicitly concluded that the effects of disabling conditions and their progression may be moderated by the elimination of physical obstacles and barriers.
through housing modifications, in turn affecting the need for personal care or assistance (Institute of Medicine, 1991).

Taken together, these studies establish a framework and set of hypotheses for examining the role of housing in long-term care. But the full framework has been applied to only one long-term care decision, namely, institutionalization. Other choices of particular policy interest, including decisions to add special features or modifications to the dwelling, have largely been neglected. Research on dwelling modifications has focused mainly on the prevalence and determinants of these modifications. Several analyses suggest that roughly 10% of households headed by elderly individuals have at least one such modification in their homes (Pynoos, Cohen, David, & Bernhardt, 1987; Reschovsky & Newman, 1990; Struyk, 1982). Estimates for frail elderly individuals diverge widely from a low of about 10% (Struyk & Katsura, 1988) to a high of about 33% (Soldo & Longino, 1988). In the 7 years between 1982 and 1989, the use of special equipment, including some housing modifications, increased significantly despite the aging of the elderly population and declines in the rate of persons reporting few impairments (Manton, Corder, & Stallard, 1993a).

Pynoos (1993) reviewed a number of empirical studies that have attempted to identify factors that influence household decisions regarding modifications. He divided these factors into three categories: level of awareness, affordability, and adequacy of the service delivery system. He concluded that many older persons are apparently unaware of the potential usefulness of modifications and that affordability and the inadequacy of the service delivery system impede access to assistive-technology devices, resulting in unmet needs.

Although their research is more than a decade old, Struyk and Katsura (1988) appear to be the only analysts to date who have estimated a behavioral model examining the likelihood that an elderly household will modify its dwelling. Using a sample that included both disabled and nondisabled elderly individuals, they found that dwelling modification is significantly determined by the presence of household members with activity limitations. However, neither current economic status nor change in economic status over the observation period (typically 2 years) played a significant role, thereby questioning the affordability argument. The authors concluded that targeted services, rather than income supplements, are likely to be more effective in addressing this need. These services might include assistance in finding a contractor to install the special features or help in identifying exactly what modifications are needed.

As this review attests, researchers’ knowledge of the role of housing and neighborhood in outcomes for the disabled is sketchy at best. But intuition that housing is important is bolstered by strongly suggestive evidence that the housing setting is a critical element in in-home and community-based care. Perhaps the biggest obstacle to knowledge development is inadequate data. The 1995 AHS is one effort to begin to address this inadequacy and is the primary database used in this analysis.

Methods

Data

The national AHS is a biennial survey of 60,000 nationally representative residential dwellings and household characteristics sponsored by the U.S. Department of Housing and Urban Development and conducted by the Census Bureau. To be included in the sampling frame, a housing unit must be a house, apartment, group of rooms, or a single room occupied or intended for occupancy as separate living quarters. The sample excludes institutional living arrangements such as hospitals and nursing homes.

In 1995, the AHS included a supplement of questions on disability and housing modifications along with the standard core of information on housing unit and neighborhood attributes and the demographic and economic characteristics of the households occupying them. (The disability and housing modification items are summarized in the Appendix.) This allows us to examine the relationship between disability and housing characteristics. Although the AHS is based on a sample of housing units, it can be used to make estimates about households with disabled members and about individuals with disabilities.

Measurement Issues

The goals of the 1995 AHS supplement were to estimate the prevalence of housing-related disabilities and dwelling modifications and provide an initial basis for assessing the extent to which the disabled are living in dwellings that accommodate their conditions or, alternatively, whether they have unmet needs for special dwelling or building modifications. Statistical analysis of the items in the AHS supplement (Newman, 2001) suggest that three measures capture the key concerns of housing-related disability and modifications of the housing unit that may make it more accommodating to the elderly resident’s needs: (a) difficulty in using or functioning in the dwelling, and the use, or need, of assistance in using or functioning in the dwelling; (b) unmet need for dwelling modification; and (c) the presence of dwelling modification. The first two can be viewed as different ways to measure the concept of “housing-related disability.” These three measures constitute the key dependent variables in this analysis.
Results

An estimated 5.7 million elderly persons residing in the community require assistance in activities of daily living (ADLs) and instrumental ADLs (IADLs), or roughly one fifth of community-resident elderly individuals (Committee on Ways and Means, 1998). This estimate grows to roughly 39% (about 11 million) if the definition of disability is broadened to include any limitation in the ability to perform activities usual for their age group because of a physical, mental, or emotional problem (National Center for Health Statistics, 2000). Using the AHS measures, roughly 14% of community-resident elderly individuals have a housing-related disability as measured by reports of difficulty or assistance receipt or need. This rate is far more modest than that reflecting ADL, IADL, or activity limitation problems. It is about two-fifths smaller than the estimated rate for ADL and IADL needs and about one third the rate for all limitations in activities.

Bivariate Analysis

Difficulty or Assistance.—Compared with elderly individuals with no difficulties or assistance needs, elderly individuals with housing-related disability are much more likely to be female, Black, and very low income, as shown in the first three columns of Table 1. Disparities in financial status are particularly striking. The fraction of disabled elderly individuals with incomes in the lowest quintile of the income distribution is 50% higher than that for the nondisabled, and the rates of public assistance receipt in the form of welfare income or food stamps is more than twice that for the nondisabled.

Consistent with their demographic and socioeconomic profile, elderly individuals with housing-related disability are more likely to live in older housing of lower value ($92,624 vs. $106,309, respectively) and to pay lower rents ($400 vs. $455, respectively). The disabled are also somewhat more likely to rent than own (75% are homeowners vs. 82% of the nondisabled), to live in multiunit buildings with 50 or more units (8% vs. 5%, respectively). Although the prevalence of dwelling modifications is higher in large compared with small multiunit structures (see below), living in a large building was no guarantee that needed modifications would be present, at least in 1995. Perhaps age of housing plays some role, as elderly individuals with unmet need are somewhat more likely to live in older housing than those whose need for modification are met.

Those with unmet need for dwelling modification have a higher rate of both housing and neighborhood problems. Roughly 11% have moderate physical deficiencies in their dwelling, a rate that is about twice as large as those with no unmet need. Further, nearly 28% live in units that are considered physically substandard—a rate that is two-thirds higher than for elderly individuals with no housing-related disability. Neighborhood problems include noise and traffic (43% compared with 36% for the nondisabled), crime (30% vs. 21%), and unkempt streets (36% vs. 22%). By contrast to the previous measure of housing-related disability (i.e., difficulty or assistance need or receipt), housing affordability problems are not significantly greater among those with unmet need than among those whose needs are being met.

Dwelling Modification.—Few demographic characteristics distinguish elderly individuals with housing-related disability who live in dwellings with at least some modification from those with no dwelling modifications, as shown in the seventh through ninth columns of Table 1. Blacks are less likely to have at least one dwelling modification than not (11% vs. 14%, respectively). Contrary to initial expectations, those living alone and those with lower incomes are more—not less—likely to have one or more modifications. If those living alone are also less likely to have access to personal assistance to cope with their housing-related disability, then techno-
<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Difficulty or Assistance (n = 2,020, 13.7%)</th>
<th>No Difficulty or Assistance (n = 12,830, 86.3%)</th>
<th>p</th>
<th>Unmet Need (n = 453, 22.7%)</th>
<th>No Unmet Need (n = 1,556, 77.3%)</th>
<th>p</th>
<th>At Least One Dwelling Modification (n = 935, 48.7%)</th>
<th>No Dwelling Modifications (n = 1,033, 51.3%)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographic and Socioeconomic Characteristics</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>% female</td>
<td>71.14</td>
<td>57.03</td>
<td>&lt;.01</td>
<td>76.04</td>
<td>69.65</td>
<td>&lt;.10</td>
<td>72.28</td>
<td>69.46</td>
<td>ns</td>
</tr>
<tr>
<td>% Black</td>
<td>12.48</td>
<td>7.96</td>
<td>&lt;.01</td>
<td>21.01</td>
<td>9.99</td>
<td>&lt;.01</td>
<td>10.59</td>
<td>14.19</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>% 1-person household</td>
<td>38.96</td>
<td>28.31</td>
<td>&lt;.01</td>
<td>37.48</td>
<td>39.42</td>
<td>ns</td>
<td>41.11</td>
<td>36.92</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>Mean income</td>
<td>$22,804.96</td>
<td>$29,178.49</td>
<td>&lt;.01</td>
<td>$20,740.92</td>
<td>$23,421.67</td>
<td>&lt;.05</td>
<td>$23,421.08</td>
<td>$22,124.93</td>
<td>ns</td>
</tr>
<tr>
<td>Income in 1st quintile</td>
<td>41.89</td>
<td>27.56</td>
<td>&lt;.01</td>
<td>45.12</td>
<td>40.86</td>
<td>ns</td>
<td>42.52</td>
<td>41.25</td>
<td>ns</td>
</tr>
<tr>
<td>% receive welfare or food stamps</td>
<td>14.23</td>
<td>5.87</td>
<td>&lt;.01</td>
<td>18.98</td>
<td>12.77</td>
<td>&lt;.01</td>
<td>13.29</td>
<td>14.87</td>
<td>ns</td>
</tr>
<tr>
<td>Housing Characteristics</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>% ≤ 3 rooms in dwelling</td>
<td>12.10</td>
<td>7.68</td>
<td>&lt;.01</td>
<td>10.43</td>
<td>12.61</td>
<td>&lt;.05</td>
<td>14.94</td>
<td>9.35</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>% owners</td>
<td>74.58</td>
<td>82.48</td>
<td>&lt;.01</td>
<td>69.34</td>
<td>76.08</td>
<td>&lt;.01</td>
<td>71.18</td>
<td>77.72</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>% ≥ 50 units in building</td>
<td>7.33</td>
<td>4.89</td>
<td>&lt;.01</td>
<td>7.63</td>
<td>7.23</td>
<td>&lt;.05</td>
<td>12.79</td>
<td>2.20</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>% built 1960 or earlier</td>
<td>53.03</td>
<td>48.72</td>
<td>&lt;.01</td>
<td>57.17</td>
<td>51.84</td>
<td>&lt;.05</td>
<td>48.16</td>
<td>57.06</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Mean house value</td>
<td>$92,624.05</td>
<td>$106,308.94</td>
<td>&lt;.01</td>
<td>$80,146.74</td>
<td>$95,999.78</td>
<td>&lt;.01</td>
<td>$95,402.29</td>
<td>$89,192.49</td>
<td>ns</td>
</tr>
<tr>
<td>Mean rent</td>
<td>$399.68</td>
<td>$455.34</td>
<td>&lt;.01</td>
<td>$407.91</td>
<td>$396.05</td>
<td>ns</td>
<td>$416.17</td>
<td>$374.18</td>
<td>&lt;.10</td>
</tr>
<tr>
<td>Housing and Neighborhood Problems</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Housing costs &gt; 50% income</td>
<td>15.04</td>
<td>11.45</td>
<td>&lt;.01</td>
<td>17.13</td>
<td>14.40</td>
<td>ns</td>
<td>12.62</td>
<td>17.02</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>Housing costs &gt; 30% income</td>
<td>32.11</td>
<td>26.79</td>
<td>&lt;.01</td>
<td>33.26</td>
<td>31.72</td>
<td>ns</td>
<td>30.78</td>
<td>33.09</td>
<td>ns</td>
</tr>
<tr>
<td>Moderate physical defects</td>
<td>6.26</td>
<td>3.22</td>
<td>&lt;.01</td>
<td>11.32</td>
<td>4.81</td>
<td>&lt;.01</td>
<td>6.27</td>
<td>6.35</td>
<td>ns</td>
</tr>
<tr>
<td>Severe physical defects</td>
<td>2.65</td>
<td>1.99</td>
<td>&lt;.05</td>
<td>3.33</td>
<td>2.47</td>
<td>ns</td>
<td>2.36</td>
<td>2.96</td>
<td>ns</td>
</tr>
<tr>
<td>% substandard</td>
<td>17.54</td>
<td>10.79</td>
<td>&lt;.01</td>
<td>27.98</td>
<td>14.59</td>
<td>&lt;.01</td>
<td>15.64</td>
<td>19.50</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>Noise, traffic</td>
<td>27.65</td>
<td>29.23</td>
<td>&lt;.01</td>
<td>42.60</td>
<td>36.14</td>
<td>&lt;.01</td>
<td>39.41</td>
<td>36.56</td>
<td>ns</td>
</tr>
<tr>
<td>Crime</td>
<td>22.68</td>
<td>16.39</td>
<td>&lt;.01</td>
<td>29.78</td>
<td>20.73</td>
<td>&lt;.01</td>
<td>24.23</td>
<td>21.81</td>
<td>ns</td>
</tr>
<tr>
<td>Trash, litter in the streets</td>
<td>25.50</td>
<td>17.27</td>
<td>&lt;.01</td>
<td>36.31</td>
<td>21.83</td>
<td>&lt;.01</td>
<td>20.90</td>
<td>30.20</td>
<td>&lt;.01</td>
</tr>
</tbody>
</table>

Notes: From 1995 National American Housing Survey dataset, http://www.huduser.org/datasets/ahs/ahsprev.html. In the public domain. Sample is defined as individuals 65 and older. “Difficulty or assistance” = an affirmative answer to any of the nonsensory difficulty items (e.g., entering and exiting, going up and down steps), or the use of or need for special modifications, equipment, or personal assistance.
logical modifications perhaps become more important. At least at this aggregate level, the negative correlation between income and presence of dwelling modifications belies the affordability hypothesis. However, it is unlikely that affordability plays no role, because those with unmet need for dwelling modifications were significantly more likely to have low incomes (though they are only marginally more likely to have high housing cost burdens, a difference that does not attain statistical significance). Part of the explanation is that 71% of elderly individuals with housing-related disability who report that they live in assisted housing also report the presence of at least one dwelling modification—a rate that is more than 50% higher than those not living in assisted housing. Although about 5% of all elderly individuals in the 1995 AHS sample live in assisted housing, roughly 10% of those who meet the disability definition in this article report residence in assisted housing. A more complete understanding of the relationship between income and dwelling modification would require more precise data than are available in the AHS to allow matching actual and needed modifications to specific disabling conditions.

The need for such matching can be seen in the housing and neighborhood characteristics of housing-related disabled elderly individuals with, and without, dwelling modifications. One might expect that those who live in modified dwellings would have different housing and locational attributes from those who report an unmet need for modifications. Just the opposite is the case for two variables. Housing tenure and number of units in structure have the same relationship to the presence of a dwelling modification as to the unmet need for modification. Disabled elderly individuals with unmet need for modifications—or who actually live in a modified dwelling—are less likely to be owners and to live in structures with a larger number of units, with the latter having a much stronger effect on the unmet need for dwelling modification. More liberal treatment of missing data included an additional 3.2% on unmet need and 2.9% on dwelling modification were dropped. Dropped cases due to missing data on independent variables included an additional 3.2% on unmet need and 2.9% on dwelling modification. More liberal treatment of missing data cases did not change results.

Multivariate Analysis.—Table 2 reports the results of multivariate analyses on the number of unmet needs for dwelling modifications and the number of dwelling modifications. The strongest predictor of each dependent variable is the number of housing-related difficulties, with each difficulty increasing the number of unmet needs by about 10% and the number of dwelling modifications by about 7%.

Consistent with the affordability hypothesis, the number of unmet needs for dwelling modification increases as income falls. The relationship is just the reverse for the number of dwelling modifications, as was the case in the bivariate results, but the regression-adjusted result is not statistically significant. Being non-White increases the number of unmet needs and decreases the number of dwelling modifications even when other demographic, neighborhood, and disability indicators are taken into account. Non-Whites have 24% more unmet needs and 20% fewer dwelling modifications than other racial and ethnic groups.

### Table 2. Demographics, Housing, Neighborhood, and Disability Effects on Unmet Need and Dwelling Modification of Elderly Individuals, 1995

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Number of Unmet Needs</th>
<th>Number of Dwelling Modifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-reporter</td>
<td>.0376</td>
<td>.1807</td>
</tr>
<tr>
<td>Income ($1,000s)</td>
<td>.0022</td>
<td>.0028</td>
</tr>
<tr>
<td>Male</td>
<td>.0375</td>
<td>.0066</td>
</tr>
<tr>
<td>Non-White</td>
<td>.2437</td>
<td>-.2023</td>
</tr>
<tr>
<td>18–34 years old</td>
<td>.0403</td>
<td>-.1572</td>
</tr>
<tr>
<td>35–44 years old</td>
<td>.0909</td>
<td>-.1101</td>
</tr>
<tr>
<td>45–64 years old</td>
<td>.0558</td>
<td>.0221</td>
</tr>
<tr>
<td>Household size</td>
<td>.0351</td>
<td>-.0217</td>
</tr>
<tr>
<td>No. of rooms</td>
<td>-.0285</td>
<td>.0626</td>
</tr>
<tr>
<td>No. of units in building</td>
<td>-.0009</td>
<td>.0345</td>
</tr>
<tr>
<td>Age of building (10s)</td>
<td>.0125</td>
<td>-.0513</td>
</tr>
<tr>
<td>Renter</td>
<td>.0468</td>
<td>.2057</td>
</tr>
<tr>
<td>Neither owner nor renter</td>
<td>.0050</td>
<td>.0151</td>
</tr>
<tr>
<td>No. of defects</td>
<td>.1217</td>
<td>-.0597</td>
</tr>
<tr>
<td>Neighborhood crime</td>
<td>.0762</td>
<td>-.0190</td>
</tr>
<tr>
<td>Single-family unit</td>
<td>-.0891</td>
<td>.0355</td>
</tr>
<tr>
<td>Housing cost/income</td>
<td>.0081</td>
<td>-.0036</td>
</tr>
<tr>
<td>No. of difficulties or assistance</td>
<td>.0971</td>
<td>.0664</td>
</tr>
</tbody>
</table>

Notes: From 1995 National American Housing Survey dataset, http://www.huduser.org/datasets/ahs/ahsprev.html. In the public domain. Results from ordinary least squares regression. Cases representing the 7% missing on unmet need and the 4.2% missing on dwelling modification were dropped. Dropped cases due to missing data on independent variables included an additional 3.2% on unmet need and 2.9% on dwelling modification. More liberal treatment of missing data cases did not change results.
Several housing and neighborhood attributes are significant predictors of the number of dwelling modifications. The number of rooms in the dwelling unit and the number of housing units in the structure each increase the number of modifications significantly. On the other hand, older buildings are significantly less likely to contain dwelling modifications, with each additional 10 years of age decreasing the number by about 5%. None of these features has a significant effect on the number of unmet needs, however.

More consistent is the physical quality of the dwelling as measured by the number of defects. Each additional physical deficiency increases the number of unmet needs by about 12% and decreases the number of dwelling modifications by about 6%.

Changes in Housing-Related Disability, 1978–1995

Because a subset of similar housing-related disability items were included in both the 1978 AHS and the 1995 AHS, these two surveys can be viewed as a two-cohort study and analyzed to estimate changes that occurred during the intervening 17-year period. This comparison offers some insight into the possible effects of the 1990 ADA and, alongside it, the stepped up enforcement of the Fair Housing Act and possibly Section 504 of the Rehabilitation Act. Such insights are only tentative and speculative, however. For example, any observed changes may also reflect greater public sensitivity to increasing accessibility for the handicapped. A rigorous study of the effectiveness of this shift in policy regimes requires a research design and data that allow the net effects of these policies to be measured, which cannot be done through the two cohort comparisons afforded by the 1978 and 1995 AHS. Nonetheless, this descriptive comparison is helpful in at least suggesting whether the direction of change is consistent with the intended goals of these policies.

To ensure comparable samples for this comparison, the analysis is limited to those respondents who answered affirmatively to similar housing-related disability items in the two surveys. Unfortunately, there are only two such items—entering or exiting the home, and going up and down steps in the home—and both pertain to mobility difficulties in and around the home. If these two items do not produce a sufficiently good match of sample members in the 2 years, there is a greater chance that at least some part of any observed difference in prevalence rates of dwelling modification and unmet need should be attributed to differences in sample characteristics and not the effects of policies. A first-cut analysis of this issue suggests that any bias in the estimated changes between the 2 years is likely to understate any increase in the prevalence of dwelling modification but to overstate any decreased prevalence in unmet need. Therefore, if the rates of dwelling modification are higher in 1995 even with the conservative bias of this approach, there is greater confidence that these rates are not likely to be overstated. But declines in the rate of unmet need may be less reliable.

As context, there was a small but statistically significant increase in the prevalence of housing-related disability between 1978 and 1995 among the community-resident elderly, based on the two identical measures available in the two surveys. The proportion of elderly individuals reporting a difficulty with either, or both, entering or exiting the home, or negotiating the steps inside the home, grew from 7.82% in 1978 to 8.79% in 1995 ($p < .01$). This result is inconsistent for elderly individuals with those reported by Manton, Corder, and Stallard (1993b), who compared rates of ADL and IADL impairments of elderly individuals in the 1982, 1984, and 1989 National Long-Term Care Survey (NLTCs). The source of this discrepancy is not known, but its source may be differences in sample design, survey content, question wording, and order between the NLTCs and the AHS.

The first three columns of Table 3 shows the significant increase in the presence of a wide range of dwelling modifications in the homes of those with either or both of the two types of housing-related disability. The prevalence of at least one such feature increased about two-fold (roughly 26% to 49%, respectively). There has been a six-fold increase in the prevalence of ramps, nearly a doubling in the prevalence of handrails or grab bars, a four-fold increase in extra wide doors or hallways, and an eight-fold increase in bathrooms with accessible design.

This growth may have occurred through an increase in installations of modifications in existing homes, the greater likelihood of newly developed housing (particularly for seniors) to incorporate such features, or some combination of the two. The data indicate that dwelling modifications in 1995 were more likely in newer housing (built in 1991 or later) than in older housing: 55% versus 43%. Although disabled elderly individuals living in both single family and multiunit buildings experienced increases in dwelling modifications, the increase was substantially larger in multiunit buildings. The increase in single family properties was 82% (26% in 1978 to 47% in 1995), but was 103% in buildings with more than four units (30% to 61%).

Because the population has aged between 1978 and 1995, and because older people are more likely to have dwelling modifications in their homes than younger people, some increase in the prevalence of such modifications could be attributed to the aging of the population (LaPlante, Hendershot, & Moss, 1992). Age-adjusted analyses (not shown), however, reveal that the portion of the increased presence of modifications attributed to population aging, at least as reflected in the AHS sample, is minimal.
Table 3. Change in Prevalence Rates of Dwelling Modifications and Unmet Need for Dwelling Modifications Among Elderly Individuals, 1978–1995

<table>
<thead>
<tr>
<th>Modification</th>
<th>1978 ( (n = 1,295) )</th>
<th>1995 ( (n = 1,305) )</th>
<th>( p )</th>
<th>1978 ( (n = 1,310) )</th>
<th>1995 ( (n = 1,323) )</th>
<th>( p )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ramps</td>
<td>2.39</td>
<td>14.05</td>
<td>&lt;.01</td>
<td>12.92</td>
<td>11.72</td>
<td>ns</td>
</tr>
<tr>
<td>Elevator or stair lift</td>
<td>3.47</td>
<td>5.25</td>
<td>&lt;.05</td>
<td>11.69</td>
<td>4.53</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Extra handrail or grab bars</td>
<td>19.84</td>
<td>35.71</td>
<td>&lt;.01</td>
<td>23.98</td>
<td>11.13</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Extra wide doors or hallways</td>
<td>2.32</td>
<td>9.47</td>
<td>&lt;.01</td>
<td>3.32</td>
<td>5.01</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>Door handles instead of knobs</td>
<td>0.72</td>
<td>5.36</td>
<td>&lt;.01</td>
<td>1.37</td>
<td>3.28</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Push bars on doors</td>
<td>0.40</td>
<td>1.83</td>
<td>&lt;.01</td>
<td>1.91</td>
<td>2.84</td>
<td>ns</td>
</tr>
<tr>
<td>Modified wall sockets or light switches</td>
<td>2.59</td>
<td>2.81</td>
<td>ns</td>
<td>0.37</td>
<td>1.97</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Modified sink faucets or cabinets</td>
<td>1.75</td>
<td>2.67</td>
<td>ns</td>
<td>1.34</td>
<td>2.97</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Bathroom designed for easier accessibility</td>
<td>1.45</td>
<td>11.76</td>
<td>&lt;.01</td>
<td>4.56</td>
<td>7.81</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Any of the above</td>
<td>25.82</td>
<td>49.29</td>
<td>&lt;.01</td>
<td>41.93</td>
<td>26.74</td>
<td>&lt;.01</td>
</tr>
</tbody>
</table>

Notes: From “1978 and 1995 National American Housing Surveys,” 1995 National American Housing Survey dataset, http://www.huduser.org/datasets/ahs/ahsprev.html. In the public domain. Sample is defined as individuals answering affirmatively to either of the following items: (a) difficulty entering or exiting the home, and (b) difficulty going up and down the steps. No missing data on screener items in the 1995 survey. The less than 2% \( (n = 43) \) of cases with missing data on screener in 1978 were excluded. Missing data in the row variables omitted on an item-by-item basis.

The increased presence of dwelling modification is presumably associated with the significant decline in unmet need for dwelling modification during this 17-year period, as shown in the fourth through sixth columns of Table 3. Although, as noted, the data on change in unmet need may be less reliable than that on dwelling modification, the relationship between the change in these two indicators makes intuitive sense. In 1978, 42% of elderly AHS respondents with housing-related disability reported to have at least one unmet need. By 1995, this rate declined to roughly 27%. Elderly individuals experienced their greatest decreases in unmet need for elevators or stair lifts and extra handrails or grab bars (24% to 11%, respectively).

Nonetheless, despite the across-the-board increase in the presence of dwelling modifications, unmet needs for other modifications not only remained but increased over time. Elderly individuals experienced an increase in unmet need for extra wide doors or hallways, door handles instead of knobs, modified wall sockets or light switches, modified faucets or cabinets, and accessible bathroom design. As noted earlier, the sheer increase in the prevalence of dwelling modifications is not necessarily synonymous with an increase in those modifications that are most relevant to the individual’s disability. It is also possible that favorable experiences with housing modifications increase the consumer’s awareness of what can be accomplished with modifications and the potential for further gains with additional features.

**Discussion**

A suitable housing environment may improve disabled elderly individuals’ ability to reside as independently as possible in the community. Research suggests that a “user-friendly” home not only increases its safety and usability by the disabled resident, but may also facilitate the efficient delivery of in-home care. Yet, the ongoing health policy debate has been devoid of information about the living circumstances of people with disabilities. Even descriptive information has been lacking that could help policymakers and the public assess alternative proposals for health care reform, and particularly which services should be modified and which should be cut back or eliminated. If, for example, it turns out that a sizable share of disabled elderly individuals are living in seriously deteriorated housing located in safe neighborhoods, one might expect a different reaction to proposed cutbacks in service than if most were well housed. Such information should also be a significant input to housing assistance policy. At present, approximately 11.2% of all subsidized housing units are occupied by disabled individuals 62 and older—HUD’s threshold for the “elderly” designation. This translates into about 520,000 older persons (U.S. Department of Housing and Urban Development, 1998).

To date, the ability to examine the suitability of the housing settings in which disabled persons reside and the outcomes that appear to be associated with the physical features of their residential settings has been seriously hampered by data inadequacies. The current research takes advantage of the 1995 AHS special supplement on disability and housing modification in an effort to begin to close these gaps.

Roughly 14% of elderly persons in AHS sample households have either a nonsensory mobility limitation, personal activity limitation, or use or need assistance. The most prevalent difficulties are with mobility (negotiating steps, entering, or exiting...
the home), doing housework and laundry, bathing, cooking and preparing food, and reaching bathroom facilities.

Of elderly persons with at least one such housing-related disability, 49% are living in a dwelling with at least one special modification designed to accommodate a disabled person’s use and enjoyment of the dwelling. Nonetheless, 23% of housing-disabled elderly persons report having an unmet need for dwelling modification. Whether this reflects “residual disability,” that is, disability that remains even after appropriate modifications have been made to the dwelling, the mismatch between the modifications in the home and the resident’s disability, or the inability of technology to address some disabling conditions (or level of disability) is not known.

Relative to the nondisabled, elderly persons with a housing-related disability are more likely to have low incomes and other socioeconomic disadvantages, to live in smaller and older dwellings with more physical deficiencies, to bear high housing costs relative to income, and to be located in neighborhoods characterized by crime and poor maintenance. Each of these factors can put the housing-related disabled at risk in their homes and may impede the delivery of needed in-home services. Although cross-sectional data cannot establish cause and effect between disability and disadvantage, each of these indicators of disadvantage can put the housing-related disabled at risk in their homes and may impede the delivery of needed in-home services. For example, roughly 12% live in dwellings with three or fewer rooms, about 18% live in physically substandard dwellings, roughly 23% portray their neighborhoods as having a crime problem, and 15% have serious housing affordability problems, with heavy housing cost burdens exceeding 50% of income.

Multivariate analyses to assess the relative importance of demographic, housing, neighborhood, and disability attributes in accounting for variations in dwelling modifications and unmet need for dwelling modification (both presence and number) point to three important findings. First, although there is a negative relationship between unmet need for dwelling modification and income (i.e., as income increases, the probability of an unmet need decreases as does the number of unmet needs), the estimated impact of every additional $1,000 of income is trivial. Although a larger sample and alternative statistical techniques could increase the absolute size of this impact somewhat, it is unlikely to do so dramatically. Therefore, the affordability hypothesis is not strongly confirmed by this analysis. It is worth noting that much past research on the affordability hypothesis focused on the relationship of income to the presence of any modifications in the dwelling, not unmet need for modifications. This research has produced mixed results. In the present analyses, higher income is associated with significantly fewer dwelling modifications, not a greater number. A partial explanation for this relationship is likely to be the role of assisted housing; roughly 71% of elderly individuals who meet the disability criteria used in this analysis and who report that they live in some form of assisted housing also report the presence of a dwelling modification. All of these individuals have low incomes.

A second finding is the strong relationship between physical housing deficiencies and unmet need for dwelling modification. Because income and housing affordability are already being controlled, this measure is picking up something beyond economic status. One interpretation is that inadequate housing cannot accommodate needed dwelling modifications. Each additional defect in the dwelling increases the number of unmet needs by about 12%.

Third, the number of housing-related difficulties or the use or need of assistance is by far the strongest predictor of both unmet need and dwelling modifications. Each additional housing-related difficulty increases the number of unmet needs by about 10% and the number of dwelling modifications by about 7%. Other data show that roughly 45% of housing-disabled elderly persons who report an unmet need for dwelling modification live in dwellings with at least one such modification. The 54% who live in a modified dwelling report that at least one of the modifications is not responsive to their particular needs. Possible interpretations for the strong effect of disability on both unmet need for modifications and the presence (or number) of modifications were noted earlier and include a possible mismatch between modifications and disabling conditions and the presence of residual disability.

A comparison of the prevalence of dwelling modifications and unmet need for dwelling modifications in the 1978 AHS and the 1995 AHS reveals a significant increase in modifications (from 26% to 49%) and a significant decrease in unmet need for modifications (from 42% to 27%). Among the most prominent changes were a nearly six-fold increase in ramps, nearly a doubling of handrails and grab bars, a four-fold increase in extra wide doors or hallways, and an eight-fold increase in accessible bathrooms. These changes are consistent with the introduction of the ADA in 1990 and the strengthening and stepped-up enforcement of the Fair Housing Act and possibly Section 504 of the Rehabilitation Act between the late 1970s and mid-1990s. But they are also consistent with other interpretations, such as the greater awareness of the accessibility needs of the handicapped. The speculative interpretation regarding the effectiveness of the ADA and other legislation, therefore, deserves more careful study.

As the foregoing suggests, the 1995 AHS is a rich source of information on the living conditions of America’s disabled elderly. But improvements in the supplement’s design could increase its usefulness for policy analysis substantially (McGovern, n.d.; Zuckerberg, 1996). One key weakness in the current
design is the lack of clarity about whether a sample member’s reported housing-related disability is affected by receipt of assistance (e.g., whether difficulties performing tasks remain even after appropriate dwelling modifications are present). Arguably, those who report no housing-related disability because of the presence of appropriate dwelling modifications are just the observations analysts need to study to learn how their successes might be generalized to others. Other limitations include the inability to distinguish between short- and long-term, chronic housing-related disability, to match modifications with the underlying disabling condition, and to general aggregate estimates of the share of the U.S. housing stock containing special features or modifications. Beyond providing a national estimate, this information could be used to analyze whether healthy individuals living in modified dwellings are more likely to remain there when they become disabled or whether such dwelling modifications affect residential mobility and care decisions by disabled relatives of the modified dwelling’s owner (LaPlante et al., 1992). In addition, even though the AHS’s focus is on the housing-disability nexus, there may be ways to design such measures to more closely parallel those of key disability surveys. This would have the triple benefits of using measures similar to those that have been rigorously tested and whose psychometric properties are well documented, generating closer prevalence rates between the AHS and such surveys, and perhaps increasing the likelihood that a broader range of researchers from fields outside housing would begin to incorporate housing into their analyses of the needs of the disabled.

One approach to accomplishing these objectives is to establish a working group to assist the Office of Policy Development and Research (PDR) and the Census Bureau’s Housing Division in the design of any future disability and modification supplement for the AHS. This group should include a combination of researchers, practitioners, members of the disabled community, and staff of PDR and Census. Finally, because the reliability of even “standard” measures of disability is often less than ideal, the design of any future supplement should begin with cognitive interviews to help ensure that the right questions are being asked and in the right way to generate the best information on the living conditions of America’s disabled.

References


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Appendix

1995 American Housing Survey Modification Supplement Questions

[215a.] Does anyone in this household/do you have difficulty in doing any of the following?

(1) Entering and exiting this home
(2) Getting around inside the home, such as: (a) going up and down the steps; (b) opening and closing or going through
any doors of this home; (c) moving between rooms; (d) reaching the bathroom facilities including the tub, shower, toilet
or sink; (e) reaching the kitchen facilities, including sink, stove, refrigerator, and kitchen cabinets
(3) Does anyone in this household/do you have difficulty with personal activities such as: (a) cooking and preparing food;
(b) feeding themselves; (c) bathing, getting in and out of the tub or shower; (d) grooming and dressing; (e) doing house-
work and laundry tasks

(Does anyone in this household/do you have serious:
(4) Difficulty seeing, even when wearing glasses or contact lenses
(5) Problems hearing even a normal conversation even when wearing a hearing aid
(6) Does anyone in this household/do you use or need special modification, equipment, or the assistance of another per-
son around the home because of a physical limitation?

If “yes,” respondents are asked to identify household member(s) with limitation.

For multi-unit dwellings:

[218] Which of the following does this building have? (a) ramps; (b) handrails; (c) automatic doors; (d) handicap parking; (e) ele-
vators with audio cueing or braille; (f) accessibility for people with physical limitations to public use facilities, such as the
lobby, laundry room and storage areas

For all dwellings:

[219] The following is about the features, modifications, and/or aids for your home.

[219a.] Does this home have: (1) ramps; (2) elevators or stairlift; (3) extra handrails or grab bars; (4) extra wide doors or hall-
ways; (5) door handles instead of knobs; (6) push bars on doors; (7) modified wall sockets or light switches; (8) modified
sink faucets or cabinets; (9) bathroom designed for easier accessibility such as for wheelchair use; (10) kitchens
designed for easier accessibility such as for wheelchair use; (11) raised lettering or braille; (12) specially equipped tele-
phone; (13) flashing lights; (14) any other structural modification (specify); (15) the help of another person with their/
your limitation; (16) a cane, walker or crutches; (17) a wheelchair; (18) motorized or electric cart; (19) any other device
(specify)

[219b.] If “yes,” respondent is asked whether self or household member(s) with limitation(s) needs the feature, modification and/
or aid.

[219c.] Which limitation requires the use of this aid? (a) Entering and existing this residence; (b) Getting around inside the home;
(c) Personal activities; (d) Vision problems; (e) Hearing problems

*Items also appear in the 1978 American Housing Survey Modification Supplement questionnaire, by the U.S. Bureau of the