The Utilization of Different Modes of Residence And Health Services by the Elderly

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Abstract

Demand for health services are examined among Americans ages 65 and older using the Medical Expenditure Panel Survey. Analyses are provided of mode of residence, demand for paid health services in private settings, and the choice of type of nursing home using a common set of explanatory variables. The research shows that age, Medicare coverage, and the use of assistive technology are the strongest predictors of mode of residence. The second analysis shows that total expenditures for paid home health care (HHC) and hospital care do not decrease as expected when the percentage paid by individuals and/or their families increases. Finally, the third analysis suggests that the distribution of nursing home (NH) services is related to ability to pay.

Although the functional status of older Americans has improved as longevity has risen, it is nonetheless true that aging is associated with an increased incidence of health problems. The number of Americans ages 65 and older stood at 13 percent of the population in 1995 (Davis and Burner, 1995) and is projected to rise to 20 percent by the year 2010 (Hobbs and Damon, 1996). This concentration of the population among older groups is expected to increase the total demand for health care services in both institutional and noninstitutional settings. The purpose of this paper is to provide an overview of the demand among the population of Americans ages 65 and older for health care services.

Certainly, part of the motivation for a study of this nature is to better understand the factors which contribute to the demand for health care services. Ultimately, policy makers and practitioners would like to understand how to provide alternative care that is both less expensive and leads to higher patient satisfaction. The interest in cost containment is related to broader social issues of efficient resource use that are reflected in the federal budget of the U.S. government. In 2002, the primary health insurance program for Americans ages 65 and older is projected to account for 16 percent of all outlays (Congressional Budget Office, 1997). Within Medicaid, a governmental program for providing health care for low income individuals, the fasting growing component of costs is long-term care. The amount of resources being used in these programs warrants attention to understanding the nature of demands from older Americans for health care services.

The research presented here will make use of a data source which has only recently become available, the Medical Expenditure Panel Survey (MEPS), to provide a broad examination of three segments of health care demand among those ages 65 and older that have typically been examined separately in previous studies. First, factors influencing the mode of residence will be examined focusing on living independently, living with relatives, and living in a nursing home (NH). Second, for those living in a noninstitutional setting, their demand for health

care services as reflected in dollars spent on home health care (HHC), physician visits, and hospital services will be examined. Finally, for those living in a nursing home, the choice between a complex and simple organizational structure will be examined.

One of the advantages of the MEPS data are that they allow a description of the entire population ages 65 and older rather than subgroups such as those receiving health care services or those living in institutions. Because of the uniformity of the data across the population, it is possible to include duplicate control variables in the various analyses.

In each of the analyses, economic and other factors are considered which influence demand following the construction of Anderson and Newman (1973, p.107). They state that the use of health services is, "dependent on: (1.) the predisposition of the individual to use services; (2.) his ability to secure services; (3.) his illness level." This conceptualization provides a useful framework for assessing the influence of various factors on the demand for health care.

The first component of the behavioral model, the predisposing characteristics, exist prior to the onset of illness. These include demographic and social structure characteristics of the individual that result in a greater propensity to use health services. The second component refers to factors that directly affect the ability of an individual to obtain health services, primarily income, insurance, and price. The final component, the level of illness, refers to need. This is often measured with limitations in functional status or a medical diagnosis.

The analysis will begin with an examination of the mode of residence of Americans ages 65 and older because the nature of demand for services depends on where a person lives. In a NH setting, the cost of a residence and many health services related to functional ability are bundled together. In a private setting, a person would typically pay separately for health care services.

Then, the demand of those living in private settings for HHC, physician visits, and hospital services will be examined. Again, the need for these services relative to ability to pay will be examined. In this case, the study focuses on copayment rates relative to costs of the service.

Finally, the focus will turn to the choice among NHs with a complex versus simple organizational structure. Complex organizational structures where the NH is integrated with other care facilities such as a hospital, potentially provide the opportunity for cross subsidization of services. Also, those with acute medical conditions may prefer proximity to advanced facilties. Costs may mitigate those desires.

The paper proceeds with a summary of the relevant literature for each of the three areas of analysis. Then, the data and methods are described followed by descriptive statistics and model estimates. A discussion and summary of the results is provided in closing.

BACKGROUND

Global Demand for Mode of Residence

Many researchers have examined the determinants of different living arrangements for the elderly. Some studies have looked at the demand for living alone or with relatives, while others have analyzed the demand for NH care. Sandefur and Tuma (1987) report that 25 percent of those over the age of 60 in the pre-war period in the 1940s lived alone. The authors also state that from 1940 to 1985, the percent of those 85 years of age and older and living alone increased from 13 percent to 57 percent and those living in institutions increased from 7 percent to 25 percent.

Sharing space with middle-aged children has been found to be more rare than children providing caregiving and/or time to their parents (Boaz et al., 1999). Studies find that individuals living alone have a greater chance of placement in a NH (Shapiro and Tate, 1988) and Newman et al. (1990) find that living alone increases one's risk of institutionalization by approximately 3 percent.

Predisposing Characteristics. As expected, an older age has been found to decrease the likelihood of living alone and living with relatives relative to an institution (Borsch-Supan et al., 1991). Others report that an increase in age increases the risk of placement in a NH (Klein, 1996; Wolinsky and Johnson, 1991; Murtaugh et al., 1990; Greene and Ondrich, 1990; Wingard et al., 1990, 1987; Dolinsky and Rosenwaike, 1988; Shapiro and Tate, 1988; Scanlon, 1980; Vicente et al., 1979). Lamberton et al. (1986) find that the private demand for NH care is not significantly affected by an individual being 70-74 years of age, while being 75-84 decreases the demand and being 85 years of age or older increases the demand. Cohen et al. (1986), on the other hand, find that the lifetime risk of NH use increases until age 80 but at age 85 decreases significantly. The authors explain that this may occur because individuals over the age of 85 are healthier and have less chronic conditions.

In terms of gender, females are more likely to live alone or with relatives relative to living in a NH according to Borsch-Supan et al. (1991). In contrast, others have found that women are more likely to live in a NH or have a greater risk of institutionalization (Klein, 1996; Murtaugh et al., 1990; Wingard et al., 1990, 1987; Vicente et al., 1979; Palmore, 1976) and some find that women are twice as likely as men to be institutionalized (Dolinsky and Rosenwaike, 1988; Cohen et al., 1986).

The effect of marital status on the likelihood of living alone or with relatives relative to being in an institution has been found to be insignificant (Borsch-Supan et al., 1991). While others have found that being married significantly decreases the chance of NH placement (Freedman, 1996; Klein, 1996; Dolinsky and Rosenwaike, 1988; Wingard et al., 1987; Palmore, 1976).

Race has also been found to significantly impact the demand for different modes of residence. Blacks have been found to have a greater probability of living with children or another person (Soldo et al., 1990). Whites, on the other hand, have a greater chance of institutionalization (Cagney and Agree, 1999; Reschovsky, 1996; Murtaugh et al., 1990; Greene and Ondrich, 1990; Dolinsky and Rosenwaike, 1988; Scanlon, 1980; Vicente et al., 1979; Palmore, 1976).

Individuals with greater availability of kin have a reduced chance of institutionalization (Reschovsky, 1996; Dolinsky and Rosenwaike, 1988; Vicente et al., 1979). Scanlon (1980) also finds that the proximity of family is important when NH utilization is analyzed. The author reports that if family is available, NH utilization is reduced.

Enabling Characteristics. Researchers have found that various economic measures impact the demand for mode of residence. For example, Medicaid eligibility has been found to decrease the probability of shared living arrangements for the elderly (Soldo et al., 1990).

Higher income has been found to increase the likelihood that an elderly individual lives alone or lives with relatives rather than in a NH (Borsch-Supan et al., 1991). Soldo et al. (1990)

find that a higher income decreases the probability of a shared living arrangement and others have found that a higher income increases the chance of NH placement (Vicente et al., 1979).

Findings on the relationship between education and NH placement have shown mixed results. Education variables have shown no effect (Vicente et al., 1979), while education has also been shown to increase the total chance of utilization (Palmore, 1976). Dolinsky and Rosenwaike (1988) find that the relationship between education and institutionalization is curvilinear. The authors report that low levels of education are associated with a low chance of institutionalization. As the level of education rises, the risk of institutionalization rises. After an individual earns a high school diploma, the likelihood of NH placement falls.

Need characteristics. Overall, an individual's need characteristics are strong predictors of institutionalization (Jette et al., 1992). Not surprisingly, an elderly individual's functional ability has been found to be the most significant predictor of the person's mode of residence (Borsch-Supan et al., 1991). Doty (1986), on the other hand, reports that many impaired elderly living in the community with family assistance are as disabled as NH residents.

Elderly individuals living with relatives have been found to have higher dependency scores for activities of daily living (ADLs) than those living alone (Doty, 1986). Variables measuring an individual's level of need have been shown to increase the probability of living with others (Soldo et al., 1990). The authors report that dependence in five or six activities of daily living (ADLs) increase the probability of living with a child or another person.

Disabilities and functional limitations, generally measured using ADLs have also been shown to impact NH utilization. Many have found that NH use increases when individuals need help with ADLs (Reschovsky, 1996; Wolinsky and Johnson, 1991; Greene and Ondrich, 1990; Wingard et al., 1990, 1987; Shapiro and Tate, 1988). Vicente et al. (1979) uniquely find that NH placement is not related to ADLs or health measures.

Some report that medical conditions do not predict living arrangements well (Borsch-Supan et al., 1991). In a study of the elderly in Germany, chronic conditions have found to be

insignificant predictors of NH placement (Klein, 1996). While others have found that cancer and strokes are among the leading reasons for NH admissions (Wingard et al., 1990).

Market Demand for Paid HHC, Physicians' Visits, and Hospital Care

Predisposing Characteristics. Branch et al. (1993) describe the total episodes of care for Medicare HHC and find that these individuals are older (i.e., 22 percent 85 years of age or older) and predominantly female. Others find that older age increases the use of home-based services while gender does not significantly impact usage (Logan and Spitze, 1994). Blacks are more likely to use HHC over skilled nursing facility care than whites (Cagney and Agree, 1999). The availability of family members has been found by others to decrease the use of HHC (Kemper, 1992; Wolinsky and Johnson, 1991).

When using bivariate statistical analyses in their study of the use of formal HHC in the year before death, Grabbe et al. (1995) find that usage is significantly associated with older age, being female, and the availability of more family caregivers. When the authors use logistic regression, they find that gender and the number of family caregivers have the greatest effect on the use of formal HHC.

With respect to the utilization of physician and hospital care, age has been shown to be positively associated with physician and hospital utilization (Wolinsky et al., 1986; Wolinsky and Coe, 1984). Wolinsky et al. (1986) report an inverse J-curve relationship between aging and physician utilization with the pivotal point occurring at age 80.

Women have been found to utilize physician and hospital care less (Wolinsky and Johnson, 1991). Wolinsky and Coe (1984) show that the married elderly have fewer physician and hospital visits while being widowed had been shown to be insignificant (Wolinsky and Johnson, 1991). Race and living alone have also been shown to be insignificantly related to the use of health services (Wolinsky and Johnson, 1991).

Enabling Characteristics. Medicaid coverage has been shown to be positively associated with the use of physician and hospital care as well as HHC (Grabbe et al. 1995; Wolinsky and Johnson, 1991; Wolinsky and Coe, 1984). Insurance coverage, income, and education are also related to the increased utilization of health services (Kemper, 1992; Wolinsky and Johnson, 1991; Wolinsky and Coe, 1984).

Need Characteristics. Functional impairment and disability have been found to be significantly associated with the use of formal HHC (Grabbe et al., 1995; Logan and Spitze, 1994; Kemper, 1992; Wolinsky and Johnson, 1991). In their description of the users of Medicare HHC, Branch et al. (1993) find that over 79 percent rely on a cane, crutch, or walker while almost 12 percent use a wheelchair.

Grabbe et al. (1995) find that those with more health problems use more formal HHC in the year before death. In describing the episodes of Medicare HHC, Branch et al., 1993 find that 11.5 percent have malignant neoplasms, 5 percent have diabetes, and between 5 and 10 percent have heart disease, cerebrovascular and/or ischemic heart disease.

Need variables have been shown to account for more than 50 percent of the variance explained in physician utilization and about 75 percent of the variance in hospital utilization (Wolinsky and Coe, 1984) and are considered to generally predict utilization more than predisposing and enabling characteristics (Wolinsky et al., 1983). Greater nutritional risk has been shown to significantly increase physician and hospital utilization (Wolinsky et al., 1983). ADL dependence is also significantly related to hospital utilization (Wolinsky et al., 1983).

NH Demand

How does the utilization of long-term care services differ in terms of the structure of the provider? The answer to this question is important since an understanding of the cost for long-term care and successful attempts at cost containment stem from knowledge about the utilization of services. Health care organizations are becoming more complex with the current evolution of

managed care and policymakers need to understand their impact on the elderly's access to and use of quality services. More specifically, we need to understand how the structure of long-term care services impacts the utilization and accessibility for our growing and aging minority and chronically ill populations. In human terms, this knowledge is relevant for the almost 1.6 million people in NHs (Rhoades et al. 1998).

Andersen and Newman (1973) explain that structure and access are two interrelated subcomponents of organization or what the system does with its resources. The authors point out that access, the means through which the patient gains entry to the medical care system and continues the treatment process, varies according to the direct out-of-pocket cost for medical care along with other factors. Scanlon (1980) explains that price is only relevant for those paying out of their own income and the Medicaid recipients pay a price related to their incomes; therefore, with a large percentage of Medicaid patients, price may not have a large effect on total utilization. Reschovsky (1996) finds that price is not significantly associated with NH demand.

The structure of an organization relates to the characteristics of the system that determines what happens to the patient following entry to the system (Andersen and Newman, 1973) and one area of interest is the process of referral to other sources of care.
NHs are becoming increasingly part of complex organizational structures (Rhoades and Krauss 1999). In the current study, a simple NH is defined as one that has only nursing units. A NH that is part of a complex organizational structure includes NHs that are hospital-based, that are within a continuing care retirement community, that have a personal care unit, or that are another type of NH.

From 1987 to 1996, the percentage of NHs that were hospital-based increased by 5.7 percent and those that were affiliated with non-nursing beds increased by 4.4 percent. Since managed care is encouraging increased integration, how does the demand for NHs with simple organizational structures compare with the demand for those with complex organizational

structures? How do these organizational structures affect accessibility for minority and indigent segments of the elderly population?

To the authors' knowledge, no studies have directly examined the characteristics of those demanding NH care from organizations with a simple versus a complex structure. Some studies have analyzed NH use among residents of continuing care retirement communities (CCRC). Research finds that males are more likely to enter NHs while being married is associated with less hazard of NH entry (Cohen et al., 1988). CCRC residents have 1.5 times greater lifetime expectancy of NH placement and repeated placements than might be expected for the general elderly population (Cohen et al., 1989; Cohen et al., 1988) while case management among assisted living residents can be effective in reducing the rate of institutionalization (Morris et al., 1987). Newcomer and Preston (1994) find that CCRC residents are more likely to use nursing units after a hospital stay or outpatient surgery than are community residents.

Some studies have examined hospital-based NHs. Bishop and Dubay (1991) find that hospital-based skilled nursing facilities serve more Medicare patients. Evidence for differential access to NHs with simple or complex organizational structures is provided by research that finds hospitals transfer patients more quickly to NHs when the hospital is affiliated with a NH (Kenney and Holahan, 1991).

METHODOLOGY

The current analysis uses data from the household and NH components of the 1996 Medical Expenditure Panel Survey (MEPS). The household component provides annual estimates for measures of health status, insurance coverage, health care use, health care expenditures, and sources of payment for health services. The NH component provides data on

both the characteristics of the facility[1] and its residents. Facility characteristics include ownership structure, organizational complexity, and wages for the nursing department. Information on the facility's residents provides details on their functional limitations, medical conditions, demographic characteristics, and health insurance (Agency for Healthcare Research and Quality, 2001).

Because this analysis tests the relationship between enabling characteristics, such as Medicare and Medicaid, and modes of residence, including NHs, the samples include only individuals 65 years of age or older. The resulting household sample includes 2284 individuals while the NH component includes data on 3377 individuals.

Cross-sectional analysis is used to examine each type of demand. First, the global demand for different modes of residence is estimated using a multinomial logit model. The outcome variable includes measures for living alone, living with relatives, or living in a NH. The omitted outcome is living in a NH; therefore, the probability of living alone or with relatives is studied relative to living in a NH. The explanatory variables include measures for predisposing, enabling, and need characteristics. These components of Andersen and Newman's behavioral model provide common measures across different modes of residence. Data for this analysis comes from both the MEPS household and NH component. The model is as follows:

$$\text{Mode of residence} = f(\text{predisposing, enabling, need characteristics}) \qquad [1]$$

The second set of models examines market demand for paid HHC, physicians' visits, and hospital care. Because some individuals may not use these services, tobit models are run. In

[1] For a NH to be included in the MEPS NH component, a facility must have at least three beds and meet one of the following criteria: (1) it must have a facility or distinct portion of a facility certified as a Medicare skilled nursing facility. (2) It must have a facility or distinct portion of a facility certified as a Medicaid nursing facility. (3) It must have a facility or distinct portion of a facility that is licensed as a NH by the State health department or by some other State or Federal agency and that provides onsite

addition to explaining the utilization of paid home care, physicians' visits, and hospital care using predisposing, enabling, and need characteristics, these models incorporate a measure for the percentage of the total expenditure for the service paid by the individual or family. Only data from the household component is used for these models, which are expressed as follows:

Total expenditures for paid HHC	=	*f* (percent total expenditures paid by self and/or family, predisposing, enabling, and need characteristics)	[2]
Total expenditures for outpatient physician visits	=	*f* (percent total expenditures paid by self and/or family, predisposing, enabling, and need characteristics)	[3]
Total expenditures for hospital care	=	*f* (percent total expenditures paid by self and/or family, predisposing, enabling, and need characteristics)	[4]

The low predictive power of Andersen and Newman's behavioral model for explaining the elderly's use of physician and hospital services has been addressed (Wolinsky and Coe, 1984; Wolinsky et al., 1983; Eve and Freidsam, 1980). The authors present one existing explanation for why predisposing and enabling characteristics may not be found to have strong predictive power for physician and hospital utilization. The reason is that these health services are often covered by third-party insurance. With public and private insurance coverage, predisposing and enabling characteristics may no longer be key determinants. The utilization of ancillary services that address health maintenance and/or preventive health care may be better explained by the behavioral model (Snider 1980a, 1980b). Andersen and Newman's model may explain the use of ancillary services (e.g., HHC) by the elderly because they often need these services for chronic conditions and functional limitations more than acute care services. In addition, these services are often not covered by insurance. The current study will allow comparison of the predictive power of the behavioral model with respect to acute as well as ancillary services. That is, the

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supervision by a registered nurse or licensed practical nurse 24 hours a day, 7 days a week (Bethel, Broene,

utilization of physician, hospital care, and formal HHC will be analyzed using Andersen and Newman's model.

Another explanation offered for the low predictive power of Andersen and Newman's model is the lack of comprehensive measures for the predisposing, enabling, and need characteristics (Wolinsky and Johnson, 1991; Wolinsky and Coe, 1984; Wolinsky et al., 1983). The authors explain that national datasets often lack detailed information on health insurance coverage, social supports, and functional limitations. Wolinsky et al. (1983) also report that past studies often used only one measure of an individual's need characteristics. The current study will use a national dataset that provides information on health insurance coverage, kin support, and functional limitations and uses multiple measures of an individual's need characteristics.

In addition to these explanations for the why Andersen's behavioral model may not be useful in predicting the utilization of physician and hospital services, the methodology used in these past studies may be contributing to this finding. To the authors' knowledge, none of the existing studies has used tobit analysis to account for the censored utilization data (Long 1997). Specifically, some individuals may not have any expenditures for physician, hospital, and/or HHC. The data is censored at zero. The tobit model has been developed for these cases in which the independent variables for the entire sample are observed, but only limited information about the dependent variable is available.

The final analysis looks at the demand within NHs and uses data from the MEPS NH component. A binary logit model is used to test the probability that an individual lives in a NH with a complex or simple organizational structure. Wages for the nursing staff are used as a proxy for the price of care in addition to predisposing, enabling, and need characteristics. The model is

Living in a NH with a complex or simple organizational structure	=	*f* (licensed wages, unlicensed wages, predisposing, enabling, and need characteristics)	[5]

and Sommers 1998).

Each analysis is run using a full model using all of the variables measuring an individual's predisposing, enabling, and need characteristics. Each analysis is then run three times using only the predisposing, only the enabling, and only the need characteristics. This approach allows a comparison of the impact of different measures of demand.

Dependent Variables

In the first model that examines the demand for different modes of residence, the dependent variable can take three different values. The outcome variable takes the value zero for living alone in a private household, one for living in a private household with relatives, and two for living in a NH.

The second analysis examines market demand for paid HHC, physicians' visits, and hospital care. The dependent variables in the three tobit models are the total expenditures in 1996 for paid HHC, physicians' visits, and hospital care respectively. Expenditures in the MEPS dataset refer to what is paid for health care services. They represent the sum of direct payments for care provided during the year, including out-of-pocket payments and payments by private insurance, Medicaid, Medicare, and other sources.

Paid HHC represents the sum of expenditures for both agency- and nonagency-provided HHC. Total expenditures for physicians' visits includes both office-based and outpatient services. The dependent variable in the final tobit, total expenditures for hospital care, includes the sum of facility and physician expenditures for inpatient and emergency room care.

The final analysis examines the demand for NHs with simple or complex organizational structures. The dependent variable is binary with the value zero for a NH with a complex organizational structure and one for a simple organizational structure. A NH with a simple organizational structure is defined as a NH that contains only nursing units. In contrast, a NH with a complex organizational structure includes NHs that are hospital-based, that are within a

continuing care retirement community, that have a personal care unit, or that are another type of NH.

Explanatory Variables

Predisposing Characteristics. This study uses explanatory variables to measure the following predisposing characteristics: age, whether the person is male, married, white, and has family contact. Age is measured by two binary variables. One measure indicates whether the person is 65 to 74 years of age and the second indicates whether the person is 75 to 84 years of age. The findings on these age variables are interpreted relative to the omitted age category, those who are 85 years of age or older. Some segments of the elderly population, such as those 85 years of age and older, are growing more quickly. By using these age categories in the following analyses, the future impact of the growing number of elderly at different ages can be more fully understood.

A binary explanatory variable measures whether an individual has family contact. Family contact is measured by whether the person lives with relatives and/or informal, unpaid HHC is provided by relatives. The remaining variables are also binary and one indicates that the person is male, married, and white. As cited in existing literature, the availability of kin support, gender, marital status, and race have often been shown to influence the demand for different living arrangements and health services by the elderly.

In terms of the predicted relationship between the dependent variables and the predisposing characteristics, older age is expected to increase the utilization of NH care, paid HHC, physician visits, and hospital care. Being male and/or married is expected to positively impact living arrangements with relatives while decreasing the utilization of paid HHC, physicians, and hospital care because of the increased presence of social supports. Family contact is expected to directly decrease the likelihood of the elderly living alone or in a NH. Because of a possible substitution effect, the demand for paid HHC, physicians, and hospital care are also

expected to decrease. The impact of the predisposing characteristics on the demand for NHs with simple or complex organizational care is less predictable.

Enabling Characteristics. The explanatory variables measuring enabling characteristics capture insurance coverage with a binary variable indicating whether the person participates in Medicaid and/or has Medicare coverage. A proxy for accessibility, having served active duty in the armed forces, represents another enabling characteristic that has been used by previous researchers (Wolinsky, 1982). Binary variables with the value one indicate whether the person is a high school graduate and/or has a college degree and represent proxies for income. Education has also been used as a proxy for wealth (Dolinsky and Rosenwaike, 1988). The inclusion of these enabling characteristics will help highlight inequities in access that may exist for the indigent portions of the elderly population.

Medicaid participation is predicted to increase the use of NH care since living in private households can require more costly services. The effect of Medicaid on the demand for other health service providers is less certain. With less financial resources, these individuals may be less likely to demand physician and hospital care. Medicaid participation, however, is expected to reduce the probability of utilization of NHs with complex organizational structures. The explanation is that many continuing care retirement communities and organizations with personal care units often require a substantial financial investment by the elderly.

The effect of Medicare coverage on the mode of residence is difficult to predict since nearly all elderly persons are covered. With the presence of this insurance, the demand for paid HHC, physicians, and hospital care is expected to rise since coinsurance rates would be lower. Also, Medicare generally pays a higher NH rate than that paid by Medicaid patients and Medicare pays a portion of a NH stay following hospitalization for the elderly under qualifying medical conditions. For these reasons, a NH that is hospital-based may tend to have more Medicare patients.

Serving in the armed forces and higher income as measured by educational levels, are expected to increase the demand for living alone and living with relatives. The individual is expected to opt for the more attractive alternatives to NH care since they have the enabling resources. These resources are also expected to increase the utilization of paid home health, physicians, hospital care, and NHs with complex organizational structures.

Need Characteristics. Each of the analyses in this study also controls for the need characteristics of an individual including functional status and life threatening conditions. Functional status is measured with three binary variables indicating whether the individual has ADL limitations, uses assistive technology, and/or wears dentures or a bridge. ADL limitations, using the MEPS household component data, is measured by whether the individual requires help and/or supervision with bathing, dressing, getting around, walking, bending, and stooping. Using the NH component data, ADL limitation is measured by whether the resident is not independent with transferring, locomotion, dressing, bathing, eating, and toileting. Using the household and NH component data, assistive technology is coded as one if the individual uses a walker and/or cane.

The presence of ADL limitations, the use of assistive technology, and wearing dentures or a bridge are expected to increase the probability of residing with family or in a NH with a complex organizational structure. These individuals are at greater risk of falls and potentially greater nutritional risk that would prevent them from safely living alone. These need characteristics would also presumably increase the demand for other health services such as paid HHC, physicians, and hospital care. Because of the frailty of the elderly with these characteristics, they may also use NHs with a complex organizational structure. This could be the result of stays in hospitals that have a NH or the result of seeking assistance of providers with personal care units that are associated with NHs.

Cancer, diabetes, and cardiopulmonary conditions measure whether the individual has need characteristics that are life threatening. Binary variables are coded as one when the

condition is present. The measure for cardiopulmonary disease is constructed from whether the individual has emphysema, chronic obstructive pulmonary disease, stroke, hypertension, and/or ischemic heart disease.

Because these conditions are life threatening they are expected to reduce the probability of living alone. If the individual is suffering from cancer, diabetes, or a cardiopulmonary condition, they are expected to demand more health services including paid HHC, physician visits, and hospital care. The impact of these needs on the type of NH demanded is less predictable. The ongoing medical needs, acute and chronic, associated with these conditions may result in the individual seeking the services of a NH that offers an enhanced referral system to a hospital and/or personal care units.

Additional variables. To initially describe the modes of residence of the elderly population 65 years of age and older, whether the individual receives unpaid or paid HHC is included. This measure is derived from the MEPS data information on HHC. A person is reported as receiving HHC if they received home health services from an agency, paid independent, or informally. An individual is reported as receiving informal or unpaid HHC if the home health event was provided by a friend, neighbor, relative, and/or volunteer.

The second analysis examining the demand for paid HHC, physicians' visits, and hospital care uses an additional explanatory variable. In addition to measures for predisposing, enabling, and need characteristics, the model includes a variable for the percentage of the total expenditures that are paid by the individual or family for the service. This can be considered a measure of the coinsurance rate and allows analysis of how an individuals' liability for services impacts the demand. As the percentage paid by the individual and/or family increases, the utilization of paid HHC, physicians, and hospital care is expected to decrease.

In the third analysis that examines the demand for NHs with simple or complex organizational structures, wages for licensed and unlicensed nursing staff is used as a proxy for the price of care. The wages of nursing assistants, approximately half of a NH's employees, have

been found to have a very strong positive effect on price (Chiswick, 1976). The author also found that the wages of registered nurses had a positive but insignificant effect. In the current study, licensed wages are calculated as the facility's average wage for registered and licensed practical nurses. Unlicensed wages represent those paid to nurses' aides.

The effect of these price proxies on NH demand is difficult to predict. First, many elderly who reside in NHs are covered by Medicaid and the price they pay is based upon their income. Second, concern about the care received in a NH may result in the elderly increasing their demand for higher priced NH care in anticipation of higher quality care.

RESULTS

Descriptive Tables

Tables 1 through 5 provide information on the weighted observations and percentages by age and mode of residence. Table 1 shows that almost 32 percent of those over the age of 65 live alone, 64.5 percent live with relatives, and approximately 4.5 percent live in NHs. Women tend to live alone while men are more likely to live with relatives as shown in Table 2. With respect to living in a NH, 5.6 percent of women over the age of 65 live in a NH while only 2.8 percent of men in this age grouping live in this setting. In terms of other predisposing characteristics, less than 11 percent of the sample is nonwhite, more than 94 percent have family contact, and almost 53 percent are married.

Table 1 shows that those 65 years of age and older and that are living alone and females are more likely to have unpaid HHC. Elderly living with family might be expected to receive more informal or unpaid assistance. This finding may reflect that those living with family may actually receive assistance but it is going unreported. The other interesting result is that the more educated elderly, assumed to have higher incomes, are also more likely to have unpaid HHC.

Table 3 presents descriptive information on the enabling characteristics of those over the age of 65. Approximately 10 percent of this population participates in Medicaid and 98 percent are covered by Medicare. While only 4.5 percent of those over the age of 65 live in a NH, 28.4 percent of those who participate in Medicaid live in a NH. The majority of those covered by Medicare live with family.

The functional and life-threatening need characteristics of the sample are presented in Tables 4 and 5 respectively. 38 percent have limitations with activities of daily living and almost 18 percent of those over the age of 65 use assistive technology. While less than 32 percent of those over the age of 65 live alone, 41 percent of those using assistive technology live alone. Additionally, although almost 64 percent of those over the age of 65 live with family, only approximately 52 percent of those with ADL limitations or those using assistive technology live with family.

Table 5 shows the cardiopulmonary disease affects the 65 and over population more than the other life threatening diseases. Almost 65 percent suffer from cardiopulmonary disease and the majority live with family. Although 4.5 percent of those over the age of 65 live in a NH, 7.4 percent of those with emphysema and/or chronic obstructive pulmonary disease (COPD) live in NHs. Overall, the majority of those suffering from a life threatening condition live with family.

Global Demand for Mode of Residence

Table 6 presents the logit coefficients for the four multinomial logit models of mode of residence: all predisposing, enabling, and need explanatory variables; only predisposing explanatory variables; only enabling explanatory variables; and only need explanatory variables.[2] The presented results for the modes of residence, living alone and living with relatives, are relative to the omitted mode of residence, NH.

[2] The descriptive statistics for these variables are presented in Appendix A, Table 1.

All of the independent variables are significant at the .001 level. Relative to being 85 years of age or older, being 65 to 74 or 75 to 84 years of age increases the probability of living alone or with relatives relative to living in a NH. These odds decrease with age as expected.

In the first model, being married, being male, having family contact, and having diabetes each reduces the probability that an individual will live alone relative to living in a NH while having any of these characteristics increases the probability of living with relatives relative to living in a NH. Of these findings, the effect of having diabetes is the most interesting. An individual suffering from this chronic disease is more likely to live with others, whether in a private residence or in a NH. The findings from the first model also show that being white reduces the probability of living alone or with relatives relative to living in a NH.

With respect to the enabling characteristics in the full model, participation in Medicaid reduces while Medicare increases the probability of living alone or with relatives. Each of the remaining enabling characteristics, having served in the armed forces, having a high school diploma, and being a college graduate, decrease the probability of living alone or with relatives relative to living in a NH.

Having ADL limitations and having a cardiopulmonary condition both decrease the probability of living alone or with relatives relative to living in a NH. Diabetes, as mentioned earlier, has differing effects on these outcomes. Using assistive technology or wearing dentures or having cancer all increase the probability of living alone or with relatives, with using assistive technology having the greatest impact on the odds.

e^{β} indicates how the odds of the outcome event, living alone or with relatives relative to a NH, change with a change in the independent variable by one unit. The odds of living alone or with relatives are much greater if the individual is 65-74 years of age, has Medicare coverage, and uses assistive technology. This pattern is repeated in the models using only predisposing or enabling characteristics. In the model using only need characteristics, the odds of living with

relatives changes the most if the individual has cancer rather than if the individual uses assistive technology.

When the model is run using only predisposing characteristics, being white is the only variable to have a different effect on the probabilities than in the full model. Being white now increases the probability of living alone relative to living in a NH. While in the full model having served in the armed forces and being a college graduate decreased the probability of both living alone or living with relatives relative to living in a NH, both measures increase the probability of these two outcomes when the model is run using only enabling characteristics. The results of the model using only variables to measure need characteristics coincide with the results of the full model.

Market Demand for Paid HHC, Physicians' Visits, and Hospital Care

The descriptive statistics for the variables used in the models of market demand are presented in Appendix A, Table 2. The average total expenditure for paid HHC, outpatient physician visits, and hospital care are $712.44, $916.79, and $1,846.60 respectively. These figures may be considered indicative of modest to moderate to heavy use of the health care services. Also, those 65 years of age and older and their families pay the greatest percentage of total expenditures for physicians (i.e., 15 percent) while paying only 2.2 percent and 1.1 percent of paid HHC and hospital care total expenditures respectively.

Table 7 presents the tobit coefficients for the model of paid HHC. As the percentage of total expenditures paid by self/family increases, the demand for paid HHC increases. Overall, more of the measures for enabling and need characteristics are significant than the predisposing characteristics. Family contact is the only significant predisposing characteristic and decreases the utilization of paid HHC.

In terms of enabling characteristics, Medicaid participation and being a high school graduate both significantly contribute to increased utilization of paid HHC. Medicare coverage

and being a college graduate both significantly decrease the use of paid HHC. Having served in active duty is the only insignificant enabling characteristic.

In terms of need characteristics, the use of paid HHC increases with the presence of ADL limitations, the use of assistive technology, cancer and diabetes. Wearing dentures or a bridge significantly decreases the use of paid HHC. Only the presence of a cardiopulmonary condition is insignificant.

When the tobit model is run using only predisposing characteristics, all of the variables are now significant. In addition to the findings from the full model, this model shows that being 75 to 84 years of age, being white, and being a male significantly reduce the expenditures for paid HHC. The income proxies, being a high school and being a college graduate, are no longer significant when the model is run using only enabling characteristics. When only variables measuring need characteristics are used to explain expenditures for paid HHC, cardiopulmonary disease is again the only insignificant variable. The signs on all remaining need variables are the same as in the full model.

The results of the models to explain expenditures for physician visits are presented in Table 8.[3] The full model using all of the predisposing, enabling, and need characteristics shows that as the percentage of total expenditures paid by self/family for doctors visits increases, the demand for the service decreases. This finding coincides with the findings of Manning et al. (1987) that when less is paid out-of-pocket, utilization increases.

When the full model containing all of the predisposing, enabling, and need characteristics is run, need characteristics tend to be more significant than the predisposing and enabling characteristics. Expenditures for outpatient physician visits increases if an individual is white, a high school graduate, uses assistive technology, has cancer, or has a cardiopulmonary condition.

[3] These models are also run on outpatient providers, which include visits to the following types of providers: chiropractors, midwives, nurses and nurse practitioners, optometrists, podiatrists, physician's assistants, physical therapists, occupational therapists, psychologist, social workers, technicians,

On the other hand, utilization of physician visits decreases if an individual is 65-74 years of age, has family contact, is a college graduate, or wears dentures or a bridge.

When the expenditures for physicians' visits are explained using a model with only explanatory variables measuring predisposing characteristics, age is no longer significant. Being married now positively impacts the dependent variable. In the model using only enabling characteristics, having served in the armed forces now increases the expenditures for physicians' visits. Using assistive technology is no longer significant in the final model that uses only need characteristics as the independent variables. In this model, diabetes now significantly increases the expenditures for physician visits.

Table 9 presents the results of four tobit models used to explain expenditures for hospital care. Each model shows that that as the percentage of total expenditures paid by self/family for hospital care increases, the demand for hospital care increases. In the first model, Medicaid participation, ADL limitations, using assistive technology, diabetes all have a positive and significant impact on the demand for hospital care. The demand for hospital care is significantly decreased if the individual is 75 to 84 years of age, has family contact, and/or wears dentures/bridge.

In the second model using only predisposing characteristics, being married now significantly reduces the demand for hospital care. The model using only enabling characteristics reveals no difference in findings from the full model. When expenditures for hospital care are explained with a model using only need characteristics, cancer is found to now positively impact the expenditures.

The elasticity of total expenditures with respect to a change in the coinsurance rate for physician visits is -0.06. As expected, as the percentage of total expenditures paid by the individual and/or family goes down, the quantity demanded or expenditures increase. In contrast,

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receptionists/clerks/secretaries, or other medical providers. Also included in the expenditures for outpatient providers are the facility and provider expenses associated with outpatient visits to these types of providers.

the elasticity of total expenditures with respect to the fraction paid by the individual and/or family for paid home health and hospital care are 0.24 and 0.29 respectively. As the coinsurance rates for paid home health and hospital care increase the total expenditures or quantity demanded also increase.

NH Demand

Appendix A, Table 3 presents the descriptive statistics for the variables used in the analysis of NH demand for both complex and simple organizational structures. Complex structures are associated with lower average licensed wages but higher average unlicensed wages. NHs with a complex organizational structure are also more likely to have residents with higher levels of education, that have served in the armed forces, 85 years of age and older, white, male, and that wear dentures or a bridge.

Table 10 presents results for the analysis to explain the demand for NHs with simple or complex organizational structures. Using predisposing, enabling, and need characteristics in the first model, reveals that all of the variables are significant except diabetes. Licensed wages increase the demand for NHs with a simple organizational structure while unlicensed wages decrease this demand.

Age, being male, participating in Medicaid, Medicare coverage, having served in the armed forces, ADL limitations, a cardiopulmonary condition all increase the demand for a NH with a simple structure. This demand is reduced if the individual is married, white, has family contact, is a high school graduate, college graduate, uses assistive technology, wears dentures/bridge, and/or has cancer.

The second binary logit model uses only predisposing characteristics. While all of these measures remain significant, being male now reduces the demand for a NH with a simple organizational structure. When only enabling characteristics are used in the third model, no changes from the results of the full model are revealed. Two changes are evident when only need

characteristics are used to explain the demand for a NH with a simple organizational structure. First, diabetes now positively impacts this demand. Having a cardiopulmonary condition, however, now reduces the demand for a NH with a simple organizational structure while it had increased demand in the full model.

e^{β} indicates how the odds of the outcome event, living in a NH with a simple organizational structure relative to a NH with a complex organizational structure, change with a change in the independent variable by one unit. In the full model, the odds of living in a NH with a simple structure are influenced the most by the individual being a Medicaid recipient, covered by Medicare and having ADL limitations. This pattern is basically repeated in the models using only predisposing, enabling, or need components.

The first model, using all of the predisposing, enabling, need, and wage variables predicts 85.1 percent of the actual observed outcome values correctly. The models using only predisposing, enabling, and need variables respectively predict 80.5 percent, 84.8 percent, and 80.8 percent correctly.

DISCUSSION

Many of the findings from the analyses of this study are similar to the results reported from past research. This discussion will focus on findings that are somewhat unique and unexpected.

In the analysis of mode of residence, diabetes reduces the probability of living alone. This appears to make sense given that this chronic condition is associated with various medical complications (i.e., infections) and warrants daily needs (e.g., measuring blood sugar levels, monitoring diet). These components of the medical condition for the elderly person can perhaps be addressed more consistently with the assistance of others in a private household with relatives or in a NH.

In this first analysis, the findings also reveal that higher income, as measured by educational attainment, increases the probability of the individual living in a NH. This finding is rather surprising. Intuitively an individual with greater financial resources would be able to afford alternatives in a private household to meet their needs.

The second analysis looks at the demand for paid HHC, physician visits, and hospital care separately. Each tobit model contains a measure of coinsurance or the percentage of the total expenditure that is paid by the individual or their family. As this percentage increases, the demand or utilization of the health service is expected to decrease. This is shown in the case of physician visits but not with respect to paid home health and hospital care. With respect to paid HHC, the explanation may be that the individual is willing to pay for the service because the unattractive alternative may be NH care. In the case of hospital care, the patient needs acute care regardless of the cost to him or herself. Another explanation may also relate to the finding that on average, individuals and/or families pay a much smaller percentage of the total expenditure for paid HHC and hospital care.

Paid HHC is utilized more when the individual has Medicaid coverage but is utilized less if the individual has Medicare coverage. One explanation for this finding may be that Medicaid coverage of HHC does not have the same strict qualifications of Medicare, such as requiring the individual to need skilled care in the home. Also, Medicaid NH pre-admission programs in some states screen the NH applicant to ascertain whether the individual in a low income range may be eligible for less costly services at home. These two factors may contribute to this study's findings.

Being a high school graduate is found to increase the utilization of paid HHC and physician visits while being a college graduate is found to decrease their use. Rather than reflecting income, educational attainment may actually be measuring the individual's general knowledge on maintaining one's health. The college graduate may be able to maintain a healthier

lifestyle (e.g., eat a nutritious diet, follow medication instructions, etc.) and have less need for HHC and physician care.

In the models explaining the demand for paid HHC, doctor visits, and hospital care, family contact decreases the utilization of each service. This finding may lend support to for the explanation that family members are an informal substitute for these three services (Brody, 1985).

The number of variables from the behavioral model that are found to be significant in explaining expenditures for paid HHC, physician visits, and hospital care are 12, 10, and 8 respectively. Andersen and Newman's model appears to best explain the demand for paid HHC. This may lend further support for Wolinsky and Coe's (1984) conclusion that the behavioral model is less appropriate for explaining health care usage by heavy users.[4] The current study may support this conclusion based upon the assumption that the elderly are modest users of paid HHC, while being more moderate or heavy users of physician and hospital care as indicated by their average total expenditures.

Further support of the idea that the behavioral model may be best for predicting modest utilization of health services by the elderly may be provided by the third analysis. In predicting the probability of residing in a NH with a simple organizational structure relative to living in one with a complex organizational structure, all but one variable in the behavioral model is significant and all of the others are significant at the .001 level. The elderly's use of NH care can be considered modest as evidenced by Table 1 that shows only 4.5 percent of those 65 years of age and older reside in a NH.

In the analysis of NH demand, the probability of residing in a NH with a simple organizational structure increases with an increase in the licensed nursing wages. The probability is decreased with an increase in the wages of the unlicensed nursing assistants. Wages is being

[4] Using truncation and logarithmic transformations on the dependent variables measuring physician and hospital utilization to adjust for the positive skewness of the number of visits, the authors find improvement in the predictive utility of the model. Based upon their normalization of these distributions, Wolinsky and Coe conclude that the behavioral model is more appropriate for modest to moderate users of health care.

used as a proxy for price and interpreting these two conflicting effects is difficult. The effect of price on NH demand cannot be predicted *a priori*. If price is assumed to indicate quality, consumers may demand care that has a higher price. On the other hand, according to the law of demand, a higher price is associated with a decrease in demand.

The difference in the effects of the wages for licensed and unlicensed nursing staff may be explained by Chiswick (1976). The author finds that the wages of nursing assistants, who comprise one half of a NH's employees, have a very strong positive effect on NH price. The study finds that the wages of registered nurses do not have a significant effect on price. Unlicensed wages in the current study, therefore, may be a more valid measure of NH price. The negative coefficient on unlicensed wages is then perhaps more valid and coincides with the law of demand.

As Andersen and Newman (1973) explain, equitable distribution of health care refers to the idea that some characteristics should become important and others less so as equity is achieved. More specifically, the authors explain that demographic variables are important with respect to distributing health services under a system of equitable distribution because of the well-researched relationships between age, sex, marital status and physical need, disease patterns, etc. Illness levels or need characteristics would also be considered important bases for the equitable distribution of health services. The enabling characteristics, such as income and health insurance, should be less important. The lack of these resources can represent a barrier to health care or an inequitable distribution of health care services.

Four models are run to examine the probability of residing in a NH with a simple organizational structure relative to a NH with a complex organizational structure. The results of these four models indicate that second to the full model, the model using only the enabling variables most accurately predicts the outcomes. This may be interpreted as meaning that individuals do not have equitable access to these two different types of NHs. According to the research previously cited, CCRC residents are more likely to use nursing units. Patients in a

hospital that is associated with a NH are transferred more quickly to NHs. Some may argue that these referral patterns are indicative of better quality care. Others may question whether these patterns are indicative of a lower quality of life. At the very least, the results of the current study suggest that NH structure should perhaps be examined more closely.

CONCLUSION

In summary, this study finds that age, Medicare coverage, and the use of assistive technology are the strongest predictors of the mode of residence for those 65 years of age and older. The second analysis shows that total expenditures for paid HHC and hospital care do not decrease as expected when the percentage paid by individuals and/or their families increases. Finally, the third analysis suggests that the distribution of NH services that differ by organizational complexity is not equitable.

This paper has examined the demand by the elderly for different modes of residence and health services. As society ages, it will become even more important to understand the needs and characteristics of the individuals who are heavy users of different living arrangements and health care providers. The current study lends support for the inappropriateness of using a behavioral model to examine the elderly's use of services when it is heavy use. A need exists for the development of a model that can more precisely study the utilization of services by the elderly.

In addition to the aging of society, a second change is occurring. The organization and structure of health services is becoming more complex. The consequences of these emerging organizations are still unknown. Additional research is needed to examine the impact of a complex organizational structure on quality of care, quality of life, and access.

TABLE 1. WEIGHTED OBSERVATIONS AND PERCENTAGES FOR MODE OF RESIDENCE BY AGE				
Mode of Residence	*65+ (thousands)*	*65-74 (thousands)*	*75-84 (thousands)*	*85+ (thousands)*
	31,394.9	17,983.2 (57.3%)	10,518.6 (33.5%)	2,893.0 (9.2%)
Lives outside nursing home				
Lives in private household	*29,384.6 (95.5%)*	*17,799.8 (99.0%)*	*10,054.9 (95.6%)*	*2,129.9 (73.6%)*
No home health care	25,957.2 (82.7%)	16,424.3 (91.3%)	8,310.6 (79.0%)	1,222.3 (42.2%)
Receives home health care	4,027.4 (12.8%)	1,375.5 (7.6%)	1,744.3 (16.6%)	907.6 (31.4%)
Unpaid home health care	917.7 (22.8%)	#	392.7 (22.5%)	#
Pays for home health care	3,109.8 (77.2%)	#	1,351.6 (77.5%)	#
Lives in private household alone	*10,007.5 (31.9%)*	*4,784.5 (26.6%)*	*4,078.8 (38.8%)*	*1,144.3 (39.6%)*
No home health care	7,915.4 (79.1%)	4,166.9 (87.1%)	3,169.8 (77.7%)	578.8 (50.6%)
Receives home health care	2,092.1 (20.9%)	617.6 (12.9%)	909.0 (22.3%)	565.5 (49.4%)
Unpaid home health care	527.1 (25.2%)	#	#	#
Pays for home health care	1,565.0 (78.4%)	#	#	#
Lives in private household with family	*19,977.1 (63.6%)*	*13,015.3 (72.4%)*	*5,976.1 (56.8%)*	*985.6 (34.1%)*
No home health care	18,041.7 (90.3%)	12,257.4 (94.2%)	5,140.8 (86.0%)	643.5 (65.3%)
Receives home health care	1,935.4 (9.7%)	757.9 (5.8%)	835.3 (14.0%)	342.2 (34.7%)
Unpaid home health care	390.6 (20.2%)	#	#	#
Pays for home health care	1,544.7 (79.8%)	#	#	#
Lives in nursing home	**1,410.3 (4.5%)**	**183.4 (1.0%)**	**463.8 (4.4%)**	**763.1 (26.4%)**
Simple organizational structure	1,138.1 (80.7%)	151.4 (82.5%)	378.4 (81.6%)	608.3 (79.7%)
Complex organizational structure	272.2 (19.3%)	32.0 (17.5%)	85.3 (18.4%)	154.8 (20.3%)
# Number of unweighted observations less than 100 and unreliable for making national estimates				

TABLE 2. WEIGHTED OBSERVATIONS AND PERCENTAGES FOR AGE AND MODE OF RESIDENCE BY PREDISPOSING CHARACTERISTICS							
		Predisposing Characteristics					
	65+ (000s)	*Male (000s)*	*Female (000s)*	*Married (000s)*	*White (000s)*	*Nonwhite (000s)*	*Family Contact (000s)*
Age							
65+	**31,394.9**	**12,916.5 (41.1%)**	**18,478.4 (58.9%)**	**16,530.5 (52.7%)**	**28,003.0 (89.2%)**	**3,391.9 (10.8%)**	**29,601.9 (94.3%)**
65-74	17,983.2 (57.3%)	8,119.4 (45.1%)	9,863.9 (54.9%)	11,200.5 (62.3%)	15,799.5 (87.9%)	2,183.7 (12.1%)	17,435.5 (97.0%)
75-84	10,518.6 (33.5%)	4,111.2 (39.1%)	6,407.5 (60.9%)	4,777.9 (45.4%)	9,568.4 (91.0%)	#	9,739.8 (92.6%)
85+	2,893.0 (9.2%)	686.0 (23.7%)	2,207.1 (76.3%)	552.2 (19.1%)	2,635.1 (91.1%)	#	2,426.6 (83.9%)
Mode of Residence							
Lives outside nursing home							
Lives in private household	*29,384.6 (95.5%)*	12,549.3 (97.2%)	17,435.3 (94.4%)	16,299.3 (98.6%)	15,647.6 (95.5%)	3,246.9 (95.7%)	28,234.4 (95.4%)
No home health care	25,957.2 (82.7%)	11,356.9 (87.9%)	14,600.3 (79.0%)	15,191.8 (91.9%)	23,246.5 (83.0%)	2,710.7 (79.9%)	25,917.3 (87.6%)
Receives home health care	4,027.4 (12.8%)	1,192.4 (9.2%)	2,835.0 (15.3%)	1,107.5 (6.7%)	3,491.2 (12.5%)	536.2 (15.8%)	2,317,2 (7.8%)
Unpaid home health care	917.7 (22.8%)	#	716.9 (25.3%)	#	783.4 (22.4%)	#	617.7 (26.7%)
Pays for home health care	3,109.8 (77.2%)	#	2,118.2 (74.7%)	#	2,707.8 (77.6%)	#	1,699.4 (73.3%)
Lives in private household alone	*10,007.5 (31.9%)*	2,390.8 (18.5%)	7,616.7 (41.2%)	157.9 (1.0%)	9,006.3 (32.2%)	1,001.2 (29.5%)	8,297.2 (28.0%)
No home health care	7,915.4 (79.1%)	2,022.3 (84.6%)	5,893.1 (77.4%)	144.0 (91.2%)	7,132.3 (79.2%)	783.1 (78.2%)	7,915.4 (95.4%)
Receives home health care	2,092.1 (20.9%)	368.5 (15.4%)	1,723.6 (22.6%)	13.9 (8.8%)	1,874.0 (20.8%)	218.1 (21.8%)	381.8 (4.6%)
Unpaid home health care	527.1 (25.2%)	#	483.2 (28%)	#	442.4 (23.6%)	#	227.1 (59.5%)
Pays for home health care	1,565.0 (78.4%)	#	1,240.4 (72%)	#	1,431.6 (76.4%)	#	154.7 (40.5%)
Lives in private household with family	*19,977.1 (63.6%)*	10,158.5 (78.6%)	9,818.6 (53.1%)	16,141.3 (97.6%)	17,731.4 (63.3%)	2,245.7 (66.2%)	19,937.2 (67.4%)
No home health care	18,041.7 (90.3%)	9,334.6 (91.9%)	8,707.1 (88.7%)	15,047.8 (93.2%)	16,114.1 (90.9%)	1,927.6 (85.5%)	18,001.8 (90.3%)
Receives home health care	1,935.4 (9.7%)	823.9 (8.1%)	1,111.4 (11.3%)	1,093.5 (6.8%)	1,617.2 (9.1%)	318.1 (14.2%)	1,935.4 (9.7%)
Unpaid home health care	390.6 (20.2%)	#	233.7 (21.0%)	#	#	#	390.6 (20.2%)
Pays for home health care	1,544.7 (79.8%)	#	877.8 (79.0%)	#	#	#	1,544.7 (79.8%)

TABLE 2 (CONTINUED)

		Predisposing Characteristics					
	65+ (000s)	*Male (000s)*	*Female (000s)*	*Married (000s)*	*White (000s)*	*Nonwhite (000s)*	*Family Contact (000s)*
Lives in nursing home	1,410.3 (4.5%)	367.2 (2.8%)	1,043.1 (5.6%)	231.2 (1.4%)	1,265.4 (4.5%)	144.9 (4.3%)	1,367.5 (4.6%)
Simple organizational structure	1,138.1 (80.7%)	287.9 (78.4%)	850.3 (81.5%)	180.2 (77.9%)	1,012.6 (80.0%)	125.5 (86.6%)	1,103.4 (80.7%)
Complex organizational structure	272.2 (19.3%)	79.3 (21.6%)	192.8 (18.5%)	51.0 (22.1%)	252.8 (20.0%)	19.4 (13.4%)	264.1 (19.3%)

Number of unweighted observations less than 100 and unreliable for making national estimates

TABLE 3. WEIGHTED OBSERVATIONS AND PERCENTAGES FOR AGE AND MODE OF RESIDENCE BY ENABLING CHARACTERISTICS							
		Enabling Characteristics					
	65+ (000s)	*Medicaid (000s)*	*Medicare (000s)*	*Served in Armed Forces (000s)*	*Less than High School (000s)*	*High School Graduate (000s)*	*College Graduate (000s)*
Age							
65+	**31,394.9**	**3,254.8 (10.4%)**	**30,871.2 (98.3%)**	**8,120.1 (25.9%)**	**11,569.2 (36.9%)**	**18,957.9 (60.4%)**	**4,881.9 (15.6%)**
65-74	17,983.2 (57.3%)	1,517.3 (8.4%)	17,650.7 (98.2%)	#	5,751.1 (32.0%)	11,806.8 (65.7%)	#
75-84	10,518.6 (33.5%)	#	10,399.2 (98.9%)	2,261.2 (21.5%)	4,390.3 (41.7%)	5,882.6 (55.9%)	#
85+	2,893.0 (9.2%)	#	2,821.3 (97.5%)	#	1,427.8 (49.4%)	1,268.5 (43.8%)	412.6 (14.3%)
Mode of Residence							
Lives outside nursing home							
Lives in private household	*29,384.6 (95.5%)*	*2,328.9 (71.6%)*	*29,521.5 (95.6%)*	*8,016.4 (98.7%)*	*10,956.1 (94.7%)*	*18,471.2 (97.4%)*	*4,781.9 (98.0%)*
No home health care	25,957.2 (82.7%)	1,602.7 (49.2%)	25,565.0 (82.8%)	7,376.6 (90.8%)	9,096.1 (78.6%)	16,631.8 (86.3%)	4,319.7 (88.5%)
Receives home health care	4,027.4 (12.8%)	726.2 (22.3%)	3,956.5 (12.8%)	639.7 (7.9%)	1,860.0 (16.1%)	2,109.5 (11.1%)	462.2 (9.5%)
Unpaid home health care	917.7 (22.8%)	#	893.9 (22.6%)	#	348.1 (18.7%)	557.5 (26.4%)	#
Pays for home health care	3,109.8 (77.2%)	#	3,062.6 (77.4%)	#	1,511.9 (81.3%)	1,552.0 (73.6%)	#
Lives in private household alone	*10,007.5 (31.9%)*	*1,120.0 (34.4%)*	*9,865.7 (32.0%)*	*1,612.2 (19.9%)*	*4,133.1 (35.7%)*	*5,724.1 (30.2%)*	*1,415.4 (29.0%)*
No home health care	7,915.4 (79.1%)	#*	7,804.2 (79.1%)	1,373.1 (85.2%)	3,226.1 (78.1%)	4,588.4 (80.2%)	180.5 (12.8%)
Receives home health care	2,092.1 (20.9%)	#	2,061.6 (20.9%)	239.1 (14.8%)	907.0 (21.9%)	1,135.7 (19.8%)	1,234.9 (87.2%)
Unpaid home health care	527.1 (25.2%)	#	527.1 (25.6%)	#	#	#	#
Pays for home health care	1,565.0 (78.4%)	#	1,528.1 (80.6%)	#	#	#	#
Lives in private household with family	*19,977.1 (63.6%)*	*1,208.9 (37.1%)*	*19,655.8 (63.7%)*	*6,404.1 (78.9%)*	*6,823.0 (59.0%)*	*12,747.1 (67.2%)*	*3,366.6 (69.0%)*
No home health care	18,041.7 (90.3%)	#	17,760.8 (90.4%)	6,003.5 (93.7%)	5,870.0 (86.0%)	11,773.4 (92.3%)	3,084.8 (91.6%)
Receives home health care	1,935.4 (9.7%)	#	1,895.0 (9.6%)	400.6 (6.3%)	953.0 (14.0%)	973.7 (7.6%)	281.7 (8.4%)
Unpaid home health care	390.6 (20.2%)	#	366.9 (19.4%)	#	#	#	#
Pays for home health care	1,544.7 (79.8%)	#	1,528.1 (80.6%)	#	#	#	#

TABLE 3 (CONTINUED)

		Enabling Characteristics					
	65+ (000s)	*Medicaid (000s)*	*Medicare (000s)*	*Served in Armed Forces (000s)*	*Less than High School (000s)*	*High School Graduate (000s)*	*College Graduate (000s)*
Lives in nursing home	**1,410.3 (4.5%)**	**925.3 (28.4%)**	**1,349.6 (4.4%)**	**103.7 (1.3%)**	**613.1 (5.3%)**	**486.7 (2.6%)**	**100.0 (2.0%)**
Simple organizational structure	1,138.1 (80.7%)	784.1 (84.7%)	1,095.1 (81.1%)	74.7 (72.0%)	512.7 (83.6%)	384.8 (79.1%)	76.1 (79.1%)
Complex organizational structure	272.2 (19.3%)	141.8 (15.3%)	254.5 (18.9%)	29.0 (28.0%)	100.5 (16.4%)	101.9 (20.9%)	23.9 (23.9%)

Number of unweighted observations less than 100 and unreliable for making national estimates

TABLE 4. WEIGHTED OBSERVATIONS AND PERCENTAGES FOR AGE AND MODE OF RESIDENCE BY FUNCTIONAL NEED CHARACTERISTICS				
		Need Characteristics		
	65+ (000s)	*ADL Limitations (000s)*	*Assistive Technology (000s)*	*Wears Dentures or Bridge (000s)*
Age				
65+	**31,394.9**	**11,930.3 (38.0%)**	**5,518.5 (17.6%)**	**16,681.1 (53.1%)**
65-74	17,983.2 (57.3%)	4,873.7 (28.0%)	1,717.6 (9.9%)	8,547.3 (49.2%)
75-84	10,518.6 (33.5%)	4,823.3 (45.9%)	2,309.6 (22.0%)	6,478.5 (61.6%)
85+	2,893.0 (9.2%)	2,233.2 (77.2%)	1,491.3 (51.5%)	1,655.2 (57.2%)
Mode of Residence				
Lives outside nursing home				
Lives in private household	*29,384.6 (95.5%)*	*10,561.8 (88.5%)*	*5,139.0 (93.1%)*	*16,008.8 (96.0%)*
No home health care	25,957.2 (82.7%)	7,338.4 (69.5%)	2,782.9 (50.4%)	13,605.0 (81.6%)
Receives home health care	4,027.4 (12.8%)	3,223.4 (30.5%)	2,356.1 (42.7%)	2,403.7 (14.4%)
No payment for home health care	917.7 (22.8%)	738.6 (22.9%)	526.6 (22.3%)	508.0 (21.1%)
Pays for home health care	3,109.8 (77.2%)	2,484.8 (77.1%)	1,829.5 (77.7%)	1,895.8 (78.9%)
Lives in private household alone	*10,007.5 (31.9%)*	*4,311.9 (36.1%)*	*2,264.0 (41.0%)*	*5,725.0 (34.3%)*
No home health care	7,915.4 (79.1%)	2,628.9 (61.0%)	997.9 (44.1%)	4,399.9 (76.9%)
Receives home health care	2,092.1 (20.9%)	1,682.9 (39.0%)	1,266.1 (55.9%)	1,325.1 (23.1%)
No payment for home health care	527.1 (25.2%)	440.6 (26.2%)	#	#
Pays for home health care	1,565.0 (78.4%)	1,242.3 (73.8%)	#	#
Lives in private household with family	*19,977.1 (63.6%)*	*6,249.9 (52.4%)*	*2,875.0 (52.1%)*	*10,283.7 (61.6%)*
No home health care	18,041.7 (90.3%)	4,709.4 (75.4%)	1,785.0 (62.1%)	9,205.1 (89.5%)
Receives home health care	1,935.4 (9.7%)	1,540.5 (24.6%)	1,090.1 (37.9%)	1,078.7 (10.6%)
No payment for home health care	390.6 (20.2%)	298.0 (19.3%)	#	#
Pays for home health care	1,544.7 (79.8%)	1,242.4 (80.7%)	#	#

TABLE 4 (CONTINUED)

		Need Characteristics		
	65+ (000s)	*ADL Limitations (000s)*	*Assistive Technology (000s)*	*Wears Dentures or Bridge (000s)*
Lives in nursing home	**1,410.3 (4.5%)**	**1,368.5 (11.5%)**	**379.5 (6.9%)**	**672.3 (4.0%)**
Simple organizational structure	1,138.1 (80.7%)	1,107.9 (81.0%)	300.5 (79.2%)	535.1 (79.6%)
Complex organizational structure	272.2 (19.3%)	260.6 (19.0%)	79.0 (20.8%)	137.2 (20.4%)

Number of unweighted observations less than 100 and unreliable for making national estimates

TABLE 5. WEIGHTED OBSERVATIONS AND PERCENTAGES FOR AGE AND MODE OF RESIDENCE BY LIFE THREATENING NEED CHARACTERISTICS						
		Need Characteristics				
	65+ (000s)	*Cancer (000s)*	*Diabetes (000s)*	*Emphysma COPD (000s)*	*Hypertension (000s)*	*Cardio-pulmonary (000s)*
Age						
65+	**31,394.9**	**3,499.2 (11.1%)**	**4,262.9 (13.6%)**	**2,497.8 (8.0%)**	**12,099.1 (38.5%)**	**15,515.3 (49.4%)**
65-74	17,983.2 (57.3%)	1,712.2 (9.8%)	2,446.0 (14.1%)	1,524.7 (8.8%)	7,399.5 (42.6%)	9,037.1 (52.0%)
75-84	10,518.6 (33.5%)	#	1,460.5 (13.9%)	#	3,629.7 (34.5%)	4,985.4 (47.4%)
85+	2,893.0 (9.2%)	#	356.4 (12.3%)	#	1,069.9 (37.0%)	1,492.8 (51.6%)
Mode of Residence						
Lives outside nursing home						
Lives in private household	*29,384.6 (95.5%)*	*3,395.6 (97.0%)*	*4,010.1 (94.1%)*	*2,311.9 (92.6%)*	*11,567.5 (95.6%)*	*14,615.3 (94.2%)*
No home health care	25,957.2 (82.7%)	2,694.8 (77.0%)	3,054.7 (71.7%)	2,007.2 (80.4%)	9,912.3 (81.9%)	12,301.5 (79.3%)
Receives home health care	4,027.4 (12.8%)	700.8 (20.0%)	955.4 (22.4%)	304.7 (12.2%)	1,655.2 (13.7%)	2,313.7 (14.9%)
Unpaid home health care	917.7 (22.8%)	#*	#	#	353.4 (21.3%)	423.0 (18.3%)
Pays for home health care	3,109.8 (77.2%)	#	#	#	1,301.8 (78.7%)	1,890.7 (81.7%)
Lives in private household alone	*10,007.5 (31.9%)*	*1,024.8 (29.3%)*	*1,128.7 (26.5%)*	*732.2 (29.3%)*	*3,824.6 (31.6%)*	*4,734.1 (30.5%)*
No home health care	7,915.4 (79.1%)	632.7 (61.7%)	653.2 (57.9%)	598.1 (81.7%)	3,012.6 (78.8%)	3,633.1 (76.7%)
Receives home health care	2,092.1 (20.9%)	392.1 (38.3%)	475.5 (42.1%)	134.1 (18.3%)	811.9 (21.2%)	1,101.0 (23.3%)
Unpaid home health care	527.1 (25.2%)	#	#	#	#	#
Pays for home health care	1,565.0 (78.4%)	#	#	#	#	#
Lives in private household with family	*19,977.1 (63.6%)*	*2,370.7 (67.7%)*	*2,881.4 (67.6%)*	*1,579.8 (63.2%)*	*7,742.9 (64.0%)*	*9,881.2 (63.7%)*
No home health care	18,041.7 (90.3%)	2,062.1 (87.0%)	2,401.5 (83.3%)	1,409.1 (89.2%)	6,899.6 (89.1%)	8,668.4 (87.7%)
Receives home health care	1,935.4 (9.7%)	308.7 (13.0%)	479.9 (16.7%)	170.7 (10.8%)	843.3 (10.9%)	1,212.7 (12.3%)
Unpaid home health care	390.6 (20.2%)	#	#	#	#	#
Pays for home health care	1,544.7 (79.8%)	#	#	#	#	#

TABLE 5 (CONTINUED)

		Need Characteristics				
	65+ (000s)	*Cancer (000s)*	*Diabetes (000s)*	*Emphysma COPD (000s)*	*Hypertension (000s)*	*Cardio-pulmonary (000s)*
Lives in nursing home	**1,410.3 (4.5%)**	**103.7 (3.0%)**	**252.8 (5.9%)**	**185.8 (7.4%)**	**531.6 (4.4%)**	**900.0 (5.8%)**
Simple organizational structure	1,138.1 (80.7%)	78.0 (75.2%)	209.6 (82.9%)	155.1 (83.4%)	430.4 (81.0%)	726.8 (80.8%)
Complex organizational structure	272.2 (19.3%)	25.7 (24.8%)	43.2 (17.1%)	30.8 (16.6%)	101.3 (19.0%)	173.2 (19.2%)

Number of unweighted observations less than 100 and unreliable for making national estimates

TABLE 6. LOGIT COEFFICIENTS FOR A MULTINOMIAL LOGIT MODEL OF MODE OF RESIDENCE						
	Living Alone			*Living with Relatives*		
Explanatory Variables	*b*	*Standard Error*	e^b	*b*	*Standard Error*	e^b
Full Model Unweighted Observations = 3,806 and Weighted Observations = 29,521,163						
Intercept	9.864***	.024		-7.756***	.022	
Predisposing						
Age 65-74 years	3.535***	.024	34.292	3.211***	.006	24.800
Age 75-84 years	2.036***	.005	7.662	1.513***	.005	4.542
Male	-.0817***	.006	.922	.084***	.006	1.088
Married	-3.406***	.006	.033	2.279***	.006	9.770
White	-1.140***	.006	.320	-1.892***	.006	.151
Family Contact	-3.353***	.010	.035	15.188	.000	3,943,348
Enabling						
Medicaid	-6.795***	.009	.011	-6.659***	.009	.001
Medicare	3.251***	.019	25.804	2.326***	.019	10.232
Served in Armed Forces	-.664***	.009	.515	-.824***	.009	.439
High School Graduate	-.436***	.005	.647	-.423***	.005	.655
College Graduate	-.462***	.011	.630	-1.056***	.011	.348
Need						
ADL Limitations	-4.704***	.010	.009	-4.766***	.010	.009
Assistive Technology	1.341***	.005	3.821	1.776***	.005	5.904
Wears Dentures or Bridge	.849***	.004	2.337	.986***	.004	2.681
Cancer	.582***	.007	1.789	.786***	.007	2.194
Diabetes	-.406***	.005	.666	.156***	.005	1.169
Cardiopulmonary	-.778***	.004	.459	-.773***	.004	.462
Model using Variables Measuring Predisposing Characteristics Only Unweighted Observations = 5,611 and Weighted Observations = 31,331,064						
Intercept	2.419***	.006		-15.855***	.003	
Age 65-74 years	3.554***	.003	34.937	3.071***	.003	21.567
Age 75-84 years	2.232***	.002	9.317	1.633***	.002	5.122
Male	-.070***	.002	.932	-.044***	.002	.957
Married	-3.131***	.004	.044	2.461***	.003	11.716
White	.469***	.003	1.598	-.425***	.003	.654
Family Contact	-2.795***	.006	.061	15.941	.000	8,376,326
Model using Variables Measuring Enabling Characteristics Only Unweighted observations = 3,876 and Weighted Observations = 30,042,610						
Intercept	4.008***	.015		4.253***	.015	
Medicaid	-5.906***	.008	.003	-6.425***	.008	.002
Medicare	2.512***	.015	12.334	2.715***	.015	15.100
Served in Armed Forces	.038***	.005	1.039	.910***	.005	2.484
High School Graduate	-.371***	.003	.690	-.234***	.003	.791
College Graduate	.403***	.006	1.497	.355***	.006	1.426

TABLE 6 (CONTINUED)

Model using Variables Measuring Need Characteristics Only
Unweighted Observations = 5,536 and Weighted Observations = 30,806,759

Intercept	5.149***	.006		5.995***	.006	
ADL Limitations	-4.412***	.006	.012	-4.855***	.006	.008
Assistive Technology	.756***	.002	2.129	.388***	.002	1.475
Wears Dentures or Bridge	.636***	.002	1.890	.479***	.002	1.614
Cancer	.543***	.004	1.720	.802***	.003	2.229
Diabetes	-.127***	.003	.881	.281***	.002	1.324
Cardiopulmonary	-.425***	.002	.654	-.287***	.002	.750

*** Significant at the .001 level

TABLE 7. TOBIT COEFFICIENTS FOR A MODEL OF MARKET DEMAND FOR PAID HOME HEALTH CARE		
Explanatory Variables	*Coefficient*	*Standard Error*
Full Model Unweighted Observations = 2,201 and Weighted Observations = 28,839,206		
Intercept	317.9	2063.5
Percent Total Expense Paid by Self/Family	7694.4***	1871.5
Predisposing		
Age 65-74 years	2799.8*	1415.4
Age 75-84 years	-1600.5	1046.3
Male	686.5	1183.5
Married	349.6	1070.7
White	-1918.7	1430.8
Family Contact	-14,804***	1324.4
Enabling		
Medicaid	9173.4***	1295.6
Medicare	-9173.4***	1294.7
Served in Armed Forces	1039.6	1012.9
High School Graduate	1851.0*	955.6
College Graduate	-1848.4*	956.1
Need		
ADL Limitations	7694.1***	1073.5
Assistive Technology	6253.4***	1074.1
Wears Dentures or Bridge	-7.1**	2.4
Cancer	2263.9*	1299.4
Diabetes	1974.3*	1160.4
Cardiopulmonary	-342.3	963.2
Model using Variables Measuring Predisposing Characteristics Only Unweighted Observations = 2,280 and Weighted Observations = 29,938,197		
Intercept	-8086.0***	1826.6
Percent Total Expense Paid by Self/Family	19,083***	2365.1
Age 65-74 Years	9208.1***	1636.5
Age 75-84 Years	-5393.7***	1144.3
Male	-3550.2**	1116.1
Married	6458.9***	1165.2
White	-5596.1***	1529.1
Family Contact	-6443.4***	1164.7

TABLE 7 (CONTINUED)		
Model using Variables Measuring Enabling Characteristics Only Unweighted Observations = 2,240 and Weighted Observations = 29,347,849		
Intercept	-6823.8***	1369.1
Percent Total Expense Paid by Self/Family	25,183***	2369.7
Medicaid	13,086***	1410.0
Medicare	-13,093***	1490.2
Served in Armed Forces	37.1	58.5
High School Graduate	-139.6	1011.8
College Graduate	143.3	1012.3
Model using Variables Measuring Need Characteristics Only Unweighted Observations = 2,242 and Weighted Observations = 29,428,873		
Intercept	-25,212***	1498.2
Percent Total Expense Paid by Self/Family	13,381***	2090.5
ADL Limitations	9484.7***	1163.7
Assistive Technology	9943.3***	1159.8
Wears Dentures or Bridge	-7.5**	2.7
Cancer	2301.3*	1387.5
Diabetes	3237.6**	1251.0
Cardiopulmonary	-868.4	1017.3
*** Significant at the .001 level ** Significant at the .01 level * Significant at the .10 level		

TABLE 8. TOBIT COEFFICIENTS FOR A MODEL OF MARKET DEMAND FOR OUTPATIENT PHYSICIAN VISITS		
Explanatory Variables	*Coefficient*	*Standard Error*
Full Model Unweighted Observations = 2,201 and Weighted Observations = 28,839,206		
Intercept	640.2**	231.4
Percent Total Expense Paid by Self/Family	-355.8*	174.0
Predisposing		
Age 65-74 years	-349.8*	183.7
Age 75-84 years	23.5	96.2
Male	-95.0	112.0
Married	99.7	95.1
White	376.3**	146.0
Family Contact	-444.2**	136.4
Enabling		
Medicaid	214.9	158.7
Medicare	-215.1	158.5
Served in Armed Forces	10.5	104.3
High School Graduate	296.6***	88.9
College Graduate	-296.2***	89.0
Need		
ADL Limitations	0.2	2.0
Assistive Technology	335.5***	101.7
Wears Dentures or Bridge	-1.2***	0.3
Cancer	958.0***	137.1
Diabetes	163.8	128.5
Cardiopulmonary	244.7**	89.9
Model using Variables Measuring Predisposing Characteristics Only Unweighted Observations = 2,280 and Weighted Observations = 29,938,197		
Intercept	658.9***	167.7
Percent Total Expense Paid by Self/Family	-452.2*	175.8
Age 65-74 Years	-163.4	180.3
Age 75-84 Years	-55.6	95.3
Male	-94.0	93.3
Married	213.8*	94.2
White	361.1*	143.6
Family Contact	-212.3*	94.2
Model using Variables Measuring Enabling Characteristics Only Unweighted Observations = 2,240 and Weighted Observations = 29,347,849		
Intercept	811.4***	147.8
Percent Total Expense Paid by Self/Family	-407.4*	176.6
Medicaid	139.4	154.8
Medicare	-141.4	154.7
Served in Armed Forces	3.6**	1.4
High School Graduate	293.6**	89.3
College Graduate	-293.2**	89.3

TABLE 8 (CONTINUED)		
Model using Variables Measuring Need Characteristics Only Unweighted Observations = 2,242 and Weighted Observations = 29,428,873		
Intercept	548.0***	65.5
Percent Total Expense Paid by Self/Family	-380.3*	173.5
ADL Limitations	0.4	2.0
Assistive Technology	1.4	2.3
Wears Dentures or Bridge	-1.2***	0.3
Cancer	998.2***	135.1
Diabetes	236.1*	126.7
Cardiopulmonary	226.5*	89.3
*** Significant at the .001 level ** Significant at the .01 level * Significant at the .10 level		

TABLE 9. TOBIT COEFFICIENTS FOR A MODEL OF MARKET DEMAND FOR HOSPITAL CARE		
Explanatory Variables	*Coefficient*	*Standard Error*
Full Model Unweighted Observations = 2,201 and Weighted Observations = 28,839,206		
Intercept	-8301.3**	2934.7
Percent Total Expense Paid by Self/Family	50,169***	6603.0
Predisposing		
Age 65-74 years	-3381.6	2152.8
Age 75-84 years	-4003.3***	1200.4
Male	1653.9	1441.2
Married	111.3	1214.5
White	165.9	1830.8
Family Contact	-10,875***	1885.1
Enabling		
Medicaid	3119.2*	1879.8
Medicare	-1265.9	2808.9
Served in Armed Forces	613.7	1362.5
High School Graduate	1400.4	1117.5
College Graduate	-1401.0	1118.0
Need		
ADL Limitations	5493.0***	1245.1
Assistive Technology	2865.5*	1508.3
Wears Dentures or Bridge	-6.6*	3.8
Cancer	2253.5	1641.9
Diabetes	4719.6**	1502.7
Cardiopulmonary	650.0	1130.4
Model using Variables Measuring Predisposing Characteristics Only Unweighted Observations = 2,280 and Weighted Observations = 29,938,197		
Intercept	-11,386.0***	2125.4
Percent Total Expense Paid by Self/Family	50,038***	6848.3
Age 65-74 Years	936.7	2108.2
Age 75-84 Years	-5888.7***	1196.7
Male	-24.4	1177.5
Married	2741.7*	1188.6
White	-1090.0	1790.6
Family Contact	-2708.4*	1188.6
Model using Variables Measuring Enabling Characteristics Only Unweighted Observations = 2,240 and Weighted Observations = 29,347,849		
Intercept	-15,718***	2913.7
Percent Total Expense Paid by Self/Family	52,769***	6930.6
Medicaid	5192.5**	1866.7
Medicare	-1888.6	2929.5
Served in Armed Forces	309.5	1126.3
High School Graduate	537.0	1136.2
College Graduate	-535.9	1136.7

TABLE 9 (CONTINUED)		
Model using Variables Measuring Predisposing Characteristics Only Unweighted Observations = 2,242 and Weighted Observations = 29,428,873		
Intercept	-21,163***	1176.1
Percent Total Expense Paid by Self/Family	51,517***	6703.5
ADL Limitations	6433.4***	1249.1
Assistive Technology	4419.1**	1463.4
Wears Dentures or Bridge	-6.7*	3.8
Cancer	3106.8*	1634.1
Diabetes	5212.8***	1508.2
Cardiopulmonary	177.8	1125.9
*** Significant at the .001 level ** Significant at the .01 level * Significant at the .10 level		

TABLE 10. LOGIT COEFFICIENTS FROM A BINARY LOGIT MODEL OF CHOICE OF RESIDENCE WITHIN NURSING HOMES			
Explanatory Variables	*b*	*Standard Error*	e^b
Full Model Unweighted Observations = 1,465 and Weighted Observations = 621,127			
Intercept	-.557***	.055	.573
Licensed Wages	.159***	.002	1.172
Unlicensed Wages	-.127***	.003	.881
Predisposing			
Age 65-74 years	.124***	.012	1.132
Age 75-84 years	.232***	.008	1.261
Male	.100***	.011	1.105
Married	-.510***	.011	.601
White	-.446***	.014	.640
Family Contact	-.438***	.027	.645
Enabling			
Medicaid	.570***	.019	1.768
Medicare	.727***	.024	2.068
Served in Armed Forces	.162***	.018	1.176
High School Graduate	-.075***	.008	.928
College Graduate	-.504***	.016	.604
Need			
ADL Limitations	.781***	.022	2.183
Assistive Technology	-.076***	.008	.927
Wears Dentures or Bridge	-.229***	.007	.796
Cancer	-.409***	.013	.664
Diabetes	-.013	.009	.987
Cardiopulmonary	.042***	.008	1.043
Model using Variables Measuring Predisposing Characteristics Only Unweighted Observations = 2,985 and Weighted Observations = 1,251,546			
Intercept	1.136***	.023	3.114
Licensed Wages	.160***	.001	1.173
Unlicensed Wages	-.186***	.002	.830
Age 65-74 years	.251***	.008	1.285
Age 75-84 years	.166***	.005	1.181
Male	-.166***	.006	.847
Married	-.235***	.006	.790
White	-.486***	.009	.615
Family Contact	-.173***	.016	.842

TABLE 10 (CONTINUED)

Model using Variables Measuring Enabling Characteristics Only
Unweighted Observations = 1,495 and Weighted Observations = 633,609

Intercept	-.773***	.038	.462
Licensed Wages	.168***	.002	1.182
Unlicensed Wages	-.136***	.003	.873
Medicaid	.552***	.019	1.737
Medicare	.702***	.024	2.019
Served in Armed Forces	.114***	.015	1.120
High School Graduate	-.079***	.008	.924
College Graduate	-.455***	.015	.634

Model using Variables Measuring Need Characteristics Only
Unweighted Observations = 2,953 and Weighted Observations = 1,237,894

Intercept	.193***	.021	1.213
Licensed Wages	.159***	.001	1.173
Unlicensed Wages	-.172***	.002	.842
ADL Limitations	.391***	.015	1.478
Assistive Technology	-.046***	.005	.955
Wears Dentures or Bridge	-.143***	.005	.867
Cancer	-.197***	.008	.821
Diabetes	.086***	.006	1.090
Cardiopulmonary	-.051***	.005	.950

*** Significant at the .001 level

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Appendix A

TABLE 1. DESCRIPTIVE STATISTICS FOR VARIABLES USED IN MODEL OF GLOBAL DEMAND FOR MODE OF RESIDENCE				
Unweighted Observations = 5,661 and Weighted Observations = 31,394,904				
Variable	*Mean*	*Standard Deviation*	*Minimum*	*Maximum*
Predisposing Characteristics				
Age 65-74 years	.32	.47	0	1
Age 75-84 years	.33	.47	0	1
Age 85 years and over	.35	.48	0	1
Male	.32	.47	0	1
Married	.31	.46	0	1
White	.88	.32	0	1
Family Contact	.96	.19	0	1
Enabling Characteristics				
Medicaid	.54	.50	0	1
Medicare	.97	.16	0	1
Served in Armed Forces	.16	.36	0	1
High School Graduate	.51	.50	0	1
College Graduate	.12	.33	0	1
Need Characteristics				
ADL Limitations	.73	.45	0	1
Assistive Technology	.23	.42	0	1
Wears Dentures or Bridge	.50	.50	0	1
Cancer	.0853	.28	0	1
Diabetes	.17	.37	0	1
Cardiopulmonary	.58	.49	0	1

TABLE 2. DESCRIPTIVE STATISTICS FOR VARIABLES USED IN MODELS OF MARKET DEMAND FOR PAID HOME HEALTH CARE, OUTPATIENT PHYSICIAN VISITS, AND HOSPITAL CARE

Unweighted Observations = 2,284 and Weighted Observations = 28,839,206

Variable	*Mean*	*Standard Deviation*	*Minimum*	*Maximum*
Expenditures				
Total expenditures for paid home health care	$712.44	$3,856.83	0	$116,667
Total expenditures for outpatient physician visits	$916.79	$1,892.29	0	$52,840
Total expenditures for hospital care	$1,846.60	$7561.92	0	$211,862
Coinsurance Rates				
Percent of total expenditure paid by self/family for paid home health care	.02186	.1421242	0	1.00
Percent of total expenditure paid by self/family for outpatient physician visits	.1500885	.2471316	0	1.00
Percent of total expenditure paid by self/family for hospital care	.01051	.06255	0	.90476
Predisposing Characteristics				
Age 65-74 years	0.0696	0.2546	0	1
Age 75-84 years	0.5981	0.4904	0	1
Age 85 years and over	0.3323	0.4711	0	1
Male	0.4019	0.4904	0	1
Married	0.5281	0.4993	0	1
White	0.8595	0.3476	0	1
Family Contact	0.9421	0.2335	0	1
Enabling Characteristics				
Medicaid	0.1061	0.3081	0	1
Medicare	0.9851	0.1212	0	1
Served in Armed Forces	0.2524	0.4345	0	1
High School Graduate	0.5945	0.4911	0	1
College Graduate	0.1551	0.3621	0	1
Need Characteristics				
ADL Limitations	0.3586	0.4797	0	1
Assistive Technology	0.1754	0.3804	0	1
Wears Dentures or Bridge	0.5356	0.4988	0	1
Cancer	0.1016	0.3022	0	1
Diabetes	0.1480	0.3552	0	1
Cardiopulmonary	0.3932	0.4886	0	1

TABLE 3. DESCRIPTIVE STATISTICS FOR VARIABLES USED IN MODEL OF NURSING HOME DEMAND BY SIMPLE AND COMPLEX ORGANIZATIONAL STRUCTURE				
Unweighted Observations = 3,377 and Weighted Observations = 624,175				
Variable	*Mean* Complex (Simple)	*Standard Deviation* Complex (Simple)	*Minimum* Complex (Simple)	*Maximum* Complex (Simple)
Wages				
Licensed wages	$12.97 ($13.40)	1.88 (2.24)	$9.50 ($9.00)	$19.57 ($21.15)
Unlicensed wages	$6.51 ($6.38)	1.21 (1.59)	$4.25 ($4.25)	$11.42 ($20.00)
Predisposing Characteristics				
Age 65-74 years	.12 (.13)	.32 (.34)	0	1
Age 75-84 years	.31 (.33)	.46 (.47)	0	1
Age 85 years and over	.57 (.53)	.50 (.50)	0	1
Male	.29 (.25)	.45 (.43)	0	1
Married	.19 (.16)	.39 (.37)	0	1
White	.93 (.89)	.26 (.31)	0	1
Family Contact	.98 (.98)	.14 (.15)	0	1
Enabling Characteristics				
Medicaid	.97 (.97)	.18 (.16)	0	1
Medicare	.95 (.97)	.21 (.17)	0	1
Served in Armed Forces	.12 (.07)	.33 (.26)	0	1
High School Graduate	.50 (.43)	.50 (.49)	0	1
College Graduate	.12 (.08)	.32 (.28)	0	1
Need Characteristics				
ADL Limitations	.97 (.98)	.18 (.14)	0	1
Assistive Technology	.30 (.27)	.46 (.44)	0	1
Wears Dentures or Bridge	.51 (.47)	.50 (.50)	0	1
Cancer	.09 (.07)	.29 (.25)	0	1
Diabetes	.16 (.18)	.37 (.39)	0	1
Cardiopulmonary	.64 (.64)	.48 (.48)	0	1
