



**Meeting the Long-Term Care Needs of the Baby Boomers:  
How Changing Families Will Affect Paid Helpers and  
Institutions**

Richard W. Johnson, Desmond Toohey, and Joshua M. Wiener

May 2007

# **The Retirement Project**

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*A crosscutting team of Urban Institute experts in Social Security, Medicare, Medicaid, tax and budget policy, and micro-simulation modeling ponder the aging of American society.*

The aging of America raises many questions about what's in store for future and current retirees and whether society can sustain current systems that support the retired population. Who will prosper? Who won't? Many good things are happening too, like longer life and better health. Although much of the baby boom generation will be better off than those retiring today, many face uncertain prospects. Especially vulnerable are divorced women, single mothers, never-married men, high school dropouts, and Hispanics. Even Social Security—which tends to equalize the distribution of retirement income by paying low-income people more than they put in and wealthier contributors less—may not make them financially secure.

Uncertainty about whether workers today are saving enough for retirement further complicates the outlook. New trends in employment, employer-sponsored pensions, and health insurance influence retirement decisions and financial security at older ages. And, the sheer number of reform proposals, such as personal retirement accounts to augment traditional Social Security or changes in the Medicare eligibility age, makes solid analyses imperative.

Urban Institute researchers assess how current retirement policies, demographic trends, and private sector practices influence older Americans' security and decision-making. Numerous studies and reports provide objective, nonpartisan guidance for policymakers.

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# Contents

<b>Executive Summary .....</b>	<b>iv</b>
<b>Introduction.....</b>	<b>1</b>
<b>Background .....</b>	<b>4</b>
<i>Disability Rates</i> .....	5
<i>Informal Caregiving</i> .....	6
<b>Projecting the Frail Older Population and Long-Term Care Arrangements.....</b>	<b>8</b>
<b>Future Size of the Frail Older Population .....</b>	<b>10</b>
<b>Characteristics of the Frail Older Population in the Future .....</b>	<b>15</b>
<b>Future Receipt of Long-Term Care Services .....</b>	<b>19</b>
<b>Number of Long-Term Care Users .....</b>	<b>21</b>
<b>Help Hours Received by Frail Older Adults .....</b>	<b>25</b>
<b>Conclusions.....</b>	<b>27</b>
<b>Methodological Appendix .....</b>	<b>29</b>
<i>The Urban Institute’s DYNASIM3</i> .....	29
<i>Projecting Future Disability Levels</i> .....	30
<i>Projecting Long-Term Care Arrangements</i> .....	33
<b>References.....</b>	<b>46</b>

## Tables

<b>Table 1.</b>	<b>Size of the Frail Older Population, by Disability Scenario, 2000 and 2040 .....</b>	<b>14</b>
<b>Table 2.</b>	<b>Demographic Characteristics of the Frail Older Population, 2000-2040 .....</b>	<b>16</b>
<b>Table 3.</b>	<b>Educational Attainment and Income of the Frail Older Population, 2000-2040 .....</b>	<b>17</b>
<b>Table 4.</b>	<b>Characteristics of the Adult Children of Frail Older Adults, 2000-2040 .....</b>	<b>19</b>
<b>Table 5.</b>	<b>Percentage of the Frail Older Population Receiving Long-Term Care Services, 2000-2040.....</b>	<b>20</b>
<b>Table 6.</b>	<b>Number of Older Adults Receiving Long-Term Care Services, by Disability Growth Scenario, 2000–2040 (millions) .....</b>	<b>23</b>
<b>Table 7.</b>	<b>Number of Older Adults Receiving Long-Term Care Services, As Percentage of the Population Ages 25 to 64, by Disability Growth Scenario, 2000-2040 .....</b>	<b>24</b>
<b>Appendix Tables</b>		
<b>Table A1.</b>	<b>Core Demographic and Economic Processes.....</b>	<b>37</b>
<b>Table A2.</b>	<b>Characteristics of the Older Population, 2000-2040.....</b>	<b>39</b>
<b>Table A3.</b>	<b>Ordered Probit Estimates of Disability Status.....</b>	<b>40</b>
<b>Table A4.</b>	<b>Determinants of Unpaid Long-Term Care Use, for Frail Older Adults with Surviving Children.....</b>	<b>41</b>
<b>Table A5.</b>	<b>Determinants of Paid Long-Term Care Services, for Frail Older Adults with Surviving Children .....</b>	<b>42</b>
<b>Table A6.</b>	<b>Determinants of Long-Term Care Service Use, for Frail Older Adults without Surviving Children .....</b>	<b>43</b>
<b>Table A7.</b>	<b>Determinants of Monthly Hours of Help Received by Frail Older Adults With Surviving Children .....</b>	<b>44</b>
<b>Table A8.</b>	<b>Determinants of Monthly Hours of Help Received by Frail Older Adults Without Surviving Children.....</b>	<b>45</b>

## Figures

<b>Figure 1. Percentage of Adults Ages 65 and Older With Disabilities, 2000-2040 .....</b>	<b>11</b>
<b>Figure 2. Number of Frail Adults Ages 65 and Older, 2000-2040.....</b>	<b>12</b>
<b>Figure 3. Frail Adults Ages 65 and Older, As Percentage of the Population Ages 25-64, 2000-2040 .....</b>	<b>13</b>
<b>Figure 4. Distribution of Number of Adult Children for the Frail Older Population, 2000-2040 .....</b>	<b>18</b>
<b>Figure 5. Number of Frail Older Adults Receiving Long-Term Care Services, by Type, 2000–2040 (Intermediate Disability Growth Scenario).....</b>	<b>22</b>
<b>Figure 6. Number of Frail Older Adults Using Long-Term Care Services, as Share of Population Ages 25–64, 2000–2040 (Intermediate Disability Growth Scenario).....</b>	<b>22</b>
<b>Figure 7. Mean Monthly Hours of At-Home Care Among Recipients, by Source, 2000-2040 .....</b>	<b>26</b>
<b>Figure 8. Total Monthly Help Hours Received by Frail Older Adults From Adult Children and Paid Sources, By Disability Growth Scenario, 2000 and 2040.....</b>	<b>26</b>

## Executive Summary

Population aging, especially when the baby boomers reach ages 85 and older, signals a likely surge in the use of long-term care services. Long-term care is the help people need when physical or mental disabilities impair their capacity to perform everyday life's basic tasks. It is a leading cause of catastrophic out-of-pocket costs for families and involves substantial government spending, primarily through Medicaid and Medicare. Few people have insurance coverage against the high costs of long-term care. After impoverishing themselves, most people must turn to Medicaid, a means-tested welfare program, to pay for their long-term care services. The quality of long-term care is often problematic, and a growing shortage of long-term care workers will likely further threaten service delivery.

Social and demographic changes create additional challenges. Much of the care received by frail elders is provided informally by the family, and adult daughters often assume primary responsibility for their parents' care. The availability of family caregivers may fall over time because of rising divorce rates, increasing childlessness, and declining family sizes. The rising labor force participation of women may also reduce their ability to provide informal care, and it is unclear whether men will fill the gap.

The future demand for long-term care depends heavily on how old-age disability rates evolve over time. Although evidence points to recent health improvements at older ages, there is no guarantee that these trends will continue. Disability associated with the rising prevalence of diabetes and obesity in the younger population might offset the future decline in disability rates at older ages.

This study projects to 2040 the number and percentage of people ages 65 and older with disabilities and their use of long-term care services. The analysis combines new results from models of current long-term care use with simulations of the size and characteristics of the future population. Population projections were based on *DYNASIM3*, the Urban Institute's dynamic microsimulation model of the older population. Models of current long-term care arrangements were estimated based on data from the 2002 Health and Retirement Study, a nationally representative survey of older Americans. The projections show how changes in disability levels, financial resources, children's availability, and other characteristics will affect the future demand for paid and unpaid long-term care services.

Given uncertainty about future disability rates, the report shows outcomes for three different disability projection scenarios. The intermediate disability scenario, which provides the "best guess" of the future size of the frail older population, does not assume any particular trend in disability rates. Instead, projected rates depend on changing mortality rates, educational attainment, income levels, and age and race distributions. The high disability projections assume that old-age disability rates will increase by 0.6 percent per year from 2000 to 2014 and remain constant thereafter, reflecting recent disability increases at younger ages. The low disability projections assume that overall old-age disability rates will decline by 1 percent per year indefinitely. The analysis defines disability as any difficulty with the activities of daily living (such as eating, bathing, and dressing) or the instrumental activities of daily living (such as housekeeping, using the telephone, and managing money).



## **Future Size of the Frail Older Population**

- The intermediate disability growth scenario shows that disability rates at ages 65 and older will decline by a few percentage points between 2000 and 2020 but then rise somewhat through 2040 as the earliest boomers reach their 80s. Between 2000 and 2040, this scenario projects that old-age disability rates will fall from 30 to 28 percent.
- Because the overall size of the older population will increase rapidly, the number of disabled older Americans will soar in coming decades. Between 2000 and 2040 the number of older adults with disabilities will more than double, increasing from about 10 million to about 21 million, according to the intermediate disability scenario.
- The disabled older population will grow faster than the younger population, likely raising the economic burden of long-term care. The intermediate disability scenario projects that in 2040 there will be only about 9 adults ages 25 to 64 to support each disabled older adult, down from about 15 younger adults in 2000.
- Even under the most optimistic disability scenario, which assumes that disability rates fall by 1 percent per year, the size of the disabled older population will grow by more than 50 percent between 2000 and 2040, and the number of disabled older adults for every adult ages 25 to 64 will increase.

## **Future Receipt of Paid Long-Term Care Services**

- Between 2000 and 2040, the share of disabled older adults receiving paid help will increase from about 22 to 26 percent, while the share receiving unpaid help from children will fall from about 28 to 24 percent. These projections reflect declines in average family size and continued improvement in women's earnings prospects.
- Rapid population growth will substantially boost the number of older people using paid long-term care services. If future disability rates follow the intermediate growth scenario, the number receiving paid home care will more than double between 2000 and 2040, increasing from 2.2 million to 5.3 million. The number of older nursing home residents will also more than double over the period, increasing from 1.2 million to 2.7 million.
- The simulations show that even under the most optimistic scenario long-term care burdens on families and institutions will increase substantially in coming decades. If disability rates decrease steadily and substantially over time the number of older adults using paid home care will increase by three-fourths between 2000 and 2040 and the number in nursing homes will increase by two-thirds.

## Help Hours Received by Disabled Older Adults

- Between 2000 and 2040 the average number of paid hours of help hours per frail elder will increase by about 36 percent, from 163 hours per month to 221 hours.
- The projected increase in the intensity of paid home care, combined with the increase in the size of the frail older population, will substantially boost the total number of paid home care hours received by older Americans. Under the intermediate disability growth scenario, total paid home care hours will more than triple between 2000 and 2040. Total paid home care hours would almost quadruple under the high disability scenario.

How long-term care arrangements actually evolve will depend heavily on future policy choices. Efforts to promote private long-term care insurance might add funding for future long-term care services and increase the use of paid care. Medicaid and Medicare expansions could also make paid services more affordable. However, problems recruiting and retaining long-term care workers could limit the availability of paid services and sharply raise costs. The financing and organization of long-term care is the third leg of retirement security for America's older adults as they age. It deserves more attention from policymakers to ensure that frail elders receive high quality care that is affordable to them and society.

## **Introduction**

The United States is growing older. With the aging of the “baby boom” generation, the number of older persons in the United States is projected to increase from 35 million persons to 87 million persons between 2000 and 2050 (U.S. Census Bureau 2004). The 85-and-over population, which has the highest disability rate of any age group, is expected to grow even faster, from 4 million persons in 2000 to 21 million persons by 2050. The increasing importance of the older population is reflected in public policy debates about income security and Social Security and about health care and Medicare.

Missing from the current debate is a serious examination of long-term care provided by nursing homes, home health agencies, personal care attendants, adult day care programs, assisted living facilities, and family and friends. Long-term care is the help needed to cope when physical or mental disabilities impair the capacity to perform the basic tasks of everyday life. Twentieth-century medicine’s assault on infectious diseases was accompanied by the growing prominence of chronic illnesses, such as Alzheimer’s disease, osteoporosis, heart disease and stroke, and their associated disability. Although estimates vary, data from the 2004/2005 National Long-Term Care Survey suggests that about 7 million older people have difficulties with the activities of daily living (ADLs), such as eating, bathing and dressing, or difficulties with the instrumental activities of daily living (IADLs), such as housekeeping, using the telephone, and managing money (Manton, Gu, and Lamb 2006). Disability rates are strongly related to age; about 50 percent of the population ages 85 and older has a disability, compared with only 10 percent of the population ages 65 to 74. Among the population ages 65 and older, 69 percent will develop disabilities before they die, and 35 percent will eventually enter a nursing home (Kemper, Komisar, and Alecxih 2005/2006).

The aging of the population combined with age-related disability rates signals a likely substantial increase in the need for long-term care services and financing in the future, which could exacerbate problems with the current system. These problems include the following:

- Long-term care is a leading cause of catastrophic out-of-pocket costs (Wiener, Illston, and Hanley 1994). Nearly a fifth of older people will incur more than \$25,000 in lifetime out-of-pocket long-term costs before they die (Kemper, Komisar, and Alexih 2005/2006).
- Few people have insurance coverage against the high costs of long-term care. The average cost of a private room in a nursing home was \$74,095 a year in 2005 (MetLife 2005). Medicare does not cover long-term care and only about 9 percent of the population ages 55 and older had any form of private long-term care insurance in 2002, most of which has major coverage limitations (Johnson and Uccello 2005; Wiener 2006). After impoverishing themselves, most people must depend on Medicaid, a means-tested welfare program, to pay for their long-term care services.
- Government expenditures, mainly Medicaid and Medicare, are substantial and will likely increase with the growing need for long-term care services. Long-term care accounts for about a third of total Medicaid expenditures (Burwell, Sredl, and Eiken 2006). In 1999, the U.S. Congressional Budget Office (1999) projected that Medicare and Medicaid long-term care expenditures for older adults would roughly double in constant-dollar terms between 2000 and 2020; total expenditures were projected to almost triple in constant-dollar terms between 2000 and 2040.
- Despite the preference of older people for home and community-based services, the long-term care financing and delivery system is biased towards institutional care. In fiscal year 2004, only 20 percent of Medicaid long-term care expenditures for people age 65 and older went to home and community based services.<sup>1</sup>
- The quality of long-term care services is often problematic. In 2005, about 16 percent of facilities were cited for quality of care problems that caused harm or immediate jeopardy to residents (U.S. Government Accountability Office 2005). Moreover, in 2005, the Administration on Aging's national ombudsman reporting system received more than 230,000 complaints concerning nursing facility residents' quality of care, quality-of-life problems, and residents' rights (U.S. Administration on Aging 2007).
- There is a shortage of long-term care workers, with associated high turnover rates and low levels of training (Stone and Wiener 2001). Turnover rates for certified nurse assistants in nursing homes average about 70 percent per year, but exceeded 100 percent per year in some states (Decker et al. 2003).

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<sup>1</sup> Based on unpublished 2005 Urban Institute analyses.

This study contributes to the debate on the future of long-term care by providing projections to 2040 of the number and percent of older people with disabilities and their use of long-term care services. These projections were developed by adding a long-term care module, mostly based on analysis of the Health and Retirement Study (HRS), to the Urban Institute's *DYNASIM3* model, which projects demographic characteristics, work participation, income and assets, and family structure for older adults. This study goes beyond earlier projections (Rivlin and Wiener 1988; Wiener, Illston, and Hanley 1994) by explicitly modeling the effects of certain factors, such as the impact of education on disability rates and the availability and use of informal care on the use of paid services, that were not included in earlier models. On the one hand, higher educational levels, which have been projected to increase over time with the aging of the baby boom generation, have been associated with lower levels of disability; on the other hand, the projected decline in the number of children of older people may decrease the availability of informal care and cause an increase in the use of nursing home care and paid home care.

The simulations show that even under the most optimistic scenario long-term care burdens on families and institutions will increase substantially in coming decades. Our projections indicate that if disability rates decrease steadily and substantially over time the number of older adults using paid home care will increase by three-fourths between 2000 and 2040 and the number in nursing homes will increase by two-thirds. Over the same period, the number receiving help from their adult children will increase by about one-third. Under the less optimistic assumption that disability rates will decline only modestly over time, the number of older adults using paid home care and nursing home care will more than double between 2000 and 2040, and the total hours of paid home care will more than triple.

## **Background**

The long-term care delivery system includes informal care, paid home care, residential care facilities and nursing homes. In 2002, 61 percent of frail older adults who did not live in nursing homes received help with basic personal activities or with household chores from paid and unpaid caregivers (Johnson and Wiener 2006). Among older adults with severe disabilities living at home, nearly 9 in 10 received help, and care recipients averaged 289 hours of help per month. Almost three-fifths (57 percent) of frail older adults received some unpaid care, as did 81 percent of persons with limitations in three or more activities of daily living. Only 14 percent of frail older adults and 37 percent of older adults with severe disabilities received paid home care services in 2002. Current public policies at the federal and state levels are designed to expand the role of home and community-based services to “rebalance” the financing and organization of long-term care (Wiener and Tilly 2003).

Assisted living and other congregate settings are a fast-growing housing and service option for adults with disabilities. Although they encompass a wide range of housing options and are difficult to define, they typically offer frail older adults basic services and round-the-clock oversight in settings that are less institutional than nursing homes. Most offer group meals, housekeeping services, medication reminders, and help with ADLs (Hawes et al. 1999). Based on data from 1998 and 2000, Spillman and Black (2005) estimated that between 400,000 and 800,000 older people lived in residential care facilities.

Nursing homes, increasingly the last resort for older adults with long-term care needs, primarily serve persons with severe medical and disability problems. In December 2006, 1.4 million adults lived in Medicare and Medicaid-certified nursing homes, and about 90 percent of residents were age 65 or older (American Health Care Association 2006; Jones 2002). The share

of older adults in institutions has declined in recent years, falling from 7.5 percent of older people in 1982 to 4.0 percent in 2004/2005 (Manton, Gu, and Lamb 2006).

The use of long-term care services is a complicated process that depends on many factors, including the level and type of disability, age, gender, financial status, marital status, and availability of informal care (Wiener, Illston, and Hanley 1994). *DYNASIM3* uses these factors in a microsimulation model to project future long-term care use, meaning that it starts with a sample of actual people and simulates what happens to each of them individually over time. Some factors are likely to change in ways that increase the use of services compared to current patterns, while others may reduce service use. Two critical determinants of long-term care use are the disability rate and availability of informal services.

### ***Disability Rates***

Long-term care services are used by people with disabilities, usually in ADLs and IADLs, or who are cognitively impaired (e.g., those with Alzheimer's disease). Future demand for long-term care services depends on whether disability rates rise or fall. There is a growing consensus that limitations in IADLs and functional limitations, such as difficulty bending, reaching and stooping, declined during the 1990s (Freedman, Martin, and Schoeni 2002). There is less agreement, however, about recent trends in the more severe type of disability that involves ADL limitations. One study found that the combined age-adjusted share of the older population with ADL disabilities or living in institutions fell by about 20 percent between 1982 and 2004/2005 (Manton, Gu, and Lamb 2006). Other studies, however, have found no significant changes in recent ADL disability rates (Crimmins, Saito, and Reynolds 1997; Schoeni, Freedman, and Wallace 2001; Waidmann and Liu 2000), while still others have found small increases (Crimmins and Saito 2000; Liao et al. 2001).

The fact that disability rates declined in the past, however, does not guarantee that they will decline in the future. Much of the recent decline in disability appears to be related to educational gains among older Americans (Freedman and Martin 1999). Average schooling levels will continue to rise in the older population (Smith 2000), but it is not certain that the strong negative relationship between education and disability will persist. Disability associated with the rising prevalence of diabetes and obesity in the younger population might offset the future decline in disability rates at older ages (Lakdawalla et al. 2003; Mokdad et al. 2000, 2001). In fact, between 1984 and 2000 disability rates increased at ages 40 to 49 while falling at ages 60 to 69 (Lakdawalla, Bhattacharya, and Goldman 2004). In addition, recent research found that adults born between 1948 and 1953 reported worse health in 2004, when they were ages 51 to 56, than those born 12 years earlier reported in 1992, when they were the same age (Soldo et al. 2006). Other research, however, found that mortality rates at ages 55 to 74 were lower between 1999 and 2002 than between 1971 and 1975, largely due to reduced smoking and better control of blood pressure (Cutler, Glaeser, and Rosen 2007).

### ***Informal Caregiving***

Much of the long-term care received by frail elders is provided informally by the family at home, and adult daughters often assume primary responsibility for the care of their parents. The availability of family caregivers may decline over time because of rising divorce rates (Teachman, Tedrow, and Crowder 2000), increasing childlessness (Bachu 1999), and declining family sizes (Bachu and O'Connell 2001). Women born between 1956 and 1960 had only 1.9 children on average, compared with 3.2 children for women born between 1931 and 1935 (Redfoot and Pandya 2002), while the share of women ages 40 to 44 without any children almost doubled (to 19 percent) between 1980 and 1998 (Bachu and O'Connell 2001). The rising labor



force participation of women (Blau 1998) may also reduce their ability to provide informal care and it is unclear whether men will fill the gap. From 1980 to 2001, the labor force participation rate of married women ages 45 to 64 increased from 47 percent to 66 percent (U.S. Census Bureau 2002). The impact of these social and demographic pressures will intensify once the boomers reach their 70s and 80s and many develop long-term care needs.

How families respond to these pressures will have important consequences for older adults, younger family members, and the cost of public programs. If family members respond by providing less informal care in coming years, many older adults may turn to paid services, such as formal home care or nursing home care. Greater longevity by men may result in more married couples that will reduce demand for paid long-term care (Lackdawalla and Philpson 2002). However, in one study using data from the Study of Asset and Health Dynamics Among the Oldest Old (AHEAD), frequent help from children with basic personal care reduced the likelihood of nursing home use over a two-year period by about 60 percent for disabled older adults ages 70 and older (Lo Sasso and Johnson 2002). Thus, the reduced availability of informal care from children may increase demand for nursing home care. Similarly, in a study of determinants of home care use, frail older people with high-earning adult children received less unpaid care from their offspring and more care from paid sources than frail older adults whose children had worse labor market prospects (Johnson forthcoming). These findings imply that the demand for paid services will likely rise in the future as the opportunity cost of care from adult children—especially daughters—grows.

## **Projecting the Frail Older Population and Long-Term Care Arrangements**

We examined boomers' likely long-term care arrangements by applying results from models of current long-term care use to simulations of the size and characteristics of the future population. Population projections were based on *DYNASIM3*, the Urban Institute's dynamic microsimulation model. Current models of long-term care arrangements were based on data from the 2002 HRS, a nationally representative longitudinal survey of older Americans conducted by the University of Michigan with primary funding from the National Institute on Aging. The projections show how changes in disability levels, financial resources, children's availability, and other characteristics will affect the future demand for paid and unpaid services. The appendix provides additional details about our methods.

The number of older Americans with long-term care needs in coming decades will depend on future trends in disability rates, but as noted earlier experts disagree about how these trends will evolve. Given the uncertainty about future disability rates, we computed three different disability projection scenarios. The intermediate disability scenario, which provides our "best guess" about the future size of the frail older population, does not assume a specific trend in disability rates. Instead, projected rates depend on changing mortality rates, educational attainment, income levels, and age and race distributions. For example, this scenario projects that rising education and income would reduce disability rates, but that disability rates would rise as the share of the older population at very advanced ages increases over time. The high disability projections assume that old-age disability rates would increase by 0.6 percent per year from 2000 to 2014 and remain constant thereafter, about the rate of increase Goldman et al. (2005) projected, reflecting recent disability increases at younger ages. The low disability projections

assume that overall old-age disability rates would decline by 1 percent per year indefinitely, consistent with recent U.S. Congressional Budget Office (2004) assumptions.

We combined projections of individual and family characteristics with estimated parameters from current models of long-term care arrangements to project the future use of paid and unpaid long-term care services. We based our model of current long-term care arrangements on the assumption that families make rational decisions about long-term care arrangements so as to maximize their well-being subject to financial and time constraints. Adult children and their frail parents likely weigh relative costs and benefits when making long-term care arrangements, and would thus use less unpaid help from children and more assistance from paid helpers when the costs to children of providing care are relatively high. Previous projections of future long-term care use have not fully addressed the impact of the changing availability of informal care (Kennell et al. 1992; Lakdawalla et al. 2003; Rivlin and Wiener 1988; Wiener, Illston, and Hanley 1994). The price of unpaid care from adult children depends on how much they could earn in the labor market if they chose to work. Other factors that affect long-term care arrangements include the potential care recipient's disability level, gender, age, race and ethnicity, marital status, number of adult sons and daughters, and the children's income, disability, education, and demographic characteristics.

The analysis projects the number of frail Americans ages 65 and older and the number who receive long-term care. Frailty is defined as difficulty with at least one ADL or IADL. ADLs consist of bathing, getting in and out of bed, eating, dressing, walking across the room, and using the toilet. IADLs consist of shopping for groceries, preparing hot meals, using the telephone, taking medications, and managing money. The results show the number and share of older frail Americans receiving any unpaid care, unpaid care from adult children, unpaid care

from other family members or friends, paid home care, and nursing home care. Additionally, we project total monthly hours of at-home care received from paid and unpaid sources. We report outcomes for 2000, 2010, 2020, 2030, and 2040 under the high, intermediate, and low disability scenarios, but we highlight results for the intermediate scenario, which represents our best estimate of future outcomes. The report also projects long-term care arrangements for the subset of frail older Americans with severe disabilities, defined as three or more ADL limitations.

The projections assume that current policies and behavior patterns persist through 2040. The results reflect changes over time in key characteristics of the frail older population, including financial resources, the availability of child caregivers and the cost of their time, and age, race, and educational distributions. However, policy changes could cause actual future outcomes to diverge substantially from our projections. For example, increased government subsidies for paid home care or private long-term care insurance could promote the future use of paid helpers at home. Similarly, future generations of older frail Americans may be more comfortable with paid helpers than the current generation, perhaps because of earlier experiences with childcare providers, leading to greater future use of paid home care than we project.

### **Future Size of the Frail Older Population**

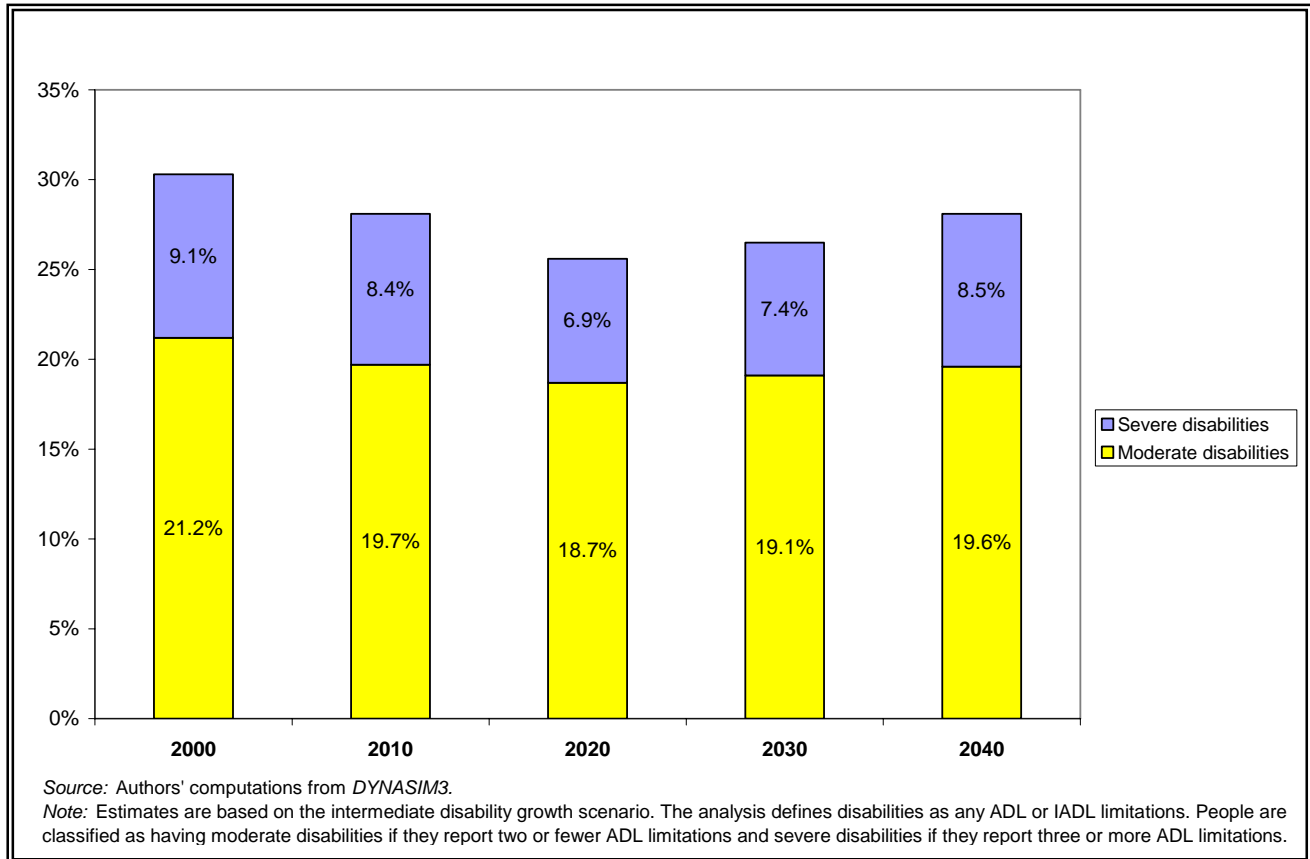
The intermediate disability scenario shows that between 2000 and 2020 disability rates at ages 65 and older will decline by a few percentage points, falling from about 30 to 26 percent (figure 1).<sup>2</sup> This 4-percentage-point decline will reduce the relative risk that an older adult

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<sup>2</sup> Our disability rate for 2000 is consistent with results from the HRS, but exceeds rates estimated in some other datasets. For example, 80.3 percent of respondents in the National Long-Term Care Survey reported no disabilities in 1999 (Manton and Gu 2001). Discrepancies arise from differences in disability definitions, the wording and flow of survey questions, the treatment of missing data, and the sampled population (Freedman et al. 2004).

**Figure 1**

**Percentage of Adults Ages 65 and Older with Disabilities, 2000–2040**



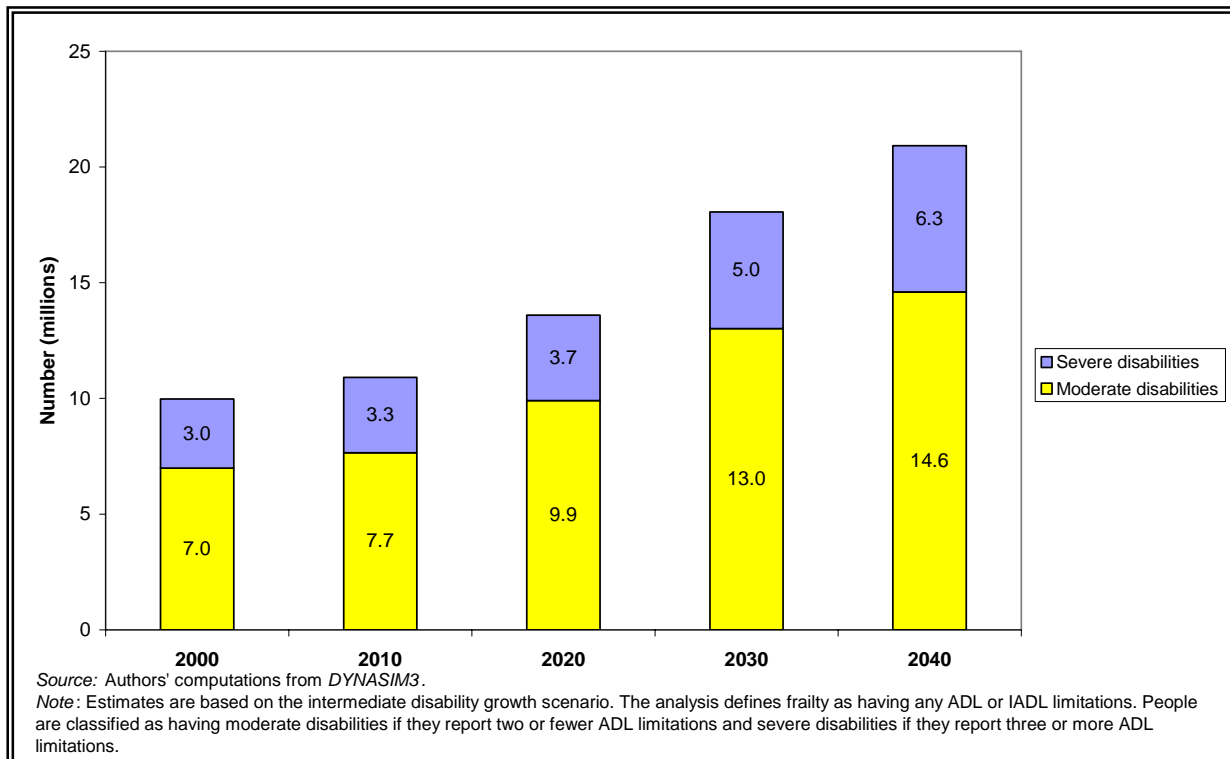
becomes frail by about 15 percent. Severe disability rates, defined by the presence of three or more ADL limitations, will fall by about 2 percentage points, to about 7 percent, a relative decline of 23 percent. Educational gains among older adults will drive these projected improvements, under the assumption that current health advantages for well-educated older adults persist. Between 2000 and 2020, the share of adults ages 65 and older with a college degree will nearly double, to about 28 percent. (Appendix table A2 describes the changing characteristics of the older population.)

Between 2020 and 2040, however, disability rates at older ages will rise by more than 2 percentage points, to about 28 percent, as the older population ages rapidly. With the oldest baby

boomers turning 85 in 2031, the number of adults ages 85 and older as a portion of the population ages 65 and older will rise from about 9 percent in 2030 to about 14 percent in 2040, after remaining fairly constant during the previous 30 years. Between 2000 and 2040, then, the intermediate disability scenario implies that disability rates will decline by only 2 percentage points.

Because the overall size of the older population will expand rapidly, the number of frail older Americans will soar in coming decades. Between 2000 and 2040, the number of older adults with disabilities will more than double, increasing from about 10 million to about 21 million (figure 2). The number of older Americans with severe disabilities will increase by more than 3 million, to about 6 million adults.

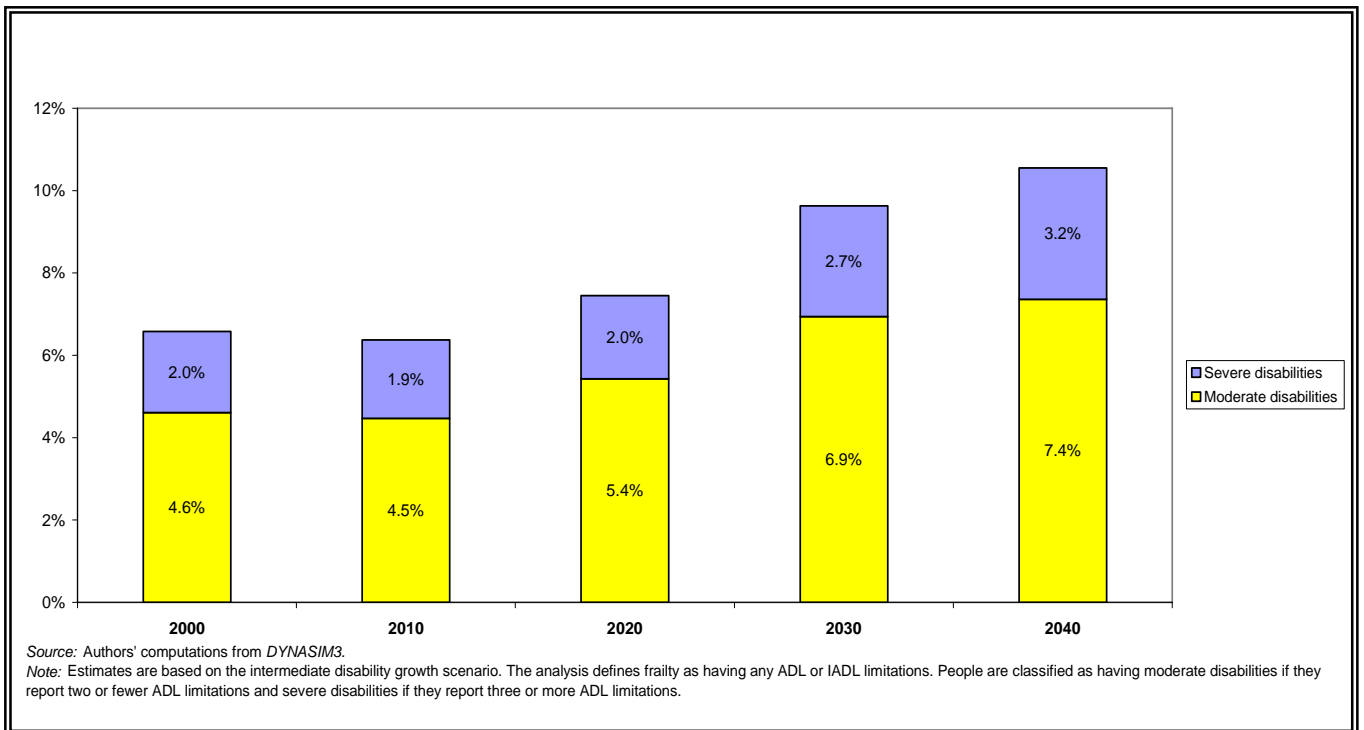
**Figure 2**  
**Number of Frail Adults Ages 65 and Older, 2000–2040**



The frail older population will grow faster than the younger population, likely raising the economic burden of long-term care. Between 2000 and 2040 the number of frail older adults relative to the number of adults ages 25 to 64 (who are more likely than other groups to work and pay taxes) will increase from 6.6 to 10.6 percent (figure 3). In 2040, then, there will be only about 9 adults ages 25 to 64 to support each frail older adult, down from about 15 younger adults in 2000. The growth in the relative size of the frail older population will increase the time and financial burdens on the younger population of providing long-term care, unless the portion of care costs paid by older care recipients themselves (or by their private insurance policies) increases over time.<sup>3</sup>

**Figure 3**

**Frail Adults Ages 65 and Older, as Percentage of the Population Ages 25-64, 2000–2040**



<sup>3</sup> Technological improvements in long-term care delivery, which has always followed a low-tech, hands-on approach, could also reduce future care burdens.

Given uncertainty over how future disability rates will evolve, the actual size of the future disabled population could differ substantially from our projections. Table 1 compares outcomes based on our best guess about future trends (the intermediate disability scenario) with a more pessimistic outlook that assumes disability rates increase by 0.6 percent per year between 2000 and 2014 (and remain constant thereafter) and a more optimistic outlook that assumes that disability rates decline by 1 percent per year between 2000 and 2040. The high and low disability scenarios present plausible upper and lower bounds on the future size of the older frail population.

**Table 1**  
**Size of the Frail Older Population, by Disability Scenario, 2000 and 2040**

	2000	2040		
		Low	Intermediate	High
<b>Percentage of Adults Ages 65+ with Disabilities</b>				
Any disability	30.3	20.3	28.0	33.0
Moderate disabilities only	21.2	14.2	19.6	23.1
Severe disabilities	9.1	6.1	8.5	9.9
<b>Number of Frail Adults Ages 65+ (millions)</b>				
Any disability	10.0	15.1	20.9	24.6
Moderate disabilities only	7.0	10.6	14.6	17.2
Severe disabilities	3.0	4.5	6.3	7.4
<b>Frail Adults Ages 65+, as Percentage of Population Ages 25-64</b>				
Any disability	6.6	7.6	10.6	12.4
Moderate disabilities only	4.6	5.4	7.4	8.7
Severe disabilities	2.0	2.3	3.2	3.7

**Source:** Authors' computations from *DYNASIM3*.

**Notes:** Estimates are for Americans ages 65 and older. The analysis defines disabilities as any ADL or IADL limitations. People are classified as having moderate disabilities if they report two or fewer ADL limitations and severe disabilities if they report three or more ADL limitations. Components do not always add to totals because of rounding.



These sensitivity analyses show that the 2040 disability rate for the older population will likely range between 20 and 33 percent. The number of frail older Americans in 2040 will range between about 15 million and 25 million. Even under the most optimistic disability scenario, the size of the 2040 frail older population will exceed the 2000 population by more than 50 percent, and the number of frail older adults relative to the number of adults ages 25 to 64 will grow between 2000 and 2040. It is unlikely, then, that health improvements alone will resolve questions about how to finance future long-term care costs.

### **Characteristics of the Frail Older Population in the Future**

In addition to increasing in size, the frail older population will grow older and more ethnically diverse by 2040 and will include a smaller percentage of widows. For example, between 2000 and 2040 the portion of frail older adults who are ages 65 to 74 will decline from about 38 to 30 percent, while the portion who are ages 85 and older will increase from about 19 to 29 percent (table 2). Nearly all of the increase in the oldest frail population will occur after 2030, since the oldest baby boomers will not reach age 85 until 2031. The number of older Hispanics with disabilities will soar over time, accounting for about one in five frail older adults in 2040, up from 1 in 15 in 2000. Additionally, the portion of the frail older population that is widowed will decline, primarily because expected improvements in male life expectancy will narrow the gender gap between male and female mortality rates. However, divorce and the share who never marry will rise in the frail older population. By 2040, about one in six frail older adults will be divorced. Accounting for all of these trends in marriage, divorce, and widowhood rates, the share of the frail older population currently married will decline by nearly 5 percentage points between 2000 and 2040.

**Table 2****Demographic Characteristics of the Frail Older Population, 2000–2040**

	2000	2010	2020	2030	2040
<b>Age</b>					
65–74 (%)	38.3	40.0	43.9	38.4	29.6
75–84 (%)	42.3	37.0	36.1	40.4	41.0
85 and older (%)	19.4	23.0	20.1	21.2	29.4
Mean age	77.5	77.7	77.1	77.8	79.8
<b>Race (%)</b>					
African American	10.2	11.1	11.4	11.7	13.4
Hispanic	6.8	10.0	13.3	16.4	19.5
Non-Hispanic white and other	83.1	78.9	75.2	71.9	67.1
<b>Gender (%)</b>					
Male	34.4	35.7	37.5	37.7	38.5
Female	65.6	64.3	62.5	62.3	61.5
<b>Marital Status (%)</b>					
Married	39.8	39.5	39.8	38.8	35.2
Widowed	43.5	40.7	35.5	33.0	34.7
Divorced	9.3	13.6	16.4	17.4	16.8
Never married	7.5	6.3	8.3	10.9	13.3

**Source:** Authors' computations from *DYNASIM3*.

**Notes:** Projections of the frail population ages 65 and older are based on the intermediate disability scenario. Components do not always sum to 100 percent because of rounding.

Older boomers with long-term care needs will be better educated and receive more income than the current generation of frail older people. The share of frail older adults with college degrees will more than double between 2000 and 2040, while the share without high school diplomas will be cut in half (table 3). Rising educational levels and growing productivity will expand financial resources. Between 2000 and 2040 real median household income among older people with disabilities will increase by about 40 percent, even though incomes for frail older people will continue to lag those for healthier older people. By 2040, about 41 percent of

**Table 3****Educational Attainment and Income of the Frail Older Population, 2000–2040**

	2000	2010	2020	2030	2040
<b>Education (%)</b>					
Did not complete high school	41.0	30.2	21.8	19.4	17.9
High school graduate	47.7	54.0	57.6	57.9	56.1
College graduate	11.3	15.8	20.6	22.6	26.1
<b>Real Household Income (\$)</b>					
Mean	31,056	35,162	40,758	43,445	45,168
Median	22,087	24,557	28,102	29,248	30,848
<b>Household Income Relative to Poverty Level (%)</b>					
0 to 1	13.0	12.2	11.6	10.3	9.5
1.01 to 2	29.0	24.8	21.6	19.9	18.9
2.01 to 3	20.5	19.1	17.2	17.8	17.3
3.01 to 4	14.3	13.6	13.2	13.0	13.0
More than 4	23.3	30.2	36.4	39.0	41.3

**Source:** Authors' computations from *DYNASIM3*.

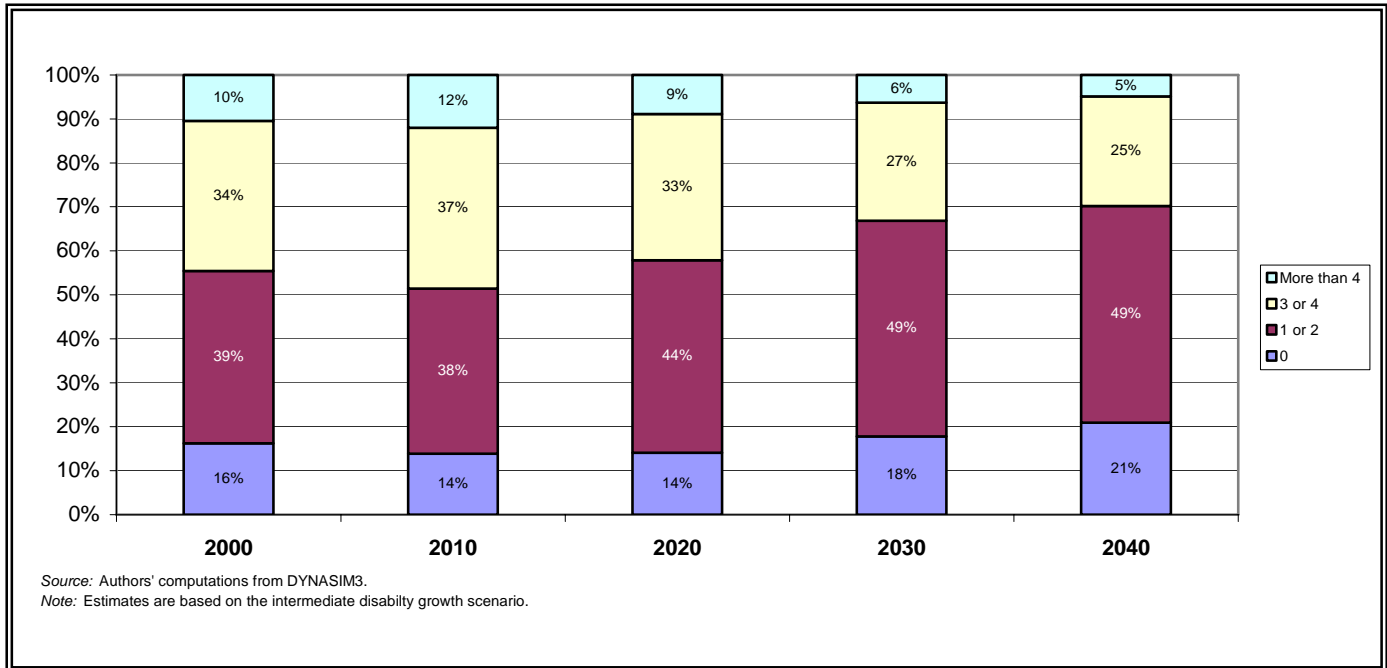
**Notes:** Projections of the frail older population ages 65 and older are based on the intermediate disability scenario. Financial amounts are expressed in constant 2002 dollars. Components do not always sum to 100 percent because of rounding.

frail older adults will have incomes in excess of four times the federal poverty level; only about 10 percent will live in poverty, compared with 13 percent in 2000.

Fewer adult offspring will be available to care for their frail parents in coming years. The relatively low fertility rates that have prevailed since about 1975 will increase the portion of the frail older population without any surviving adult children from about 16 percent in 2000 to about 21 percent in 2040 (figure 4). The likelihood that frail older people have large families to provide care will also decline over the coming decades.

**Figure 4**

**Distribution of Number of Adult Children  
for the Frail Older Population, 2000–2040**



The characteristics of frail older adults' children will change as well. Despite the trend toward later childbearing (Matthews and Hamilton 2002), more of their children will be near traditional retirement ages in coming decades as the frail older population itself grows older. For example, between 2000 and 2040 the share of their adult children ages 60 and older will double, to about one in five (table 4). The increased availability of retired offspring could reduce the opportunity cost of providing care, since retirees do not forego labor market earnings when they engage in care activities.<sup>4</sup> However, educational gains among adult women could increase the opportunity cost of providing care by boosting caregivers' earnings potential. In 2040, about 60

<sup>4</sup> Many people caring for their older parents today are near or past traditional retirement ages. In 2002, 19 percent of adult children caring for frail older parents were ages 60 and older (Johnson and Wiener 2006).

**Table 4****Characteristics of the Adult Children of Frail Older Adults, 2000–2040**

	2000	2010	2020	2030	2040
<b>Age (%)</b>					
<b>Sons and Daughters</b>					
18–30	2.5	2.8	3.5	4.6	4.6
30–39	9.0	10.3	12.4	14.5	14.6
40–49	42.0	30.1	29.6	30.8	29.7
50–59	36.2	40.7	31.5	29.8	31.0
60 and older	10.2	16.1	23.0	20.3	20.1
<b>Education (%)</b>					
<b>Sons</b>					
Did not complete high school	13.6	12.5	13.1	13.1	12.3
High school graduate	33.9	33.5	33.7	33.4	34.2
College graduate	52.5	54.0	53.3	53.5	53.6
<b>Daughters</b>					
Did not complete high school	13.8	12.6	12.3	11.0	9.4
High school graduate	38.9	35.4	32.9	30.5	30.1
College graduate	47.3	52.0	54.8	58.5	60.4

**Source:** Authors' computations from *DYNASIM3*.

**Notes:** Projections of the frail population ages 65 and older are based on the intermediate disability scenario. Totals do not always sum up 100 percent because of rounding.

percent of adult women with frail parents ages 65 and older will have completed four or more years of college, up from about 47 percent in 2000 (table 4). Sons' average educational attainment will not change over time. These estimates are consistent with high college graduation rates among young women today, which now exceed those for young men (Stoops 2004).

### **Future Receipt of Long-Term Care Services**

The changing characteristics of the frail older population will reduce the proportion receiving unpaid help from family and friends by a few percentage points over the coming decades and increase the proportion receiving paid services by a few percentage points. Between

2000 and 2040, the share of frail older adults receiving any unpaid help will fall from about 57 to 54 percent, while the share receiving help from adult children will fall from about 28 to 24 percent (table 5).<sup>5</sup> At the same time, the share receiving paid help will increase from about 22 to 26 percent. These projections reflect declines in average family size and continued improvement in women’s earnings prospects. Unpaid help from spouses and other people who are not the recipients’ children will remain more common than help from children, even though the likelihood that frail older adults will be married in the future will decline slightly.

The proportion of the frail older population residing in nursing homes will not change much between 2000 and 2040, rising by less than 1 percentage point to 13 percent. The increase over time in adult children’s opportunity cost of providing care will boost admission rates but

**Table 5**

**Percentage of the Frail Older Population Receiving Long-Term Care Services, 2000–2040**

	2000	2010	2020	2030	2040
<b>All Frail Older Adults</b>					
Any unpaid help	57.2	55.9	53.6	53.2	53.8
Unpaid help from children	27.8	28.2	26.3	23.8	23.9
Unpaid help from other sources	39.1	37.3	36.3	37.8	37.9
Paid home care	22.2	22.6	21.3	22.3	25.5
Nursing home care	12.3	11.9	10.7	11.2	12.9
<b>Severely Disabled Older Adults</b>					
Any unpaid help	78.7	77.8	77.0	76.1	75.6
Unpaid help from children	41.8	43.1	43.2	39.4	38.1
Unpaid help from other sources	51.2	48.8	47.5	49.1	49.6
Paid home care	53.4	54.2	53.7	55.2	59.0
Nursing home care	30.9	29.8	28.6	29.2	31.6

**Source:** Authors’ computations from *DYNASIM3*.

**Notes:** Projections of the frail population ages 65 and older are based on the intermediate disability scenario.

<sup>5</sup> These projections of the share of the frail older population receiving long-term care refer to the intermediate disability growth scenario. The low and high growth scenarios generate very similar projections.

will be offset by declines in the share of frail older adults with limited income, who often tend to use nursing homes partly because Medicaid heavily subsidizes the prices they face.

Older people with severe disabilities will remain much more likely to receive long-term care services than the general population of frail older adults. In 2040 about three-quarters of older adults with severe disabilities will receive unpaid help, more than one-third will receive unpaid help from children, and nearly 6 in 10 will receive paid home care. Almost one-third will reside in nursing homes.

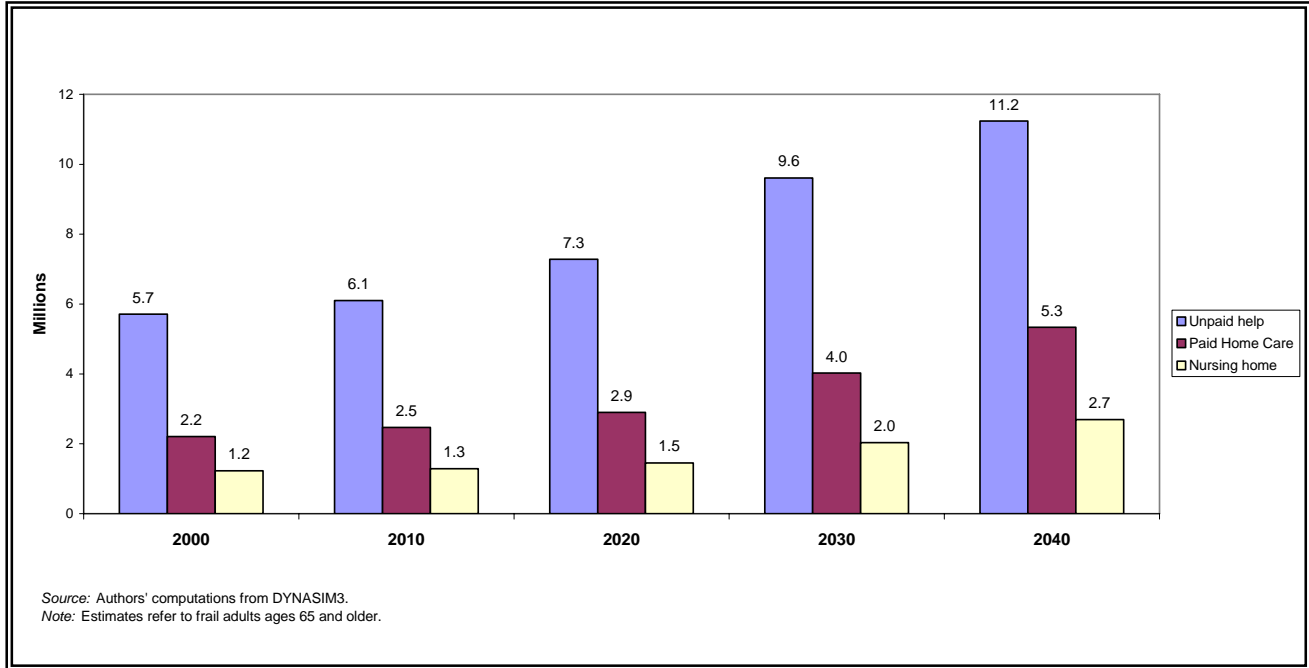
### **Number of Long-Term Care Users**

Although the share of the frail older population receiving paid long-term care services will not increase much, rapid population growth will substantially boost the number of older people using paid services. If future disability rates follow the intermediate growth scenario, the number of frail older adults receiving paid home care will more than double between 2000 and 2040, increasing from 2.2 million to 5.3 million (figure 5). The number of older nursing home residents will also more than double over the period, from 1.2 million to 2.7 million. The use of unpaid help will increase more slowly in relative terms. Nonetheless, by 2040 about 11.2 million frail older adults are likely to receive unpaid help from family and friends.

The number of frail older adults receiving long-term care will also grow over time as a share of the population ages 25 to 64, suggesting that care burdens on prime-age workers will rise as the boomers age. For example, under the intermediate disability growth assumptions older paid home care users will equal 2.7 percent of the population ages 25 to 64 in 2040, up from 1.5 percent in 2000 (figure 6). Between 2000 and 2040 older recipients of unpaid help as a share of the prime working-age population will increase from 3.8 to 5.7 percent. The number of older

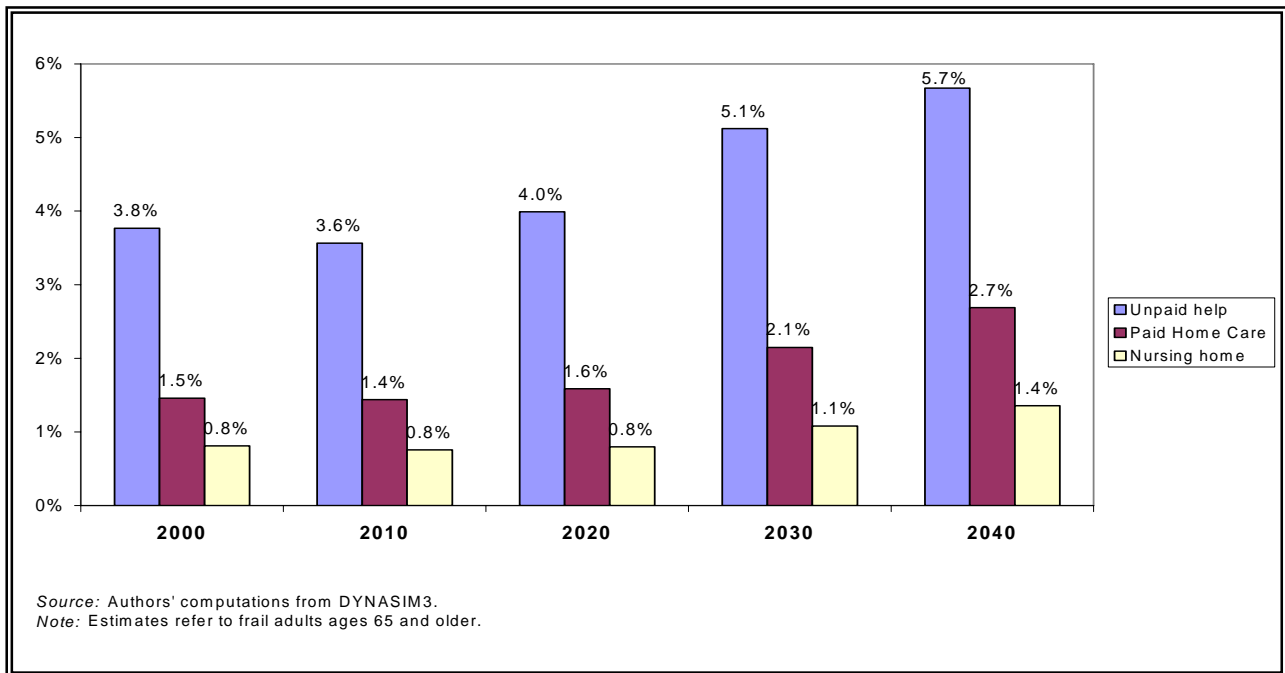
**Figure 5**

**Number of Frail Older Adults Receiving Long-Term Care Services, by Type, 2000–2040 (Intermediate Disability Growth Scenario)**



**Figure 6**

**Number of Frail Older Adults Using Long-Term Care Services, as Share of Population Ages 25–64, 2000–2040 (Intermediate Disability Growth Scenario)**





nursing home residents for every 1,000 adults ages 25 to 64 will nearly double, increasing from 8 to 14.

The actual number of older adults receiving long-term care will depend on the future evolution of old-age disability rates. For example, if future disability rates follow the low-growth scenario—a likely lower bound for the future number of older Americans with long-term care needs—then we project that only 3.9 million older Americans will use paid home care in 2040 (table 6). However, if disability instead follows the high-growth scenario and increases somewhat in the next few years, then the number of older paid home care recipients will reach 6.2 million by 2040, nearly tripling between 2000 and 2040. The number of older nursing home residents in 2040 will range from 2.0 million to 3.1 million, depending on the future course of

**Table 6**  
**Number of Older Adults Receiving Long-Term Care Services, by Disability Growth Scenario, 2000–2040 (millions)**

	2000	2010	2020	2030	2040
<b>Low Disability Scenario</b>					
Any unpaid help	5.7	6.0	7.2	8.2	8.2
Unpaid help from children	2.8	3.0	3.5	3.8	3.7
Unpaid help from other sources	3.9	4.0	4.8	5.8	5.7
Paid home care	2.2	2.4	3.0	3.6	3.9
Nursing home care	1.2	1.3	1.5	1.8	2.0
<b>Intermediate Disability Scenario</b>					
Any unpaid help	5.7	6.1	7.3	9.6	11.2
Unpaid help from children	2.8	3.1	3.6	4.3	5.0
Unpaid help from other sources	3.9	4.1	4.9	6.8	7.9
Paid home care	2.2	2.5	2.9	4.0	5.3
Nursing home care	1.2	1.3	1.5	2.0	2.7
<b>High Disability Scenario</b>					
Any unpaid help	5.7	6.9	9.4	11.9	13.1
Unpaid help from children	2.8	3.5	4.5	5.3	5.8
Unpaid help from other sources	3.9	4.6	6.5	8.6	9.3
Paid home care	2.2	2.8	3.9	5.1	6.2
Nursing home care	1.2	1.5	1.9	2.6	3.1

**Source:** Authors' computations from *DYNASIM3*.

disability rates, while the number of older recipients of unpaid help from family and friends will range from 8.2 million to 13.1 million.

Even under the most optimistic disability scenario, however, the number of older long-term care users as a share of the working-age population will increase over time. For example, under the low disability scenario the number of older paid home care users per 1,000 adults ages 25 to 64 will rise from 15 in 2000 to 20 in 2040 (table 7). Under the high disability scenario, the number will more than double by 2040, to 31.<sup>6</sup>

**Table 7**

**Number of Older Adults Receiving Long-Term Care Services, As Percentage of the Population Ages 25 to 64, by Disability Growth Scenario, 2000–2040**

	2000	2010	2020	2030	2040
<b>Low Disability Scenario</b>					
Any unpaid help	3.8	3.5	3.9	4.4	4.1
Unpaid help from children	1.8	1.8	1.9	2.0	1.9
Unpaid help from other sources	2.6	2.3	2.7	3.1	2.9
Paid home care	1.5	1.4	1.6	1.9	2.0
Nursing home care	0.8	0.7	0.8	1.0	1.0
<b>Intermediate Disability Scenario</b>					
Any unpaid help	3.8	3.6	4.0	5.1	5.7
Unpaid help from children	1.8	1.8	2.0	2.3	2.5
Unpaid help from other sources	2.6	2.4	2.7	3.6	4.0
Paid home care	1.5	1.4	1.6	2.1	2.7
Nursing home care	0.8	0.8	0.8	1.1	1.4
<b>High Disability Scenario</b>					
Any unpaid help	3.8	4.1	5.1	6.4	6.6
Unpaid help from children	1.8	2.0	2.5	2.8	2.9
Unpaid help from other sources	2.6	2.7	3.5	4.6	4.7
Paid home care	1.5	1.6	2.1	2.7	3.1
Nursing home care	0.8	0.9	1.1	1.4	1.6

**Source:** Authors' computations from *DYNASIM3*

<sup>6</sup> Our projections of the future number of older long-term care recipients did not change significantly when we dropped child characteristics from our long-term care models. It does not appear, then, that the failure of earlier modeling efforts to account for changing child characteristics seriously biased their findings.

## **Help Hours Received by Frail Older Adults**

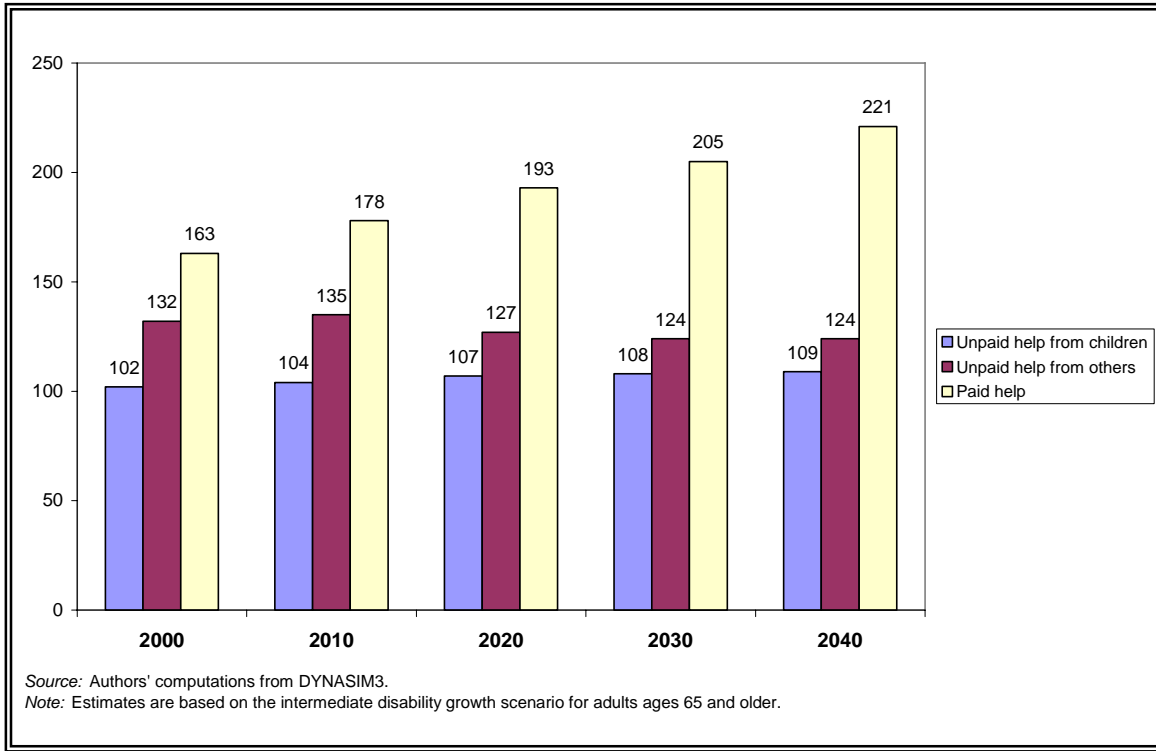
The average number of paid help hours obtained by recipients of paid home care will increase substantially over the next few decades, while the average number of unpaid help hours will remain fairly stable. Between 2000 and 2040 the average number of paid help hours will increase by about 36 percent, from 163 hours per month to 221 hours (figure 7). This growth will be driven partly by increases in the opportunity cost of children's time, which have larger impacts on the amount of paid home care than on the likelihood that older people receive any home care. More importantly, increases in the share of frail older adults with high incomes (who can afford to purchase paid services) and in the share divorced or never married (who tend to use more paid home care than other groups) will boost the intensity of paid home care use.

Unpaid help hours per recipient will not increase much over time. Between 2000 and 2040 the average number of unpaid help hours from adult children will increase by about 7 percent among recipients. The increase in the opportunity cost of children's time will significantly slow the growth in children's help hours. The average number of unpaid help hours from other sources will fall by about 6 percent between 2000 and 2040.

The projected increase in the intensity of paid home care, combined with the expansion in the size of the frail older population, will substantially boost the total number of paid home care hours received by older Americans. Under the intermediate disability growth scenario, total paid home care hours will more than triple between 2000 and 2040, from 360 million hours per month to about 1.2 billion hours (figure 8). Total paid home care hours would almost quadruple if disability rates increased somewhat in the future, as assumed in the high disability scenario. Total unpaid help hours from adult children will also increase over time as the population

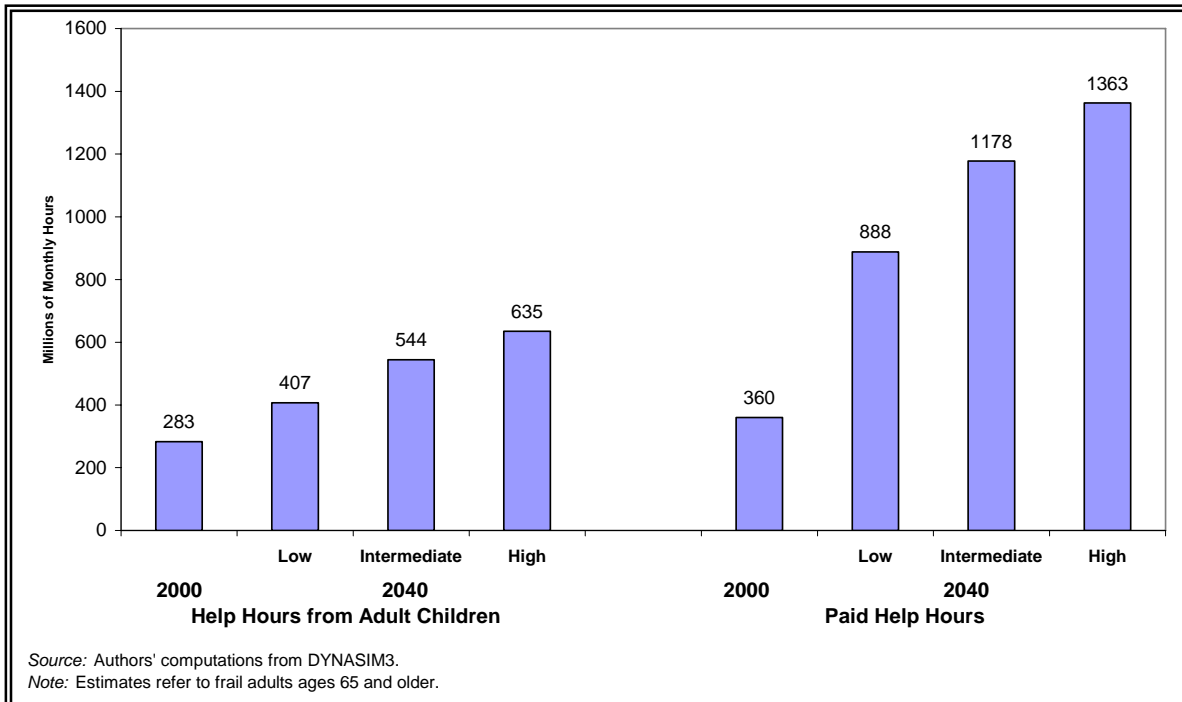
**Figure 7**

**Mean Monthly Hours of At-Home Care among Recipients, by Source, 2000–2040**



**Figure 8**

**Total Monthly Help Hours Received by Frail Older Adults from Adult Children and Paid Sources, by Disability Growth Scenario, 2000 and 2040**



expands, but growth rates will be more modest. Under the intermediate disability scenario, total help hours from adult children will not quite double between 2000 and 2040.

## **Conclusions**

The simulations show that even under the most optimistic scenario long-term care burdens on families and institutions will increase substantially in coming decades. Our projections indicate that if disability rates decrease steadily and substantially over time the number of older adults using paid home care will increase by three-fourths between 2000 and 2040 and the number in nursing homes will increase by two-thirds. Over the same period, the number receiving help from their adult children will increase by about one-third.

Under an intermediate assumption that disability rates will decline only modestly over time, the number of older adults using paid home care and nursing home care will more than double between 2000 and 2040, and the total hours of paid home care will more than triple. Using our best guess about future disability rates, our projections indicate that the number of older paid home care users per working-age adult will increase by about 80 percent between 2000 and 2040, while the number of older nursing home residents per working-age adult will increase by about 75 percent. Unless the boomers prepare for their future long-term care needs by boosting their retirement savings or purchasing private long-term care insurance coverage, these trends will raise the financial burdens on the younger population of providing long-term care. The outlook becomes more difficult if old-age disability rates increase over time.

Although we project that declines in average family sizes and improvements in women's employment prospects will reduce the share of frail older adults receiving unpaid help from their children, families will continue to play pivotal roles in long-term care provision. Many families

will be unable to afford paid home care, even as the opportunity costs of family care rise. Elder care responsibilities will create special burdens for women, who have always been much more likely than men to serve as the primary caregivers for their parents. Many will likely be forced to cut back on their paid work, threatening their own financial security (Johnson and Lo Sasso 2006). Caregiving often takes emotional tolls, leaving caregivers feeling overwhelmed and isolated from their friends. Many caregivers in fact report high levels of stress, depression, and physical health problems (Yee and Schultz 2000). These consequences will likely become more severe as families shrink and the frail older population grows.

How long-term care arrangements actually evolve will depend heavily on future policy choices. Efforts to promote private long-term care insurance might add funding for future long-term care services and increase the use of paid home care. Medicaid and Medicare expansions could also make paid services more affordable. However, problems recruiting and retaining long-term care workers could limit the availability of paid services and sharply raise costs. The financing and organization of long-term care is the third leg of retirement security for America's oldest adults at they age. It deserves more attention from policymakers to ensure that frail elders receive high quality care that is affordable to them and society.

## **Methodological Appendix**

We projected future long-term care arrangements to 2040 by combining simulations of the size and characteristics of the future population with results from models of current long-term care use. The projections show how changes in disability levels, financial resources, children’s availability to provide care and the costs they incur, and other characteristics will affect the future demand for paid services.

### ***The Urban Institute’s DYNASIM3***

Projections of the size and characteristics of the future population were based on *DYNASIM3*, the Urban Institute’s dynamic microsimulation model. Starting with a representative sample of individuals and families from the 1990 to 1993 panels of the Survey of Income and Program Participation (SIPP), the model “ages” the data year by year, simulating such demographic events as births, deaths, marriages, and divorces, and such economic events as labor force participation, earnings, hours of work, and retirement. The model simulates Social Security coverage and benefits, employer-sponsored pension participation, and benefit payments and pension assets. It also simulates home and financial assets, health status, living arrangements, and income from other family members. Additionally, it calculates Supplemental Security Income (SSI) eligibility, participation, and benefits.

Each demographic and economic characteristic modeled in *DYNASIM3* uses the latest and most appropriate data available. Many of the model predictions are calibrated to external targets, and utilize the inflation, interest rate, and productivity growth assumptions used by the Social Security trustees. Table A1 reports the data and processes used to estimate the key

characteristics. *DYNASIM3* also includes Social Security and SSI benefit calculators and payroll tax calculators. For additional information about *DYNASIM3*, see Favreault and Smith (2004).<sup>7</sup>

### ***Projecting Future Disability Levels***

Given the uncertainty about how old-age disability rates will evolve over time, we computed three different disability projection scenarios, all of which were based on the current observed relationship between disability rates and personal characteristics (including years until death). We estimated an ordered probit model of disability status in 2000 on a sample of 10,612 adults ages 65 and older from the HRS. We modeled two disability categories—moderate disability, defined as any ADL or IADL limitation but no more than two ADL limitations, and severe disability, defined as three or more ADL limitations—with the omitted reference group consisting of those who did not report any disabilities.<sup>8</sup> We could observe respondent deaths up to four years after the 2000 survey, because when we completed our study respondents had been tracked through 2004. As a result, we could compare disability rates for older adults who died within the next four years with disability rates for longer survivors. In addition to future mortality, other model predictors included age, gender, education, marital status, and household income.<sup>9</sup> The changing characteristics of the older population are described in table A2.

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<sup>7</sup> Numerous recent studies of future retirement outcomes have used *DYNASIM3*, including research evaluating various Social Security reform proposals (Favreault, Mermin, and Steuerle 2006; Favreault et al. 2004; Mermin and Steuerle 2007; Uccello et al. 2003), assessing the baby boomers' retirement preparedness (Butrica and Uccello 2004), examining the likely consequences of single mothers' recent employment gains for their retirement benefits (Johnson, Favreault, and Goldwyn 2003), measuring the potential impact of growing earnings inequality on future retirement incomes (Smith 2003), and examining the likely effect of delayed retirement on future government revenues (Butrica, Smith, and Steuerle 2006).

<sup>8</sup> ADLs consisted of dressing (including putting on shoes or socks), bathing or showering, eating (such as cutting up food), walking across a room, getting in or out of bed, and using the toilet (including getting up or down). IADLs consisted of preparing hot meals, shopping for groceries, making phone calls, taking medications, and managing money (such as paying bills and tracking expenses).

<sup>9</sup> Although disability precedes mortality, we modeled disability as a function of future mortality because *DYNASIM3* projects mortality rates and calibrates them to Social Security Administration (SSA) projections, as described below.



Table A3 reports estimates from the model. Disability rates increased with age (especially after age 74) and fell with household income. Women exhibited higher disability rates than men, African Americans and Hispanics exhibited higher rates than whites, and high school dropouts exhibited higher rates than those with more education. Older married adults were significantly less likely to report disabilities, holding other factors constant, than older people who were widowed, divorced, or never married. Most notably, future mortality was a strong predictor of frailty. People who died by 2004 were substantially more likely to report difficulties with ADLs or IADLs than people who survived.

Because *DYNASIM3* projects all of the model predictors, we were able to use these estimated parameters to project future disability levels. Given the importance of time to death in the disability model, the mortality projections in *DYNASIM3* merit additional elaboration. *DYNASIM3* predicts death in four stages. The first stage estimated an individual's death probability with 1980-82 data from the National Longitudinal Mortality Study (NLMS), as a function of his or her fixed characteristics and varying socioeconomic attributes. Three separate regressions, based on age and sex, were estimated.<sup>10</sup> The second stage used 1982-97 data from Vital Statistics to calibrate the age-race parameters in the NLMS models and incorporate a time trend. The third stage of the model assigned different death probabilities for those receiving Social Security Disability Insurance (SSDI), who exhibit relatively high mortality rates, based on Zayatz's (1999) estimates from aggregate data. In the final stage, the expected probability of death was calibrated in six age groups (separately for males and females) to targets produced by the Social Security actuaries for the 2002 Trustees' Report. The age ranges included infants (not

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<sup>10</sup> Separate regressions were estimated for men ages 25 and older, women ages 25 and older, and both men and women younger than age 25.

yet one year old), ages 1 to 54, 55 to 64, 65 to 74, 75 to 84, and 85 and higher. The target data came from unpublished SSA sources (Favreault and Smith 2004).

We used these model parameters to identify older adults in *DYNASIM3* with disabilities in 2002. We computed the probabilities of severe disability (three or more ADL limitations) and moderate disability (some IADL or ADL limitations but no more than two ADL limitations) for each individual based on the estimated coefficients and cut points from the ordered probit model and the individual's values for the predictors.<sup>11</sup> We then compared the probabilities to a random number between zero and one drawn from a uniform distribution. We assigned the individual no disabilities if the random number fell below the probability of having no disabilities, we assigned moderate disability if the random number exceeded the probability of having no disabilities but fell below the sum of the probabilities of having no disability or moderate disabilities, and we assigned severe disabilities if the random number exceeded the sum of the probabilities of having no disability or moderate disabilities.

Each of the disability projection scenarios assumed that relationships between personal characteristics and disability rates observed in 2000 continued into the future, but they made different assumptions about future trends in overall rates. The intermediate disability scenario assumed no particular trend in disability rates. Instead, rates evolved over time as mortality rates, educational attainment, and income levels changed and as age and race distributions changed. For example, this scenario projected that rising education and income would reduce disability rates, but that disability rates would rise as the share of the older population at very advanced ages increased over time. The high disability projections assumed that old-age disability rates

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<sup>11</sup> The probability of having no disabilities equaled  $F(\text{cut1}-Xb)$ , where  $F(\cdot)$  is the cumulative normal distribution,  $\text{cut1}$  is the first estimated cut point in the ordered probit model, and  $Xb$  is the sum of the products of the estimated coefficients and associated values of the predictors. The probability of being moderately disabled is  $F(\text{cut2}-Xb)-F(\text{cut1}-Xb)$ , where  $\text{cut2}$  is the second estimated cut point in the ordered probit model, and the probability of being severely disabled is  $1-F(\text{cut2}-Xb)$ .

would increase by 0.6 percent per year from 2000 to 2014, about the rate of increase Goldman et al. (2005) projected, reflecting recent disability increases at younger ages. The low disability projections assumed that overall old-age disability rates would decline by 1 percent per year, consistent with recent Congressional Budget Office (2004) assumptions.<sup>12</sup>

### ***Projecting Long-Term Care Arrangements***

We combined projections of individual and family characteristics with estimated parameters from current models of long-term care arrangements to project the future use of paid and unpaid long-term care services. We based our model of current long-term care arrangements on the assumption that families make rational decisions about care so as to maximize their well-being subject to financial and time constraints. We expect children and parents to weigh relative costs and benefits when making long-term care arrangements, and thus to use less unpaid help from children and more assistance from paid helpers when the costs to children of providing care are relatively high. Previous projections of future long-term care use have not fully addressed the impact of the changing availability of informal care (Kennell et al. 1992; Lakdawalla et al. 2003; Rivlin and Wiener 1988; Wiener, Illston, and Hanley 1994).

We used data from the 2002 HRS to estimate logit equations of the receipt of any unpaid help, any unpaid help from biological children, any unpaid help from other sources, any paid home care, and nursing home care. We also estimated ordinary least squares regressions of at-home help hours received from adult children, other unpaid helpers, and paid helpers, for frail older adults who received some help from each source. The HRS collected detailed information on help from family and friends, the use of formal long-term care services, and children's

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<sup>12</sup> We adjusted the cut points estimated from the ordered probit model to reach these disability targets in each scenario, but the relative importance of age, gender, education, race, marital status, income, and time to death was identical in the different scenarios.

characteristics. Respondents who reported any ADL or IADL limitations were asked if anyone helped them with each activity during the last month. They reported how they were related to each of their helpers and whether they were paid for their assistance. The survey also identified respondents living in nursing homes at the time of the interview. Additionally, the HRS collected information about each respondent's offspring, including their age, gender, marital status, and education.

The equations were estimated for a sample of adults ages 65 and older with some ADL or IADL limitations as functions of the opportunity cost of children's time, income, disability, education, and demographic characteristics. Demographic characteristics consisted of the potential care recipient's gender, age, race and ethnicity, marital status, number of adult daughters, and number of adult sons. Disability level was measured by an indicator for having severe disabilities. To account for differences in consumption needs by family size, we measured income as the ratio of household income to the federal poverty level. Separate equations were estimated for the sample of 2,713 frail older adults with any surviving children and for the 436 frail older adults with no surviving children. Equations for childless adults did not, of course, include variables for the number of children or the value of children's time.

The price of unpaid care from adult children depends on how much the children could earn in the labor market if they chose to work. We measured the family's opportunity cost of unpaid help from children as the hourly earnings of the child with the lowest potential wage—what the child could earn if he or she were employed. We imputed potential wages based on ordinary least squares regressions of the natural logarithm of hourly wages for a sample of workers in the 2002 Current Population Survey, a nationally representative monthly household survey conducted by the U.S. Census Bureau. We pooled data from the June, July, August, and September waves. The regressions were estimated separately for men and women as functions of

age and its square, race and ethnicity, education, and marital status.<sup>13</sup> The analysis used the regression results to impute an hourly wage to every adult child of each frail older adult in our sample, including those children who were not actually employed, because some nonworking caregivers might have elected to work for pay if they were not providing care.

Tables A4 and A5 report odds ratios and standard errors from the models of long-term care arrangements for frail older adults with surviving children.<sup>14</sup> Although the price of children's time did not significantly reduce the likelihood that frail older adults received any unpaid help from their adult children, it did significantly increase the likelihood that they received paid home care and nursing home care. A \$1-increase in the hourly price of children's time increased the probability of paid home care by 7 percent and of nursing home care by 8 percent. Each additional daughter (up to three) increased the probability of any unpaid help from children by 29 percent. The receipt of long-term services increased with age and disability. Married frail older people with able-bodied spouses were much less likely than unmarried people to receive nursing home care, paid home care, or help from children, but much more likely to receive unpaid help from other sources (including spouses). People with very low household incomes or very high household incomes were more likely than people with moderate incomes to receive assistance from paid helpers, at home or in nursing homes. High-income people can better afford to purchase services than moderate-income people, and many low-income people qualify for Medicaid-financed services.

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<sup>13</sup> The regressions were based on a sample of 29,188 working men and 26,995 working women. They showed that earnings increased significantly with education and age (up to about age 50). Earnings were significantly higher for whites than blacks and Hispanics, and for married adults than unmarried adults. The r-squared statistics were 0.36 for men and 0.33 for women.

<sup>14</sup> Odds ratios significantly greater than one indicate that the associated factor was positively correlated with the outcome, and those less than one indicate negative correlations.

Results from the models of long-term care services for frail older adults without children are shown in table A6. As the models for adults with children indicated, the receipt of long-term care services increased with age and disability. Married people without children were much more likely than unmarried people to receive unpaid help from family and friends, and less likely to receive paid home care services.

Tables A7 and A8 show results from the models of monthly hours of help received by frail older adults with and without surviving children, among those who received help. The opportunity cost of children's time significantly reduced hours of unpaid help from children received by frail older adults who obtained any help from children. A \$1-increase in the hourly price of children's time reduced monthly help from children by almost five hours. A \$1-increase in the hourly price of children's time also increased monthly hours of paid home care by almost four hours, but the effects were not significant, probably because our sample included only 333 paid home care recipients.

Long-term care projections relied on our disability forecasts and *DYNASIM3*'s projections of the distribution of income, education, age, race and ethnicity, marital status, and adult children in the future older population. The projected number and characteristics of adult children for the older population came from *DYNASIM3*'s fertility and educational attainment modules, which build in some correlation between the parent's and child's schooling. Although children's real wages will increase over time with productivity growth, we did not build any real growth into the price of children's time as caregivers, relative to the price of paid services, because we expect the price of paid services to increase at the same rate (Stone and Wiener 2001).

**Table A1. Core Demographic and Economic Processes**

<b>Process</b>	<b>Data</b>	<b>Form and predictors</b>
<b>Demographics</b>		
Birth	NLSY (1979–94), VS, OACT	Seven-equation parity progression model; varies based on marital status; predictors include age, marriage duration, time since last birth; uses vital rates after age 39; sex of newborn assigned by race; probability of multiple birth assigned by age and race.
Death	NLMS (1979–81), VS, OACT	Three equations; time trend from Vital Statistics 1982–97; includes socioeconomic differentials; separate process for the disabled based on age, sex, and disability duration derived from Zayatz (1999).
Immigration	Vital Statistics	Simple reweighting procedures.
First marriage	NLSY (1979–93), NCHS	Eight discrete-time logistic hazard models for persons age 15 to 34; depends on age, education, race, earnings, presence of children (for females); uses Vital Statistics rates at ages outside this range.
Remarriage	NCHS	Table lookups; separate by sex for widowed and divorced.
Mate matching	NA	Closed marriage market (spouse must be selected from among unmarried, opposite-sex persons in the population); match likelihood depends on age, race, education.
Divorce	PSID (1985–93)	Couple-level outcome; discrete-time logistic hazard model depends on marriage duration, age and presence of children, earnings of both spouses. (Also includes a separate model to predict separation.)
Leaving home	NLSY (1979–94)	Three equations; family size, parental resources, and school and work status are important predictors.
Living arrangements	SIPP (1990–93)	Projected at age 62 and older; predictors include number of children ever born, income sources, demographic characteristics.
Education	NLSY (1979–94), CPS (1995–98)	Ten cross-tabulations based on age, race, sex, and parents' education.
Disability	SIPP (1990–93)	Discrete-time logistic hazard model incorporates various socioeconomic differences (age, education, lifetime earnings, race/ethnicity, marital status and nativity).

(continued)

**Table A1. (continued)**

<b>Process</b>	<b>Data</b>	<b>Form and predictors</b>
<b>Economics</b>		
Labor supply and earnings	PSID (1980–93), NLSY (1979–89)	Separate participation, hours decisions, wage rates for 16 age-race-sex groups; all equations have permanent and transitory error components; key predictors include marital status, education level, age splines, region of residence, disability status, whether currently in school, birth cohort, job tenure, and education level interacted with age splines; also number and ages of children. Model forms vary by outcomes.
Job change	SIPP, PENSIM	Assigned from PENSIM to DYNASIM population to age 50 through a statistical match (based on age, gender, education, industry, tenure, pension coverage and type of plan).
Pension coverage	SIPP, PIMS	Accumulation of defined contribution plans based on self-reports; assignment of replacement rates for defined benefit plans with reductions in replacement rates based on number of job changes.
Saving/Consumption	SIPP, PSID (1984–94), HRS, SIPP 1990–93 matched with SSA administrative data (1951–99)	Separate models estimated for housing and nonhousing wealth based on income and demographic characteristics using random effects and annual hazard models; each model includes an individual-specific error term.
<b>Benefits</b>		
Social Security Old-Age and Survivors Insurance (OASI)	SIPP (1990–93) matched to SSA administrative data (1951–99)	Benefit claiming simulated beginning at age 62; model uses discrete-time hazard models to determine age at take-up based on age, benefit amount, spousal characteristics, and Social Security policy parameters.
Social Security Disability Insurance (SSDI)	SIPP (1990–93) matched to SSA administrative data (1951–99)	Benefit claiming predicted through discrete-time hazard model including age, education, lifetime earnings, race, ethnicity, marital status, nativity, and disability status in $t - 1$ .
Supplemental Security Income (SSI)	SIPP (1990–93)	Uses program rules (income and asset tests) to determine eligibility and a participation function based on potential benefit and demographic and economic characteristics including age, education, race, family structure, home ownership, and sources of income.

**Source:** Favreault and Smith (2004).

**Notes:** CPS = Current Population Survey; HRS = Health and Retirement Survey; NA = Not Applicable; NCHS = National Center for Health Statistics; NLMS = National Longitudinal Mortality Study; NLSY = National Longitudinal Survey of Youth; OACT = Intermediate assumptions of the OASDI Trustees; PENSIM = Pension Simulation Model; PIMS = Pension Insurance Modeling System from the Pension Benefit Guaranty Corporation; PSID = Panel Study of Income Dynamics; SIPP = Survey of Income and Program Participation; VS = Vital Statistics.



**Table A2. Characteristics of the Older Population, 2000–2040**

	2000	2010	2020	2030	2040
<b>Age</b>					
65–69 (%)	28.9	33.3	33.9	29.3	25.2
70–74 (%)	25.9	24.4	27.9	26.9	23.9
75–79 (%)	21.5	18.1	18.5	20.2	20.8
80–84 (%)	13.8	13.1	10.9	14.2	16.4
85 and older (%)	9.9	11.2	8.9	9.4	13.7
Mean age	74.6	74.3	73.7	74.5	75.7
<b>Race (%)</b>					
African American	8.1	8.0	8.7	9.4	10.2
Hispanic	5.7	8.2	10.6	13.1	16.1
Non-Hispanic white and other	86.2	83.8	80.7	77.4	73.7
<b>Gender (%)</b>					
Men	41.0	42.8	44.1	44.2	45.7
Women	59.1	57.2	55.9	55.8	54.3
<b>Marital Status (%)</b>					
Married	51.4	51.7	52.5	50.8	48.5
Widowed	34.1	30.2	25.3	24.4	25.4
Divorced	9.0	12.8	15.0	15.2	14.3
Never married	5.6	5.3	7.2	9.6	11.8
<b>Number of Surviving Children</b>					
0 (%)	13.4	12.6	15.4	19.0	21.9
1 (%)	14.6	13.6	16.7	18.6	18.4
2 (%)	22.9	25.9	31.2	31.5	30.7
3 (%)	21.7	21.9	18.7	17.1	16.9
4 (%)	15.4	15.2	11.1	8.6	7.8
More than 4 (%)	12.1	10.9	7.0	5.2	4.2
Mean number	2.5	2.5	2.2	1.9	1.8
<b>Education (%)</b>					
Did not complete high school	30.1	20.7	14.4	12.7	12.6
High school graduate	54.2	57.6	57.9	57.8	53.8
College graduate	15.7	21.7	27.7	29.5	33.6
<b>Household Income Relative to Poverty Level (%)</b>					
0 to 1	8.5	8.0	7.2	6.3	5.9
1.01 to 2	21.5	18.2	15.6	14.5	12.8
2.01 to 3	16.7	14.8	13.1	13.8	13.2
3.01 to 4	13.0	12.3	11.6	11.1	11.3
More than 4	40.2	46.7	52.5	54.4	56.8
<b>Mean Household Income</b>	37,910	45,133	55,020	58,815	62,716

**Source:** Authors' computations from *DYNASIM3*.

**Table A3. Ordered Probit Estimates of Disability Status**

Variables	Coefficient	Standard Error
<b>Age Splines</b>		
65–69	.005	.019
70–74	.021	.013
75–79	.041***	.013
80–84	.042***	.013
85 and older	.048***	.008
<b>Female</b>	.177***	.032
<b>Education</b>		
Did not complete high school [Reference: High school graduate]	.275***	.033
College graduate	-.075	.047
<b>Race and Ethnicity</b>		
African American	.232***	.045
Hispanic [Reference: Non-Hispanic white and other]	.225***	.056
	...	...
<b>Marital Status</b>		
[Reference: Currently married]	...	...
Widowed	.077**	.037
Divorced	.127**	.058
Never married	.179**	.089
<b>Household Income (\$1,000)</b>	-.002**	.001
<b>Mortality</b>		
[Reference: Survived at least 4 years]	...	...
Survived 2 years, but died within 4 years	.605***	.044
Died within 2 years	.871***	.044
/cut1	1.18***	0.08
/cut2	2.13***	0.08

**Source:** Authors' computations from the 2000 Health and Retirement Study (HRS).

**Notes:** The ordered probit modeled moderate disabilities (defined as any limitation with an activity of daily living [ADL] or instrumental activity of daily living [IADL] but no more than two ADL limitations) and severe disabilities (defined as three or more ADL limitations), relative to no disabilities. Estimates were based on a sample of 10,612 adults ages 65 and older.

\*  $.05 \leq p < .1$     \*\*  $.01 \leq p < .05$     \*\*\*  $p < .01$

**Table A4. Determinants of Unpaid Long-Term Care Use, for Frail Older Adults with Surviving Children**

	<u>Any Unpaid Help</u>		<u>Any Unpaid Help from Children</u>		<u>Any Unpaid Help from Other Sources</u>	
	Odds Ratio	S.E.	Odds Ratio	S.E.	Odds Ratio	S.E.
<b>Hourly Price of Children's Time</b>	0.99	0.01	0.98	0.02	1.00	0.01
<b>Number of Children</b>						
Daughters (up to 3)	1.04	0.06	1.29***	0.08	0.81***	0.05
Sons (up to 3)	0.98	0.05	1.00	0.06	0.94	0.05
Indicator for 4 or more daughters	1.16	0.21	1.04	0.20	1.07	0.20
Indicator for 4 or more sons	1.00	0.18	1.27	0.25	1.07	0.20
<b>Age</b>	1.04***	0.01	1.05***	0.01	1.01	0.01
<b>Severely Disabled</b>	4.32***	0.52	2.74***	0.30	2.59***	0.27
<b>Male</b>	1.07***	0.11	0.66***	0.08	1.27**	0.13
<b>Race and Ethnicity</b>						
African American	1.36**	0.21	1.25	0.19	1.25	0.19
Hispanic	0.90	0.18	0.66*	0.14	1.13	0.23
[Ref: White or other]	...	...	...	...	...	...
<b>Marital Status</b>						
[Ref: Widowed]	...	...	...	...	...	...
Divorced or separated	0.80	0.14	0.81	0.14	1.06	0.22
Never married	0.91	0.58	0.55	0.37	3.72**	1.96
Currently married	2.01***	0.26	0.20***	0.03	8.47***	1.17
<b>Married to Spouse with Disabilities</b>	0.63***	0.09	2.04***	0.37	0.50***	0.07
<b>Education</b>						
Not high school graduate	1.22*	0.13	1.13	0.13	1.03**	0.15
[Ref: High school grad]	...	...	...	...	...	...
Four or more years of college	0.93	0.14	0.90	0.18	0.87	0.14
<b>Ratio of Income to Poverty Level</b>						
No more than 1	1.83***	0.36	1.60**	0.35	1.16	0.23
1.01 to 2	1.20	0.19	1.00	0.19	1.17	0.19
2.01 to 3	0.95	0.16	0.79	0.15	0.95	0.16
3.01 to 4	...	...	...	...	...	...
Greater than 4	0.64***	0.11	0.65*	0.14	0.59***	0.10
<b>Wald chi-square statistic</b>	266.29		449.34		395.67	

**Source:** Authors' computations from the 2002 Health and Retirement Study (HRS).

**Notes:** Estimates were from logit models of any unpaid help from adult biological children, any unpaid help from other sources, any paid home care, and any nursing home. Help received at home was measured during the month preceding the survey interview, and nursing home care was measured at the time of the interview. S.E. denotes the standard error of the odds ratio. The sample was restricted to 2,713 adults ages 65 and older with at least one limitation with an activity of daily living (ADL) or instrumental activity of daily living (IADL) and with surviving children. The price of children's time was set equal to the imputed hourly wage of the child with the lowest wage.

\*  $.05 \leq p < .1$     \*\*  $.01 \leq p < .05$     \*\*\*  $p < .01$

**Table A5. Determinants of Paid Long-Term Care Services, for Frail Older Adults with Surviving Children**

	Any Paid Home Care		Any Nursing Home Care	
	Odds Ratio	S.E.	Odds Ratio	S.E.
<b>Hourly Price of Children's Time</b>	1.07***	0.02	1.08***	0.02
<b>Number of Children</b>				
Daughters up to 3	1.10	0.08	0.97	0.10
Sons up to 3	1.03	0.07	1.13	0.11
Indicator for 4 or more daughters	0.99	0.28	2.06*	0.78
Indicator for 4 or more sons	0.85	0.21	0.46**	0.18
<b>Age</b>	1.08***	0.01	1.05***	0.01
<b>Severely Disabled</b>	12.20***	1.59	10.16***	1.80
<b>Male</b>	0.81	0.12	1.03	0.21
<b>Race and Ethnicity</b>				
African American	1.02	0.22	0.65	0.19
Hispanic	1.11	0.30	0.61	0.28
[Ref: White or other]	...	...	...	...
<b>Marital Status</b>				
[Ref: Widowed]	...	...	...	...
Divorced or separated	1.13	0.28	0.99	0.30
Never married	2.26	1.47	...	...
Currently married	0.35***	0.06	0.27***	0.07
<b>Married to Spouse with Disabilities</b>	1.82***	0.40	1.34	0.43
<b>Education</b>				
Not high school graduate	1.04	0.16	1.10	0.21
[Ref: High school grad]	...	...	...	...
Four or more years of college	1.11	0.24	0.78	0.22
<b>Ratio of Income to Poverty Level</b>				
No more than 1	1.70*	0.48	2.05*	0.76
1.01 to 2	1.41	0.34	1.69	0.55
2.01 to 3	1.21	0.31	1.35	0.46
3.01 to 4	...	...	...	...
Greater than 4	1.65*	0.44	1.86*	0.64
<b>Wald chi-square statistic</b>	519.70		332.31	

**Source:** Authors' computations from the 2002 Health and Retirement Study (HRS).

**Notes:** Estimates were from logit models of any unpaid help from adult biological children, any unpaid help from other sources, any paid home care, and any nursing home. Help received at home was measured during the month preceding the survey interview, and nursing home care was measured at the time of the interview. S.E. denotes the standard error of the odds ratio. The sample was restricted to 2,713 adults ages 65 and older with at least one limitation with an activity of daily living (ADL) or instrumental activity of daily living (IADL) and with surviving children. The price of children's time was set equal to the imputed hourly wage of the child with the lowest wage.

\* .05 ≤ *p* < .1      \*\* .01 ≤ *p* < .05      \*\*\* *p* < .01

**Table A6. Determinants of Long-Term Care Service Use, for Frail Older Adults without Surviving Children**

	Any Unpaid Help		Any Paid Home Care		Any Nursing Home Care	
	Odds Ratio	S.E	Odds Ratio	S.E	Odds Ratio	S.E
<b>Age</b>	1.04***	0.02	1.05***	0.02	1.08***	0.02
<b>Severely Disabled</b>	2.96***	0.80	11.51***	3.45	7.01***	2.34
<b>Male</b>	1.12	0.29	0.90*	0.29	1.65	0.58
<b>Race and Ethnicity</b>						
African American	0.79	0.23	1.09	0.39	1.10	0.45
Hispanic	1.56	1.13	0.15***	0.10	0.10**	0.10
[Ref: White or other]	...	...	...	...	...	...
<b>Marital Status</b>						
[Ref: Widowed]	...	...	...	...	...	...
Divorced or separated	0.24***	0.12	0.51	0.28	1.06	0.69
Never married	1.58	0.50	0.93	0.37	1.84	0.80
Currently married	5.68***	2.23	0.36**	0.18	0.38	0.23
<b>Married to Spouse with Disabilities</b>	0.28**	0.15	1.73	0.95	2.38	1.69
<b>Education</b>						
Not high school graduate	2.18***	0.60	0.58	0.20	0.57	0.21
[Ref: High school grad]	...	...	...	...	...	...
Four or more years of college	1.13	0.41	1.14	0.49	0.52	0.22
<b>Ratio of Income to Poverty Level</b>						
No more than 1	0.85	0.44	2.22	1.38	2.88	2.03
1.01 to 2	1.16	0.57	0.86	0.46	3.03*	1.87
2.01 to 3	1.47	0.74	0.73	0.42	1.88	1.30
3.01 to 4	...	...	...	...	...	...
Greater than 4	1.34	0.67	0.90	0.51	2.13	1.35
<b>Wald chi-square</b>	63.34		100.49		85.12	

**Source:** Authors' computations from the 2002 Health and Retirement Study (HRS).

**Notes:** Estimates were from logit models of any unpaid help, any paid home care, and any nursing home. Help received at home was measured during the month preceding the survey interview, and nursing home care was measured at the time of the interview. S.E. denotes the standard error of the odds ratio. The sample was restricted to 436 adults ages 65 and older with at least one limitation with an activity of daily living (ADL) or instrumental activity of daily living (IADL) and without any surviving children.

\*  $.05 \leq p < .1$     \*\*  $.01 \leq p < .05$     \*\*\*  $p < .01$

**Table A7. Determinants of Monthly Hours of Help Received by Frail Older Adults with Surviving Children**

	<u>Hours of Unpaid Help from Children</u>		<u>Hours of Unpaid Help, Other Sources</u>		<u>Hours of Paid Home Care</u>	
	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
<b>Hourly Price of Children's Time</b>	-4.73***	1.68	-4.51**	1.93	3.86	4.09
<b>Number of Children</b>						
Daughters up to 3	0.31	9.24	14.77	10.29	-3.58	16.09
Sons up to 3	-6.26	7.36	6.53	8.95	19.82	14.44
Indicator for 4 or more daughters	-17.08	22.27	-87.33***	26.95	136.79*	72.11
Indicator for 4 or more sons	9.53	24.93	-17.04	29.22	-113.19**	49.78
<b>Age</b>	-0.10	0.94	1.68	1.07	3.18*	1.86
<b>Severely Disabled</b>	37.77***	13.50	110.96***	17.71	51.94*	28.74
<b>Male</b>	9.94	16.43	29.79	19.86	51.17	39.25
<b>Race and Ethnicity</b>						
African American	34.26*	19.73	2.91	20.30	88.70*	45.20
Hispanic	52.04*	27.65	13.50	28.46	69.12*	37.93
[Ref: White or other]	...	...	...	...	...	...
<b>Marital Status</b>						
[Ref: Widowed]	...	...	...	...	...	...
Divorced or separated	-15.63	24.92	-37.51	25.85	66.73	56.72
Never married	5.97	63.29	5.90	59.36	93.42	170.51
Currently married	-31.73	19.25	78.44***	27.02	-48.06	40.31
<b>Married to Spouse with Disabilities</b>	-26.57	19.08	-53.84***	18.59	-14.73	43.97
<b>Education</b>						
Not high school graduate	-0.49	14.37	-11.75	18.19	-25.90	31.92
[Ref: High school grad]	...	...	...	...	...	...
Four or more years of college	15.95	26.93	8.62	25.17	57.54	48.29
<b>Ratio of Income to Poverty Level</b>						
No more than 1	2.41	25.01	9.67	29.58	-12.68	53.07
1.01 to 2	11.02	21.42	-17.17	24.91	50.02	48.93
2.01 to 3	4.46	23.67	8.73	27.67	4.35	47.33
[Ref: 3.01 to 4]	...	...	...	...	...	...
Greater than 4	12.35	27.75	-41.65	27.88	63.06	58.75
<b>Intercept</b>	151.66*	91.03	-35.25	111.19	-251.52	168.42
<b>F statistic</b>	2.25		6.21		1.66	
<b>Observations</b>	872		926		333	

**Source:** Authors' computations from the 2002 Health and Retirement Study (HRS).

**Notes:** Estimates were from ordinary least squares regressions of monthly hours of unpaid help from children, monthly hours of unpaid help from other sources, and monthly hours of paid help. S.E. denotes the standard error. The samples were restricted to adults ages 65 and older with at least one limitation with an activity of daily living (ADL) or instrumental activity of daily living (IADL) who were receiving help and had surviving children.

\*  $.05 \leq p < .1$     \*\*  $.01 \leq p < .05$     \*\*\*  $p < .01$

**Table A8. Determinants of Monthly Hours of Help Received by Frail Older Adults without Surviving Children**

	Hours of Unpaid Help		Hours of Paid Home Care	
	Coeff.	S.E	Coeff.	S.E
<b>Age</b>	3.12	2.08	5.79	5.77
<b>Severely Disabled</b>	28.44	33.09	41.54	58.98
<b>Male</b>	36.49	38.92	201.88*	106.11
<b>Race and Ethnicity</b>				
African American	89.87**	44.45	117.59*	65.16
Hispanic	45.84	52.15	238.13***	74.99
[Ref: White or other]	...	...	...	...
<b>Marital Status</b>				
[Ref: Widowed]	...	...	...	...
Divorced or separated	-78.75*	43.73	85.43	107.16
Never married	-0.42	46.69	4.78	63.45
Currently married	96.24**	43.52	42.57	112.86
<b>Married to Spouse with Disabilities</b>	-121.13***	43.85	1.73	218.62
<b>Education</b>				
Not high school graduate	-38.83	42.05	-16.46	78.42
[Ref: High school grad]	...	...	...	...
Four or more years of college	-75.24**	36.60	-45.12	76.16
<b>Ratio of Income to Poverty Level</b>				
No more than 1	138.44**	58.10	-104.11	68.75
1.01 to 2	105.79*	55.24	-89.15	95.10
2.01 to 3	67.00	45.31	275.00	227.43
3.01 to 4	...	...	...	...
Greater than 4	59.73	52.05	56.65	107.18
<b>Intercept</b>	-280.10	185.178	-417.80	502.779
<b>F statistic</b>	1.65		1.94	
<b>Observations</b>	184		53	

**Source:** Authors' computations from the 2002 Health and Retirement Study (HRS).

**Notes:** Estimates were from ordinary least squares regressions of monthly hours of unpaid help and monthly hours of paid help. S.E. denotes the standard error. The samples were restricted to adults ages 65 and older with at least one limitation with an activity of daily living (ADL) or instrumental activity of daily living (IADL) who were receiving services and had no surviving children.

\*  $.05 \leq p < .1$     \*\*  $.01 \leq p < .05$     \*\*\*  $p < .01$

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