
Chapter 9

**Technology, Housing, and
the Living Environment
of the Elderly**

Contents

	<i>P a g e</i>
Introduction	277
Demographic Influences	277
Changes in Households	277
Marital Status	278
Living Arrangements	280
Housing Status of the Older Population	282
Tenure of Elderly Households	282
Housing Deficiencies	283
Housing Expenditures	285
Recent Changes in Expenditures and Deficiencies.	286
Housing and Environmental Fit of the Impaired Elderly	288
Age, Impairment, and the Housing Environment.	288
Impairment and Disability.	288
Prevalence of Disability	290
Evolution of Federal Housing Policy for the Elderly.	294
General Housing Policy and Federal Programs	294
Federal Housing Programs for Older Americans	294
Impact of Federal Housing Programs on the Elderly	300
The Macro-Environment of Housing for the Elderly	301
Characteristics of Elderly Single-Family Housing	301
The Micro-Environment of Housing for the Elderly	315
Technological Applications in the Home	315
Concluding Remarks	324
Research Priorities	325
Issues and Options	325
Chapter 9 References	327

Tables

<i>Table No.</i>	<i>Page</i>
23. All Households and Households With an Elderly Head: United States, 1950-82	278
24. Marital Status of the Population Aged 65 and Over, by Age and Sex: United States, 1970 and 1982	279
25. Living Arrangements of the Population Aged 65 and Over, by Age and Sex: United States, 1970 and 1981	280
26. Elderly Headed Households, by Tenure: United States, 1979 and 1982	282
27. Housing characteristics of Elderly Headed Households: United States, 1979	283
28. Deficiency Criteria for Physically Inadequate Housing: United States, 1981	284
29. Incidence of Housing Deficiencies and Excess Expenditures: United States, 1979 ...	285
30. Persons Needing Help in Basic Activities of Daily Living and Persons in Nursing Homes, by Selected Ages: United States, 1977	291
31. Noninstitutionalized Persons With Activity Limitation Due to Chronic Conditions, and Persons Dependent in Selected Basic Activities of Daily Living (ADLs), by Age: United States, 1977 ,	291
32. Mobility Limitations Due to Chronic Conditions Among Noninstitutionalized Persons, by Age: United States, 1977	292
33. Summary of Housing Units for the Elderly Currently Subsidized by Selected Federal Housing Programs: United States, 1981-82.	296

Figure

<i>Figure No.</i>	<i>P a g e</i>
27. Schematic Diagram of the Competence and Environmental Press Model: Behavioral Outcomes of Person-Environment Interaction	289

Technology, Housing, and the Living Environment of the Elderly

Introduction

Major demographic and technological changes in housing and living arrangements of older Americans in the recent past signal new challenges for Federal housing policy in the future.

Understanding the effects of these trends for the elderly is particularly relevant because of the growing importance of the residential environment as persons age. Questions of safety, security, satisfaction with life, and maintenance of independence are only a few of the issues that have a bearing on Federal policy in housing, technological change, and the elderly (see, e.g., 43). Moreover, as the elderly population itself ages, greater challenges arise for assuring that the very old are not only adequately housed but also properly served (74).

Issues surrounding '(housing and the elderly)' go beyond the physical dwelling itself. The status of older persons in terms of their housing and living arrangements is intricately related to their socioeconomic, marital, familial, psychological, and physical status. Whether directly or indirectly, Federal housing policy affects central aspects of the older individual's well-being.

This chapter discusses the demographic, social, and technological developments that have helped create the current Federal role in housing policies affecting the elderly. It includes a synopsis of the major Federal housing programs that have an impact on the older population, their relative contribution to providing or subsidizing housing for this special group, and their current status or level of activity. It also provides an analysis of potential future needs in Federal housing policy and in achieving the explicit goal of assuring "safe and decent housing" for all persons and families, as first stated in the Housing Act of 1937.

More recent Federal legislation sets out the special nature of the housing needs of the elderly, especially the desirability of coordinating housing with a variety of community services. Increasingly, the emphasis is on maximizing and maintaining the residential independence of older persons, particularly those who are frail, disabled, poor, and/or living alone. Technological innovations in residential settings and development of new service delivery systems, ranging from low to high technologies, are already being applied toward these goals.

Demographic influences

Changes in households

Although it is clear that ever larger numbers and proportions of people are surviving to age 65 and beyond, the *composition* of this population must be considered when assessing the housing needs of the elderly. Among the key factors are age, sex, marital status, and living arrangements.

It is also important to distinguish between *persons* and *households* as demographic variables. The household is the best unit of analysis for discussing housing concerns, since it is the consuming entity and reflects the actual number of dwelling units that are occupied. During the decade of the 1970s, the over-65 population grew by 28 percent, to 25.7 million persons. In contrast, the rate of growth for the total population was only

11 percent; this age-specific growth differential has existed for most of this century. (See ch. 2 for a complete discussion of these trends.) Moreover, during the 1970-80 period the aging of the older population itself was shown by the 33-percent increase in the over-75 population, and the even more marked increase of 61 percent in persons over 85.

This impressive growth in numbers of persons only forms the underlying basis for assessing housing demand by the elderly. The change in numbers of households is more relevant. According to the Annual Housing Survey of the Bureau of the Census, by 1980 there were 16.5 million households maintained by a person over 65. This figure is about one-fifth of all U.S. households, a proportion that has been increasing since world War II. Thus, while the number of older persons doubled between 1950 and 1980, the number of households headed by older persons increased even more—by a factor of 2.5 (from 6.4 million to 16.5 million). Table 23 shows these trends from 1950 to 1982.

Table 23 also shows the variability of decennial percent changes in both total and elderly households, which reflects the wide variation in fertility rates of earlier decades. The low fertility rates of the 1930s lessened the demographic potential for future household formation. The cohort born between 1930 and 1934 exerted relatively little influence on household formation in 1959 (i.e., when these individuals reached age 25 to 29, a major life-cycle stage for household formation). Similarly, when this cohort reaches age 65 to 69

in 1999, they will add a relatively small number and proportion to the total of elderly households.

Therefore, despite the higher decennial rates of growth in elderly households since 1950, the rate of increase has both varied and slowed. In 1950, fewer than 15 percent of U.S. households were headed by elderly persons; this figure rose to 19.6 percent in 1970 and to almost 21 percent in 1982. The earlier increases in elderly households were largely due to the increased likelihood of older persons maintaining independent households and the general trend toward greater survivorship in old age.

The trend in household growth among the elderly is expected to slow during the rest of this century (66). Issues related to quantity or supply of housing for older persons are likely to be less crucial than questions regarding its financing, maintenance, and distribution. Also, new issues regarding the integration of housing policy with public services, especially long-term care, will become increasingly important.

Marital status

Increased emphasis on quality of the living environment and service coordination is predicated on the differences in types of households within the older population. Age-based differences in marital status and living arrangements of the older population have remained quite stable during the last two decades, but sex-based differences have changed somewhat. Table 24 shows the dis-

Table 23.—All Households and Households with an Elderly Head: United States, 1950-82
(numbers in millions)^a

Year	All households		Households with elderly head ^b		
	Total number	Percent change preceding decade	Number	Percent change preceding decade	Percent of total
1950	43.4	—%	6.4	—0/0	14.70/0
1960	52.6	21.2	9.4	46.9	17.9
1970	62.9	19.6	12.3	30.9	19.6
1980	80.7	28.3	16.5	34.1	20.4
1982	83.5	—	17.3	—	20.7

^aFigures are for the noninstitutionalized population.

^bElderly head of household is a person aged 65 or older.

SOURCE: Data derived from U.S. Bureau of the Census, *Current Population Reports*, Series P-m, Nos. 361 and 366, and Series P-25, No. 605; *Current Housing Reports*, Annual Housing Survey, 1960.

Table 24.—Marital Status of the Population Aged 65 and Over, by Age and Sex: United States, 1970 and 1982 (percent distribution)

Year and marital status	Male			Female		
	Age 65+	Age 65-74	Age 75+	Age 65+	Age 65-74	Age 75+
1970: ^a						
Never married	7.5%	8.00/0	6.60/0	7.7%	7.80/o	7.5%
Married, spouse present	69.9	75.2	60.4	33.9	43.5	19.1
Married, spouse absent	3.2	2.8	3.9	1.7	1.6	1.9
Widowed	17.1	11.3	27.7	54.4	44.0	70.3
Divorced	1.3	2.7	1.4	2.3	3.0	1.3
Total ,	100.0	100.0	100.0	100.0	100.0	100.0
1982: ^b						
Never married	4.4	4.9	3.3	5.6	5.3	6.1
Married, spouse present	77.6	81.5	70.2	38.5	49.3	2.4
Married, spouse absent	2.4	2.5	2.3	1.7	2.0	1.2
Widowed	12.4	7.5	21.7	50.4	38.3	68.5
Divorced	3.2	3.6	2.4	3.8	5.1	1.8
Total	100.0	100.0	99.9	100.0	100.0	100.0

^a1970 figures are based on total civilian resident population.^b1982 figures are based on total civilian resident population, excluding persons who are institutionalized.SOURCE: U.S. Bureau of the Census, *Current Population Reports*, Series P-20, Nos. 212 and 3S0.

tribution of marital status within the older population by age and sex in 1970 and 1982.

Most noticeable are the similarities *within* the sexes and the age groups for both years. Although not shown, data for 1960 had similar relative differences. Those differences in marital status that do exist are found *between* the sexes and age groups within either year. For example, although widowhood is perceived as an increasing problem for older women, the proportion widowed actually declined between 1970 and 1982. For all older women, widowhood was 4 percentage points *lower*, at 50.4 percent in 1982. To the extent that widowhood reduces quality of life in older age (2,48,49), the overall status of older women has improved slightly. By a similar difference of 4.5 percent, the proportion of women over 65 who are married with spouse present has increased to 38.5 percent.

In 1982, 12.4 percent of older men were widowed, a proportion one-fourth that of their female counterparts. Over three-fourths of the men were married with spouse present. Even for men over 75, 70 percent were still in that category, compared with only 22 percent of women in that age group. Thus, while recent trends have been toward increases in proportions married for both sexes and all older age groups, the lifestyle "advan-

tage" for older men has actually improved proportionally.

But increasing *numbers* of older women are becoming widowed, especially when compared to men. Between 1970 and 1982 the number of widowed older women rose by 1.7 million (to 8.1 million), even though the proportion in that category was 4 percentage points lower. In contrast, there has been an actual decline in the number of widowed older men—from 1.42 million in 1970 to 1.34 million by 1980. The proportion of all widowed older men was almost 5 percentage points lower by 1982 (90).

Thus, the numbers of widowed older women, while increasing, are doing so at a decreasing rate. There has been no significant change in numbers of older men widowed during the last 12 years. Because life expectancies at birth, at age 65, and even at age 85 are higher for women, their increase in total numbers has been greater, thereby enhancing both the positive and negative changes that have occurred in their marital status.⁷

The growth in the total number of older men was almost entirely comprised of those who were

⁷The total population of older males grew by 2.1 million between 1970 and 1982, while the total female older population gained almost twice that amount (3.9 million) during the same period.

married with spouse present. Almost 8 percent more older men were in this category in 1982 than in 1970, a gain of 2.2 million. In contrast, the additional 2 million women who were married with spouse present represented only one-half of the total increase in older women from 1970 to 1982. The other 1.9 million were either never married, widowed, divorced, or separated.

Various factors account for these differences. As noted above, age- and sex-specific differences in life expectancy continue to have an impact on the sex composition of the older population, although their respective rates of increase have slowed. Moreover, husbands are, on average, 3 to 4 years older than their wives, thereby increasing the "risk" of female widowhood by increasing the average age differential between spouses. Finally, even among married older persons, who have higher life expectancies in general, wives still have notably higher life expectancies than husbands (66).

Living arrangements

These demographic influences and their social impacts are also seen in the living arrangements of the older population. Data for 1970 and 1981, shown in table 25 (comparable 1982 data are not yet available), indicate the changes in—and the

differences between—the living arrangements of older men and women. A notable change since 1970 has been the dwindling proportions of both men and women who live with someone other than a spouse, especially those over 75. The proportion of all older men living with someone else dropped from 14.2 to 9.1 percent. Even more dramatic is the decrease in older women living with someone else, which fell from more than 27 percent in 1970 to less than 20 percent in 1981. The largest decrease was for women over 75: from more than one-third to less than one-fourth. The likelihood that very old women will be living alone has thus increased substantially since 1970.

In 1981, 79 percent of men 65 to 74 were living with a spouse, compared with only 47 percent of women in that age group (who also showed an increase since 1970, but a less dramatic increase than for men). A more profound difference is found for the over-75 population. Almost two-thirds of these men lived with their spouses in 1981, but fewer than one-fifth of all women over 75 did so. The effect of differences in life expectancy between the sexes on the living arrangements of the elderly is, therefore, much greater for the very old population.

Among all older women, almost 39 percent lived alone in 1981, 5 percentage points higher than in 1970. The comparable figure for older men was

**Table 25.—Living Arrangements of the Population Aged 65 and Over, by Age and Sex:
United States, 1970 and 1981 (percent distribution)^a**

Year and living arrangement	Male			Female		
	Age 65+	Age 65-74	Age 75+	Age 65+	Age 65-74	Age 75+
1970:						
In households	95.5%	96.40/0	93.7%	95.0%	97.6%	91.1%
Living alone	14.1	11.3	19.1	33.8	31.6	37.0
Spouse present	69.9	75.2	60.4	33.9	43.5	19.1
With someone else	11.5	9.9	14.2	27.4	22.4	35.0
Not in households	4.5	3.6	6.3	5.0	2.4	8.9
Total	100.0	100.0	100.0	100.0	100.0	100.0
1981:						
In households	96.2	97.9	92.9	93.8	97.8	88.3
Living alone	13.8	11.1	19.0	38.8	34.2	45.1
Spouse present	74.1	79.0	64.8	35.5	47.3	19.3
With someone else	8.3	7.8	9.1	19.4	16.2	23.8
Not in households	3.8	2.1	7.1	6.3	2.2	11.7
Total	100.0	100.0	100.0	100.0	100.0	100.0

^aFigures are for the total civilian resident population.

SOURCE: Siegel, 1983; based on data from U.S. Bureau of the Census, *Current Population Reports*, Series P-20, various nos.

less than 14 percent. More than four times as many women as men over 65 lived alone in 1981 (i.e., more than 6.0 million women v. fewer than 1.5 million men).

Women over 65 also have higher risk of institutionalization than their male counterparts. While the proportion of all older men who are "not in households"² declined from 1970 to 1981 to 3.8 percent, the proportion of older women in that group increased to 6.3 percent. As in the case of widowhood, women face a much greater risk of institutionalization at the oldest ages (75 and over) and the difference has been increasing; their rate of institutionalization increased from 8.9 percent in 1970 to 11.7 percent in 1981. This change is correlated with the growth toward a much higher proportion of very old women who live alone (45 percent in 1981 v. 37 percent in 1970).

Elderly women who are likely to be institutionalized are also likely to be very old, widowed, living alone, and poor. Although these factors contribute to the likelihood of functional dependency and institutionalization (99), an encouraging trend is the recent decline or leveling in the proportion of both men and women aged 65 to 74 who are institutionalized. This change can be partly explained by the recent increases in proportions married and living with their spouses.

The most recent trends in both marital status and living arrangements among elderly men and women thus indicate four general changes:

1. There is an increase in the proportions of older men and women who are married and living with their spouses. These trends are equally evident for both young-old and very-old males, as well as for young-old females. For very-old women, no change in proportion who are married with spouse present has occurred during the last decade.
2. Smaller proportions of older men and women, across all age subgroups, are living with

someone other than their spouses. This trend is particularly evident among very-old women,

3. Institutionalization rates for the younger subgroup of older persons (the young old) have decreased, especially for elderly men. But among the very old, these rates have increased, notably so for women.
4. The proportion of older men who live alone has remained constant, but the proportion of older women living alone has markedly increased.

Most of these trends are expected to persist in the foreseeable future. Between 1980 and 1995 little change is anticipated in the proportions of elderly men and women who are either single or married and living with a spouse. Nor are the proportions of older men who live alone or with someone other than a spouse expected to change significantly (89).

The one clear change expected over the next 15 years is an increase in the proportion of so-called "nonfamily" households among elderly women, i.e., those who live alone or with nonrelative. Corresponding to this shift will be a decline in the proportion of households headed by elderly women living with other relatives (from more than 54 percent in 1981 to 50 percent by 1995). In general, over 55 percent of *all* households maintained by elderly persons in 1995 are expected to consist of persons living alone or with nonrelative) four-fifths of which will be headed by women (89).

The changes are more dramatic for the **over-75 population**. In 1981, two-thirds of all households headed by a person over 75 were single-person or nonfamily households, which are projected to remain at that level through 1995. Women are expected to comprise almost 84 percent of these single and nonfamily households in the over-75 population.

²The category "not in households" corresponds to "in group quarters," which includes the "institutionalized," of whom 96 percent are in nursing homes and the remainder in other types of group quarters.

³Bureau of the Census estimates and projections for "nonfamily households" do not include persons who are institutionalized.

Housing status of the older population

These demographic trends among the elderly indicate the need for new approaches by the Federal Government to the housing needs of the older population. The data reviewed here underscore the dual growth in both family units and single-person elderly households since World War II. This growth in U.S. households maintained by elderly persons was accompanied by increases in the numbers and proportions of older persons in institutions (i.e., nursing homes and personal care homes, including domiciliary and board and care facilities). These institutions and their residents are not included in the count of households, but they currently house approximately 1.4 million elderly residents—more than 2% times their number in the mid- 1960s. The following sections are restricted to the housing situation of the non-institutionalized elderly.⁴

Tenure of elderly households

Among the 16.5 million “elderly households” in 1980, approximately 12.3 million were owner-occupied and only 4.2 million were renter-occupied. This relatively high rate of homeownership among the elderly has been increasing since World War II. By 1970 over two-thirds of all elderly households were owned; by 1979 the proportion had increased to almost 72 percent (tables 26 and 27). Included in the growth of elderly homeownership is an increase in the prevalence of manufactured or mobile housing units. By 1980 over one-fifth of all elderly homeowners resided in this type of housing (56).

The growth in ownership during the 1970s has continued during the 1980s. By 1982 the number of elderly-headed households reached 17.3 million, of which 76 percent (13.2 million) were owner-occupied and 24 percent (4.1 million) were renter-occupied (90). Thus, not only did the number of elderly-headed households increase by 1.1 million units in just 3 years, but the entire net growth was in owner-occupied households. The same period showed a net decrease in elderly

renter-occupied households: from 4.6 million in 1979 to 4.1 million in 1982.

It should be noted that some of this change is due to underestimates from the 1979 Annual Housing Survey (AHS) data. The 1979 AHS sample used baseline data from the 1970 census of population for its estimates of persons and households. Compared with 1979, the survey data estimates for 1982 have been adjusted upward in accord with 1980 census counts for persons and households.⁵ If the average 2 percent adjustment from the 1980 census base is applied to the 1979 survey data, more accurate estimates of change can be developed (see table 26).

By adjusting the 1979 survey data as shown in table 26, the 1979-82 increase in total elderly households was 0.8 million units. Using these adjusted figures, the number of elderly owner-occupied households increased by 1.4 million and the number of renter-occupied households decreased by 0.6 million. (Estimates of the inaccuracy of owner/renter distribution in 1979 are not available).

An ever-growing number and proportion of elderly households are owner-occupied. This is one of the most important facts regarding the housing status and problems of older Americans, because housing tenure (i.e., whether owned or rented) of the elderly tends to be associated with

⁵These most recent 1980 census-based adjustments resulted in a 2-percent increase, on average, in the civilian noninstitutional population, as well as in the number of families and households that are used for estimates from census survey data since 1980.

Table 26.—Elderly Headed Households, by Tenure: United States, 1979 (unadjusted and adjusted) and 1982 (numbers in millions)

Household tenure	1979		1982
	Unadjusted	Adjusted	
Total households	16.2	16.5	17.3
Owner-occupied	11.6	11.8	13.2
Renter-occupied	4.6	4.7	4.1

SOURCE: OTA adjustments based on U.S. Bureau of the Census *Current Population Reports*, Series P-20, Nos. 352 and 381.

⁴See chs. 2 and 7 for details on the types of older persons most likely to be institutionalized and the types of care provided.

Table 27.—Housing Characteristics of Elderly Headed Households: United States, 1979 (numbers in thousands)

Housing characteristics	Owner-occupied		Renter-occupied	
	Number	Percent	Number	Percent
Total households	11,609	71.60/0	4,605	28.40/o
Median household income	\$8,904		\$6,500	
Poverty status	1,741	15.0	1,289	28.0
Median value of house/median gross rent	\$38,900		\$ 168	
Single-person household	4,302	37.1	3,032	65.8
Two-or-more person household	7,307	62.9	1,573	34.2
Unit built before 1940	4,891	42.1	1,950	42.3
Unit lacks some or all plumbing ^a	321	2.8	269	5.8

^aSee table 28 for details

SOURCE: Adapted from 1980 AHS survey data; Struyk and Turner, 1982 (71)

various social and demographic characteristics related to need for assistance. Furthermore) the development, applicability, and accessibility of new technologies in the dwelling unit may involve different approaches for owned v. rented units.

Those elderly who rent their dwelling units are, in general, more likely to need government assistance to achieve decent, safe, and sanitary housing. Differences exist not only between renters and owners, but also between owners who still have a mortgage indebtedness and owners who do not. Table 27 shows some of the general differences between elderly households that are owner- v. renter-occupied.

These 1979 data illustrate the general differences in housing status that persist today among the older population. Almost 72 percent of all elderly headed households in 1979 were owner-occupied;⁶ of these, 63 percent contained two or more persons and 37 percent contained only one person. In contrast, elderly renter-occupied units comprised less than 30 percent of the total, and fully two-thirds of these were occupied by only one person. Renter-occupied households were almost twice as likely as owner-occupied households to have incomes below the poverty level,

Housing deficiencies

Housing adequacy can be similarly differentiated. There is a high association among such characteristics as living alone, poverty status, and various other factors related to housing adequacy.

⁶The estimates in table 26 imply that the proportion of owner-occupied units in 1982 had increased to 76 percent, but this figure may be slightly high.

As noted earlier, elderly persons who live alone are more likely to be women, very old, poor, and inadequately housed; they are also more likely to have inadequate diets, need social supports and services, and be in ill health than are those who live with one or more other persons.

Compounding the difficulties for those who live alone, especially renters, are problems related to the housing units themselves. The data in table 27 show that renters not only have lower median household incomes, they are also twice as likely to be living in a unit that lacks some or all plumbing (although there are a greater **number** of owner-occupied units with inadequate or missing plumbing). Elderly rental units are also more than twice as likely to have two or more dwelling deficiencies than are elderly owned units (103).

Analysis of AHS data shows that among all elderly renters in poverty in 1979, almost one-third were in units with one or more physical deficiencies. Table 28 shows eight major physical deficiency categories that are used by the Department of Housing and Urban Development (HUD) for the AHS. These criteria emphasize the severity of the housing deficiencies that are included in the data cited above. Following the example of other analyses, table 28 lists two groups of deficiencies, "structural" and "maintenance" (71).

Because of the requirements for the two categories under "maintenance deficiencies" (e.g., at least three of four common area problems), it is reasonable to assume that their prevalence is understated in available housing survey data. Many units with some structural deficiencies, including local municipal building code violations and safety hazards, might not be included in the more stringently defined AHS data.

**Table 28.—Deficiency Criteria for Physically inadequate Housing:
United States, 1981**

Type of deficiency	Description of deficiency
Maintenance deficiencies:	
Physical structure. , ,	Has at least three of five structural problems: <ul style="list-style-type: none"> . leaking roof; • open cracks/holes in interior walls or ceilings; • holes in floors; • peeling paint or broken plaster over 1 square foot of an interior wall; • evidence of mice/rats in the last 90 days.
Common areas	, For a multi-unit building has at least three of four: <ul style="list-style-type: none"> • no working light fixtures in common hallway; • loose, broken, or missing stairs; • broken or missing stair rails; • no elevator in buildings of four or more stories.
<i>Structural deficiencies:</i>	
Plumbing	, Lacks or must share some or all plumbing facilities: <ul style="list-style-type: none"> . hot and cold piped water; • flush toilet; • bathtub or shower. Lacks adequate provision for sewage disposal: <ul style="list-style-type: none"> • connection with public sewer; • septic tank; • cesspool; • chemical toilet.
Kitchen	Lacks or must share some or all kitchen facilities: <ul style="list-style-type: none"> • sink with piped water; • a range or cookstove; • a mechanical refrigerator.
Electrical	Lacks electricity. Has at least three electrical deficiencies: <ul style="list-style-type: none"> • one or more rooms without a working wall outlet; . fuses blown or circuit breakers tripped three or more times in the last 90 days; • exposed interior wiring.
Heating.	Has unvented gas- or oil-burning room heaters.

SOURCE: Adapted from Struyk and Turner. 19S2 (71); based on HUD AHS criteria.

In 1979, 11.5 percent of all elderly households that received no Federal housing assistance (i.e., not federally regulated) had at least one physical deficiency. Among renter-occupied elderly households the comparable figure was 17.2 percent; among owner-occupied households without a mortgage, the prevalence was 10.1 percent and only 6.5 percent for owners with mortgages. Note that about 80 percent of all elderly homeowners do not have mortgages. Thus, generalized data on older homeowners are biased toward the characteristics of those without mortgage indebtedness, thereby providing inadequate information about elderly homeowners with mortgages.

Some of the highest incidence of housing deficiencies are found among the elderly in poverty, regardless of tenure status; almost one-third of

poor elderly owners and renters occupy dwellings with at least one deficiency. Housing problems are especially acute for the most vulnerable and isolated elderly. Forty percent of unassisted elderly households in rural farm areas and small towns occupied physically deficient dwelling units in 1979. In contrast, 22 percent of elderly households in urban areas of nonmetropolitan counties and only 12 percent of those in metropolitan counties were in that category.'

Moreover, within each of the three tenure groups (renters, owners without a mortgage, and owners with a mortgage), black households (all

⁷ A metropolitan county is generally defined as any county with at least one central city of 50,000 or more population, as well as any contiguous county that is economically and socially integrated with the metropolitan county that contains the central city.

ages) had the highest incidence of dwelling disrepair. Forty-six percent of all black renter-occupied households were physically deficient in 1979, compared with only 13 percent for all other renter households. The same comparisons exist for mortgaged owner-households (25 percent for black households v. only 4 percent for white) and nonmortgaged owners (36 v. 8 percent, respectively).

Housing deficiencies are thus not only higher among elderly than nonelderly households, they are particularly severe among Americans who are also poor, black, and/or renters. These differences have remained constant since the early 1970s, despite the overall improvement in the housing quality for the elderly vis-a-vis the nonelderly population (71).

Housing expenditures

Relative housing expenditures of the elderly are also higher. A generally accepted index of excess housing expense, adopted by HUD, uses the following criteria:

Excessive housing expense burden occurs when:

- for renters, gross rent (contract rent, plus utilities paid by the tenant) reaches more than 30 percent of gross household income;
- for owner-occupants, direct expenditures for housing (excluding those for major maintenance and improvements) reach more than 40 percent of gross household income.

Among unassisted households in 1979, excess expenditures were incurred by over 18 percent of elderly households and 15 percent of nonelderly households. However, notable differences exist in the distribution of the expenditure burden within the two age groups (table 29). Among nonelderly households, 33 percent of the renters and 8 percent of the owners with mortgages had excess housing expenditures. For elderly households, the corresponding figures were dramatically higher: 55 percent for renters and 25 percent for owners with mortgages. The overall rates by age group are closer, because fewer than 20 percent of all elderly homeowners have a mortgage, compared with more than 60 percent of the nonelderly. Thus, in terms of both absolute and

Table 29.—Incidence of Housing Deficiencies and Excess Expenditures: United States, 1979 (percent distribution)

Age group and tenure status	Physical deficiencies	Excess expenditures
Nonelderly households:		
Total	7.60/o	15.20/o
Renters	13.2	33.4
Owners with mortgage	3.1	7.9
Owners without mortgage	7.9	1.7
In poverty	26.3	70.8
Renters	28.7	86.5
Owners with mortgage	17.1	73.2
Owners without mortgage	26.2	18.2
Elderly households:		
Total	11.5	18.4
Renters	17.2	55.3
Owners with mortgage	6.5	25.3
Owners without mortgage	10.1	4.5
In poverty	29.0	41.0
Renters	31.0	74.9
Owners with mortgage	33.6	74.9
Owners without mortgage	27.4	17.7
Owners with mortgage:		
Black	24.7	44.3
Other	3.8	22.6
Owners without mortgage:		
Black	36.5	7.2
Other	8.3	4.4
Renters:		
Black	46.0	57.8
Other	13.3	55.0

SOURCE: Adapted from Struyk and Turner, 1982 (71); data are only for households not receiving housing assistance.

relative figures, those renters in both age groups who do not receive any housing assistance are far more likely to be burdened with excessive housing costs.

Other differences in housing expenditures exist. Poverty status, combined with lack of housing assistance, is clearly a major reason for excess housing expenditures for both the elderly and the nonelderly. Among all impoverished nonelderly households, 71 percent experienced excess housing costs in 1979, especially the renters (87 percent). Over 73 percent of poor, nonelderly owners with mortgages also had excessive costs (compared with only 18 percent for their nonmortgaged counterparts). The largest differences among the nonelderly exist in the rates for the poor compared with the total population, regardless of household tenure. Only 8 percent of all owners with mortgages and a mere 2 percent of those without mortgages had excess expenditures. But

one-third of all nonelderly renter-occupied households were in this predicament,

Although elderly renters and mortgaged households, on average, have notably higher rates of excess expenditures than nonelderly households, these differences are either reversed or nonexistent when specifically comparing only the poverty level households of the two age groups. Among all impoverished renters, the elderly households were less likely to have excess expenditures than the nonelderly, in part because of smaller dwelling requirements and available Federal subsidies. The expenditure rates for owner-occupied households in poverty were virtually the same between the two age groups (70).

poverty-level households of all ages, occupied by renters or owners with mortgages, have by far the highest levels of housing expense burden. Thus, among those who do not receive housing assistance, the cost of housing weighs most heavily on those with the least resources. Black households, young and old, are the most vulnerable, especially black renters, who had both the highest rates of physical deficiencies (46 percent) and of excess housing expenditures (58 percent).

Thus, for households not receiving housing assistance, the risks of housing inadequacies and excessive costs are distributed differently among subgroups of the population:

- Among all households, renters are most likely to face physical deficiencies in their units.
- Among all renters, those who are black, poor, and/or elderly are more likely to live in physically inadequate housing.
- In contrast to the nonelderly, impoverished elderly owners with mortgages are most likely to be in housing with physical inadequacies, followed by impoverished elderly renter-occupied households.
- Except for owners without mortgages, the poor of all age groups are highly likely to have excess housing expenditures. Over one-half of renter-occupied elderly households were burdened by excess housing costs.

Recent changes in expenditures and deficiencies

While higher proportions of older Americans have consistently had excess housing expenditures, the *relative* change in this burden during the late 1970s was generally lower for the elderly than for the nonelderly (71). From 1974 to 1979, the incidence of excess housing expenditures increased by 38 percent among all nonelderly and 29 percent among all elderly households. The notable exception was for elderly owners with mortgages. Although comprising only one-fifth of all elderly homeowners, those with mortgages had an increase in housing expense burden of 61 percent (for nonelderly mortgagees the increase was 52 percent). Elderly renters had a notably lower increase of 26 percent in the incidence of excess housing expenditures.

The greatest increase in cost burden was for owners without mortgages: 67 percent for the elderly and 89 percent for the nonelderly. Low-income elderly and nonelderly households had distinctly lower net cost increases from 1974 to 1979, except for owners without mortgages. These data indicate that owners without mortgages, in all age groups and regardless of poverty status, experienced the greatest increases in excess housing costs during the late 1970s.

An additional problem occurred for elderly owners with mortgages: a notable increase of 14 percent in households occupying units that were physically deficient (3 percent for the nonelderly). Indeed, for the elderly and nonelderly groups, the only increases in incidence of deficiencies were for owner-occupied households with mortgages. Renters and mortgage-free owner households of all ages had *decreases* of up to 31 percent in physical housing deficiencies.

Clearly, the trend is toward better quality housing for most households, except for poverty-level elderly owner-occupants with mortgages. The 1974-79 increase in the incidence of physical deficiencies in their units was an extremely high 72 percent. These households of older persons are

least likely to either undertake or afford regular maintenance or major repairs. As a result, these dwellings—already likely to be among the oldest housing stock—suffer the consequences of this neglect.

Among elderly households themselves, some further differences exist in housing quality and excess expenditures. Available data from the AHS indicate that owner-occupied households maintained by persons over 70 have higher incidence of physical deficiencies as well as excess expenditures than households headed by those 65 to 69. These differences exist for both mortgaged as well as mortgage-free elderly households. For example, 10 percent of mortgaged owners over 70 v. 4 percent of those 65 to 69 were in physically deficient housing in 1979. For those without mortgages, the proportions were 11 and 9 percent, respectively. Similar age-based differences were found with respect to excess expenditures, particularly among owners with mortgages. Excess costs were experienced by 28 percent of heads of household over 70 and by 23 percent of those 65 to 69 (71).

Among elderly renters, 50 percent of households headed by persons 65 to 69 and 58 percent of households headed by those over 70 had excess housing expenditures. The one exception to these differences is for physical deficiencies, where 19 percent of households headed by younger elderly and 16 percent of those headed by persons over 70 were in physically deficient units.

These survey data suggest some additional generalizations about trends and changes in the housing status of older Americans. Among households not receiving housing assistance, the following major trends occurred from 1974 to 1979:

- Overall, housing quality improved for most elderly as well as nonelderly households, especially poor renters and owners without mortgages.
- Elderly households without mortgages had the highest increase in the incidence of excess housing costs.

- These two trends imply that improvements in the quality of housing among the elderly have been “bought”) in part, at the cost of greater expenditures for both renters and mortgage-free households.
- Among all tenure groups, only elderly owners with mortgages had a net increase in the incidence of physical deficiencies, compounded by a high increase in excess expenditures.
- Among elderly owners, the older the head of the household the greater the degree of both housing deficiencies and excess expenditures.

Thus, elderly households as a whole are less well housed and burdened by greater excess expense than nonelderly households. But such a generalization ignores even more important differences that are relevant to Federal housing policies, especially those concerned with targeting resources where they are most necessary.

One implication is that careful targeting of public policy for housing assistance could go beyond the current emphasis on low-income renters, both elderly and nonelderly. Notably vulnerable are those older homeowners who have both mortgage indebtedness and household incomes below the poverty level. They number up to 280,000 households, one-third of which are in physically deficient units. Moreover, most of these deficient dwelling units were built before 1940, and many need major structural repairs and greatly improved maintenance.

Even though the monthly mortgage amount may be small relative to the average for newer mortgages, it is sufficiently burdensome to this group of poverty-level householders to place them among the three-fourths with excess expenditures. Thus, the clear dilemma for this subgroup of the older population is their high probability of living in deficient and possibly dangerous housing, while being the least likely to afford improvements to the dwelling unit.

Housing and environmental fit of the impaired elderly

Another aspect of the housing situation of elders concerns not only the quality and cost of housing, but its viability as a supportive environment for older persons who have limitations in functional abilities or suffer from chronic impairments.

Congress and the Federal Government have exhibited growing concern since the early 1960s for functionally limited or disabled persons.⁷ However, such concern has primarily been for rehabilitation programs directed toward those who are considered employable (e.g., largely through vocational education and training programs).⁸ Far less concern has been shown for developing support for older disabled persons who are not likely to be in the paid labor force.

Only in the last decade, after considerable pressure from advocacy groups, has Federal legislation been created to broaden the scope of assistance and protection for disabled persons of all ages. An example is the 1978 amendments to the Rehabilitation Act, one section of which emphasized and affirmed the civil rights of all disabled Americans. Two other examples are the 1976 amendments to the Architectural Barriers Act and amendments to the Housing and Community Development Act, both of which attempted to assure equal access to federally owned, operated, and subsidized commercial or residential buildings.

But most programs for the disabled remain targeted toward employment opportunities, income maintenance, and health care (83). Few are specifically oriented toward promoting independent living; those that are have only recently been developed and implemented in a haphazard and slow manner. Notwithstanding such limitations, these recent efforts attempt to promote the max-

imum independence of disabled and elderly persons by providing financial assistance and incentives for self-care and services in the least restrictive environment.

Age, impairment, and the housing environment

The evolution of Federal programs benefiting the disabled and elderly occurred in part because of the growing recognition that physiological aging is often accompanied by decrements in functional abilities (32). Recent legislative objectives pay more attention to the problems of functional impairment among the elderly. But definitive information on the functional problems of the elderly in their housing environment is limited. Descriptive, but sometimes inconclusive or contradictory, research on aging and the environment has been developed on issues such as the neighborhood (25,59), types and quality of housing (44), and institutional living (34,96). Federal housing and aging programs respond only in part to these issues, even though they have become increasingly relevant to older people. As the older population itself continues to age, the challenge grows for assisting older persons to maintain independence in their housing units and the community.

Their demographic and household characteristics can either enhance the ability of older persons to live independently in their own homes or exacerbate problems they encounter in daily activities. For instance, informal supports from family or other household members often substitute for public agencies or technological applications in the home to assist older persons who are frail or unable to independently carry on activities of daily living.

Impairment and disability

The impact of functional limitations is best understood by distinguishing among the concepts

⁷See ch. 7 for a more detailed discussion of functional limitation or disability, chronic conditions, and other factors related to physical and mental impairments among the elderly.

⁸Major legislative initiatives in this regard were the Education of the Handicapped Act and its Amendments, the Rehabilitation Act of 1973 (and especially, its 1978 Amendments), and the Vocational Education Act of 1963.

of “impairment,” “disability,” and “handicap” (83). *Impairments* are physical or mental abnormalities that can be identified or diagnosed. (Chs. 3, 4, and 7 discuss impairments that are particularly evident in the elderly.) An impairment, such as chronic hypertension or severe arthritis, may become a disability if it interferes with the person’s ability to perform one or more functions. In this sense, *disability* relates most closely to functional limitation and can be specified in terms of a person’s problems in performing regular activities of daily living. These activities can range from personal care (basic) tasks, such as bathing and dressing, to instrumental tasks, such as working, shopping, or driving an automobile.¹⁰ One or more disabilities are considered a *handicap* only in terms of the social and environmental context of the disabled individual. When a disability cannot be overcome by technological intervention (e.g., anti-hypertensive drugs or prosthetic devices), formal or informal supports (e.g., family assistance or home chore services), or other types of assistance, it becomes a handicap (100).

But determining when such a handicap is present is often difficult. The same disability can be a handicap in one environment but not in another, as well as for one individual but not for another in the same environment. This dilemma is one reason that accurate measurement of functional limitations must include many domains, including social resources, personal feelings of well-being or control, and environmental fit (36). For example, a person disabled by severe arthritis may be handicapped in a two-story house but not in a single-level one. In addition, the values and attitudes of disabled persons concerning their impaired status and the nature of their living environments will affect their feelings of constraint or degree of handicap.

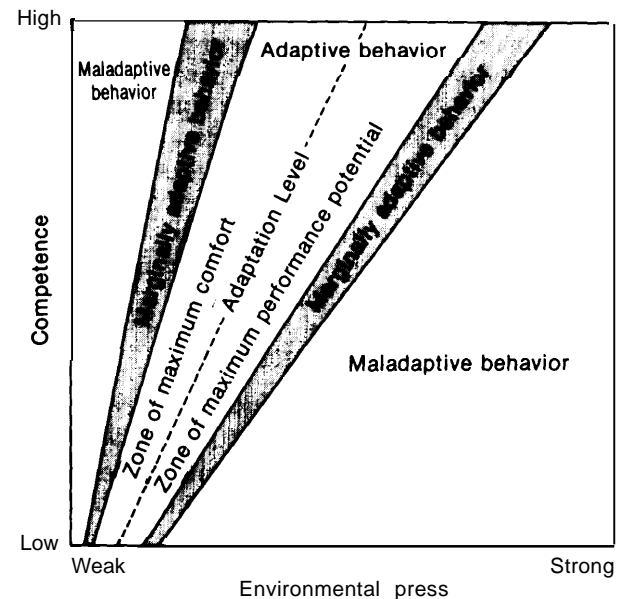
This approach has been well developed in studies on the psychosocial aspects of institutions for older people, particularly nursing homes. Kahana (34) developed a model of “person-environment congruence” to explain how behavior varies in response to the physical, social, and psychologi-

¹⁰Ch. 7 discusses such activities as “basic physical activities” or “home management activities.” These terms are used interchangeably with those in this chapter, such as “activities of daily living” (ADL) or “instrumental activities of daily living” (IADL).

cal milieu of the institutional residential environment. others have developed similar person-environment interaction models that can be more generally applied to other residential situations. In the latter, the range of possible behaviors and responses of the individual is greater, because control and adaptation are more probable. The optimal environment is one that “fits” or is congruent with the needs of the individual.

For older persons with some degree of functional impairment, environmental congruence becomes more difficult to achieve. This problem has been conceptualized as “competence and environmental press” (45). “Competence” represents the individual’s functional capacities in terms of health, perception, cognition, and motor skills. “Environmental press” is a type of environmental stress or demand placed on the individual that activates behavior. The relationship between the individual’s competence and the environment’s press creates a broad spectrum of adaptive behaviors. The more competent the individual, the greater the ability to respond positively to environmental press. A schematic diagram of this interaction is shown in figure 27.

Figure 27.—Schematic Diagram of the Competence and Environmental Press Model: Behavioral Outcomes of Person-Environment Interaction



SOURCE: Adapted from Lawton and Nahemow, 1973 (45).

But it is difficult to determine when environmental press is strong enough to induce functional dependence in the older person (i.e., when he or she moves from the marginal to the maladaptive behavior situation in fig. 27).

Although these interrelations are situation-specific, they suggest broader applications for the older population as a whole. In general, chronically disabled persons are likely to become increasingly dependent as they age; this is a function of lowered physiological reserve and increased prevalence of multiple disabilities (100). This likelihood, combined with the knowledge that the social supports and physical environment of the elderly can be altered, indicates the need for increased efforts to implement home-based supportive strategies.

Prevalence of disability

Assessing or measuring the extent of functional disability among the noninstitutionalized elderly is imprecise, in part because of the nebulous and contextual distinction between disability and handicap. Two important benchmarks of the difference between the institutionalized and noninstitutionalized elderly are their relative rates and degrees of functional disability *and* dependence on others for supportive care (99). As noted in chapter 7, institutionalized elders are highly likely to suffer from at least one mental or physical impairment. An estimated 50 to 60 percent of elderly persons in nursing homes have some degree of organic mental disorder, primarily dementia of the Alzheimer type. Almost 9 out of 10 institutionalized older persons have at least one chronic impairment. From the perspective discussed above, they are disabled persons with inadequate environmental supports in the general community (high environmental press), which necessitates some type of institutional care.

The characteristics of institutionalized older persons contrast with those of community dwelling individuals in terms of person-environment congruence. Although the data are by no means satisfactory, differences in impairment levels between these two groups of elderly persons can be discerned. Two of the most common survey measures of disability are the '(activities of daily

living" (ADL) and the "activity limitation" scales. The ADL measure appears in a number of functional assessment instruments used in community studies, clinical evaluations, and needs assessment surveys for aging program development. The ADL scale measures whether the individual needs help in performing six basic activities: eating, dressing, transferring (to/from bed or chair), bathing, toileting, and maintaining continence. The original ADL scale (37) is often used in conjunction with the measures of "instrumental ADL" that indicate need for assistance in preparing meals, doing housework, going shopping, or handling money.

Risk of nursing home admission is most highly associated with dependency in a number of ADL tasks. An analysis of merged data from the 1977 National Nursing Home Survey (NNHS) and the 1977 National Health Interview Survey (NHIS) indicated that major predictors of nursing home residency included: 1) dependency in many ADLs (especially the basic ones of eating, toileting, bathing and/or dressing); 2) a diagnosed mental disorder; 3) poverty; and 4) lack of a spouse/widowhood.¹¹ These conclusions can be compared with the findings of other studies that functional impairments increase dramatically with age, especially among persons over age 85. (For detailed data, see ch. 7.)

When this information is combined with other data from surveys of older persons who are living in nursing homes, different characteristics emerge in terms of the degree, extent, and types of functional impairments that exist among the young old, old old, and very old subgroups in the older population. Table 30 summarizes one aspect of these differences.

This information adds another perspective to the demands that functional impairments make on elderly persons in the community. The residential environment and the types of support that can be provided to mitigate these impairments take on increasing importance as a person's age

¹¹These merged data allowed comparison between a nationally representative sample of the community dwelling elderly population and a sample of nursing home patients comprised largely of those who were "residents" for more than 3 months (i.e., long-stayers). Most "admissions" to nursing homes are short-stayers whose chronic impairments are different (47,99).

Table 30.—Persons Needing Help in Basic Activities of Daily Living and Persons in Nursing Homes, by Selected Ages: United States, 1977 (percent distribution)

Age group	(A) Percent with basic ADL dependency	(B) Percent in nursing homes	Ratio of "B," t. "A"
65-74	3.50/0	1.4"/0	.40
75-84	11.3	6.4	.56
85+	35.1	2.6	.61

^aThese figures include all persons who reside in either the community or in nursing homes and who are dependent in one or more basic ADL tasks.

SOURCE: Health Care Financing Administration, January 1981 (91).

approaches 85. One inference from these data is that, all things being equal, the risk of institutionalization is not as great for those elderly who are impaired in instrumental ADL (e.g., shopping or housework) as compared with basic ADL tasks. It is for impairments in instrumental ADL that families, community resources, social services, and various technologies are most likely to provide assistance.

This conclusion is corroborated by studies of "burnout" by family caregivers of functionally impaired elderly. A "crisis threshold" appears to exist, at which point the stress on family caregivers becomes too great and institutionalization of the disabled parent or spouse is highly likely (102). When incontinence or the inability to feed oneself becomes severe, or other basic physical or mental abilities are greatly diminished, the supports (informal, formal, or technological) maybe insufficient to permit continued residence in the home.

Other measures of functional disability also show greater prevalence among the elderly. Degree of "limitation in activity," generally disaggregate by "major" and "nonmajor" activities, is a

commonly used measure. There are limitations to the inferences that can be made from these data, because of questions concerning how older retired persons may interpret the word "major" (paid work is the most common referent for "major activity"). Although the incidence of major limitations among the retired elderly may be under-reported, the NHIS data indicate a consistent relationship between increasing age and the prevalence of activity limitations and ADL dependency (table 31).

In 1981, 47 percent of all noninstitutionalized persons over age 65 had some kind of limitation in their daily routine. Of these persons with limitations, 86 percent were limited in a major activity, i.e., paid work or housekeeping (93). Thus, 4 of every 10 elderly people have some degree of major restriction in their environment, and this ratio increases dramatically for the very old (63 percent; table 31). The chronic conditions primarily responsible for these activity limitations are arthritis/rheumatism, heart conditions, visual impairments, and hypertension; these are followed in prevalence by diabetes and hip or leg impairments.

The ability to cope with such restrictions often depends on one or more of the following: 1) the availability of persons who can provide assistance, 2) technologies and devices that assist the individual to perform tasks, and 3) environmental design that reduces the impacts of these restrictions. According to 1979 data, the need by older persons for assistance in "any one" of seven basic ADLs (i.e., an unduplicated count) increases dramatically with age. For all older persons in the community, 9 percent need some type of assistance to perform any one of the basic activities. Within the older population the proportion grows dramatically from 5 percent of those 65 to 74 to

Table 31.—Noninstitutionalized Persons With Activity Limitation Due to Chronic Conditions, and Persons Dependent in Selected Basic Activities of Daily Living (ADLs), by Age: United States, 1977 (percent)

	All ages	45-64	65-74	75-84	85+
With activity limitation	13.5%	23.0°/0	38.6°10	48.4%	63.2%
Dependent in at least one ADL°	0.7	0.7	2.2	5.8	15.0
Dependent in four ADLs.	0.1	0.1	0.4	0.6	3.7

^aThe activities of daily living (ADL) in these data include bathing, dressing, eating, and toileting.

SOURCE: Health Care Financing Administration, January 1981 (91).

35 percent for persons over 85¹² (94). Slightly higher proportions are found for persons needing assistance in instrumental, or home management, activities (10.5 percent of all older persons in the community, ranging from 6 percent of the 65 to 74 group to 40 percent of those over 85).

Therefore, based on an estimated elderly *non-institutionalized* population of 26 million persons in 1983 and the NCHS 1979 survey data noted above, more than 2.3 million older Americans living in the community need assistance in performing a basic ADL such as bathing, dressing, or walking. More than 2.7 million need assistance with instrumental activities such as shopping, household chores, etc. Although the data do not account for the relationship between the two groups of tasks, most persons needing assistance with basic activities are probably included in the number requiring home management help. As discussed later in this chapter, such assistance can be from persons who provide informal supports, formal services, technologies in the home and community, or some combination of these.

The restrictions faced by most older persons do not, in general, confine them to their homes. Problems with mobility and the need for assistance increase both by age and by distance from the home. In 1977, just over 8 percent of all older persons in the community needed help in getting around outside their neighborhood. Within their neighborhoods, 6 percent required mobility assistance and less than 3 percent needed help getting around within the dwelling unit. Table 32 indicates the positive relationship of distance from home and increasing age with need for mobility assistance among the elderly.

Two other mobility limitations should be considered regarding older persons living at home. Although table 32 shows that their prevalence increases outside the home, mobility restrictions in using stairs around or within the home are especially problematical for the elderly. They are a major contributor to falls among the elderly, who are highly vulnerable to them; the elderly account

Table 32.—Mobility Limitations Due to Chronic Conditions Among Noninstitutionalized Persons, by Age: United States, 1977 (percent)

Mobility limitation	65+	65-74	75-84	85+
Outside the neighborhood.	.8.4	4.6	12.0	30.6
Within the neighborhood . . .	6.0	3.1	8.3	24.4
Within the house.	2.6	1.4	3.5	10.8

SOURCE: NCHS, unpublished data, 1963.

for more than two-thirds of all deaths from falls in the United States. Special tabulations from the 1978 AHS indicate that almost 10 percent of those older persons sampled had specific mobility limitations in “going up or down stairs,” compared with only 4 percent who had problems “getting around inside the dwelling” (54). The same AHS tabulations showed that 3 percent of the elderly were limited in their ability to “use equipment in the dwelling” (e.g., kitchen, bathroom, etc.). Overall, 13 percent of the AHS respondent sample had at least one limitation in “personal mobility” (54).

These data from various sources lead to the following generalizations about the functional abilities of older noninstitutionalized persons and the implications regarding their living environments:

- Available indices of functional impairment indicate that dependence in *basic* ADLs (especially eating and toileting) is much greater for institutionalized older persons, as is mental confusion. Such dependency increases greatly for persons over 85.
- Risk of institutionalization is related to person-environment congruence; the older the person is, the more likely that this congruence will not exist for the community-dwelling elderly (in independent households). This risk is exacerbated for those who are poor and who live alone.
- Dependence in *instrumental* ADLs, such as shopping and housekeeping, is more likely to be mitigated by different types of support, such as those from family and friends, formal services, and assistive devices.
- Past survey data suggest that among the 26 million older persons living in the community in 1983:
 - 2.3 million needed some type of assistance in performing one or more basic ADLs (personal care);

¹²These figures increase for rates based on assistance needed in “one or more” ADLs (i.e., a duplicated count): 7 per 100 age 65 to 74, 16 per 100 age 75 to 84, and 44 per 100 age 85 and over. These rates cannot be translated into unduplicated population figures.

- 2.7 million needed some type of assistance in performing instrumental (home management) activities;
- persons dependent in basic ADLs are highly likely to also be dependent in instrumental ADLs, but not necessarily vice-versa;
- 10.5 million had some type of limitation in a major activity, and an additional 1.7 million were limited in a minor activity;
- mobility limitations are less prevalent than other types of functional impairments, except for using stairs (affects 2.6 million) and traveling outside one's neighborhood (affects 2.1 million); and
- approximately 780,000 had a notable limitation in using household appliances and equipment.
- Except for the measure of general activity limitation, the prevalence of functional impairments (basic and instrumental ADLs, mobility, etc.) is highly correlated with increasing age. In general, prevalence of such impairments:
 - doubles from age 65-74 to 75-84; and
 - triples from age 75-84 to 85 and over.
- These rates of major functional impairment by age are 1½ to 2 times higher for black older men and women.

The various problems with everyday tasks that the elderly face can have a profound influence on their sense of worth and well-being, and their ability to maintain an independent lifestyle. The prevalence data presented above are based on measures that include only those older persons who *need* assistance, *experience* limitations in certain activities, and have problems with mobility. It is not possible, given existing data and resources, to estimate the additional number of older persons who may have marginal levels of functional impairment or who do not readily admit such problems, incapacities, or needs.

The aforementioned prevalence data are likely to reflect the minimum degree of functional impairment among older persons who are not institutionalized. The importance of promoting housing environments that ameliorate these problems is, therefore, that much greater. But these

supportive environments require very different levels of commitment and assistance from both formal and informal sources, as well as physical characteristics that can promote person-environment congruence.

As noted earlier in this chapter, most informal supports for noninstitutionalized elders come from available family members, especially spouses and daughters (31,64). It is also clear that such support is far more readily available for instrumental tasks than for personal care requirements, since the former can often be provided by friends and neighbors as well as family members (1,85). Most of the research consistently finds that approximately four-fifths of all supportive care is provided by these informal caregivers and the remainder by formal service agencies (64; also, see ch. 7).

Some research also indicates that a hierarchy exists in the composition of the informal support network. When available, spouses are the primary and usually the sole providers of assistance, followed by a daughter or other close family member. Friends and neighbors tend to be primary caregivers only when family support is unavailable, and if the recipient is a long-time neighborhood resident (69). Finally, for the great majority of community-dwelling elderly who do not have major functional impairments in personal care activities, little or no help is provided. When help is needed, it is most likely to be for light housework, heavy chores, and shopping (4).

It remains unclear to what extent the application of technology to the physical housing environment and technological applications within the house mitigate the need for supportive assistance. As the remainder of this chapter indicates, the existing type, design, and nature of housing occupied by most older persons does not provide the kind of supportive environment that many older persons need in order to carry on daily activities with a minimum of dependence on caregivers. In general, Federal housing policies and programs have not been developed to encourage, much less provide, such supportive environments for older persons,

Evolution of Federal housing policy for the elderly

The role of the Federal Government in assisting older Americans with their housing requirements has its roots in the evolution of Federal involvement in housing policy for all age groups. As in many other areas of public concern and government assistance, housing policies specifically for the elderly are a relatively recent development in the history of U.S. housing assistance programs.

General housing policy and Federal programs

The involvement of the Federal Government in housing ranges from direct provision of dwelling units for specified populations to indirect incentives and benefits provided through the Internal Revenue Code (e.g., Federal income tax deduction for mortgage interest paid by homeowners and tax incentives for housing developers). This chapter briefly reviews only the most relevant components of Federal housing policies and programs involving the elderly.

The Federal Government first became involved in housing during World War I, when 5,000 units were constructed primarily to provide housing for defense workers. The project was costly and inefficient, and ended with the Armistice. During the post-Depression period, Federal involvement in housing was resurrected. As part of the National Industrial Recovery Act, the Federal Government subsidized the construction of low-rent housing to assist the unemployed, the poor, and the housing industry itself (24).

The genesis of public housing was the Housing Act of 1937 that, as noted at the beginning of this chapter, established the general goal of Federal involvement to assist local units of government in providing "safe and decent" housing for low-income families. The Federal Government was no longer involved in direct management and construction of public housing units. Moreover, the Act of 1937 primarily served the "submerged middle class" (12) by providing temporary housing during the economic recovery. During the period following World War II, public housing increasingly became the domain of the long-term poor,

as the new middle class benefited from FHA mortgage insurance programs and the GI Bill.

The changed nature of Federal public housing goals was reflected in the National Housing Act of 1949, which developed the first major statement for a national housing policy oriented toward urban renewal, slum clearance, assistance to the poor, and subsidies to the housing construction industry. Indeed, the construction of public housing was designed to be efficient, high-density, standardized, and adequate for an average family with children. No distinctions were made for other possible groups of tenants or types of units. Not until the mid-1950s was Federal legislation for assisted housing specifically targeted toward the elderly.

Federal housing programs for older Americans

During the 1950s, Federal legislation began to reflect attention to the growth of the older population and some of the special problems faced by older Americans. One arena for this awareness was public housing. The Housing Act of 1956 was the first to make explicit reference to the elderly as a special subgroup. The Act included four relevant provisions that:

- expanded the definition of "family" to include single persons over 65 in the eligibility criteria;
- allowed local public housing authorities to favor elderly persons ("families") in tenant selection;
- allowed certain private institutions to assist with mortgage payments for persons over 60 who had low-incomes;¹³ and
- eased FHA mortgage insurance qualification criteria for those over 60, recognizing them as a special group.

This expansion of public housing legislation for older persons coincided with growing national

¹³This provision of the 1956 Housing Act was the first step toward future legislation that encouraged private sponsorship arrangements for development of low- and moderate-income housing for the elderly.

awareness of and response to the elderly as a special group in need. Passage of the Medicare program in 1965, after more than a decade of effort, was one example of such attention to older Americans (30,50). During this period, however, the elderly themselves were not a homogeneous political force with a strong group consciousness (3). Yet they were often generally characterized as the “deserving poor” and, in a sense, used as a moral force for enacting social programs that might not otherwise have been politically feasible if proposed for the population as a whole.

Housing legislation for the elderly may have been especially favorable in this regard, since public housing projects for the nonelderly were often viewed as undesirable or threatening to the neighborhoods adjoining them. During the 1960s, HUD attempted to institutionalize the decentralization of public housing by applying funding pressure on suburban governments to accept low-income projects. Similar to the introduction of Medicare as a political compromise for a universal national health insurance program (30), public housing exclusively for the elderly “appears to have been a convenient compromise for many [congressional] committees” (52).

Local public housing authorities were far more likely to propose and win community approval for projects oriented toward the elderly, especially in neighborhoods that required changes in zoning ordinances. Cost considerations for both public housing authorities and private sponsors also made elderly housing projects attractive because they were exempt from the density and net area coverage limits of nonelderly housing. For many communities, low- and moderate-income housing for the elderly was an acceptable and even welcome alternative to other types of public housing (42).

The following synopsis indicates the extent of Federal involvement in housing programs that benefit the elderly. Because communities have generally favored HUD-subsidized housing for the elderly over other types of public housing, most new construction of subsidized housing in the last decade has been for projects intended solely for elderly occupants. But the two HUD programs specifically for the elderly (Section 202 and Sec-

tion 231) have, overall, provided a relatively small number of dwelling units. Table 33 summarizes the various housing programs and their impact on older persons. There are no Farmers Home Administration (FmHA) assistance programs solely targeted for older persons, except for one part of the Section 504 program (as described below).

It is important to note that Federal housing legislation has a very complex history. Most of the programs have been revised, changed, canceled, resurrected, or altered from their original legislation by congressional, regulatory, or executive action. The brief review presented here only highlights their characteristics.

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT PROGRAMS

Low-Rent Public Housing.—As noted earlier, public housing began with the Housing Act of 1937, and is the oldest housing program of the Federal Government. It has provided the greatest number of units for the elderly, who currently occupy about 45 percent of all low-rent public housing units. Local housing authorities, assisted by HUD funding, create and manage this housing for families and older persons who meet local income eligibility standards. Tenants’ rents cannot exceed 30 percent of their adjusted incomes¹⁴ (33).

This program is still active, but has recently experienced difficulty in finding acceptable sites for new units and in subsidizing the operating costs of existing units (44,81). It provided over 500,000 low-rent units for the elderly in 1982.

Section 8 Rental Subsidies.—Another major form of Federal housing subsidy is the Section 8 program created by the Housing and Community Development Act of 1974. It guarantees payment of a per-unit subsidy to owners of rental property occupied by qualified tenants (i.e., those with incomes below 80 percent of the median in the metropolitan area). The subsidy pays the difference between 30 percent of the tenant’s income and the HUD-established “fair market rent.” The

¹⁴ “Adjusted income” is based on a variety of factors such as size and type of household, age of the head-of-household, number of dependents, cash benefits, and other factors.

Table 33.—Summary of Housing Units for the Elderly Currently Subsidized by Selected Federal Housing Programs: United States, 1981-82

	Estimated number		Elderly units as percent of total
	Of occupied units	Of units occupied by the elderly	
HUD programs: ^a			
Public housing.....	1,121,972	500,885	44.60/o
Section 8.....	1,211,211	630,111 ^b	52.0
Section 202.....	58,773	58,773	100.0
Section 236.....	386,754	71,800	19.0
Section 231.....	44,088	44,088	100.0
Section 221(d)(3)			
Rent supplement.....	81,252	6,195	8.0
BMIR.....	113,960	259	0.2
Section 232.....	147,336 ^c	147,336	100.0
Total.....	3,165,346	1,459,447	46.1
FmHA programs:^d			
Section 502.....	1,119,091	26,363	2.4
Section 504:			
Loans.....	51,296	NA	NA
Grants.....	39,269	39,269	100.0
Section 515.....	116,102	39,475	34.0
Total.....	1,325,758	NA	NA

^aFigures for HUD programs represent units currently insured as of June 1982, whether the program is active or inactive. These are not cumulative figures over the history of each HUD program.

^bFigures do not include Section 202 households receiving Section 8 subsidies.

^cThe "units" for this program are nursing home beds.

^dFigures for FmHA programs are cumulative as of September 1981.

SOURCE: Adapted from Congressional Research Service, 1982 (79); and Cohen 1983(16)

owner-developer may be either a profit-making or nonprofit sponsor. Where Section 8 subsidies are provided for elderly housing, the units are generally developed through the Section 202 program. These rental units may be newly constructed, existing, or substantially rehabilitated.

The Section 8 rental subsidy program remains active) with more than 50 percent of the beneficiaries (over 630,000) being elderly households. Currently, there are problems with cost inflation of rental subsidies for new construction units (versus those for existing units) and undesirable long-term commitments of Federal subsidy funding. These problems are being considered in proposed legislative amendments.

Section 202 (and Section 236) Elderly Rental Housing Mortgage and Rent Subsidies.—The Section 202 program was first authorized by the Housing Act of 1959, phased out in 1969, and renewed by the Housing and Community Development Act of 1974. The original program provided 50-year direct Federal loans at 3 percent interest to nonprofit sponsors of multi-unit hous-

ing built specifically for low- and moderate-income elderly (age 62 and over) and handicapped persons. Over 45,000 units were developed before the program was temporarily replaced by Section 236 under the Housing Act of 1968.

The latter program (Section 236) required mortgages at market rates, with no occupancy restrictions as to type of household. Federal interest reimbursement to the developer reduced the real interest rate; the amount of the subsidy was based on the number of low-income tenants served. Section 8 replaced Section 236 in 1974, although a few new starts have occurred since then from commitments made prior to that time. Because Section 236 only subsidizes mortgages, rapidly increasing operating costs and relatively small increases in rental income have troubled these projects. Currently, about 72,000 units under Section 236 assistance (19 percent of the total) are occupied by elderly households.

The reauthorization of Section 202 in 1974 changed the financing period to 40 years, with interest rates that approximate the market rate.

Subsequent amendments limit the interest rate to 9.25 percent for nonprofit sponsors of these projects. The 1974 reauthorization was important because it:

- promoted greater heterogeneity of tenants by encouraging a mix of low- and moderate-income households;
- encouraged a more equitable distribution by increasing the number of units constructed in nonmetropolitan areas or away from central city core neighborhoods;
- coordinated with the Section 8 rental subsidies to promote affordable housing for low-income elderly households;
- called attention to the special design features that are important in units for the elderly; and
- broadened the definition of “family,” specifically for the elderly, to include two or more older persons living together (who need not be related) or one older person plus an “essential person” who provides assistance.

These changes and new emphases made the combined Section 202/Section 8 program more attractive to State and local public housing authorities, as well as to nonprofit sponsors (44). One remaining shortcoming in the program is the continued under-representation of small communities in nonmetropolitan areas in development of Section 202 or other HUD-subsidized housing. FmHA housing programs have not filled this void, in part because the sponsor qualification criteria of both HUD and FmHA¹⁵ limit the likelihood that small town and rural nonprofit entities can be eligible sponsors for such projects (29).

In mid-1982 the Section 202 program was providing almost 59,000 units for the elderly and handicapped. Recently, the program has become more responsive in providing the supportive environments needed by many older persons, including cooperative demonstration programs that incorporate congregate social services into the housing. However, recent legislative proposals

(e.g., ‘the Housing and Urban-Rural Recovery Act of 1983) have been designed to phase out Section 202 over the next few years, with restructuring of financing and other program changes anticipated for 1985. Nonprofit sponsorship, flexibility in unit-cost limitations to account for design features that accommodate the elderly and handicapped, and increased attention to shared housing are features of these legislative changes (81).

Section 231 Rental Housing Mortgage Insurance.—The Housing Act of 1959 also authorized the Section 231 mortgage insurance program. Federal insurance was provided for market-rate loans obtained by either nonprofit or profit-making sponsors of rental housing (new construction or substantial rehabilitation) for people in middle- and higher-income ranges; at least 50 percent had to be occupied by the elderly or handicapped. These units tended to be “upscale” in design and quality. Special services and facilities for the elderly were encouraged.

A number of these projects were developed as “retirement centers” or “life care communities” that provided many supportive services, including medical and nursing care when necessary. These projects usually required large “entrance fees” for those advantages, reinforcing the selective bias toward the more wealthy. The entrance fee charge was prohibited in 1963 as a sign of Federal commitment to those most in need of assistance. The program has suffered a very high failure rate through default or foreclosures. Although still “active,” Section 231 is not emphasized as an important component of Federal housing policy. In mid-1982 there were over 44,000 units occupied by the elderly; 9 out of 10 are in urban areas.

Section 221(d)(3) Below Market Interest Rate Subsidies and Rent Supplements.—The Section 221(d)(3) program was created by the Housing Act of 1954 and was the precursor of the Section 236 program. It has had minimal impact in providing housing assistance to the elderly. The program initially provided mortgage insurance for multi-family rental housing for low- and moderate-income tenants, but in 1961 it added interest rate subsidies for developers. The subsidies created a “Below Market Interest Rate” (BMIR)

¹⁵The criteria tend to favor projects with so or more units, supportive services, secure financing, and prior experience with such housing development—all of which are less likely for nonmetropolitan area sponsors.

¹⁶These figures are for “currently” insured or subsidized units. They are not “cumulative” numbers since the program was initiated.

by paying the difference between 3 percent and the market interest rate financing obtained by the housing sponsor. No income limits were used to restrict occupancy, but not until 1964 did the program permit elderly persons living alone to be eligible tenants. Also, rent supplements were made available to low-income households.

The program has been phased out since enactment of Section 236 and, subsequently, the Section 8 rental subsidy program. Currently, a few hundred elderly units are assisted under the BMIR program, and 6,000 units receiving rent supplements are occupied by the elderly (8 percent of the total).

Section 232 Nursing Home Mortgage Insurance.—The Section 232 program subsidizes the construction of nursing home and intermediate care facilities by providing mortgage insurance for their construction or renovation. Facilities must be built for at least 20 patients who require skilled nursing or intermediate care. Eligible sponsors are profit-making or nonprofit corporations that meet all State licensing and regulatory requirements for nursing home development. By 1981 the Section 232 program had provided mortgage insurance for more than 1,300 facilities that contained over 147,000 beds for elderly patients.

FARMERS HOME ADMINISTRATION PROGRAMS

In contrast to most HUD programs, which tend to favor metropolitan areas and medium-sized cities, programs of the FmHA are limited to communities of no more than 20,000 persons that are located within nonmetropolitan counties and communities of less than 10,000 persons within metropolitan counties.

Section 502 Rural Low-Interest Homeownership Loans.—The Section 502 program provides direct low-interest Federal loans to low- and moderate-income families for the construction, purchase or rehabilitation of housing. The housing must conform to FmHA standards, and the loan recipients must be unable to obtain financing at affordable rates in their area. For very low-income households, an "interest credit" subsidy can be obtained that reduces the interest on the loan to as low as 1 percent, but the recipient must clearly be able to afford the property's mortgage,

taxes, maintenance, and other payments to be eligible for this special subsidy.

Since its inception in 1965, the Section 502 program has provided over 1.3 million loans. It currently assists over 1.1 million households, only 2.4 percent of which are elderly. Given the higher prevalence of physical deficiencies in elderly occupied housing in rural areas (29), it is unclear why greater numbers have not been recipients of the rehabilitation loans. One suggested explanation is that the incomes of most rural elderly households are too low to qualify for these loans, even the lowest cost ones with the interest credit advantage.

Section 504 Rural Home Repair Loans.—This program was developed to help very low-income households who cannot qualify under Section 502. Section 504 provides home repair loans at 1 percent interest and a payback period of up to 20 years. The maximum loan amount is \$5,000 and must be used for repairs that improve the safety and sanitation of the dwelling. Allowable repairs include those for the foundation, roof, heating, water, and septic systems. Another common use of the loans is to repair or add kitchen or toilet facilities.

Direct grants for similar repair needs can be specifically provided to persons aged 62 and over whose incomes are so low that they cannot repay the costs of the repairs. Although the FmHA does not maintain age-specific data across its programs, Section 504 grants for elderly rural homeowners (80 percent of all rural elderly own their own homes) totaling \$24 million were obligated in 1981 (81). Also, it has been estimated that 60 percent of the FmHA home repair loans are made to elderly rural homeowners (78).

Section 515 Rural Rental Housing Loans.—Although originally legislated to serve the elderly exclusively, since 1966 the Section 515 program has included families of all ages. It provides direct loans for the construction, purchase, or extensive rehabilitation of multi-unit rural rental housing for low- or moderate-income families, including the elderly and the handicapped. Sponsors can include individuals, public agencies, profit-making corporations, and nonprofit organ-

izations. Interest rates vary depending on type of sponsor and proportion of units devoted to low-income tenants (nonprofit sponsors can receive loans at rates as low as 1 percent). Moreover, a certain number of units in the project can qualify for rental assistance supplements from either the HUD Section 8 program or a similar one through the FmHA.

The FmHA estimates that approximately 34 percent of all Section 515 assisted units are occupied by elderly households (16); about one-half of those units receive rental supplement assistance.

OTHER HUD HOUSING ASSISTANCE PROGRAMS

Section 312 Housing Rehabilitation Loans.—Authorized by the Housing Act of 1964, the Section 312 program provides direct Federal loans to property owners for housing rehabilitation that will bring the dwelling into compliance with area building codes. Thus, the rehabilitation work is often extensive in nature (in 1977 the average loan was over \$7500). The loans carry a 3 percent interest rate and a maximum payback period of 20 years. Applicants must be unable to obtain private financing on comparable terms in their local area. Priority is given to applicants with low or moderate income. However, the program is available only to homeowners in areas where other Federal programs such as urban renewal or Community Development Block Grants (CDBG) are under way. Because of these requirements, the program tends to be available only in certain areas of larger cities. Delays in the approval process, contractor payments, and other administrative problems have plagued the program (44).

Another problem, similar to that with the Section 502 program, is the bias against low-income elderly applicants who may be considered high risks for paying back the loan. This concern for a client's ability to repay the loan has grown because the program's most recent reauthorizations by Congress require that all new loans be funded from repayments and recoveries from existing loans. Precise data on the proportion of older persons receiving these loans are not available. Selected studies indicate that consistently less than one-sixth of all loans are given to the elderly, a

figure that is notably below their proportion of all homeowners. A sampling of program reports in 1975-76 showed that less than 20 percent of the loans were made to either the elderly or the handicapped (70). In 1977, about 16 percent of the loans went to homeowners aged 65 and over (44). Figures for more recent years suggest even lower proportions of loans went to elderly households. In 1980 and 1981, about 16 percent of the loans were made to homeowners aged 62 and over (86).

Community Development Block Grants (CDBG).—The CDBG program provides considerable resources to communities for various development efforts aimed at improving housing and neighborhoods in urban areas. Authorized by the Housing and Community Development Act of 1974, the program awards HUD block grants through State allocation procedures to the governments of selected major cities and urban counties. Two-thirds of CDBG funds are targeted for these "entitlement" cities in metropolitan counties; less than one-third of the funds are earmarked for cities with less than 50,000 population. As with other HUD programs, exact data are unavailable on the proportion of CDBG funds that benefit the elderly. Some project funds have helped to build or renovate senior centers (less than 1 percent of all CDBG funds in 1981), and considerably more funding has been used to create centers for the handicapped, to renovate public housing, remove architectural barriers, and undertake other activities that indirectly benefit older persons (86).

Housing rehabilitation efforts comprise a major portion of CDBG funding; 38 percent of the total in 1981. One study of project reports indicated that up to one-third of all rehabilitation grants were made to elderly households (70). Along with other possible sources of assistance for housing rehabilitation, such as Section 312 and Section 502, the CDBG program can provide considerable resources for older homeowners who meet program eligibility criteria. Questions remain, however, about the accessibility of these rehabilitation programs to older homeowners who are marginally poor or who are in commu -

nities that may not be targeted under CDBG entitlements or FmHA criteria.

Impact of Federal housing programs on the elderly

The evolution of Federal housing legislation since the Housing Act of 1937 indicates the public commitment to provide adequate housing for those least able to afford it. The concept of Federal housing assistance has expanded, from the first programs that directly provided public housing to the current broad array of programs that provide indirect assistance to different population subgroups in many types of housing. The programs reviewed above exemplify this variety of assistance and indicate the efforts that have been made to recognize and serve the special housing needs of older Americans.

The following generalizations can be made concerning the approach and responsiveness of these programs to helping older persons meet their housing needs:

- Most Federal housing programs subsidize the construction or substantial rehabilitation of multi-unit *rental* housing for income-eligible families through interest rate subsidies, rental cost reimbursement, and mortgage insurance for housing sponsors (not for housing consumers).
- Efforts to respond to the housing needs of older Americans have involved both construction and rehabilitation approaches, but their impact has been disappointing in comparison to the demand for such assistance. For example, the Section 202 and public housing programs have never met suggested annual production goals (e.g., the 1971 White House Conference on Aging set a target of 120,000 new units of elderly housing per year). Annual production has never come close to that rate, as seen in table 33.
- Relative to the long history of Federal housing policy, only recently has greater attention been given to preserving the housing stock through rehabilitation loan programs for owners of single-family housing as well as multi-unit dwellings.
- Federal housing program changes during the 1960s promoted the inclusion of elderly persons, both single and married. Yet restrictive eligibility criteria continued to disproportionately exclude certain subgroups of the elderly, particularly those who were unrelated but sharing a dwelling unit and those who were located outside of central city and metropolitan areas.
- Until recently, Federal housing programs paid little attention to special design and service needs of older persons. In some instances, the design of federally subsidized housing, particularly high-rise public housing, *increased* the likelihood that older persons would become isolated, injure themselves, or be victims of crime (53).
- These tenant eligibility and architectural design problems were either lessened or eliminated in the Section 202 reauthorization in 1974 and subsequent amendments. However, the number of subsidized units that are available to the elderly remains woefully inadequate, and prospects for the future do not indicate a major increase in production. In most communities, waiting lists of prospective elderly tenants generally range from 1½ to 3 times the number of units that are available and often require a 5- to 10-year delay.
- Insufficient attention has been paid to the aging of the people who comprised the first cohorts of tenants in public housing and Section 202 projects. As the survivors among these early tenant cohorts become increasingly dependent for assistance in daily activities, their existing housing environments may be unable to provide the types of support required for independent living.
- Problems in the lack of supportive environments for the very old go well beyond federally assisted housing projects. They involve the even greater numbers of impaired or marginally independent elderly who are in unassisted independent housing in the community.

Because many of these housing problems for the elderly are generic, increased attention is being paid to policies that can encourage supportive environments for all older persons, whether in

federally assisted or independent housing. The following sections discuss the variety of elderly housing options that exist in the community and

suggest ways in which **technologies** can be **applied** to assist older **persons** in their housing environment.

The macro-environment of housing for the elderly

Although the various Federal housing programs provide subsidized rental units for about 1.5 million older persons (see table 33), approximately 90 percent of the elderly live independently in the community (sometimes called “nonprogrammatic” housing). As shown in table 26, over three-fourths of these elderly households are owner-occupied. This is due in part to other Federal and State policies (e.g., income and property tax laws) that have encouraged private sector housing development and private ownership of housing. Attitudinal surveys indicate that older persons who are in good health, and who can afford to do so, strongly prefer to maintain independent households (63,65). The prevalence of elderly, owner-occupied households—over one-fifth of all owned housing units—attests to this preference. Federal policy that either subsidizes elderly housing construction programs or supports older homeowners can directly influence the ability of older persons to remain independent and active in their communities—the macro-environment.

Characteristics of elderly single family housing

The elderly have the highest rate of homeownership among all age groups. As in the general population, single-family housing predominates among these older households. Nine out of ten owner-occupied elderly units are single-family residences. But in contrast to the general population, elderly homeowners are notably more likely to live in housing that was built before 1940; 40 percent of elderly owners, but only 22 percent of nonelderly owners, live in units that predate 1940. Older houses tend to be less energy efficient, require more repairs, and have larger average room size than newer housing. It is thus more likely that older homeowners have greater housing repair and maintenance burdens than do

younger homeowners (70). The very old are especially at risk of such burden, because they are most likely to be on fixed incomes and to be in the oldest housing. Many elderly homeowners avoid major home repairs. Undermaintenance is one of the most commonly used methods of “dis-saving” (i.e., false economizing) by elderly homeowners, especially those living in houses that predate 1940. Avoiding maintenance or needed repairs is one way that older homeowners on limited incomes are able to continue paying for more essential goods and services.

These older homeowners are increasingly likely to be located in the suburbs of metropolitan areas, ^{*7} especially those adjacent to central cities where the single-family housing stock is the oldest. As with the elderly who entered subsidized rental housing during the 1960s, homeowners in suburbia are also “aging in place.” As suburban housing ages, increasing numbers and proportions of pre-elderly suburban homeowners are reaching age 65 and over. The rate of increase from 1970 to 1976 for all suburban households headed by an older person was more than three times the rate for central cities—31 percent in suburbia versus 10 percent in central cities. For older **homeowners**, the increase in suburbia was 36 percent, compared with 17 percent in central cities (27). These trends have continued into the 1980s and are not expected to change so long as ownership **and** maintenance of single-family houses remain economically practical for the majority of older Americans.

While suburban elderly homeowners and renters tend to have higher median incomes than their central city counterparts, there is little difference between them in the prevalence of chronic con-

^{17A} suburb is commonly defined to include all areas within a Standard Metropolitan Area that are outside the limits of a central city (as defined by the U.S. Bureau of the Census).

ditions, sensory impairments, and mobility limitations. Lack of an automobile or an inability to drive presents a greater burden for the elderly in suburbia, where the impact of minimal public transportation is made worse by the distances required to travel for essential services, shopping, and other routine tasks or needs. Maintaining the independence of the suburban elderly involves greater attention to their mobility problems outside the home environment. Recent estimates indicate that almost 1 million older persons (excluding about 750,000 who are homebound or bedridden) have mobility limitations in the macro-environment beyond their immediate neighborhoods. Home health care and supportive service programs, combined with paratransit services for necessary trips outside the home, respond to the growing needs for assistance by elderly homeowners living in single-family suburban housing. The preponderance of single-person elderly households, even in suburbia, compounds this need for supportive environments and services.

EXCESS HOUSING SPACE

The prevalence of single-family housing among the elderly also raises questions regarding excess housing space. While "overcrowding" is generally defined as greater than one person per room, no definitive criteria exist that objectively measure the existence of excess space or "overhousing." Overhousing is a relative concept that cannot simply be measured in terms of numbers of persons and rooms. For the elderly, lifecourse changes in family composition and living arrangements, and the consequent increase in proportions of single- and two-person households, are the primary reasons for excess space in existent housing. A suggested measure of overhousing incorporates an economic variable that compares one's existing housing space to the amount of space one would be willing to "purchase" at current rental costs (79). **The comparison is made with** renter households in similar income groups to assess the marginal utility of purchasing such excess space. One set of estimates based on this type of comparison using AHS data found that, in 1979, 2.3 million single-person, elderly owned households occupied five or more rooms. But based on comparisons with renter households of similar income levels, less than 500,000 single-person elderly households

"should" have occupied that many rooms. According to these criteria, about 4 million elderly households (about one-fourth of the total) were considered overhoused in 1979. The proportions overhoused increased with increasing income levels and were notably more prevalent in **metropolitan than** in nonmetropolitan areas (79).

These data suggest the existence of a prospective pool of elderly homeowners who might consider alternatives to their current housing situation, as discussed further below. The feasibility of such options for the elderly will be based, in part, on the economic constraints (or advantages) of their existing housing, the cultural values that support single-family housing choices, and the marginal costs or rewards of changing one's existing housing.

SHARED HOUSING

Shared housing, or homesharing, includes a variety of living arrangements in which two or more unrelated individuals share a large apartment or house, as well as meals and some chores. Common living areas, including kitchen facilities, are shared; residents have private bedrooms and usually share semiprivate bathrooms. For many elderly homeowners, it is an ideal way to retain ownership, remain in familiar surroundings, reduce isolation, gain assistance with daily activities, and supplement a limited income. For homesharers, it provides less expensive housing in established neighborhoods, daily companionship, and an opportunity to help others.

Homesharing has occurred for decades on an informal and naturally occurring basis. Estimates from national survey data indicate that in 1980, 2.5 percent of all elderly households contained one or more nonrelative (76). The U.S. Bureau of the Census estimates that up to 270,000 older persons are currently in some type of shared housing arrangement. With the recent growth in numbers of owner-occupied, single-person households among the elderly, greater attention is being given to promoting shared housing arrangements through matching programs sponsored by various social service agencies.

Notably successful programs include Operation Match in the Washington, DC, metropolitan area,

Project Match in San Jose, CA, and Homesharing for Seniors in Philadelphia and Seattle. These programs are operated by local public agencies, federally subsidized nonprofit organizations, and local voluntary or religious groups. During the past 10 years, more than 200 shared housing units specifically for low-income elderly persons have been developed by community-based or religious groups. There are also an estimated 200 programs in the United States that currently provide individual homesharing matching services for the elderly.¹⁸

The projects range from agency-sponsored group homes that usually have 4 to 10 residents who share a large home to individualized arrangements that match an older homeowner with a boarder. In sponsored housing owned by an agency or private investor, the resident usually pays monthly rent in return for a private bedroom, private or semiprivate bath, meals, and laundry service. Limited transportation services may also be provided. Individual homesharing arrangements may be far less structured than agency-based group homes, depending on the needs and desires of the individuals involved. For example, the boarder can pay rent, provide services to the homeowner in lieu of rent, or some combination of the two.

For most types of homesharing, formal agreements are generally written to assure that no misunderstandings occur regarding the rights and responsibilities of the parties involved. The nature of homesharing makes the matching process an important and labor-intensive endeavor (17). Proper screening of applicants, both homeowners and sharers, requires intensive interviews and background checks to ascertain the expectations, personality traits, health, and economic status of the persons who apply. Homeowners might have unrealistic expectations about services to be provided by the boarder, while potential renters might not understand their responsibilities and constraints. A major goal of the matching process is to minimize possible conflicts and maximize a successful and enduring relationship between

the homesharers. Mutually positive interdependence is a key factor in successful homesharing arrangements.

Properly developed and sustained, shared housing promotes greater economic and personal security for older homeowners, while providing affordable rental housing for other older persons or for younger individuals seeking temporary housing. Although far fewer in number, intergenerational arrangements are often successful because of the types of assistance that younger persons can provide in the home (e.g., chores, routine maintenance) and the stability and support that older persons can provide to young people. Whether intergenerational or intragenerational, homesharing arrangements may be particularly suitable at those times in the lifecourse when major changes have occurred. For older persons, widowhood, divorce, or other types of social support losses can be ameliorated by homesharing. For young persons just entering college or the job market, shared housing arrangements can provide an affordable and congenial living environment. Similar advantages are gained by older persons in intragenerational shared housing.

Another advantage of shared housing is its efficient use of existing housing stock, with no major construction or renovation costs (80). Communities can benefit from the expansion of affordable rental housing that homesharing provides, while preserving the single-family nature of the neighborhood. In essence, homesharing generally replaces family members who are no longer part of the household. Thus, it need not be viewed as a major cause of increased population density in residential neighborhoods or of significant increases in the need for public facilities and resources. An added communal benefit is the continued economic and functional independence of the community's older homeowners and the likelihood that homesharing will enhance the informal support system for those older persons who need assistance in the activities of daily living. When carefully developed and administered to maximize the likelihood of long-term matches, to assure the safety of all persons involved, and to retain the existing nature of the neighborhood, shared housing can benefit the old, the young, and the community at large.

¹⁸Detailed information on such groups is available from the Shared Housing Resource Center in Philadelphia, PA.

HOUSING CONVERSIONS AND ACCESSORY APARTMENTS

A variety of housing options that do not involve a shared household are included in the category of housing conversions, all of which promote the use of existing housing stock. Most common among them are:

- extensive rehabilitation of abandoned residential dwellings to bring them in compliance with local zoning and safety codes;
- conversion of nonresidential buildings into multi-unit residential dwellings for the elderly; and
- conversion of existing single-family houses into dwellings with two or more units, or accessory apartments.

Each type of housing conversion has different benefits and constraints. Housing construction and design technologies can play a central role in the economic feasibility of such conversions, but local customs and zoning ordinances can be just as important to the possibility of their development (82). The attitudes of older persons for whom these conversions are intended also play a significant role in their potential success.

Rehabilitation of Abandoned Dwellings.--The feasibility of converting abandoned residential dwellings depends largely on the ability of community-based organizations to promote such projects. They are generally feasible only where government subsidies are available to organizational sponsors or where the real estate market is sufficiently strong for private investors to be involved. Government subsidies for this type of conversion usually take the form of low sale prices for abandoned buildings whose ownership has been relinquished to the municipality through tax delinquencies. Public auctions of abandoned buildings in need of rehabilitation generally yield low sale prices in return for commitments by the purchasers to renovate the building and bring it up to fire and safety codes. Conversion projects with organizational sponsors (e.g., religious or secular nonprofit groups) are facilitated by coordination with local public housing agencies or quasi-public housing development programs to assure that the conversions satisfy all local zoning and housing code requirements.



Photo credit: Suzanne Larronde

Rehabilitation of abandoned residential dwellings often requires government/private sector cooperation.

The economic feasibility of conversions for homesharing purposes is based on various factors. They include:

- tax credits or other incentives by local municipalities;
- applicability of modular construction technologies for such dwellings;
- lowered construction and rehabilitation costs in units with existing infrastructure (e.g., structural, electrical, and plumbing systems);
- cost savings from use of shared kitchen, living, and bath facilities;
- adequate rental income from multiple tenants; and
- assistance of local agencies in finding and selecting tenants.

While these inducements are strong, relatively few rehabilitation conversions of abandoned dwellings have been undertaken specifically for developing shared housing. The tenuous nature of the process and the limited availability of suitable locations or structures constrict the potential market for such conversions. Rather, abandoned dwellings have been more suitably converted by younger persons seeking affordable and conveniently located housing in central city areas. With relatively low purchase prices, abandoned residential dwellings offer home ownership opportunities to younger families who are able to invest time and labor to rehabilitate the unit.

For most homesharing purposes, such rehabilitation involves a degree of speculation that is generally not warranted unless a number of the incentives listed above are available. The key factors are economic feasibility and the existence of an organizational sponsor to promote and undertake this type of extensive rehabilitation for homesharing purposes.

Conversion of Nonresidential Buildings.-- Since the early 1970s, when real estate values in both central city and suburban areas began to appreciate rapidly, older nonresidential buildings became feasible for conversion to multi-unit, high-density residential use. The rapid growth of single- and two-person households—both young and old—during the last two decades created a large pool of prospective owners and renters who prefer living in proximity to urban amenities, job locations, service agencies, and public transportation (59).

The changing economic and commercial basis of many central cities left older manufacturing and commercial buildings empty or underutilized. In some urban core areas, conversion of nonresidential buildings coincided with government-subsidized urban renewal programs that were aimed at revitalizing a central city's daytime commercial and nighttime entertainment and residential functions. For similar reasons as those noted in the previous section, the conversions were economically attractive to commercial developers. The 1970s were a period of rapid growth in "theme areas" of cities that catered to the young professional market of consumers for housing, retail facilities, and entertainment. The first era of conversions included the development of specialized shopping and entertainment facilities, followed by the growth in multi-unit residential dwellings. The latter were sometimes created from buildings that were warehouse or manufacturing facilities. Their solid structural, plumbing, electrical, heating, and other components generally provided a sound infrastructure that would have cost much more if newly constructed. Retrofitting of existing infrastructure components is one economic advantage of conversions. In general, older nonresidential buildings require weatherization, insulation, and updating of the heating and cooling systems. Their size and open

spaces often permit considerable flexibility in designing interior units for residential purposes. Units for single- or two-person households, which might comfortably occupy from 800 to 1,200 square feet of space, are especially feasible in such projects.

The earliest multi-unit conversions were marketed for young urban households. However, as the proportions of older people in central city areas grew and their housing desires leaned toward smaller, more convenient, and affordable settings, the use of central urban buildings for rental or condominium units designed especially for elderly households also became feasible. Studies during the 1970s confirmed the potential of central city nonresidential buildings for providing new housing that was safe, responded to the needs of older persons for proximity to shopping, services, and public transportation, and provided a homogeneous residential environment with some degree of informal supports (8,60). Without government subsidies, the majority of these multi-unit rental buildings must cater to the elderly households that have moderate incomes. Elderly renters, who are most likely to have low incomes, are unlikely to afford such housing unless Section 8 or other subsidies are available to reduce out-of-pocket monthly costs. Even where Section 231 mortgage insurance was available to subsidize this type of conversion, the units developed were largely for "retirement centers" that rarely included low-income residents,

Thus, conversions of nonresidential buildings into units for the elderly are usually undertaken by profit-making developers and are generally targeted toward middle or higher income consumers. Compared to suburban areas, where the higher income elderly are concentrated, the central urban location of most nonresidential buildings limits the potential elderly market that is available. The indigenous central city elderly population is most likely to be poor and in need of rental housing. Thus, these conversions would be more feasible for poor elderly residents if government housing subsidies were available to promote the development of lower cost rental units.

Single-Family Housing Conversions and Accessory Apartments.--One of the more com -

mon types of housing conversion is the creation of an additional apartment within an existing single-family house. These are generally called “accessory apartments,”¹⁹ to emphasize their characteristics as separate living quarters created within existing houses. The Census Bureau estimates that there are 2.5 million accessory apartments in the United States (18)77), although some sources would yield higher estimates (68). One reason for the lack of accurate data is the often circumspect nature of these additions, many of which violate local housing ordinances and zoning laws that only permit single-family housing in a neighborhood. Door-to-door surveys in single-family neighborhoods would undoubtedly yield greater numbers of such secondary units than are known to local authorities.

Conversion to an accessory apartment generally involves building a self-contained independent unit, usually with a separate entrance, that includes a separate kitchen, bathroom, bedroom, and living room. Although most conversions of this type are undertaken covertly because of existing restrictions in local housing codes, they are feasible because the exterior appearance of the single-family house remains unchanged. The accessory unit is often added in a basement or one part of a large home, with a private entrance from the side or rear of the house. Thus, most homes with these added units retain their single-family appearance.

While accessory apartments may be developed to provide rental income for an owner-occupant, the units are often developed to provide independent living quarters for a parent or other relative (hence, the term “mother-in-law apartment”). Recently, these units have gained attention as a potential source of added income for elderly homeowners. Given the degree of overhousing that exists among elderly homeowners,²⁰ especially single-person households in suburban areas, conversions to accessory units are an alternative to homesharing. This alternative may be more at-

tractive to elderly homeowners who wish to retain their privacy and independence, and similarly attractive to potential renters (elderly or nonelderly) who would prefer separate living quarters at an affordable rent.

Today, conversions to create accessory apartments are more technically feasible than ever before, because modular room and wall units are available at somewhat lower cost and higher quality than many units built on site. Because the basic infrastructure for plumbing, electricity, heating and cooling, exterior walls, and interior walls already exists, the cost of conversion to an accessory apartment is generally much lower than the cost of constructing totally new units. Modular or factory-constructed bathrooms that include cabinets, bathtubs, shower stalls, toilets, and fixtures in one unit are available. Individual modular bathtub, shower, and cabinet units have also become increasingly popular. Onsite construction labor costs are usually lower for installing factory prebuilt units. Modular kitchens are also now available, some of which have integrated wall and cabinet systems that include all major appliances (23). **The range of options** in factory-assembled units permits flexibility as well as cost savings.

In the few communities where they have been studied, accessory apartments have generally been well-received by residents of all ages and socioeconomic levels (28). In one analysis of three suburban communities where accessory apartments have been permitted under local zoning law changes, about 12 percent of the single-family homes in each area had accessory apartments. Residents in communities with affluent homeowners were particularly pleased that persons were living in many of the houses while the owners were away for extended and frequent trips. It was also shown that homes with accessory apartments were unlikely to have a negative effect on neighborhood housing values, but absentee ownership of any type of single-family housing, either with or without an accessory apartment, was more likely to create lowered values (28). Thus, in some communities that legally authorize accessory apartments, the permits require that the houses be owner-occupied. Some communities also require that either the homeowner or the tenant(s) be age 65 or over. Such restrictions are

¹⁹Accessory apartments are also sometimes called “secondary units” or “mother-in-law apartments.”

²⁰Census data indicate that almost two-thirds of all elderly homeowners are part of one- or two-person households in homes with at least five rooms. This group numbers about 7.3 million elderly households.

intended to maintain the stability of the communities in which accessory apartments are permitted. Moreover, in the three communities studied, the average length of tenancy in the accessory apartments was approximately 5 years, a relatively long period for rental households.

These results may not always be duplicated, depending on the type of community and housing stock in which the conversions occur, as well as the general demand for rental units. In one demonstration program recently undertaken to convert two-story houses to duplex units, the results were mixed. The older dwellings in which the secondary units were constructed required more extensive rehabilitation and time than is the case for converting a basement into an apartment. Because it was a government-assisted demonstration program, there were numerous required approvals, resulting in delays in obtaining financial assistance. The older homeowners incurred debts and inconvenience for periods longer than anticipated. Because of their costs, these conversions required more years of rental payments to yield a net profit on the conversion costs incurred by the elderly owners. The results, while promising, would have been far better had the long delays not occurred (9).

Thus, while not foolproof, accessory apartments provide a likely source of additional housing for persons needing rental quarters, while also adding to the income of single-family homeowners. In most communities, secondary units neither change the appearance of the neighborhood nor detract from housing values. Because of these attributes, the potential for accessory apartment development is strong, but not until some of the myths surrounding this type of housing are corrected and public attitudes are changed. When properly developed and integrated within existing single-family communities, accessory apartments can directly benefit elderly households, both owners and renters alike. Continued growth in the number and proportion of accessory apartments in most areas of the United States, especially older suburbs, can be expected during the next two or three decades as demand for rental housing grows.

DETACHED ACCESSORY HOUSING: THE ELDER COTTAGE

Another housing option for the elderly is a relatively small, free-standing cottage that is factory-built and erected on a preformed foundation. These cottages are generally known as “granny flats,” a term borrowed from Australia where the original units were developed. They are also known as “echo” (elder cottage housing opportunity) housing or, more simply, elder cottages. Granny flats are designed for installation in the side or backyards of existing single-family homes. Their potential use has grown as new construction technologies have improved their appearance, quality, and energy efficiency.

These small homes range in size from 500 to 800 square feet and contain one or two bedrooms. They are either totally built and assembled at the factory or built in modular sections that are easily assembled on the site. In the United States, one Pennsylvania company offers three basic cottage models that range in price from \$15,000 to more than \$22,000, plus foundation, installation, transportation, and utility connection costs (14). Factory production techniques using template guides for cutting and assembling all sections have improved the quality of the total unit. Exterior wall boards with high insulation value are usually combined with vinyl or aluminum siding, inner wall batt insulation, weatherstripping, magnetic door seals, and double-pane windows (and storm windows) to promote energy efficiency and comfort levels that are suitable for elderly persons. The modular construction of these homes includes all major kitchen appliances, cabinets, and bathroom fixtures. The modular units, or even an entire assembled house can be transported to the site, where the house is erected on a prebuilt foundation with all water and utility lines installed. The housing unit can be installed, and all required plumbing and utility connections completed, in 1 or 2 days.

Because elder cottages are intended for the elderly, door openings are designed for wheelchair accessibility; entry ramps in place of stairs are optional provisions. Although usually defined as “temporary” housing for zoning purposes (simi-



Photo credit: The Coastal Colony Corp., 1983

The "elder cottage" is one example of a free-standing granny flat.

lar to mobile homes), elder cottages are constructed to last permanently. But they are designed to be easily disassembled, removed from the foundation, and moved to another site. Such technological and design specifications enhance their feasibility as temporary structures while maximizing the quality of the environment for those older persons who may have functional impairments and mobility restrictions.

Other technological advances can make factory-built elder cottages even more responsive to the *individual* needs and desires of older residents. New applications of existing computer design technologies could lead to the availability of consumer-designed housing that takes advantage of the economies of factory-built housing. An example is the "Burroughs house" in Sweden, which can be designed in sections as small as 4 feet by 8 feet. First, a normal blueprint is drawn to the specifications of the consumer. Then, an electronic pencil or eye traces over the blueprint, which

is electronically sent to the factory where the modular units are constructed (35). In this way, elder cottages that respond to the desires of the residents could be individually designed (e.g., from a range of options for room size and layout), built at a centralized factory, and shipped to dispersed geographic areas. Given the limited size of the cottages, adapting the interior living space to meet the consumer's desires would give these units broader appeal and greater marketability.

As with accessory apartments, however, the greatest challenge to the development of elder cottages is resistance of local communities to this type of secondary housing in traditionally single-family neighborhoods. Local zoning restrictions are the key barriers to the spread of such housing. It appears, however, that some of the resistance is dissipating. In recent years, some States (e.g., California, Pennsylvania, Arizona, and New York) have enacted different types of legislation that "authorize" local communities to permit con-

struction of granny flats in single-family neighborhoods or in rural areas. As the esthetic and physical qualities of elder cottages improve, local communities may be more likely to permit their construction. In communities where they are currently allowed, the rental of elder cottages is often restricted to family members. In this way communities protect themselves from development of accessory units that might become commercial rental property. Because granny flats are temporary structures, local codes often require that they be disassembled when the unit is no longer occupied by the family member(s). While such requirements preserve the limited scope of granny flats and increase their acceptability in single-family neighborhoods, the cost of removal (about \$8,000) adds to their total cost and, therefore, reduces their feasibility.

According to existent information, communities that allow granny flats in single-family neighborhoods have had very few requests for permits (95). Where they have been built, no negative effects in housing values, esthetics, crowding, or other consequences have been discerned. Elder cottages, when carefully constructed to assure their quality and designed with roofing, siding, and other materials that correspond to the neighborhood's existing housing, can provide an economical, safe, independent, convenient, and supportive housing environment for older persons.

But the current market for granny flats appears to be very limited and selective, especially when contrasted with the millions of accessory units that have been constructed in the United States during the past decade. Even in Australia, where granny flats were first developed, less than 600 have been erected. In the United States, investment in construction of granny flats, despite recent advances in modular technologies, requires significant capital outlay, uses valuable open space, and usually includes restrictions on permanence of the structure. Conversion to accessory apartments requires fewer risks, lower costs, and less inconvenience. Thus, the relative **advantages of granny flats** over accessory units are difficult to ascertain, except in special circumstances where a detached unit is particularly desirable.

CONGREGATE AND ASSISTED HOUSING

Congregate or assisted housing describes various types of housing complexes that can be defined and described as service-integrated group living or assisted independent living. The term encompasses multi-unit complexes that provide their residents with some degree of supportive services, the most common of which is one or more meals served daily in a central area (7). The fundamental feature is a supportive environment that can be flexible in meeting the diverse needs of the elderly, especially as they reach the oldest ages when chronic conditions and impairments are more likely to limit their independence (see chs. 3 and 7). The ideal congregate housing setting follows the earlier-discussed model of environmental congruence. Flexibility is another ideal aspect, particularly the ability of the environment to meet the needs of the residents as they age. Congregate housing is thus considered to best approximate an accommodating environment whose supportive elements can be called on as the needs of individual residents increase over time and they require greater assistance in activities of daily living (6).

publicly sponsored Congregate Housing. —Until recently, the Federal Government has not been a strong proponent of supportive housing for the elderly. The traditional approach of HUD has been to concentrate only on construction of housing complexes through its subsidy programs for developers and renters—the so-called ‘(bricks and mortar’ orientation. But as demands grew for more supportive environments for those older persons who were in subsidized housing complexes (e.g., public housing, Section 202), HUD eventually entered into cooperative agreements with other Federal agencies to integrate social and long-term care services with physical housing programs. These funding initiatives have supported demonstration programs that provide a range of congregate services in Section 202/8 assisted housing for the elderly. The total effort is, however, small in comparison to the number of potential residents who could benefit from congregate programs and the range of services that could be provided to maximize the supportive nature of the housing environment.

As the proportions of old-old and very-old residents in elderly housing complexes grow (i.e., aging in place), numerous services in addition to daily congregate meals are usually required. Among these are medical and health care services, housekeeping and chore services, meals on wheels, increased security, transportation outside the neighborhood, education programs, and recreational activities. Ironically, reductions in Federal subsidies for congregate housing programs are occurring at a time when the older population is itself aging and the need for these supportive services is growing. The surviving members of the first cohorts of elderly residents in Section 202 housing are now the very old. Yet, the environments that 20 years earlier may have provided adequate safety and support for the young old have certainly become less "friendly" to these very-old residents. Indeed, even the best efforts of the Federal Government in the current period of economic restraints would not meet the broad range of needs for this type of supportive housing environment.

In order to accommodate this growing demand for assisted living, new design features that promote the supportive nature of the physical environment can be combined with the provision of more services to help older residents remain in their current living environment. But there is no single Federal agency that is responsible for initiating, developing, and implementing this type of supportive housing environment for the elderly. Because of both the limited Federal involvement and the growing awareness of the elderly housing market, private developments aimed at middle-income elderly households have become increasingly prevalent, especially as current government subsidies for congregate housing are being reduced or eliminated. But most of these new units are beyond the economic reach of poor and near-poor elderly households who must still rely on government assistance to find adequate housing. A notable gap remains between the poor and nonpoor elderly in access to affordable living environments that provide a high degree of supportive services.

Privately Developed Residential Complexes for the Elderly.—The service-rich characteristic of congregate housing is exemplified by

new, privately sponsored housing complexes that are popularly referred to as "life care communities" continuing care retirement communities," or "residential care complexes." These communities typically consist of apartments in a congregate setting and/or single-family cottages in a cluster arrangement that most often include recreational facilities, a nursing home, acute care clinic, and a range of supportive services for their residents. A broad array of congregate services are offered, including daily meals, laundry services, homemaker chore services, and transportation assistance. Life care communities are established to encourage the continued independent lifestyle of the residents while also assuring them of long-term care (including nursing) and supportive services as the need arises.

Residential care complexes require an "entry" or "endowment" fee when the resident enters the facility, plus a monthly "service" fee that covers the unit's rental costs and those ancillary services that are included at no extra charge. The units are not purchased by the resident, but the entry fee "guarantees" lifetime occupancy. Most facilities also guarantee that the resident will receive all types of long-term care, including nursing care, without additional cost. Some facilities, especially those with lower entry fees, assess additional charges for services such as nursing home care. Although facilities may include acute care clinics, the charges for these services or for hospitalization (i.e., outside the facility) are borne by the resident in addition to the entry and monthly fees. In 1983, entry fees ranged from \$20,000 to more than \$100,000 for an individual (the cost for couples is usually 15 to 20 percent higher), while monthly fees averaged \$600 for a single person and \$850 for a couple (87). The large range in costs, especially for entry fees, reflects differences in the location, amenities, scope of services (particularly nursing home coverage), and sponsorship of residential care communities.

Current estimates indicate that about 100,000 elderly Americans are living in approximately 300 life care communities, most of which are operated by nonprofit organizations affiliated with religious denominations. This fact has made life care communities an attractive option because of the expected security and trustworthiness asso-

ciated with these types of sponsoring organizations. The older person is investing a large initial fee on the good faith that the sponsor will provide the housing and all services during the resident's lifetime. However, some life care communities have already broken their contracts and some sponsors have gone into bankruptcy. In some of these instances, clearly fraudulent practices led to losses of lifetime savings for many residents. In others, the sponsors had underestimated the actuarial characteristics of prospective residents, resulting in higher than anticipated costs for supportive and nursing services for chronically ill residents. These costs were in excess of the income generated from the entry fee pool and the monthly fees (87).

One result of these failures has been the reevaluation of the actuarial assumptions for both morbidity and mortality that are used in determining fees. In many of the first-developed communities, new residents are paying substantially higher entry fees than earlier residents, and annual increases in monthly fees at some facilities have greatly surpassed the rate of increase in the general cost of living. As noted above, in some continuing care retirement communities, nursing home care is not included in the life care contract. Rather, the contract specifies extra fees that would be charged when the resident requires skilled nursing care or placement in the community's nursing home.

These adjustments in the costs and contract obligations of life care communities emphasize their newness and the need for the industry to more carefully develop such lifetime plans, which involve critically important actuarial projections (101). The elderly consumer is also warned to scrutinize the features of the life care contract, as well as the reputation and past performance of the sponsor. While the great majority of life care communities are successful and continue to provide the expected services, caution on the part of the consumer remains important in an industry that has few, if any, Federal or State regulatory safeguards.

OTHER TYPES OF CONGREGATE HOUSING

Two other types of congregate housing are particularly relevant to the elderly: nursing homes

and board and care facilities. These types of housing are distinguished by the relative dependence of their elderly residents, as compared to those in life care communities or elderly housing complexes. The elderly in nursing homes and board and care facilities do not maintain individual dwelling units and have little responsibility for daily chores. This type of housing is often called "domiciliary," in reference to the types of personal care and protective oversight that are provided to the residents. Because the residents and characteristics of these two housing categories were discussed in chapter 7, they are only briefly reviewed here.

Nursing Homes.—In the United States, there are more than 23,000 facilities that provide nursing and related types of 24-hour care. Over 5,000 of these homes provide skilled nursing care. Currently, about 5 percent of the older population, or more than 1.3 million persons over 65, are residents of nursing homes at any one time. But about 20 percent of all older persons will live in a nursing home sometime in their lives. The elderly comprise more than 85 percent of all nursing home residents, whose average age is 83. Almost half of the total cost of nursing home care is paid by Medicaid, with additional small percentages paid by Medicare and by private insurance (about 2 to 3 percent by each).

The health, functional, and social characteristics of nursing home residents differ markedly from those of the community dwelling older population. Nursing home residents are far more likely to be mentally impaired, to suffer from urinary incontinence, and to be dependent in eating, bathing, dressing, and other basic activities of daily living (99). They are also more likely to be widowed or single; hence, less likely to have informal support from a spouse or other family members.

Differences *among* nursing home residents are also discernible in terms of their length of residency. Recent studies indicate that between one-third and one-half of all nursing home residents stay for less than 3 months (i.e., "short-stayers"); about one-half of these persons died in the nursing home or shortly after discharge, usually to a hospital (47). Those who stay for 4 or more months are highly likely to be "long-stayers" who

remain in the nursing home for well over a year. These individuals are far more likely than short-stayers to be mentally impaired and dependent in one or more basic activities of daily living (see ch. 7 for detailed characteristics of nursing home residents and the types of care they need).

The ability of nursing homes to respond to the many needs of their elderly residents depends in large part on the number of staff available, their training, qualifications, and experience in geriatric care, and their attitudes about elderly residents who typically have a high degree of dependency (91). These are crucial elements for quality of care in nursing homes. Another important factor is the living environment and its ability to provide psychological as well as physical support to the residents. Design and technological features that enhance safety, security, privacy, convenience, and attractiveness can promote the health and well-being of nursing home residents. Many of these features, some of which can also be incorporated in independent community-based housing, are described in the following section on micro-environments for the elderly.

Because nursing home residents typically have decrements in the senses, special attention to barrier-free environmental design is highly important. Declines in vision and hearing acuity of the average elderly nursing home resident require various adjustments in the physical environment that ameliorate the problems associated with these sense losses. For vision, degeneration of the cornea can lead to severe loss of acuity, particularly in color discrimination. Peripheral field loss from retinal disease or glaucoma leads to "tunnel vision," resulting in poor orientation but generally good color acuity. Cataract and corneal disease result in varying degrees of clouding and distortion, with poor vision in bright light or areas with high surface glare. The effects of these conditions can be reduced by specific environmental adaptations. Heightened color intensity and contrast (e.g., accent stripping) would assist those who have peripheral loss, but such color cueing is generally not useful for persons with corneal degeneration. However, the use of oversized letters on nonglare surfaces and luminous, well-diffused indirect lighting will most likely benefit all persons suffering from vision loss. For those who

are blind, raised letters, braille, and auditory cues are the obvious environmental requirements to reduce the degree of dependence of the nursing home resident.

Hearing loss, which affects about 30 percent of all older persons and a significantly higher proportion of the very old (who are most likely to be institutionalized), can also range from mild to severe.²¹ Presbycusis (progressive loss of hearing due to various causes), tinnitus (persistent ringing in the ear), and other forms of hearing loss can restrict the ability of nursing home residents to carry on daily activities. For these persons, visual and tactile cues are helpful in managing environmental demands. Flashing lights to indicate when telephones ring or emergency alarms sound can provide an added measure of safety. Amplification devices for televisions, radios, and telephones increase their usefulness for the hearing impaired. Hearing aids that amplify sound at the outer ear are of limited value for many forms of hearing loss in the elderly, which are often due to neural degeneration in the inner ear that cannot be overcome by amplification in the outer ear. For persons with tinnitus, the characteristic ringing sounds may only be exacerbated by hearing aids. Background noise that interferes with conversational hearing can be reduced with appropriately placed carpeting, drapes, and other sound-absorbing materials.

Thus, more attention should be paid to visual and tactile environmental cues for the hearing impaired, especially those in nursing homes. Meanwhile, recent improvements in the technology of cochlear implants that restore very limited sound receptivity in the inner ear for deaf persons hint at possible future applications for large numbers of elderly people with hearing impairments caused by neural loss. These implants, recently approved by the Food and Drug Administration for use in the United States, hold promise for future application if their performance can be greatly improved and their cost reduced.

The general loss of tactile, motor, and ambulatory abilities among very-odd nursing home resi-

²¹Additional information on hearing loss among the elderly is provided in ch. 3 and in the forthcoming *OTA Background Paper on Management of Hearing Impairment in the Elderly*.

dents is another area in which environmental design and technologies can provide assistance (39). Among the most common and least costly technologies are replacement of door knobs with door handles to greatly reduce the difficulty that many elderly persons have in gripping and turning door knobs. Door handles require less dexterity and twisting torque of the hand and wrist (19,40). They can also be used without gripping the handle; an open or closed hand, the forearm, or even an elbow can usually be used to push the door handle down. Similar problems with other types of fixtures are ameliorated by push-pull controls for plumbing fixtures and electrical controls (e.g., for persons severely afflicted with arthritis, toggle switches are far easier to operate than knobs).

Other environmental technologies that are especially useful in nursing homes are changes in floor surface texture and color to denote differences in patient rooms, common areas, and staff areas. Nonskid surfaces and graspable handrails at proper heights for older persons and those in wheelchairs are low-technology applications that enhance the safety of nursing home residents. Safety grab bars, handrails, and raised toilet seats are also low cost but highly effective safety additions for bathrooms. In all cases, nursing homes can be designed to reduce the incidence of falls by avoiding steps wherever possible and using ramps to promote ambulation of patients and wheelchair access. Adequate indirect lighting, nonglare surfaces, and color cueing, as noted above, are especially important in these institutional settings.

Assistive devices such as wheelchairs are particularly relevant to nursing home residents, who comprise just under one-half of all users (84). But the technology of wheelchairs has changed slowly in recent decades, with most changes being refinements of existing features to make them more lightweight, durable, portable, and comfortable. For example, electrically self-propelled chairs have been refined to promote their safety, reduce their weight, improve the manual controls, and extend the length of time between battery charges. The next generation of wheelchairs will be the computerized version that permits the user to send instructions to the drive mechanism through a sensing device that detects specific movements of the head (61). The chair will also travel side-

ways as well as forward and backward. Its anticipated purchase cost is between \$5,000 and \$6,000, as compared with \$400 to \$900 for manual wheelchairs and \$2,000 to \$3,000 for regular power-driven chairs. As wheelchairs are improved and become more useful for greater numbers of older people, the potential number of wheelchair users in nursing homes should grow.²² However, the purchase or rental costs of these improved wheelchairs may deter their use, in part because of limited Federal or State reimbursements for those costs and the need to medically certify that such technological advantages are warranted.

Regardless of market trends in high-technology wheelchairs, nursing home environments must accommodate the needs of all wheelchair users. Proper design of patients' rooms, especially to promote the independence of the wheelchair user in moving within the room, to the bathroom, into common areas, and in transferring from bed to wheelchair, is a fundamental requirement. As with other tasks, nursing home design should be predicated on the assumption that most residents are highly restricted in mobility and dexterity, thereby incorporating designs for extra-wide doorways, open cabinets, accessible shelves, closets with low racks, adjustable beds, and sturdy ergonomically designed furniture to properly respond to these physical limitations.

For the less mobile or self-sufficient resident, nursing homes can utilize other assistive devices. Nursing staff must often assist patients in transferring from bed to wheelchair and wheelchair to toilet or bathtub. Various portable lift devices are available that help assure the safety of the patient and the nursing staff in undertaking such tasks, especially when dealing with physically frail older persons in high-accident risk areas such as bathrooms. Similarly, electrically controlled beds allow relatively easy adjustments in vertical height and horizontal position to ensure the comfort, safety, and dignity of the patient. A number of other general design and device applications are

²²One informal evaluation of wheelchair use among older nursing home residents attempted to determine why some persons who were still able to walk used wheelchairs. A frequently mentioned reason was that wheelchairs were far quicker than walking slowly, or using a cane or walker (22).

useful in both the nursing home and independent housing. Most of these are noted in the section on the micro-environment of housing for the elderly.

Board and Care Homes.--The category "board and care" includes a wide range of group homes that provide some type of supportive care to their residents. Estimates of the number of homes and residents vary greatly, because the definition of what constitutes such a facility remains nebulous. Indeed, of the 118 domiciliary care programs recently surveyed by the Administration on Aging, none identified their facilities as a board and care home (most used terms such as residential care or continuing care). In general, however, these homes are distinguished from other group quarters in that they provide room, board, and some form of *nonmedical and nonnursing* personal assistance. The latter is often referred to as "protective oversight" to emphasize the need for assistance with activities of daily living for many residents of such facilities.

Since each State individually licenses board and care homes, there is great variation in the types of facilities and resident populations that are included in national figures. The best estimate is approximately 30,000 board and care homes in the United States in 1981, with an additional 300,000 "boarding" homes in which residents primarily receive only sleeping quarters and some meals (92). An estimated 285,000 persons over 65 represent four out of every five board and care residents (72). As noted in chapter 7, these residents tend to be moderately dependent in basic or personal care tasks, and highly dependent in instrumental activities such as laundry, shopping, managing money, and cleaning. Board and care home residents also have above-average rates of poverty and mental impairment. Similar but less severe dependency seems to exist for residents of boarding homes (as distinguished from board and care facilities), but accurate national data are unavailable since boarding homes are generally not regulated or licensed. For that reason, it appears that boarding home residents are particularly vulnerable to fraud or abuse (62,75).

Because of their residents' characteristics, board and care facilities receive a significant portion of

their income from residents who receive Supplemental Security Income (SSI) payments for the poor or disabled.²³ Those facilities that care for the more frail and dependent elderly (including those who are mentally impaired) are continually challenged to provide a decent, safe, and sanitary living environment for their residents. Many of the design features noted above for nursing homes could be incorporated in board and care facilities. But, because they are unlikely to receive Federal or State reimbursements for their services, board and care facilities are limited in their ability to undertake major physical changes in the design of the home. Thus, most facilities only meet minimum local fire and safety codes; few provide environmental features that encourage independence of the residents or promote a psychologically healthy and stimulating atmosphere.

Increased attention to the growing board and care population of older persons is needed if supportive housing opportunities are to be made more available to the elderly. In order to achieve this goal, the definition of what constitutes a board and care home could be standardized, as could be some type of Federal reimbursement or subsidy for costs incurred in caring for those who might otherwise be institutionalized. For the latter to occur, minimum design and safety standards for multi-unit homes could be promulgated to inspire healthier environments for elderly residents of board and care facilities.

The different types of congregate facilities briefly reviewed above attest to the growing variety of housing opportunities for most segments of the older population. Whether publicly subsidized or privately developed, congregate housing facilities are the most promising types of accommodative living environments for the elderly who have reduced or limited functional capabilities. Congregate facilities become more important as the average age of residents increases in multi-unit complexes designed for the elderly. Yet, there is no national system by which these housing op-

²³When available, data from a 1984 survey of SSI recipients, undertaken by the Social Security Administration, should provide information on the levels of care available to SSI recipients in different types of living arrangements, including various types of board and care facilities.

portunities are coordinated or the average consumer can be informed about them. The growth of private and public housing opportunities—ranging from accessory units to shared housing to comprehensive life care retirement com-

plexes—will continue into the next century. As the U.S. population ages and the complexity of these housing opportunities grows, appropriate monitoring, regulation, and consumer protection will become more important.

The micro-environment of housing for the elderly

As noted in previous sections of this chapter, person-environment congruence becomes more important and more difficult to achieve as people age—another example of both the increasing heterogeneity and associated functional dependency with advancing years. The ability of the environment to accommodate and respond to the needs of its aging resident is often overlooked (41). It is usually assumed that what worked for persons aged 40 will provide the same environmental supports for persons aged 80. But this report has noted the changes in functional abilities that generally occur with increasing age and the need for appropriate responses to ameliorate the negative effects of those changes on the lives of older Americans.

The characteristics of the residential environment—its design, organization, and amenities—can have a profound effect on the ability of older individuals to function adequately on a daily basis (10,11). For purposes of this report, the “micro-environment” is defined as the immediate residential environment in which the individual lives, and includes the physical and esthetic elements that contribute to a person’s quality of life. As expressed in the aforementioned HUD program goals, the microenvironment should provide safe, decent, and sanitary living quarters for all residents. For those older persons whose functional capabilities are reduced, these goals increase in relevance. Housing technologies and design factors can contribute significantly to providing not only the minimum standards for adequate housing, but an environment that fosters independence and promotes safety and convenience as well (21). This section reviews some general housing technologies that respond to these goals and provides examples of their applications in the home.

Technological applications in the home

New technologies for the home environment are continually being developed, many of which can add a measurable degree of convenience and safety to residents’ daily lives. For the elderly with functional disabilities, some of these technologies can mean the difference between increased dependency on others for informal and formal support and the ability to maintain one’s independence (5). The potential advantages are especially important to the growing number of older persons who live alone. It is not only the fear of being dependent, but also of not being able to seek help at critical moments that most concerns people as they reach the oldest ages. Technological applications in existing and new housing can provide a measure of security and safety that helps dispel these fears.

GENERAL IN-HOME APPLICATIONS OF TECHNOLOGY AND DESIGN

Among the many general technological or design applications in the home, a few low- and high-technology features stand out as the most important and feasible for the elderly, whether they are renters or homeowners. These are discussed in the following section.

General Safety Features.— Safety is a fundamental issue as persons age and functional disabilities become greater. Injuries and deaths from falls and fires are the most common dangers in the home life of older Americans. In the United States, the elderly account for one-fourth of all accidental deaths—more than twice their proportion of the total population. Falls are the leading cause of accidental deaths among the elderly. In-

deed, persons over 65 account for more than two-thirds of all *deaths* from falls in the United States (15). The high risk of injury and death from falls has discernible implications for public policy; the economic consequences of falls in the elderly alone are estimated to be between \$2.5 billion and \$4 billion per year.

Risk of Falls.—There are a number of low technologies and simple design adaptations that, if implemented nationally on a large scale, would greatly reduce the risk of falls and their consequences for the elderly. Adding buffers to hard or sharp surfaces is one general approach. Properly installed carpeting, *appropriately secured* scatter rugs, upholstered furniture, and rounded edges on outside corners of walls, counters, tables, and other furniture lessen the likelihood of falls and the degree of injury when falls do occur. These measures may not prevent major injuries in older persons suffering from severe osteoporosis, but most elderly would benefit from such precautions. Care in the use of walkers, canes, and other ambulatory aids is necessary, since these assistive devices can themselves be the cause of falls. Abrupt changes in floor surface levels are dangerous, especially where there are no environmental cues such as changes in color or texture of floor coverings (15). A common example is the step-down room with a one- or two-riser step that is not easily seen by persons with reduced visual acuity. Another hazardous element in housing design is the door that opens directly onto a stair tread with no initial landing. The most common of these is found in standard house construction with doors that open directly onto basement stairways.

Stairs themselves are a major source of falls among the elderly. Most of these falls are due to tripping rather than slipping. The major problem is inappropriately designed or marked stair treads and landings. Elderly persons with arthritis or other causes of restricted mobility and agility have difficulty with normal riser heights when ascending a stairway. Reduced agility in the joints increases the risk of catching the front of the foot on the stair tread extension, or “nosing” (the portion of the tread that extends beyond the vertical riser), creating a forward fall on ascent. On descent, the short depth of the stair tread often re-

sults in “overstepping)” which usually leads to a backward fall against the stairway. Deeper treads (11 inches is ideal) with lower risers (6 to 7 inches high) are the best environmental solutions to this problem. Another risk factor in stairway falls are handrails that are inappropriately designed or installed at the wrong height for the average older person. Because the average older person has lessened ability to grip large surfaces, handrails should be small in circumference and designed to fit the partially closed palm. Their ideal height is 36 inches, the same as that for door handles and electrical switches. Stair safety is also enhanced with tread edge markings on both the bottom *and* top edges of the stair tread. Falls due to overstepping on descent are due not only to short tread depth but also to the poor visibility of the tread edge when looking down from above. A mixed blessing is provided by nonslip strips for stair treads. While they reduce the chance of slipping, they sometimes create forward falls when the foot stops abruptly on descent. Carpeted stairways should be carefully secured at all edges, especially at the nosing and the back of the stair tread. In all cases regarding stair safety, proper illumination will minimize glare, reduce confusing shadows, and maximize tread edge visibility.

A considerably more expensive technology is the chair lift. It entails a fairly expensive addition to the home, requiring a well-anchored glide track along one side of the stairway, on which an electrically powered chair moves. In some States and local jurisdictions, electric chair lifts must conform to local building codes, generally those that apply to elevators. Depending on type of model and width of stairway, the basic cost of a chair lift for a straight stairway ranges from \$2,200 to \$3,500. Stairways with bends and landings add to the complexity and cost of this technology.

Other general safety features to prevent falls in the home include the removal of thresholds across door openings to reduce the likelihood of tripping. This hazard is often overlooked, but can be especially dangerous when adjoining surfaces are slippery or of contrasting texture. Added danger occurs when a threshold abuts loose or frayed carpeting, which increases the risk of tripping. The elderly, in particular, should avoid high gloss flooring that can be slippery when wet and un-

forgiving on impact from a fall (e.g., ceramic tile floors).

Risk of Fire.—Fire safety is a second major concern in the elderly's living environment. Although local fire codes vary, institutional settings and multi-unit residential complexes are generally required to have fire retardant and nontoxic materials wherever possible, smoke detectors, full sprinkler systems, accessible fire extinguishers, and fire alarms with flashing lights as well as bells or sirens. Clearly marked exits within specified distances from any resident's room, fire-resistant metal entry doors for all rooms, alarm-activated firebreak doors in hallways and common areas, and battery-powered emergency lighting are also generally required. Inspection and enforcement of these types of fire code requirements remain a problem in many communities, especially those with high proportions of older institutional dwellings that were constructed before such codes were developed.

Building requirements are far less stringent for single-family residences. Local jurisdictions are increasingly likely to require smoke detectors in all new construction and retrofitting in previously built multi-unit complexes or in single-family units that are sold. Because the elderly are highly vulnerable to injury or death from fires, added precautions are especially relevant in their micro-environment. Fire safety would be enhanced with emergency lighting, maximal use of fire retardant and noncombustible materials, and smoke detectors with alarm buzzers and signal lights. The detectors should be installed in all hallways, adjacent to bedrooms and the kitchen, and in basements. Hand-held fire extinguishers in strategic locations (e.g., bedroom, kitchen) are an additional safety measure. Where feasible, safe egress through windows can be enhanced with step stools to reduce the risk of falls in attempting to climb over a sill.

Fire prevention is improved by behavioral precautions. Avoidance of smoking while seated in upholstered furniture and in bed are fundamental prohibitions. Care in the use of all appliances is also important. For those who may be forgetful, self-monitoring appliances are a recent advantage. An example is the iron that shuts itself off

if overheated, tipped over, or left in one position for a preprogrammed time. Similar technologies are becoming available for major kitchen appliances such as range tops and ovens (see subsection on kitchens).

Emergency Response Systems.—General safety features go beyond those related to preventing falls and fires. Electronic emergency alarm systems (e.g., "Lifeline") are increasingly available at reasonable cost. The most common type utilizes a personal transmitter that is either hand-held or worn on the body, usually on a belt or as a pendant. In an emergency, as in a fall or heart attack, the transmitter can be activated to send a signal to a central home unit that is interfaced with the telephone. The home unit then automatically dials a centralized control center that is monitored either by a person or a computer at all times. Most central monitors are currently located in hospitals or in residential care facilities. In many systems the emergency auto-dial unit includes a "(line-seizure" mechanism that automatically takes over a phone line that may already be in use for a normal call. The central computer can receive several calls simultaneously; it automatically decodes each call to identify the home from which it came and records the time and date of the emergency call.

State-of-the art systems also have special signal codes to indicate the type of emergency involved (51). The signal codes indicate whether the source of the signal was the transmitter (most likely indicating a fall, heart attack, or similar episode), the emergency button on the auto-dialer unit (suggesting the person is ambulatory), or a smoke detector or appliance (indicating excessive smoke or fire). The central monitor automatically dials the home unit to confirm that it was activated, at which time the monitoring staffperson calls the home number. If the phone is not answered within a specified time or number of rings, then the appropriate emergency assistance is contacted.

The sensitivity of the system and the possibility of accidentally relaying a signal require care in the use and monitoring of all calls. Some systems are programmed to internally verify daily that the system is not malfunctioning by automatically dialing each home unit to assure it is work-

ing. The home units also have automatic battery operation in the event of power failures or if accidentally unplugged. When in the battery-powered mode, a signal is sent to the central computer and the staff monitor will then call the home to ascertain the problem.

These emergency response alarm systems can be installed in most homes and are especially valuable for persons who are prone to heart attacks or other acute episodes. In some communities, hospitals encourage their use as one element of discharge planning. Monthly charges for these types of service begin at \$35 per dwelling unit, depending on the complexity of the system (46). Available information suggests that emergency response systems are of great value to those elderly who are most vulnerable: those with a history of acute illness and who live alone. Physical safety and the feelings of security that assistance is readily available are the most commonly cited benefits that these systems provide for elderly users who consider them well-worth the cost.

Telecommunications Safety and Convenience Devices.—Along with response systems for emergencies, a new generation of high-technology telecommunications devices are being developed that provide a much wider array of services oriented toward home safety, security, and convenience. One example is a system that employs microprocessors linked to one or more telephones to gather and monitor information provided by sensors located throughout a house. These systems (e.g., “Sensaphone”) can monitor the home’s heating, ventilation, and air-conditioning around the clock and automatically change room temperatures by preprogrammed instructions. The system also monitors the home’s electrical use, its appliances, and possible sources of inefficiency. Loud sounds emanating from any room that has a sensor can be detected. The most sophisticated units can also use infrared detectors to discern, at predetermined periods of time (e.g., at night), movements inside or outside the house, or windows or doors that are opened. These security detectors can be linked with automatic dialers, similar to the emergency response systems, to notify authorities when assistance is needed.

Other telecommunications devices are creating opportunities for home-based safety or self-health care instruction (see ch. 6). Although in its infancy and relatively expensive for most residential applications, interactive telecommunications may soon replace programmed videotape or computer disk instructional devices (73). one-way information systems are generally known as “teletext” services. These involve television signal broadcasts of information that are accessible to individuals at home through a home-based decoder. With the appropriate keypad, the user can select the programmed information for viewing through the television. Teletext currently offers viewers a variety of programs in news, sports, entertainment, health instruction, consumer information, and other services.

Interactive systems with two-way communications are in their infancy. They are generically called “videotex” systems. These two-way information systems will offer a range of services in one unit, News, shopping, and banking services by telecommunications are expected to be the first applications for general in-home use (73). Videotex not only provides one-way information, but also allows the user to respond through the network system, which usually involves telephone or cable television lines (or a combination of the two). Community-based trials have demonstrated the usefulness of videotex in providing home-based electronic “catalogs” of consumer goods and in ordering merchandise through a home terminal. Videotex is a limited form of a comprehensive computer system that will automatically monitor and run all major aspects of the modern home—the “smart house” of today. These features are only the “first generation” of a new technology that may have significant impacts on the way people work, shop, and play in the future.

For the functionally impaired elderly, such systems offer new opportunities to maintain their independence through home-based information retrieval, teleshopping, and banking. Other potential applications include the ability to monitor a patient’s vital signs and communicate them to a clinic or physician’s office (26). The patient would in turn receive information from the physician. Interactive communications of this type

may reduce the burden of difficult trips for medical examinations.

Pharmaceutical prescriptions also may be transmitted through this system, which could include detailed records of all prescribed and over-the-counter drugs being used by the patient. Indeed, the problem of “polypharmacy” (see ch. 5) in the elderly has grown as the population has aged and more drugs have become available. New methods to monitor drug intake would reduce the likelihood of negative side effects from improper combinations of drugs. Computer-based monitoring systems could also be used to “read” a patient’s pharmacy records stored on a microprocessor embedded in a magnetic strip of a plastic card that can be carried by the patient. The magnetic strip would be machine-readable and accessible to any physician or pharmacist, who would regularly enter new data about the patient. This type of monitoring could significantly increase the safety of pharmaceutical decisionmaking by helping assure that a patient is not receiving improper combinations of drugs.

Currently, these types of telecommunications systems are in development and trial phases. The expense of the technologies and their specialized components make them impractical for general use by most older persons. But they hold promise for future applications that are clearly suitable for the elderly. Contrary to some negative stereotypes, older persons are both willing and able to learn how to use telecommunications equipment (13). The key factor in the learning process for the elderly is the functional advantage that the computer provides, whether for instrumental or entertainment activities. Older persons are also more likely to welcome computers if the keyboards have larger keys and the display screens are enlarged and their glare reduced. If they perform useful functions at reasonable cost, personal computers will be used by older persons, even nursing home residents who have moderate mental and physical impairments (20,97). Thus, as they become more affordable and user-friendly, home computers and other telecommunications devices should grow in popularity and accessibility among the elderly.

The Kitchen.—Microprocessors also have had a valuable impact on kitchen safety and conven-

ience for the elderly. New appliances provide various programmable functions to assure that foods are both preserved and prepared appropriately. Touch-sensitive controls eliminate some of the problems that arthritic older persons have with knobs or dials. But these new controls tend to have poor features for the sight-impaired. Lettering and numbers are generally too small and of limited contrast for easy viewing. On the other hand, the ability to better control temperature settings and to use timing features make these appliances more convenient and safe. Whether “soft touch” push pads or dials, appliance controls for the elderly should assure sufficiently large lettering and should be located at the front of the appliance; never on the back panel. On ovens and ranges, for example, controls on back panels are more difficult to see and present greater danger of burns from contact with heating elements or flames.

Wherever possible, design elements that respond to the characteristics of the elderly should be incorporated in kitchen designs. Ovens and ranges should be located at counter height to minimize bending and reaching (19). Small countertop ovens are particularly convenient because they are at the correct height and are often the most efficient size for preparing one- or two-person meals. Other low-technology or design factors that add to the convenience and safety of kitchens include roll-out shelves in base cabinets, bottom shelves that are at least 10 inches above the floor (4 inches higher than normal), turntables (“lazy Susans”) in corner cabinets, and rounded edges on all counter and cabinet edges. For the average older person, ideal counter heights are 32 to 35 inches (about 3 inches lower than most counters) and the bottoms of kitchen sinks should be approximately the height of a person’s palm when standing. Counters and cabinets should be approximately 2 feet deep for ease of access to items on shelves. Maximum height for the highest shelves should be 70 inches. Nonglare lighting over counters and sinks adds safety to food preparation.

Various assistive devices also promote the ability of impaired older persons to function independently in the kitchen. These include electric can openers, jar cover openers (mounted under a



Photo credit: Comfortably Yours, Maywood, NJ

Turning handles can be used on appliance and faucet knobs to enhance an older person's grip and leverage.

counter or hand-held), special grip enhancers that fit over handles of pots and pans, food preparation timers with large numerals, and long-handled "reachers" (similar to those used in stores) for getting hard-to-reach objects.

The Bedroom.--One of the simplest changes in bedrooms is to raise the height of the bed for easier access and egress by older persons with limited joint mobility. Bolster rails that can be securely fastened to either end of the bed frame rails promote safety in getting in or out of bed. Nightstands should be slightly higher than the bed and lighting switches should be at the base of table lamps or mounted above the head of the bed. Touch-sensitive, metal base lamps are another convenient option. A telephone should be within easy reach from the bed, as should any emergency response transmitters.

As in all rooms, scatter rugs should be securely anchored or have nonskid backing. Closets are

more convenient with track-sliding doors, dual height clothes rails, open shelves from the floor, and roll-out drawers for selected items. Design features that minimize the need to bend, stoop, or reach should be the guiding principles in bedroom design for the elderly (55). Simple devices also are available to assist older persons in dressing. Among the more common are long-handled zipper pulls, hand "extenders" for pulling on hosiery, and the use of "velcro" fasteners instead of buttons or zippers.

The Bathroom.--The bathroom is one of the most dangerous areas in the micro-environment of the elderly. Bathrooms are a frequent site of falls by the elderly and the characteristic hard surfaces contribute to the severity of injuries. More attention has been paid to promoting safety for the elderly in bathrooms than in any other part of the micro-environment (38). Numerous low-technology adaptations to existing bathrooms are feasible. Among the most common and worthwhile is installation of strategically placed and well-anchored grab bars on a bathtub's inner and end walls (using counter-sunk bracing), and over the outer side (with U-shaped, "locking" extenders). Grab bars should be made of stainless steel or high-impact heavy gauge plastic. Bathtubs should have nonskid surfaces; newer tubs are manufactured with such surfaces, but older ones usually need nonskid strips or rubber mats.

Adjustable shower heads that move 2 to 3 feet along a vertical glide rail are convenient for older persons who have mobility and dexterity impairments. Push-pull or lever types of controls for water mixers and shower diverters are more convenient than other types of fixtures. Tub chairs that have adjustable heights, secure backs, and nonslip leg tips are recommended for those who find it difficult to remain standing for a shower or to rise up from a bath. For the more severely restricted, tub chairs with side transfer seats are available as well. Another option is a step-in shower stall made of molded fiberglass that includes a sturdy, built-in seat and movable shower head (57). All bathtub and shower areas should be well-illuminated.

Use of the toilet can be made safer by adding assist rails on either side to help prevent falls. As with the bed, some older persons have difficulty in sitting on or rising from the average toilet seat

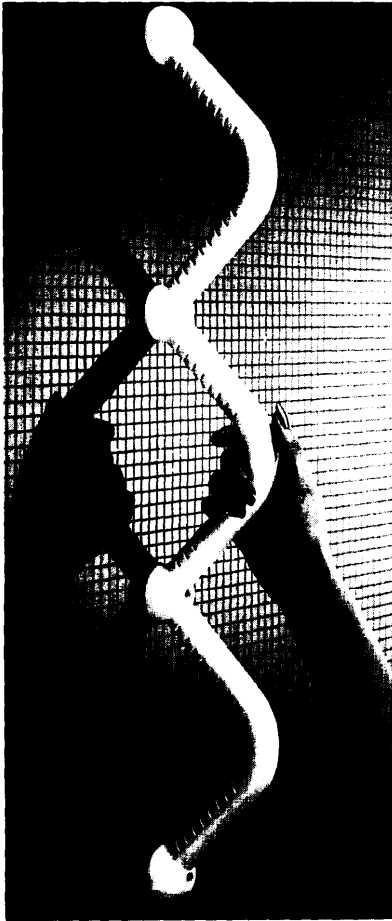


Photo credit: Comfortably Yours, Maywood, NJ

Well-anchored grab bars for bathtubs are an important safety feature for the elderly.

height of 16 inches. Various types of adapters are available to increase the height from 2 to 5 inches to ease this problem. Unless there is an emergency response system, a telephone or other signal device that can be reached from the tub or toilet is advisable for older persons prone to falls, dizzy spells, or heart attacks. Tiled or linoleum floor surfaces in bathrooms should be kept as dry as possible to minimize the risk of slipping. Ideally, bathrooms for the elderly should have well-secured wall-to-wall carpeting or large scatter rugs with nonskid rubber or vinyl backing.

Many of these features represent adjustments to conventional bathrooms. New bathroom designs based on ergonomic principles and design standards could be a major step forward. Some attempts have been made to undertake such studies and designs, but to date none have become generally available to the public. A model bathroom for the elderly and handicapped has recently been developed by the Design Research Cen-



Photo credit: Comfortably Yours, Maywood, NJ

Properly installed assist rails for toilets can be adjusted for appropriate height and width.



Photo credit: Design Research Center, University of Wisconsin-Stout

Prototypes of new bathroom designs are intended to promote the safety of older persons.

ter at the University of Wisconsin-Stout. As shown in the photographs, the design is unique and attempts to provide a far more user-friendly environment for the elderly. Lighting is indirect and nonglare. All hard surfaces are rounded and the entire room is carpeted to cushion falls. The color of the carpeting contrasts with the walls and fixtures to promote orientation for the visually impaired. The configuration of fixtures and the sturdy swing-out chair permit use at the sink and for transfer into the nonconventional bathtub. All shelves are within easy reach of the seated or standing person; the need to bend is eliminated.

The bathtub represents a significant departure from conventional design. Rather than require an older person to step over the normal 13-inch outer side of the tub (with or without grab bars), the Wisconsin design allows a person to sit in the open-sided tub, which is at chair height and has a built-in padded seat and back support. The bather sits, raises his legs, and rotates his body into the tub, much like getting into bed. A horizontally movable grab bar is used to raise the tub's circular outer side. This "bathing tube" is the enclosure for the water, which enters from shower heads above or a recessed "fountain" (i.e.,



Photo credit: Design Research Center, University of Wisconsin-Stout

The prototype bathtub design reduces the risks of falls from slipping and bending.

faucet). Push-pull and slide controls for water volume and temperature are located on the grab bar, with an auxiliary set at the foot of the tub that can be operated with the feet. The recessed fountain allows the bather to test the water temperature before turning on the shower heads. When finished bathing, the water drains out around the base upon which the person is seated (or reclining) and the bathing tube side slides back into the unit so the bather can swing out to the seat or step onto the floor.

The other unique design idea is a toilet that keeps the body raised higher than in conventional units. The seat is placed at an angle that permits the user to maintain a squatting position that aids in defecation. A swingdown support bar opposite the seat provides additional safety and comfort. The angle of the seat is also more convenient for male urination. The Center has developed alternative designs for toilets, including a simpler one that involves a hydraulic-assisted seat to aid in lowering and raising one's body, along with side support rails for added safety.

While these bathroom designs have not been adopted commercially, they hold promise for further investigation and modification. For example, recent marketing for newly designed tubs stress built-in back supports and recessed fountains in

place of potentially dangerous faucets that extend into tubs. The University of Wisconsin designs and technologies represent a conscientious attempt to create a safer and more friendly environment in the most hazardous room for older persons.

The Living Areas.—Numerous environmental design adaptations have been mentioned above that apply throughout the home. Loose and frayed rugs are particularly dangerous, as are glossy or slippery floor surfaces. Door handles, recommended for all nursing homes, can be quite expensive to install in one's home. But there are available a number of adaptive handle-shaped devices made of metal or plastic that can be snugly fitted over existing door knobs to provide the needed lever action. Numerous specially designed utensils such as scissors, gardening tools, screwdrivers, eating utensils, and writing implements have extra-large and slightly curved handles to aid in gripping. Plastic, rubber, or high-density foam pieces that can be slipped over the handles of regular utensils are a less expensive alternative.

Upholstered chairs with hydraulic or mechanical lift mechanisms under the seat cushions aid those with joint motion difficulty in sitting on or rising from the chair. Telephones with large buttons and adapters for controlling the volume in the hearing piece are commonly available. Energy-efficient windows with crank handles allow ease of use for ventilation as well as passive solar heating. In fact, an important element in housing design for the elderly is energy efficiency and safety in monitoring the heating and cooling systems to prevent conditions that lead to hypother-



Photo credits: Comfortably Yours, Maywood, NJ

Various door knob adapters can be used, including ones that convert knobs into handles or provide grooved grip-enhancers.

mia or hyperthermia, to which the elderly are particularly vulnerable.

Numerous other housing design elements, low-technology adaptations, and high-technology systems could be discussed (58,67). Clearly, the individual can do much to foster a safer and more convenient micro-environment without excessive expense. He can also invest considerable amounts to develop a computer-based living system that performs a multitude of functions—the so-called “smart house” that would combine systems such as Lifeline, Sensaphone, teletext, videotex, and other microelectronic applications into a total integrated system.

Other recent high-technology applications are in robotics, which are primarily being applied in manufacturing (see ch. 10). Also being developed are robots that perform various household functions. The current prototypes are most useful for assisting severely impaired persons such as paraplegics. However, even the most well-developed robots today require considerable programming

to perform basic tasks. Experimental (and costly) mobile robots exist that can respond to selected voice commands and perform a limited range of functions. Further development of these prototypes could lead to a time when they become much less expensive, far more appropriate for tasks of daily living, and generally available for use in the average household.

Whether the issue is high-technology robots, home-based computers, housing design elements, or low-technology adaptations and assistive devices, there is a need for greater public awareness of the possibilities for promoting the functional independence of the elderly. At the same time, the network of public agencies and private organizations involved in the field of aging could also be better informed. Finally, the private manufacturing sector should be made more aware of the significant and growing market for products and services designed to meet the environmental needs of the elderly.

Concluding remarks

This chapter has reviewed the broad range of factors that have an impact on the housing and living environment of the elderly. As the older population itself ages, the proportions of older persons living alone, experiencing housing problems, or dealing with functional impairments are likely to increase during the next three decades. New responses to assist the elderly in maintaining their independence will be needed if the projected increases in nursing home populations are to be kept at a minimum. The maintenance and energy burdens of older housing tend to fall on those elderly homeowners who are least able to pay those costs, while elderly renters (who tend to be poor) are faced with both shrinking housing opportunities and rising rental costs. These trends are occurring at a time when Federal housing programs and subsidies are being eliminated or curtailed. The elderly and the poor are the two groups that are most vulnerable to these changes in Federal support for housing.

The growing need for congregate housing facilities presents opportunities for public and private involvement across a range of housing types that can respond to the heterogeneous characteristics of the older population and their needs for supportive living environments. Excess housing space can be better used to serve both elderly homeowners and those seeking decent, affordable rental housing through developments such as shared housing, accessory units, and granny flats. Board and care facilities may become more important in providing both housing and protective oversight to many older persons who do not require skilled nursing care. The many types of life care and residential care communities being developed attest to the market for this kind of macro-environmental support. The cost of such housing opportunities varies greatly, depending on sponsor, location, and services provided. But the physical and psychological security provided by congregate facilities responds to one of the ma-

major concerns of persons as they age, Maintaining one's independence, promoting a healthy lifestyle, and being assured of long-term care and supportive services are the key attractions of residential care complexes.

Opportunities to remain independent in one's home are also possible by attention to adaptations, design factors, technologies, and behaviors that

promote safety and security. These range from nonskid treads and appropriately designed stairways to "smart" appliances and totally new bathroom designs. As with all aspects of technology, their possible applications in the micro-environment of the elderly will depend on their usefulness, cost, and adaptability in existing living environments.

Research priorities

The following items, while not exhaustive, indicate the types of research on housing and the living environment of the elderly that would be beneficial in development of public policy:

- accurate assessment of the functional abilities of older persons in tasks of daily living, the physiological bases of functional impairments, and the range of adaptive behaviors that are developed to compensate for limitations in functional ability;
- changes in household composition of the old-old and very-old subgroups of the elderly and their implications for future demand for formal and informal supports in the living environment;
- attitudes of the elderly and nonelderly concerning the types of housing opportunities that should be available and the respective roles that can be played by the government

and the private sector in providing those options;

- housing problems confronting elderly renters and mortgaged homeowners who have household incomes below or near the Federal poverty level;
- the market for the full range of elderly congregate housing facilities and strategies for promoting their development, including a wide array of accompanying services;
- ways to promote development of new models and designs of living environments for the elderly that better respond to their physical capabilities as well as their limitations; and
- development of improved projections of changes in household composition and housing demand of the older population, and ways by which this demand could be met.

Issues and options

ISSUE 1: Should the Federal Government expand existing programs that assist low-income elderly homeowners who have excessive housing deficiencies and excessive cost burdens?

Options:

- 1.1 Congress could avoid making changes in current programs that assist this subgroup of older homeowners.
- 1.2 Congress could mandate additional investigation of the housing problems of poor elder& home-

owners and the ways in which these problems could be mitigated by the Federal Government. Particular attention could be focused on possible biases against homeowners living in small communities in metropolitan counties that are not likely to benefit under CDBG or Section 312 programs.

- 1.3 Congress could appropriate significant funding increases in the Section 312 program (perhaps in conjunction with the Community Development Block Grant program) that provides low-interest loans to qualified homeowners for rehabilitation

of their housing. This expansion could greatly increase the number of loans available and/or increase the subsidies for lower interest rates on such loans. The subsidies could be modeled after the interest credit provided under Sections 502 and 504.

- 1.4 Congress could amend the Section 312 rehabilitation loan program to permit outright grants or interest-free loans to low-income elderly homeowners for removing physical deficiencies in their housing. Other amendments could broaden the availability of the loans to areas that may not have CDBG or urban renewal programs,
- 1.5 Congress could legislate new amendments to the Internal Revenue Code to permit tax incentives (deductions or credits) for expenses incurred by low-income older homeowners in correcting certified housing deficiencies.

ISSUE 2: Should Congress support the use of specific technologies in the home that assist slightly impaired older persons in carrying out their daily activities?

Options:

- 2.1 Congress could avoid further involvement in promoting or subsidizing specific home-based technologies or self-help devices for the elderly.
- 2.2 Congress could indirectly support the use of technologies in the home by encouraging or mandating that the Consumer Product Safety Commission (CPSC) monitor and evaluate the range of available products and self-help or assistive devices targeted toward elderly persons living at home. Such CPSC evaluation would discourage consumer fraud and indirectly provide consumer protection.
- 2.3 Congress could require specific safety standards on products used in the home to assist both the well elderly and those who are frail. These standards could be based on evaluations of product usefulness, safety, cost, and degree of complexity.
- 2.4 Relatively low-cost technologies that can be easily added in the home to promote safety, such as stair treads, grab bars, and other alterations, could be encouraged by Congress through amendments to housing rehabilitation programs and in coordination with social service programs under the Older Americans and Social Security Acts. Selected technologies could be specified for these purposes.
- 2.5 Congress could promote the use of more costly or complex technologies such as electronic devices (e.g., alarm systems), telecommunications, and similar devices for use in the homes of older per-

sons. Such Federal support could involve consumer information programs, tax incentives, social service coordination, or direct cost subsidies.

- 2.6 Congress could limit Federal involvement by only subsidizing the use of selected assistive devices that are not now considered medically reimbursable under Medicare, such as hearing aids and corrective lenses. The Medicare reimbursement criteria would include medical evaluation and certification of need.

ISSUE 3: How could Congress encourage utilization of technologies that promote the independence of older persons with functional impairments and major activity limitations?

Options:

- 3.1 Congress could maintain existent housing and social service policies that generally favor those who are functionally independent.
- 3.2 Congress could require increased utilization of technologies for functionally impaired older people in federally subsidized housing through requirements under the Section 202 or Section 8 housing programs. Coordination with Title XX and OAA social service programs would also be necessary, as well as development of standardized functional assessment technologies.
- 3.3 Congress could expand the scope of such assistance to include similar utilization of in-home devices for all older persons who require assistive devices to maintain their independence in the community and the home (functional assessment technologies are assumed from option 3.2).
- 3.4 Congress could indirectly support efforts to increase the utilization of in-home assistive devices for the functionally impaired elderly through public information programs and the coordination or advocacy activities of social service agencies.

ISSUE 4: Should Congress provide increased support for public and private sector efforts to develop and utilize new housing construction and design technologies that assist older persons to maintain their independence in the home?

Options:

- 4.1 Congress could maintain its current level of support through existing Federal housing programs and incentives to the private sector.

- 4.2 Congress could expand the scope of existing Federal housing rehabilitation loan programs (e.g., Section 312) or encourage the expansion of community-based grants (for low-income persons) through the CDBG program to promote the redesign and retrofitting of existing dwelling units. The programs could focus on structural changes that are required to permit older persons who have become functionally disabled to remain in their homes (e.g., design changes such as ramps, doorway openings, counter heights, etc., for those who become confined to wheelchairs).
- 4.3 Congress could promote similar redesign by developers of specialized housing complexes for impaired older people through tax incentives, Federal loan subsidies through HUD and FmHA programs, or other financing assistance.

ISSUE 5: Should Congress encourage and assist the expansion of housing alternatives that promote the continued functional independence, social well-being, or financial welfare of older persons?

Options:

- 5.1 Congress could encourage increased levels of funding for research and demonstrations that investigate the feasibility of various housing alternatives such as accessory units, granny flats, shared housing, board and care, and congregate housing. Cost-effective methods to develop such alternatives could also be investigated, including modular construction, conversion of commercial structures, and use of manufactured housing.
- 5.2 Congress could utilize existing information on the prevalence of single-family housing among older homeowners, especially low-income persons living alone, to support construction of accessory units

- as rental apartments. New construction and retrofitting technologies, such as factory-built modular bathroom and kitchen units, could be encouraged to control costs while expanding the housing stock for both older and younger persons.
- 5.3 Congress could earmark specific sums for funding the expansion of shared housing programs through coordinated efforts under Title XX, OAA, and HUD. Other support could be provided through programs such as Section 312 to subsidize necessary rehabilitation of existing houses to make them safe and sanitary for shared housing use. Such efforts could be linked with community-based development of long-term care programs to encourage informal supports along with formal services.
- 5.4 Congress could subsidize, through direct HUD and FmHA funding assistance and indirect tax incentives, private sector conversion of dormant commercial and industrial space into rental units. Special consideration could be given to those projects that are for central city and rural areas, that meet Federal design requirements for elderly/handicapped residents, and that encourage the provision of congregate services.
- 5.5 Federal assistance similar to that described in option 5.4 could be made available to promote board and care facilities that meet additional requirements for assisting functionally impaired (but not ill) older persons through long-term care and congregate services.
- 5.6 Congress could promote the development of various home equity conversion options (e.g., reverse mortgages, sale leasebacks) for older homeowners. Included in such legislation would be adequate consumer safeguards, protection of certain in-kind and entitlement benefits, federally-subsidized insurance for such financing, and Federal income tax incentives for private sector activity.

Chapter 9 references

1. Atchley, R. C., *The Social Forces in Later Life*, 3d ed. (Belmont, CA: Wadsworth Publishing, 1980).
2. Berardo, F., "Survivorship and Social Isolation: The Case of the Aged Widower," *The Family Coordinator* 19:11-25, 1970.
3. Binstock, R. H., "Interest Group Liberalism and the Politics of Aging," *The Gerontologist* 12(4): 265-280, 1972.
4. Branch, L. G., and Jette, A. M., "Elders' Use of Informal Long-Term Care Assistance," *The Gerontologist* 23(1): 51-56, February 1983.
5. Breuer, J. M., "A Handbook of Assistive Devices for the Handicapped Elderly: New Help for Independent Living," *Physical and Occupational Therapy in Geriatrics* 1(2): 1-77, 1982.
6. Brody, E. M., "Service-Supported Independent Living in an Urban Setting," *The Environmental Context of Aging*, T. O. Byerts, L. A. Pastalan, and S. C. Howell (eds.) (New York: Garland Publishing, 1979).
7. Byerts, T. O., "The Congregate-Housing Model: Integrating Facilities and Services," *Congregate*

- Housing for Older People: A Solution for the 1980's*, R. D. Chellis, J. F. Seagle, and B. M. Seagle (eds.) [Lexington, MA: Lexington Books, 1982].
8. Byerts, T. O., "Toward a Better Range of Housing and Environmental Choices for the Elderly," *Back to Basics: Food and Shelter for the Elderly*, P. A. Wagner and J. M. McRae (eds.) (Gainesville, FL: University Presses of Florida, 1979).
 9. Carlin, V. F., and Fox, R., "An Alternative for Elderly Housing: Housing Conversion," *Community Housing Choices for Older Americans*, M. P. Lawton and S. L. Hoover (eds.) (New York: Springer Publishing, 1981).
 10. Carp, F. M., "Effects of Improved Housing on the Lives of Older People," *Middle Age and A-ging*, B. L. Neugarten (ed.) (Chicago: The University of Chicago Press, 1968).
 11. Carp, F. M., "The Concept and Role of Congregate Housing for Older People," *Congregate Housing for Older People*, W. T. Donahue, M. Thompson, and D. Curren (eds.) (Washington, DC: U.S. Department of Health, Education, and Welfare, 1977).
 12. Catz, R., "Historical and Political Background of Federal Public Housing Programs," *North Dakota Law Review*, 50: 21-27, fall 1973.
 13. Chin, K., "The Elderly Learn to Compute," *Info-World*, 24ff, May 7, 1984.
 14. Coastal Colony Corp., "The Elder Cottage: A Unique Housing Alternative," brochure and price list (Lititz, PA: Coastal Colony Corp., May, 1983).
 15. Cohen, H. H., "Falls Resulting From Changes in Level, With Special Reference to the Elderly" presentation at the Annual Meeting of the Human Factors Society, Oct. 23, 1984.
 16. Cohen, J., *Public Programs Financing Long Term Care: Interim Report*, contractor report submitted to the U.S. Department of Health and Human Services (Washington, DC: The Urban Institute, January 1983).
 17. Day-Lower, D., Bryant, D., and Mullaney, J., *National Policy Workshop on Shared Housing: Findings and Recommendations* (Philadelphia: Shared Housing Resource Center, Inc., May 1982).
 18. Editorial Research Reports, "Housing Options for the Elderly," II(5): Aug. 6, 1982 (Washington, DC: Congressional Quarterly, Inc., 1982).
 19. Faletti, M. V., Stein Gerontological Institute (Miami, FL), *Human Factors Analysis of Elderly Impairment*, final report and project summary, National Institutes of Health grant No. R01-AG-02727, submitted to the National Institute on Aging, U.S. Department of Health and Human Services, Bethesda, MD, March 1983.
 20. Feier, C. D., and Leight, G., "A Communication-Cognition Program for Elderly Nursing Home Residents," *The Gerontologist* 21(4): 408-416, August 1981.
 21. Fozard, J. L., "(Person-Environment Relationships in Adulthood: Implications for Human Factors Engineering," *Human Factors* 23: 7-27, 1981.
 22. Fozard, J. L., "Human Factors and Enhanced Function in Advancing Age" presentation at the Annual Meeting of the Human Factors Society, Oct. 23, 1984.
 23. Fraker, S., "Prefabs Are Beginning to Get It Together in the U.S. Too," *Fortune*, Oct. 17, 1983, pp. 168-171.
 24. Friedman, L., *Government and Slum Housing: A Century of Frustration* (Chicago: Rand McNally, 1968).
 25. Golant, S. M., *The Residential Location and Spatial Behavior of the Elderly*, research monograph No. 143 (Chicago: Department of Geography, University of Chicago, 1972).
 26. Gorovitz, S., "Bringing Senior Citizens On-Line," *Technology Review* 88(1): 12ff, January 1985.
 27. Gutowski, M., and Field, T., *The Graying of Suburbia* (Washington, DC: The Urban Institute, 1979); see also Gutowski, M., "Housing-Related Needs of the Suburban Elderly" *Community Housing Choices for Older Americans*, M. P. Lawton and S. L. Hoover (eds.) (New York: Springer Publishing, 1981).
 28. Hare, P. H., Connor S., and Merriam, D., *Accessory Apartments: Using Surplus Space in Single-Family Houses*, report No. 365 (Chicago: American Planning Association, 1981).
 29. Harootyan, R. A., "Growing Older in Rural America: Demographic Trends and Social Policy Issues," *The Nation's Rural Elderly*, Part 7, hearings before the U.S. Senate Special Committee on Aging, Mar. 23, 1977 (Washington, DC: U.S. Government Printing Office, 1977).
 30. Harootyan, R. A., "Interest Groups and Aging Policy," *The Aging in Politics: Process and Policy*, R. B. Hudson (ed.) (Springfield, IL: Charles C. Thomas, 1981).
 31. Hendricks, J., and Hendricks, D. C., *Aging in Mass Society: Myths and Realities* (Cambridge, MA: Winthrop Publishing, 1977).
 32. Hickey, T., *Health and Aging* (Monterey, CA: Brooks/Cole, 1980).
 33. Housing and Community Development Amendments of 1981, 42 U.S.C. 5306, Public Law 97-35, 97th Cong., 95 Stat. 384,392.
 34. Kahana, E., "A Congruence Model of Person-Environment Interaction," *Aging and the Environ-*

- ment: *Directions and Perspectives*, M. P. Lawton, P. G. Windley, and T. O. Byerts (eds.) (New York: Garland STPM Press, 1980).
35. Kando, P., analyst, National Association of Home Builders Research Foundation, personal communication, Feb. 2, 1984.
 36. Kane, R. A., and Kane, R. L., *Assessing the Elderly: A Practical Guide to Measurement* (Lexington, MA: Lexington Books, 1981).
 37. Katz, S., Ford, A. B., Moskowitz, R. W., Jackson, B. A., and Jaffee, M. W., "Studies of Illness in the Aged. The Index of ADL: A Standardized Measure of Biological and Psychosocial Function," *Journal of the American Medical Association* 185: 94ff, 1963.
 38. Kira, A., *The Bathroom*, revised edition (New York: The Viking Press, 1976).
 39. Koncelik, J. A., *Designing the Open Nursing Home* (Stroudsburg, PA: Dowden, Hutchinson & Ross, 1976).
 40. Koncelik, J. A., "Elements of Geriatric Design: The Personal Environment," *Congregate Housing for Older People*, R. D. Chellis, J. F. Seagle, and B. M. Seagle (eds.) (Lexington, MA: Lexington Books, 1982).
 41. Koncelik, J. A., *Aging and the Product Environment* (Stroudsburg, PA: Hutchinson & Ross Publishing, 1982).
 42. Lawton, M. P., *Planning and Managing Housing for the Elderly* (New York: John Wiley & Sons, 1975).
 43. Lawton, M. P., *Environment and Aging* (Monterey, CA: Brooks/Cole, 1980).
 44. Lawton, M. P., and Hoover, S. L. (eds.), *Community Housing Choices for Older Americans* (New York: Springer Publishing, 1981).
 45. Lawton, M. P., and Nahemow, L., "Ecology and the Aging Process," *Psychology of Adult Development and Aging*, C. Eisdorfer and M. P. Lawton (eds.) (Washington, DC: American Psychological Association, 1973).
 46. Lifeline Systems, Inc., Watertown, MA, personal communication, Oct. 17, 1984.
 47. Liu, K., and Palesch, Y., "The Nursing Home Population: Different Perspectives and Implications for Policy," *Health Care Financing Review* 19(3): 15-23, 1981.
 48. Lopata, H. Z., *Widowhood in an American City* (Cambridge, MA: Schenkman publishing, 1973).
 49. Lopata, H. Z., *Women as Widows: Support Systems* (New York: Elsevier, 1979).
 50. Marmor, T. R., *The Politics of Medicare* (Chicago: Aldine Publishing, 1970).
 51. Ministry of Community and Social Services, Applied Program Technology Unit, Province of Ontario, Canada, "Older People Use a Young Technology to Maintain Their Independence," *Window on Technology* 1(2): 1ff, February 1984.
 52. Newcomer, R., "An Evaluation of Neighborhood Service Convenience for Elderly Housing Project Residents)" *The Behavioral Basis of Design*, P. Suedfeld and J. Russell (eds.) (Stroudsburg, PA: Dowden, Hutchinson & Ross, 1976).
 53. Newman, O., *Defensible Space* (New York: Macmillan Publishing, 1972).
 54. Newman, S., "The Growth of Elderly-Headed Households and Implications for Housing Policy," presentation at a briefing for the American Association of Retired Persons, Jan. 25, 1983.
 55. Parsons, H. M., "Residential Design for the Aging," *Human Factors* 23: 39-58, 1981.
 56. Pastalan, L. A., "Demographic Characteristics," *Journal of Housing for the Elderly* 1(1): 85-87, spring/summer 1983.
 57. Raschko, B. B., *Housing Interiors for the Disabled and Elderly* (New York: Van Nostrand Reinhold, 1982).
 58. Redden, M. R., and Stern, V. W. (eds.), *Technology for Independent Living II*, proceedings of the 1981 workshops on "Science and Technology for the Handicapped" (Washington, DC: American Association for the Advancement of Science, 1983).
 59. Regnier, V., "Neighborhoods as Service Systems," *Community Planning for an Aging Society*, M. P. Lawton, R. J. Newcomer, and T. O. Byerts (eds.) (Stroudsburg, PA: Dowden, Hutchinson & Ross, 1976).
 60. Regnier, V., and Bonar, J., "Recycled Buildings for Elderly Housing," *Community Housing Choices for Older Americans*, M. P. Lawton and S. L. Hoover (eds.) (New York: Springer Publishing, 1981).
 61. Research Institute of America, *High Technology for the Executive* 2(1), 1984.
 62. Roberts, P. R., "Human Warehouses: A Boarding Home Study)" *American Journal of Public Health*, 64(3): 277ff, March 1974.
 63. Scholen, K., and Chen, Y-P., *Unlocking Home Equity for the Elderly* (Cambridge, MA: Ballinger Publishing, 1980).
 64. Shanas, E., "The Family as a Social Support System in Old Age," *The Gerontologist* 19(2): 169-174,

- April 1979.
65. Shanas, E., Townsend, P., Wedderburn, D., Friis, H., Milhoj, P., and Stehouwer, J., *Old People in Three Industrial Societies* (New York: Atherton Press, 1968).
 66. Siegel, J. S., "Review of Official National Demographic Projections," report prepared for the Office of Technology Assessment, contract No. 333-8300, October 1983.
 67. Steinfield, E., *Barrier-Free Design for the Elderly and the Disabled*, series of four modules (Syracuse, NY: Syracuse University Gerontology Center and Center for Instructional Development, 1975).
 68. Sternlieb, G., and Hughes, J. W., *The Future of Rental Housing* (Piscataway, NJ: Center for Urban Policy Research, Rutgers University, 1982).
 69. Stoner, E. P., and Earl, L. L., "Help With Activities of Everyday Life: Sources of Support for the Noninstitutionalized Elderly," *The Gerontologist* 23(1): 64-70, February 1983.
 70. Struyk, R. J., and Soldo, B. J., *Improving the Elderly's Housing* (Cambridge, MA: Ballinger Publishing, 1980).
 71. Struyk, R. J., and Turner, M., *Changes in the Housing Situation of the Elderly: 1974-1979* (Washington, DC: The Urban Institute, 1982); also *Journal of Housing for the Elderly* 2(1): 3-20, spring 1984.
 72. Teresi, J., Holmes, M., and Holmes, D., *Sheltered Living Environments for the Elderly*, Community Research Applications, August 1982.
 73. Tydeman, J., "Videotex: Ushering in the Electronic Household," *Habitats Tomorrow: Homes and Communities in an Exciting New Era*, E. Cornish (ed.) (Bethesda, MD: World Future Society, 1984).
 74. U.S. Congress, House of Representatives, *The Need for Health and Social Services in Elderly Housing*, joint hearing before the Select Committee on Aging and the Subcommittee on Housing and Consumer Interests, Apr. 12, 1978 (Washington, DC: U.S. Government Printing Office, 1978).
 75. U.S. Congress, House of Representatives, Select Committee on Aging, *Fraud and Abuse in Boarding Homes*, hearing before the Subcommittee on Housing and Consumer Interests, June 25, 1981 (Washington, DC: U.S. Government Printing Office, 1981).
 76. U.S. Congress, House of Representatives, Select Committee on Aging, *Shared Housing*, hearing before the Subcommittee on Housing and Consumer Interests, Nov. 17, 1981 (Washington, DC: U.S. Government Printing Office, 1982).
 77. U.S. Congress, House of Representatives, Select Committee on Aging, *Housing the Elderly: Alternative Options*, hearing before the Subcommittee on Housing and Consumer Interests, Oct. 12, 1983 (Washington, DC: U.S. Government Printing Office, 1984).
 78. U.S. Congress, Library of Congress, Congressional Research Service, "Financing Rural Development: Credit Needs and Resources," Washington, DC, August 1976.
 79. U.S. Congress, Library of Congress, Congressional Research Service, "Housing Programs Affecting the Elderly: A History and Alternatives for the Future," report No. 82-119 E, Washington, DC, June 21, 1982.
 80. U.S. Congress, Library of Congress, Congressional Research Service, "Shared Housing: A Possible Alternative for Housing the Elderly?" report No. 83-30 E, Jan. 11, 1983.
 81. U.S. Congress, Library of Congress, Congressional Research Service, "An Analysis of the Housing and Urban-Rural Recovery Act of 1983" report No. 84-30 S, Washington, DC, February 1984.
 82. U.S. Congress, Library of Congress, Congressional Research Service, "Expanding Housing Opportunities Through Residential Conversions and Homesharing," report No. 84-70 S, Washington, DC, Apr. 25, 1984.
 83. U.S. Congress, Office of Technology Assessment, *Technology and Handicapped People*, OTA-H-179 (Washington, DC: U.S. Government Printing Office, May 1982).
 84. U.S. Congress, Office of Technology Assessment, *The Market for Wheelchairs: Innovation and Federal Policy*, OTA-HCS-30 (Washington, DC: U.S. Government Printing Office, November 1984).
 85. U.S. Congress, Office of the Comptroller General, General Accounting Office, "The Well-Being of Older People in Cleveland, Ohio," HRD-77-70, Washington, DC, April 1977.
 86. U.S. Congress, U.S. Senate, *Developments in Aging: 1983, Volumes 1 and 2, A Report of the Special Committee on Aging* (Washington, DC: U.S. Government Printing Office, 1984).
 87. U.S. Congress, U.S. Senate, *Life Care Communities: Promises and Problems*, hearing before the Special Committee on Aging, May 25, 1983 (Washington, DC: U.S. Government Printing Office, 1983).
 88. U.S. Department of Commerce, Bureau of the Census, "Demographic Aspects of Aging and the Older Population in the United States," *Current Population Reports*, Series P-23, No. 59, May 1976.
 89. U.S. Department of Commerce, Bureau of the

- Census, "Projections of the Number of Households and Families: 1979 to 1995," *Current Population Reports*, Series P-25, No. 805, February 1979.
90. U.S. Department of Commerce, Bureau of the Census, "Estimates of the Population of the United States, by Age, Sex, and Race: 1980 to 1982," *Current Population Reports*, Series P-25, No. 929, May 1983.
 91. U.S. Department of Health and Human Services, Health Care Financing Administration, *Long Term Care: Background and Future Directions*, HCFA 81-20047, Washington, DC, January 1981.
 92. U.S. Department of Health and Human Services, Office of the Inspector General, *Board and Care Homes: A Study of Federal and State Actions*, Washington, DC, April 1982.
 93. U.S. Department of Health and Human Services, Public Health Service, National Center for Health Statistics, "Current Estimates From the National Health Interview Survey, United States, 1981," Series 10, No. 141, Hyattsville, MD, October 1982.
 94. U.S. Department of Health and Human Services, Public Health Service, National Center for Health Statistics, "Americans Needing Help to Function at Home," by B. Feller, *Advance Data From Vital and Health Statistics*, No. 92, DHHS Publication No. (PHS)83-1250, Hyattsville, MD, September 1983.
 95. U.S. Department of Housing and Urban Development, Office of Policy Development and Research, *Granny Flats: An Assessment of Economic and Land Use Issues*, HUD-PDR-751 (Washington, DC: U.S. Department of Housing and Urban Development, January 1983).
 96. Vladeck, B. C., *Unloving Care: The Nursing Home Tragedy* (New York: Basic Books, 1980).
 97. Weisman, S., "Computer Games for the Frail Elderly," *The Gerontologist* 23(4): 361-363, August 1983.
 98. Weissert, W. G., "Innovative Approaches to Long-Term Care and Their Evaluation," paper prepared for the workshop on "The Impact of Technology on Long-Term Care," sponsored by the Office of Technology Assessment (U.S. Congress), Project Hope, Inc., and The National Health Policy Forum, February 1983.
 99. Weissert, W. G., and Scanlon, W., "Determinants of Institutionalization of the Aged," working paper No. 1466-21 (Washington, DC: The Urban Institute, November 1983).
 100. Williams, E. F., "Assessment of Geriatric Patients in Relation to Needs for Services and Facilities," *Clinical Aspects of Aging*, 2d ed., W. Reichel (Baltimore: William & Wilkins, 1983).
 101. Winklevoss, H. E., "Actuarial Aspects of Continuing Care Retirement Communities," paper presented at the University of Pennsylvania Faculty Seminar Series on Aging, Oct. 14, 1982.
 102. York, J. L., and Caslyn, R. J., "Family Involvement in Nursing Homes," *The Gerontologist* 17(6): 500-505, December 1977.
 103. Zais, J. P., Struyk, R. J., and Thibodeau, T., *Housing Assistance for Older Americans: The Reagan Prescription* (Washington, DC: The Urban Institute Press, 1982).