ABSTRACT

Greene, Angela Marie. Testing the Behavioral Model of Health Services Use for a Disabled Population. (Under the direction of Ronald Czaja.)

This research examines the factors that determine physician use in a physically disabled and the mentally disabled population using Andersen's Behavioral Model of Utilization. It also examines the predisposing, enabling and needs factors that are most important in determining physician use for this disabled population. The hypotheses for propose that predisposing, enabling, and need factors will individually have positive effects on physician use by the disabled in this study. Data are obtained from a survey of Oregon's disabled Medicaid population conducted in 1998 by a non-profit research organization. Only physically and mentally disabled individuals are included in the analysis (n=1266). A hierarchical approach is used to determine if individual concepts are significant predictors of physician use for these subgroups. Logistic regression is used to test the hypotheses. The data partially support the hypotheses. Widowed status (predisposing), presence of a regular doctor (enabling) and health status (need) are significant predictors of physician use for the physically disabled. Gender (a predisposing factor), presence of a regular physician (an enabling factor), and health status (a need factor) are significant predictors of physician use for the mentally disabled. Limitations of the study and suggestions for future research are discussed.

TESTING THE BEHAVIORAL MODEL OF HEALTH SERVICES USE FOR A DISABLED POPULATION

By

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A thesis submitted to the Graduate Faculty of
North Carolina State University
in partial fulfillment of the
requirements for the Degree of
Master of Science

SOCIOLOGY

Raleigh

2005

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BIOGRAPHY

Angela Marie Greene was born April 17, 1961 in Halifax County, North Carolina. She received her elementary education and secondary education in the public schools of Northampton County, North Carolina. She is a 1979 graduate of Northampton County High School – East in Conway, North Carolina.

Ms. Greene received a Bachelor of Science degree in Mathematics with a minor in Sociology from the University of North Carolina at Greensboro in 1983. She received a Maters of Business Administration degree from Meredith College in Raleigh, North Carolina in 1989. In the fall of 1999 she began studying for her Master of Science degree in Sociology. Ms. Greene has been working as a researcher and project manager in the areas of health, social and economic research for more then 15 years.

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INTRODUCTION

In the United States, advantages and opportunities are not equally available to everyone, especially in regard to access and use of health care. Access to medical services can be affected by poverty, stigma, and inequality. The rising costs of social and health services have the potential to widen the gap between rich and poor because vulnerable populations are often less able to afford expensive medical care or supplemental health insurance coverage. The stigma surrounding disabilities, especially mental disabilities, can affect access to and use of social and medical services because of the biases some still hold regarding the causes and treatments available to the mentally ill. Further, issues of inequality hinder the use of services for many individuals, especially those who reside in underserved areas (e.g., geographic regions), minorities, and those who are disabled.

Approximately 46 million people in the United States are uninsured or without adequate health care (U.S. Census 2004a); however, disparities in health care exist even among those who are insured. This problem is especially true for those who are most vulnerable, including the poor, the elderly, and the approximately 49 million persons with disabilities in the United States. Both material resources, such as income, and nonmaterial resources, such as social capital, are important to an individual's ability to manage health and navigate the health care system. Because of their disabilities and limited ability to maintain steady employment, the physically and mentally disabled are more likely than the nondisabled to be uninsured or underinsured and have fewer material resources to provide them access to health care. Although social programs such as Medicare and Medicaid increase access to the health care system for persons with disabilities, this group faces additional challenges to obtaining care because of their numerous health care needs, their low

incomes, and their need for community services and supports (Coyle and Santiago 2002; DeJong et al. 2002; Hanson et al. 2003). Therefore, it is critical to understand both the problems associated with access to health care and the factors most likely to affect health care use.

Persons with disabilities often have other chronic health conditions (e.g., respiratory and skin problems caused by lack of mobility) and, thus, tend to be high users of the health care system. One recent study of nonelderly disabled adults with a mix of insurance coverage (i.e., Medicare, Medicaid, both Medicare and Medicaid, and private insurance) found that 90% of the survey respondents reported at least one physician visit in the 6 months prior to the survey (Hanson et al. 2003).

Primary care physicians or health care professionals affiliated with physicians' offices or clinics are typically the source of physical health care for the physically disabled. These providers may also be the primary source of mental health care for the mentally disabled, especially given society's view of mental illness and the stigma still associated with seeing a mental health provider. In fact, according to the Surgeon General's report on mental health, approximately 11% of the U.S. population access mental health services each year, with about 5% of that care being provided by general medical providers.[1] The mentally ill population is also prone to have poor physical health outcomes. According to the U.S. Department of Health and Human Services (DHHS), approximately 40 million, or 22%, of nonelderly adults (aged 18 to 64) had a diagnosis of mental illness in 1998, and more than 22% of the population have a mental illness in any given year.

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[1] www.mentalhealth.samhsa.gov/features/surgeongeneralreport/chapter6/sec1.asp, accessed April 6, 2005.

Because the disabled are typically unable to maintain a full-time job, they generally have a low socioeconomic status (SES). As a result, Medicaid often pays for a large portion of health care for persons with low SES who have disabilities. Despite the fact that they are disabled and are potentially high users of the health care system, disabled Medicaid participants have not been the focus of major surveys until recently (Hanson et al. 2003; Long, Coughlin, and Kendall 2002; Regenstien, Schroer, and Myer 2000), and little research has been conducted that examines the disabled population's use of the health care system.

The most widely used model for studying determinants of health service use in the general population is Andersen's behavioral model of utilization (Phillips et al. 1998). Originally designed to explore how families use health services, this model has evolved to focus on individuals' use of health services. The model posits that an individual's use of health services is a function of predisposing factors (e.g., age, race, gender), enabling factors (e.g., financial and/or cost), and the need for care. Andersen's behavioral model, or a variation of it, has been used to examine determinants of health service use by several populations, but few have used the model with disabled populations. Long and colleagues (2002) are among the few researchers who have published a study that investigates the use of health services by the disabled Medicaid population.

The present study will contribute to the current state of knowledge by adding to the information available about predictors of health service use by the disabled Medicaid population. Data from a survey of Oregon's physically and mentally disabled Medicaid population will be used to answer two questions:

1. Are the factors that determine physician use in the general population similar for the physically disabled and the mentally disabled Medicaid beneficiaries enrolled in the Oregon Health Plan (OHP)?

2. Does the behavioral model of utilization (hereafter, the behavioral model) predict health service use for the physically and mentally disabled population? Which concepts are most important in determining health service use for the disabled population?

The next section of this paper provides a context for the study and describes the theoretical framework used for the analysis. Hypotheses to be tested are presented after a discussion of the analytic framework and the relevant literature. A description of the data and methods used for the analysis is then presented, followed by the characteristics of the physically and mentally disabled OHP populations. The results section presents a discussion of the factors that predict a physician visit for each population and a comparison of the two groups. The paper concludes with a discussion of the findings and any limitations of the study and suggestions for future research.

REVIEW OF THE LITERATURE

This section reviews literature that focuses on predisposing, enabling, and need characteristics that have been used to predict use of physical health care services. The first part discusses the theoretical framework used by researchers to study health care use. The second part focuses on factors that have been shown to have effects on an individual's ability to obtain needed services.

Analytic Framework

Though refinements have been made over the years to Andersen's behavioral model (Aday 1993; Andersen 1968; Andersen 1995; Andersen and Newman 1973), it remains the predominant model used to study health care use in both the sociological and public health literatures. The model, developed to study determinants of health care use, suggests that health service use is determined by three factors: societal factors, factors of the health services system, and individual factors (Andersen 1968). Individual factors, which have been the focus of several studies, include three components that relate to the use of and access to medical care and the frequency or number of visits to a physician or other medical personnel/facilities: predisposing, enabling, and need factors (Aday 1993; Andersen 1968, 1995). Regarding individual factors, Andersen theorized that a person's predisposition to seek medical attention is a function of sociodemographic characteristics. Further, he postulated that both community and personal enabling resources must be present for an individual to take advantage of medical services. Finally, Andersen noted that any use of medical care is influenced by how individuals view their own health status (i.e., the need for care). It is the perceived need for medical attention that one assumes will better explain a person's use of medical care.

As originally conceived, the predisposing component of the model included individual characteristics, such as gender, marital status, and age; social structure characteristics, such as social class, education, race, and ethnicity; and health beliefs, such as the value of health services, attitudes toward health services and physician use, and knowledge of the health care system. These variables are important to consider when examining health care use. The older an individual is, the more likely he or she is to need

medical care. Education, race, and social class may also influence an individual's ability to obtain medical care. For example, those with higher levels of education may be more likely to seek care than those who are less educated and are also better able to communicate with health care providers. Social structure, particularly social class, influences the value individuals place on health and their reactions to seeking care. Health beliefs are important in understanding the knowledge people have about the health care system and may also provide some understanding of why a person uses health services.

Even if a person has the desire to use medical services, enabling resources must be present. The enabling component of the behavioral model includes the means a person has available to use specific services. Financial means, such as family resources (e.g., income and savings), health insurance, a regular source of care, place of residence, and geographic region, are important enabling factors. Not only is it important to have the financial means (i.e., higher SES) to be able to use medical services, but medical facilities or health care providers must be present in the community or nearby vicinity as well.

Need characteristics are also important to consider in examining a population's or subgroup's use of medical care. Without a perceived need for health care, it is unlikely that a person will use health care services. The more widely used measures of need included by those using the model to study service utilization are health and functional status. Because both these measures are difficult to obtain for studies of service utilization, researchers typically use self-reported health and functional status instead of an evaluated measure of need in studies of health service utilization.

The behavioral model has undergone revisions and updates since it was introduced by Andersen in 1968 (Aday and Awe 1997; Andersen 1995; Gelberg, Andersen, and Leake

2000; Phillips et al. 1998). Variables that have been added over time include health delivery systems components, such as the number and availability of physicians or medical facilities (Aday and Newman 1997); health behavior components, such as personal health practices (Andersen 1995); and patient satisfaction components (Institute of Medicine [IOM] 1993). More recently, Gelberg and colleagues (2000) expanded each component of the behavioral model to include variables important to the homeless population (e.g., literacy, psychosocial resources, residential history, self-help skills). Andersen (1995), in response to criticism that the model did not include social networks and social interactions, noted that these concepts are important and can be considered a part of the social structure component of the original model (i.e., part of the predisposing characteristics).

Variations of the behavioral model have been used successfully in health service utilization studies of several vulnerable populations, including the elderly (Bass, Looman, and Ehrlich 1992; Wolinsky et al. 1983; Wolinsky, Johnson, and Fitzgerald 1992), the homeless and those with HIV/AIDS (Gelberg et al. 2000), and children and adolescents with disabilities (Weller, Minkovitz, and Anderson 2003). The model has also been used to examine factors associated with dental services (Andersen and Davidson 1997), mental health services (Portes, Kyle, and Eaton 1992), and physical health services (Coughlin, Long, and Kendall 2002; Coulton and Frost 1982; Gelberg et al. 2000; Thind and Andersen 2003; Weller et al. 2003; Wolinsky 1978). Likewise, a few published studies that examine the use of health services by the disabled have also incorporated the behavioral model as a theoretical framework (Long et al. 2002; Mitchell et al. 2002). The present study also uses the behavioral model as a theoretical framework to examine factors that determine the use of

physician services for a specific group: those with physical and mental disabilities who are low income and enrolled in the Oregon Health Plan.

Results of several of these studies indicate that the behavioral model is useful in predicting the frequency of physician visits. Although this theoretical framework has been used only infrequently to identify the determinants of physician visits by the disabled populations, researchers who have used this model for the general population and those who have built on it by adding different variables to the core set of predisposing, enabling, and need factors have consistently accounted for variations in the use of health care. Sociologically, assessing the model for the disabled population is important because this group is subject to multiple forms of vulnerability, and knowing as much as possible about determinants of this population's health care use will help researchers understand more about their health-seeking behavior. The conceptual model that will guide this research is based on the behavioral model of utilization and is shown in Figure 1.

The sections that follow review existing literature on the predisposing, enabling, and need factors that are particularly useful for this study. However, rather than discussing the concepts specifically, literature related to the individual variables within each of the concepts is reviewed.

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┌─────────────────────────────┐
│ Predisposing Characteristics │
│           Age                │
│           Race               │
│          Gender              │
│         Education            │
│       Marital Status         │
│     Living Arrangement       │
└─────────────────────────────┘
                                    ┌──────────────────┐
┌─────────────────────────────┐    │                  │
│   Enabling Characteristics   │    │ Use of Physical  │
│       Other Insurance        │    │  Health Care     │
│     Usual Source of Care     │    │    Services      │
│      Geographic Region       │    │ (Physician Visits)│
└─────────────────────────────┘    │                  │
                                    └──────────────────┘
┌─────────────────────────────┐
│    Need Characteristics      │
│        Health Status         │
│      Functional Status       │
└─────────────────────────────┘
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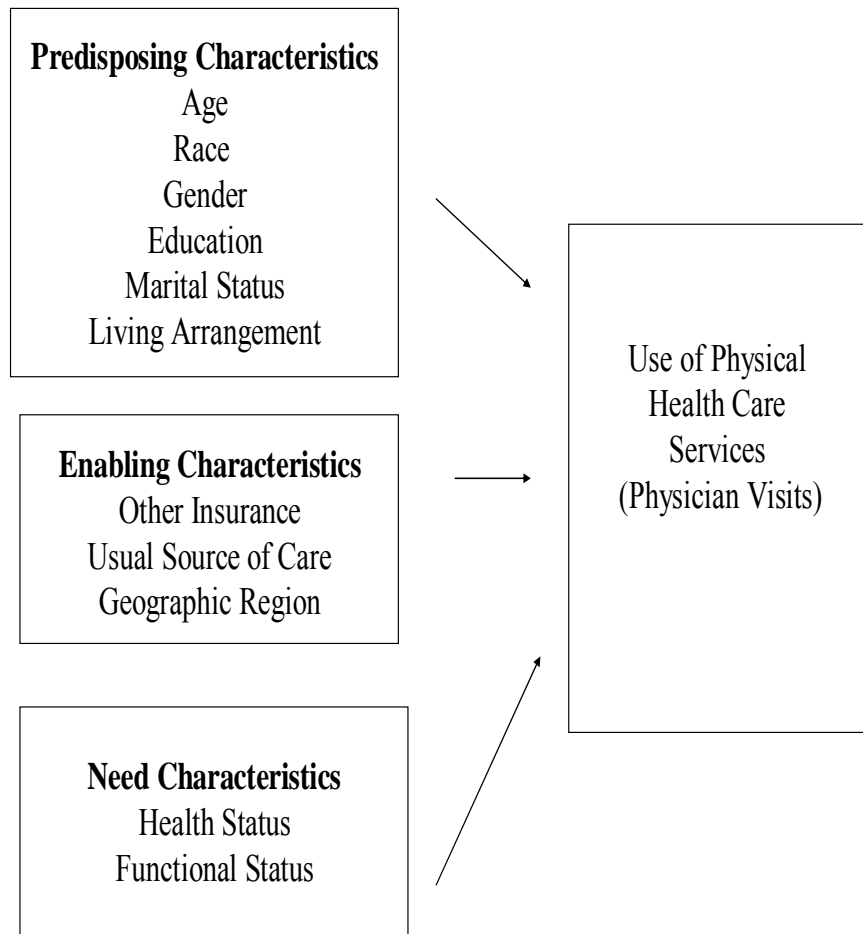
Figure 1. Model of Physical Health Care Service Use

Predisposing Characteristics

Researchers have routinely used demographic and social characteristics to define the concept of predisposing factors in studies on health care utilization. Individual components of the concept include age, gender, race, education, income, marital status, and the presence of social networks (Aday 1993; Albizu-Garcia et al. 2001; Andersen 1968; Andersen and Newman 1973; Green and Pope 1999; Hargraves, Cunningham, and Hughes 2001; Long et al. 2002). In general, studies find that the predisposing concept does not have a statistically significant effect on the use of medical services; however, separately the variables included in this component, such as age and race, have been shown to have an individual effect on service use. These variables are important because they tell us who is most likely to access and use the medical care system. Therefore, it is important that the predisposing variables be considered in this study of physician use.

Age. It is well known that older persons, because they have age-related illnesses, use more health services than younger individuals. However, it is unclear whether age has a statistically significant effect on the use of physician services. Results in the literature appear mixed. For example, in a study of a nationally representative sample of 8,098 working age adults (15 to 54 years of age) conducted to identify factors associated with health service use for panic attacks, Goodwin and Andersen (2002) found that in addition to perceived need being a significant predictor of medical service use among nondisabled adults, being older, married, more educated, and White were also determinants of medical care use.[2] Likewise, Green and Pope (1999) found that age is a statistically significant determinant of health service use, regardless of the setting (i.e., emergency room, physician office, or hospital).

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[2]Panic attacks are not defined in this study. However, panic is one of the most common psychiatric disorders seen in general medical settings. Little is known about factors associated with use of services for treatment.

On the other hand, in a literature review that included both multivariate and univariate studies exploring the predictors of health service use in chronically ill adults, de Boer, Wijker, and de Haes (1997) found age to be statistically significant in only half (8) of the 15 studies reviewed.[3] The research conducted for this article included a review of 53 studies published between 1966 and 1997 that used predisposing, enabling, and need factors to examine health service use. Long and her colleagues (2002) found that older disabled Medicaid beneficiaries were slightly more likely than younger members to have had an outpatient visit for physical health. The effect age will have on physician use in the current study is difficult to predict. I propose that age will indeed have an effect on the use of health services by the disabled population because their disabilities exacerbate age-related illnesses.

Gender. The literature consistently shows that women are more sensitive to symptoms of illness than men and that they evaluate those symptoms, determine whether action is needed, and use health care services more than men (Rieker and Bird 2000; Verbrugge 1985, 1990). In a longitudinal study to examine the effect of gender and other psychosocial factors on the use of medical services, including doctor's visits, emergency room visits, and hospital admissions, Green and Pope (1999) found that being female is a statistically significant determinant of physician visits. Results were the same when gender-specific service use (e.g., for pregnancy) was removed.[4] The study used telephone survey data of a random sample of 2,603 adult members of the Northwest region of Kaiser Permanente and was linked to 22 years of medical record data. Berk and Schur (1998) also found gender to have a statistically significant effect on physician visits. Women in their study had a third more visits to a physician than did men. Similarly, in a study of service use

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[3] Six of the eight studies conducted multivariate analyses.

drawn from the National Institutes of Mental Health Epidemiological Catchment Area program, researchers found that being female was a statistically significant determinant of medical service use for severely mentally ill persons (Narrow et al. 2000). Broyles, McAuley, and Baird-Holmes (1999) also found that women were more likely than men to visit a physician. Their study used Behavioral Risk Factor Surveillance Survey (BRFSS) data from 1,512 telephone interviews with Oklahoma residents. These researchers used Andersen's behavioral model to examine physician use by medically vulnerable (elderly, poor, and uninsured) adults.

According to Aneshensel (1999), women with psychiatric disorders are significantly more likely than their male counterparts to use health services; however, other studies do not replicate these findings. Albizu-Garcia and colleagues (2001) did not find gender to be a statistically significant determinant of outpatient use of services, including medical or mental health services, for a mental health problem. Likewise, 6 of the 13 studies reviewed by de Boer et al. (1997) found that gender had no influence on the use of physician visits.[5] Coughlin and colleagues (2002) also found that gender had no influence on the use of physician visits. Again, though the findings are equivocal, I hypothesize that being female will have a statistically significant effect on physician service use for both the physically and mentally disabled populations in this study because of the belief that women are more likely than men to acknowledge symptoms of illness and seek help for those symptoms.

Race. It is well established that racial disparities exist in access to and use of health services. Research consistently shows that Whites are more likely to have higher rates of health service utilization than Blacks and other minorities despite the increased risks these

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[4] This finding remained constant for 22 years of data.

groups have for particular health conditions and differences in health status. When attempting to determine if the presence of health insurance reduces or eliminates the racial differences in access to and use of medical services, Hargraves and Hadley (2003) found that Hispanics and Blacks were less likely (38.5% and 9.5%, respectively) to have seen a doctor in the year preceding the interview than Whites, regardless of insurance status. This nationally representative sample included interviews with 11,692 Blacks, 10,325 Hispanics, and 74,397 Whites. Similarly, using the 1994 Access to Care Survey data collected by the U.S. Census Bureau from 3,480 noninstitutionalized individuals under age 65, Berk and Schur (1998) found that race had a statistically significant effect on an individual's use of physician services. Non-Whites were more likely than Whites to have trouble obtaining care and had 10% more physician visits when they were able to see a physician.

Findings from several other studies of nondisabled populations have also found that minorities are less likely to use mental health and other outpatient services than their White counterparts. Results of analysis conducted by Weinick, Zuvekas, and Cohen (2000) on three nationally representative, household-based surveys (the National Medical Care Expenditure Survey, the National Medical Expenditure Survey, and the Medical Expenditure Panel Survey) show that Blacks and Hispanics are less likely to have outpatient medical visits. These results remained constant across each of 3 years of data. Further, Mayberry, Mili, and Ofili (2000) reviewed 400 articles published in peer-reviewed journals and found that, in general, Blacks are less likely than Whites to have seen a physician in the year prior to being interviewed; they also have fewer physician visits than their White counterparts, regardless of income status.

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[5] Five of the six studies used multivariate methods to analyze data.

Few studies have addressed the effects of race for disabled adults. In a study of 816 disabled adult Medicaid beneficiaries in New York City, Coughlin and her colleagues (2002) found no difference in physician use by race (non-Hispanic White, non-Hispanic Black, Hispanic, and other non-Hispanic racial groups) for all disability groups included in the study (i.e., physically disabled, mentally disabled, and those with mental retardation and other developmental disabilities). These researchers also used the behavioral model as a theoretical framework for their research. Because the literature on race and health service use is fairly consistent for nondisabled populations and only one study was found that focused on the disabled population, I believe it is important to examine the effect of race on the use of physician visits in the current study.

Education. There is evidence in the literature that poorer physical health and well-being is linked to lower educational attainment. Those who have higher educational attainment are more likely to be employed and therefore have the resources to obtain adequate health care. However, the effect of educational level on physician use has been mixed in studies on the nondisabled population. In fact, according to Aday (1993), the effect of education on use of medical services depends on the type of service being examined with better educated individuals receiving more preventive services and fewer hospitalizations than their less educated counterparts.

In 8 of the 10 studies reviewed by de Boer and her colleagues (1997) to examine education and utilization, education was found to have no effect on the use of physician visits. In a study of medical care use by the homeless, researchers found that educational attainment had an effect on only one type of service use under study (i.e., medical care for a skin or foot problem), and in all other cases (e.g., care for high blood pressure and vision

impairment), education had no effect (Gelberg et al. 2000). Long et al. (2002), in a study with a population similar to the one in the current study, found that education had no effect on physician use by the disabled populations included (i.e., the physically disabled, mentally disabled, and those with mental retardation and developmental disabilities). Because the sociological literature implies that educational level is important in navigating the health care system and that the less educated are in poorer health, education is an important variable to consider in studies of health service use and, thus, is included here.

Social Networks. Social network variables (i.e., marital status and living arrangements) have also been used as predictors of health service use but with mixed results. In general, the presence of a social network is believed to influence an individual's use of physician services, especially in older populations. Contrary to this premise, Green and Pope (1999) found that the more social support respondents had, the fewer contacts they had with the health care system. Likewise, research has shown that individuals suffering with mental illness tend to use fewer services if they have a support network (McAlpine and Mechanic 2000). In the majority of studies (10 of 13) including marital status as an analytic variable, de Boer et al. (1997) found that marital status had no effect on use of physician visits; they also found no evidence that social support had an effect on use of physician visits in two of the three studies that included social support in the analysis.

In a study similar to the current one, Coughlin and her colleagues (2002) found that living arrangement (i.e., whether beneficiaries lived alone or with someone) had no effect on the use of physician services. These results are from a study of working age, disabled Medicaid enrollees in New York City (840 enrollees) and Worchester County, New York (957 enrollees). Still, I believe that social support and the presence of social networks are

especially important to this analysis. I expect that the disabled, especially those who are

physically disabled, are more dependent on support from others to actually be able to go to

the physician's office and that social support will have a significant effect on the use of

physician visits by both the physically and mentally disabled. Thus, social support is

included in the model for this study.

Enabling Characteristics

Enabling characteristics are aspects of an individual's ability to pay for medical

services and the availability of such services in the area in which the individual lives.

Socioeconomic status is linked to resource availability, and those who have higher SES have

greater access to material and nonmaterial resources than those with lower SES. Because of

the costs associated with medical care, those with limited income are less able to afford to

see a doctor. For example, persons with higher SES are likely to have health insurance or

other financial means, thereby having greater access to the health care system and the

medical treatment necessary to maintain good or better health. In addition, they are more

likely to have a greater social network or more social ties than those who are in lower SES

groups.

Other Insurance. In studies of the general population, socioeconomic status has been

used as a potential predictor of medical care use with mixed results. Some researchers have

found that having lower SES is a significant barrier to obtaining health services (Beck, Jijon,

and Edwards 1996; Weinick et al. 2000), whereas others have found no relationship between

income and physician service use (Coughlin et al. 2002; de Boer et al. 1997; Wolinsky 1978).

Removing the cost barrier by extending health insurance to the uninsured has been

proven to increase the use of physician and other services (Bograd et al. 1997; Hahn 1994;

Kubrin 1995; Long and Marquis 1998; Mitchell et al. 2002; Schoen et al. 1997). Using an

expanded version of the behavioral model, Mitchell and her colleagues (2002) found, in a

study of the nondisabled adult population enrolled in OHP, that adults with insurance,

regardless of type, were significantly more likely than the uninsured to have seen a physician.

In addition, those with insurance were significantly more likely to have a regular doctor or

other health care provider to see when they are sick or in need of advice about health care.

Likewise, Berk and Schur (1998)[6] found that health insurance has an effect on an

individual's likelihood of visiting a physician. These researchers found that whether covered

by private insurance or Medicaid, those in fair or poor health were seen by a physician more

times than those who were uninsured.

   Usual Source of Care. The availability of health insurance, whether public (i.e.,

Medicare or Medicaid) or private, alone does not guarantee that an individual will see a

physician (Rask et al. 1994; Sox et al. 1998). However, having a regular doctor is believed

to have a significant influence on an individual's health care use. Researchers have

traditionally defined usual source of care in terms of an individual having a public or private

physician or clinic, a public hospital clinic, a walk-in clinic, or a private physician (Bashshur,

Homan, and Smith 1994; Ettner 1996; Mitchell et al. 2002; Rask et al. 1994; Sisk et al.

1996).[7] Several researchers have found that, in addition to having a sufficient income or

having health insurance, having a primary or regular provider tends to be a strong predictor

that a person will use some form of health care (Aday 1993; Berk and Schur 1998; Broyles et

al. 1999; Sox et al. 1998). In a study of 1,952 working age adults (18 to 64 years of age) who

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[6] Study described earlier.

[7] Use of the emergency room or the health department is not typically considered a regular place to receive health
   care.

were seen in one of five teaching hospitals in the Boston, Massachusetts, area, Sox et al. (1998) found that those without a regular physician were 4.5 times less likely than those with a regular physician to have a physician visit. It is interesting that, of the utilization measures these researchers examined, lack of a regular source of care is the only variable that was statistically significant in all instances (for delay in seeking care, physician visits in the past year, and emergency room visits in the past year).

Ettner (1996) used data from noninstitutionalized adult women aged 18 or older extracted from the National Health Interview Survey to examine the effect of having a usual source of care on the use of preventive services. Although preventive services are not the focus of my study, the results are relevant because it can be assumed that a physician visit is necessary to receive preventive checkups. Results of Ettner's study show that women with a usual source of care were approximately 1.5 times more likely to have received a routine visit for preventive services (e.g., pap smear and breast exams) than those without a usual source of care. The results remained statistically significant for each type of preventive service. In their study of the medically vulnerable, Broyles and colleagues (1999) also found that those with a usual source of care were more likely to have a visit to the doctor than those without a usual source of care.

Long and her colleagues (2002) found that the mentally ill are more likely than the physically disabled to have a usual source of care for mental health care; however, the mentally ill were less likely than the physically disabled to have a usual source of care for physical health services and more likely to report an unmet need for both physician and mental health care. Because usual source of care has been proven to have an impact on an

individual's decision to see a doctor, I propose that usual source of care will also have a significant effect on use of physician visits by my study population.

Geographic Region. Logically, individuals who live in rural or nonmetropolitan areas are more likely to have trouble finding a doctor to see them because of the limited number of doctors available, or they may have trouble traveling to the doctor's office because of the distance to the medical facility. Although some researchers find that region is a statistically significant predictor of health service use (Aday 1993; Broyles et al. 1999; Larson and Fleishman 2003), others have found mixed results. As an example, residence location was not a statistically significant predictor of physician visits in half of the studies (three of six) reviewed by de Boer et al. (1997). In two other studies, they found that those in a metropolitan area had more physician visits, and in another study they found that individuals in metropolitan areas had fewer physician visits. Likewise, in their study of disabled Medicaid beneficiaries, Coughlin et al. (2002) found no effect of geographic region on having a physician visit. Although individual enabling variables may have an effect on who does and does not receive care depending on the type of service, as a group they are not a significant predictor of physician service use (Aday 1993; Andersen 1968; Coughlin et al. 2002). Again, because the results are mixed in studies of the nondisabled population, I believe it is important to include some measure of community resources in my analysis.

Need Characteristics

The need for health care often determines whether an individual seeks care and is therefore important to consider when examining the factors associated with physician use. In fact, researchers have found that the need characteristics are most predictive of service use (Aday 1993; Andersen 1968; de Boer et al. 1997). Need for health care is measured by both

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an individual's perceived or self-rated health status and their health status as evaluated by a physician or other medical person.

Health Status. Health status has been widely used as a measure of need when examining factors that influence the utilization of physical health services. Because evaluated health status is often difficult to obtain, researchers commonly rely on self-reported health status information. Health status, as might be expected, has also been found to affect health service utilization. Berk and Shur (1998) found in their study that low-income Medicaid enrollees in fair or poor health were almost twice as likely as the privately insured in similar health to report inability to obtain care. In seven of the nine studies examining health status and physician visits reviewed by de Boer et al. (1997), those who perceived their health status to be poor made more visits to the doctor's office. One of the studies found no relationship.

Similarly, Broyles et al. (1999) found that respondents who evaluated their health status as poor or fair and who had at least one disability day (not being able to perform normal functions during the past year) visited the physician significantly more often than those in better health. Further, in a study of the mentally ill that used data from 60 communities across the United States, McAlpine and Mechanic (2000) found that the perceived need for care among persons with severe mental illness increased the probability of using specialty care by six times. Health status is an important variable to examine because one would expect those who are in less than good health to be more likely to use medical services.

Functional Status. Few studies on predictors of health care use were located that included activities of daily living (ADLs) (i.e., measures of an individual's ability to perform

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routine tasks, such as eating, bathing, dressing, toileting, and getting in and out of a chair)

and instrumental activities of daily living (IADLs) (i.e., measures of an individual's ability to

manage money, use the telephone, and do light housework) as determinants for physician

service use. In fact, de Boer's (1997) review of the literature identified only six studies of

physician use that used functional status as a predictor. Of those, four studies found that

impairments in ADLs had a statistically significant effect and resulted in more physician

visits; three of these used multivariate analysis.

Because the physically disabled and mentally disabled are more likely to experience

more difficulties with ADLs and IADLs than the nondisabled population, these are important

variables to examine in a study of physician use by the disabled. In their study of physician

use by disabled Medicaid beneficiaries in New York, Long et al. (2002) included six

measures of ADL impairments (bathing, dressing, toileting, transferring, getting around

inside the home, and eating) and six measures of IADL impairments (shopping, managing

money, preparing meals, using the telephone, doing light housework, and managing

medications). They found that individuals with mobility impairments (more ADL

impairments) and those in poor or fair health were more likely to have trouble obtaining

health care and were also more likely to use the hospital or emergency room for care, and not

see a physician, than those who were not mobility impaired. Level of impairment in IADLs

was not statistically significant in their study.

Findings from the scant literature on health care use by the disabled suggest that

disabled Medicaid beneficiaries with mental illness and those with greater health and

functional limitations face more difficulties in obtaining care than the nondisabled (Long et

al. 2002; Melfi, Croghan, and Hanna 1999; Moscovice et al. 1993). In a study of 401

noninstitutionalized elderly aged 65 or older residing in Missouri, Wilonsky et al. (1983) found that those with poor ADLs were more likely to have been hospitalized than those with better ADL functioning. Level of ADL functioning was not a significant predictor of use of doctor visits, and IADL impairments had no effect on either type of health care utilization examined. Although information on the relationship between ADL and IADL impairments is not plentiful in studies of health care use by the nondisabled population, I anticipate that because of the mobility impairments those with poor ADLs and IADLs face, the disabled will have more trouble getting to the doctor's office.

HYPOTHESES

This research will examine the following hypotheses:

H1a. All else equal, predisposing variables, including age, gender, race, education, marital status, and living arrangement, will have a positive impact on health service use for the physically disabled OHP members.

H2a. There is a positive relationship between enabling characteristics, especially other health insurance, a usual source of care, and geographic region (metropolitan versus nonmetropolitan), and health service use for the physically disabled OHP members.

H3a. There is a positive relationship between need characteristics, specifically health status and functional status will have a positive effect on health service use for the physically disabled OHP members.

H1b. All else equal, predisposing variables, including age, gender, race, education, marital status, and living arrangement, will have a positive impact on health service use for the mentally disabled OHP members.

H2b.   There is a positive relationship between enabling characteristics, especially other health insurance, a usual source of care, and geographic region (metropolitan versus nonmetropolitan), and health service use for the mentally disabled OHP members.

H3b.   There is a positive relationship between need characteristics, specifically health status and functional status will have a positive effect on health service use for the mentally disabled OHP members.

DATA AND METHODS

The data used for the analyses in this paper are part of a larger cross-sectional survey to evaluate the Oregon Health Plan (OHP). Data were collected over a 7-month period beginning on February 20, 1999, and ending on September 30, 1999. The evaluation study used a stratified random sample of noninstitutionalized children, working age (19 to 64) adults with disabilities, and elderly (65+) nondisabled beneficiaries in the OHP drawn from the Oregon Medicaid eligibility files. The original sample was stratified according to Medicare and Medicaid dual eligibility status, age group, type of disability (diagnosis missing, mentally ill, mentally retarded/developmentally disabled, physically disabled, or non-SSI eligible), and type of enrollment status (managed care versus fee-for-service) for a total of 38 strata. Those who live in group or congregate living facilities, retirement homes, and assisted living facilities were not considered to be community dwelling residents. The sample was fielded in waves to help monitor the response and eligibility rates. Sample sizes selected for each of the strata (i.e., 250 responses) allow differences between mentally ill and disabled enrollees to be detected using a one-sided significance test with significance level .05 and 90% power (Research Triangle Institute 2000).

A sample of 6,572 OHP enrollees was selected from the Oregon eligibility file, and interviews were completed using a computer-assisted telephone interviewing (CATI) instrument. The sample of disabled OHP members included those who possess one or more of the following conditions: a developmental disability, a physical disability, mental retardation, or mental illness. Elderly OHP participants were also included in the sample. The sample member was interviewed if he/she was an adult. Proxy interviews were only conducted for adults if a guardian indicated that the sample member was unable to answer the questions or if the sample member attempted to answer but was obviously having difficulty completing the interview.

Of those selected for an interview, a total of 3,309 completed the interview, for a response rate of 52.2%. Although this response rate is low, it is similar to rates achieved for other studies of the Medicaid population (Brown, Nederend, and Hayes 1999; Sisk et al. 1996). For this analysis, the data were subset to include only those who are physically disabled or had a diagnosis of mental illness on the sampling frame. After subsetting the data, the sample size for this analysis was 1,314. After one case was deleted because over half the data were missing, the sample size was reduced to 1,313. Once the data were cleaned to eliminate cases with missing data (coded as -1 and -2) on the dependent and independent variables included in the analysis, the final analytic file contained 1,268 cases. Finally, two cases were deleted because of missing data on the ADL and IADL items. Thus, the final sample size used in the study was 1,266. Table 1 shows the steps used to create the final analytic file and the resulting sample size.

Table 1. Analysis File Creation

Sample Size	Action	Physically Disabled Cases	Mentally Disabled Cases	Final Sample Size
1,314	Deleted one case with over half the data missing	794	519	1,313
1,313	Deleted cases missing on dependent variables (mental health visits/ physician visits)	775	493	1,268
1,268	Deleted two cases with missing information about activities of daily living	773	493	1,266

The reported response rate was approximately 50%. Again, this rate is considered to be a fairly good response for a population of low SES.

Measurement of Variables

The dependent variable is physician health visits. There are 11 independent variables, falling into three categories of predisposing, enabling, and need characteristics. The predisposing variables are age, gender, race, education, marital status, and living arrangements. The enabling variables are whether the respondent has another source of health insurance, whether the respondent has a usual source of health care, and the respondent's geographic region.[8] Need variables are health status and assistance both with activities of daily living (ADLs) (e.g., bathing) and with instrumental activities of daily living (IADLs) (e.g., managing money).

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[8] Eligibility for the Oregon Health Plan is based on 100% of poverty; therefore, by definition, all respondents are low income. As might be expected with a low-income population, there was a high nonresponse to the income question with income data missing for more than a quarter of the sample. Of those who responded, approximately 91% reported income of $14,000 or less. There was no straightforward way to impute values for these missing cases and deleting cases with missing income data might have introduced selection bias. Therefore, the income variable is not used as an enabling variable in this study.

Dependent Variable

Physician Visits

For this analysis, the number of medical visits that a beneficiary had during the past 90 days was used to determine whether the respondent had a visit to a physician. If a respondent reported one or more visits to a physician when asked, "*During the past 3 months how many visits have you made to a doctor or other medical person?*," the variable (physician visits) was coded 1; if the respondent reported zero visits, the variable was coded 0. The survey instrument used in this study excludes emergency room visits but includes visits to a doctor's office, community clinic, hospital clinic, or other such place. Because emergency room visits, by definition, are typically made when an individual is experiencing a serious medical problem requiring immediate attention, this analysis excludes visits to the emergency room.

Independent Variables

Predisposing variables in this analysis include sociodemographic and social structure variables. Enabling variables include the presence of other insurance, the existence of a regular doctor, and geographic location. In addition to health status, functional status variables are included in the model to measure the degree of disability and as an indication of the need for health care. Each of these factors and the variables included in the concept are presented in the sections that follow.

Predisposing Characteristics

Age. Age was created using responses to the question, "*How old are you?*" It was collected as a continuous variable and is used as such in this analysis.

Gender. Interviewers were instructed to record the respondent's gender or ask, "*Are you male or female?*" Responses include male (0) and female (1), with male being the reference category.

Race. Respondent race was obtained from responses to the question, "*Please tell me which of the following groups best describes your racial background.*" Original response categories were the traditional Census Bureau categories: American Indian or Alaska Native (1), Asian or Pacific Islander (2), Black or African American (3), White (4), and Other (5). "Other" was not read as a category, and those who voluntarily reported "other" as their racial category were asked to specify what they meant. A small number of respondents were categorized as something other than White and, upon inspection, were determined to fit primarily into the category of White (e.g., German, Italian), with very few exceptions. Therefore, for this analysis, race was recoded into a dummy variable: White (1) and Non-White (0) (which includes Native Americans or Alaska Natives, Asian or Pacific Islanders, and Blacks). Non-White is the reference category.

Education. The education variable was created from the question, "*What is the highest grade or year of schooling that you have completed?*" The five original response categories—elementary school but no high school (01), some high school (02), high school graduate (03), some college or technical school (04), and college graduate or postgraduate school (05)—were recoded to include three categories: less than high school, high school graduate, and some college or college graduate. Dummy variables were created for the latter two categories. Less than high school education is the reference category.

Marital Status. Marital status was obtained from the question, "*What is your marital status?*" The response categories are married (01), separated (02), divorced (03), widowed

(04), or never been married (05). Dummy variables were created for each of the first four

response categories, and never married is the reference category.

        Living Arrangements. Living situation was obtained from the item, "*Who usually*

lives in your apartment or home with you?" Responses include lives alone (01), lives with

spouse (02), lives with other family member (03), lives in a congregate living setting (04),

and lives with other nonfamily member (05). For this analysis, the last two categories (04

and 05) were combined into one category (lives with other nonfamily members). Dummy

variables were then created to represent each category, with living alone as the reference

category.

        Enabling Characteristics

        Other Insurance. Information on whether the respondent has other insurance was

obtained from the question, "*Do you currently have any type of health insurance coverage in*

addition to OHP?" The response categories are yes (1) and no (2). Other insurance was

recoded to yes (1) and no (0). No is the reference category.

        Usual Source of Care. Usual source of care information was obtained from

responses to the question, "*Is there a place you usually go when you are sick or need advice*

about your health?" The response categories are yes (1) and no (2). The variable was

recoded to yes (1) and no (0), with no as the reference category.

        Geographic Region. To determine whether the respondent lives in a metropolitan

area, respondents were asked, *What county do you currently live in?* The county code was

then entered into the data set. For this analysis, the geographic region variable was created

by merging the metropolitan area code for Oregon from the Area Resource File using the

county code as the merge variable. Geographic region was measured as a dummy variable, with nonmetropolitan region as the reference category.

Need Characteristics

Health Status. Health status was collected by asking, "*In general, would you say your health is excellent (1), very good (2), good (3), fair (4), or poor (5)?*" For this analysis, excellent (1) and very good (2) were combined into a single category, and fair (4) and poor (5) were combined into a single category. A dummy variable was then created for each of the following categories: excellent/very good and good. Fair/poor health is the reference category.

Functional Status. Functional status is measured using responses to a list of items used to determine a person's ability to perform ADLs (such as the ability to eat, dress, and bathe oneself) and IADLs (such as housecleaning, shopping, and managing money). Of the 13 questions used to determine functional abilities, 6 are ADLs and 7 are IADLs. Respondents were considered impaired in each of the 13 tasks if they reported having either a little or a lot of difficulty performing the task. Two variables, one each for ADLs and IADLs, were created to count the number of functional limitations and used as a proxy for level of disability in the analysis. Functional status was then coded into three categories to represent the number of impairments: no impairments, one to two impairments, and three or more impairments for both the ADLs and IADLs. Two dummy variables were created for ADL impairment: one variable for one to two impairments in ADLs and one variable for three or more impairments in ADLs. Two dummy variables were also created for IADLs: one to represent one to two impairments in IADLs and one to represent three or more

impairments in IADLs. No impairment is the reference category for both ADL and IADL

impairment.

Analytic Methods

The data include sample weights that reflect the differential sampling rates in the 38

strata. Weights were adjusted for the biasing effects of survey nonresponse. The total

number reflects the total number of individuals enrolled in OHP as of December 1998

(Research Triangle Institute 2000). Data used for the multivariate analysis are unweighted

because the weighted percentages are similar in all instances to the unweighted percentages;

however, the descriptive analysis presents both weighted and unweighted data.   See

Appendix A1 for the results of the weighted data.

Data were analyzed using basic univariate and bivariate descriptive statistics. Chi-

square tests were used with categorical variables, and a t-test was used for age (the only

continuous variable) to determine if there are statistically significant differences in utilization

and other characteristics between the physically disabled and the mentally ill. Logistic

regression was used to model the significance of the effects of the predisposing, enabling,

and need variables on utilization of physical health services.

RESULTS

Results of the analysis are presented in two sections. The first section includes the

frequency distributions with regard to all variables included in the analytic models for the

total population and separately for both the physically disabled and the mentally ill. In

addition, the section examines the statistical differences between the unweighted data of the

two groups using a chi-square test of differences ($p < .05$). The second section provides

results of the logistic regression analyses. Finally, a comparison of the models is presented

to determine if there are statistically significant differences in the determinants of physician visits between the physically disabled and the mentally ill.

Univariate Analysis

Dependent Variable

General characteristics of the study sample are shown in Table 2. The majority (61%) of the sample are physically disabled, while the remaining 39% are mentally disabled. A little more than three fourths (77.7%) of the sample have had at least one physical health visit. Significantly more of the physically disabled subgroup than the mentally ill group had a doctor visit for physical health needs ($p = .0005$). Slightly less than three fourths (73%) of the mentally disabled population had visited a doctor, while more than 80% of the physically disabled population had seen a doctor during the 3 months before their interview.

Independent Variables

Predisposing Characteristics. The study population ranges in age from 19 to 76 years of age. As can be seen from Table 2, the average age of the study population is approximately 47 years, and the majority (62%) of the total sample are female. The

Table 2. Characteristics of Study Sample Unweighted

Characteristic	Total Sample (%)	Mentally Disabled (%)	Physically Disabled (%)
Sample size	1,266 (100%)	493 (38.9%)	773 (61.0%)
Outpatient visits in past 3 months			
Physical health doctor visit **	77.7	72.6	81.0
Predisposing Characteristics			
Mean age **	46.7	43.6	48.6
Gender			
Male	38.2	37.5	38.6
Female	61.8	62.5	61.5
Race/ethnicity			
White	81.5	79.2	82.7
Non-White	18.5	20.3	17.3
Education			
Less than high school	31.6	29.0	33.5
High school graduate	34.6	37.7	32.6
Some college or college graduate	33.7	33.3	33.9
Marital status **			
Married	14.1	8.7	17.5
Separated	6.6	7.1	6.3
Divorced	36.7	36.0	37.1
Widowed	6.4	3.9	8.0
Never married	36.3	44.4	31.0
Living arrangements **			
Lives alone	35.7	37.7	34.4
With spouse	11.7	7.5	14.4
With other family members	33.5	31.6	34.8
With other nonfamily members	19.0	23.1	16.4
Enabling Characteristics			
Has usual source of care *	95.9	94.3	96.9
Has other insurance **	36.7	29.8	41.0
Geographic region **			
Metropolitan	57.3	63.9	53.2
Nonmetropolitan	42.7	36.1	46.8

(continued)

Table 2.   Characteristics of Study Sample Unweighted (continued)

Characteristic	Total Sample (%)	Mentally Disabled (%)	Physically Disabled (%)
Need Characteristics			
Health status **			
Very good/excellent	14.7	18.7	12.2
Good	25.6	25.3	25.7
Fair/poor	59.7	56.0	62.1
Needs assistance with ADLs **			
None	37.6	52.9	27.8
1 to 2	26.2	24.3	27.4
3 or more	36.2	22.7	44.8
Needs assistance with IADLs **			
None	17.1	23.1	13.2
1 to 2	31.7	29.4	33.1
3 or more	51.3	47.5	53.7

* $p < .05$
** $p < .01$

physically disabled group is significantly older than the mentally disabled group (49 years compared with 44 years, $p < .0001$).

According to 2000 Census data, the majority (86.6%) of Oregonians are White. Not surprisingly then, the majority (81.5%) of the study sample and the majority of both the physically disabled and the mentally disabled populations (82.7% and 79.2%, respectively) are also White. The physically disabled and mentally disabled samples do not differ significantly on race.

The sample is almost evenly split on education level. A little less than one third (31.6%) of the sample reported less than high school education, about a third (34.6%) of the sample reported being a high school graduate, and the remaining one third (33.7%) reported having some college or a college degree. There is no significant difference between the physically disabled and the mentally disabled on education, and the characteristics of the two

groups generally mirror those of the total sample. Approximately one third (33.5%) of the physically disabled and 29% of the mentally disabled have less than a high school education. About a third of both groups (33.9% of the physically disabled and 33.3% of the mentally ill) have some college or a college degree. The remaining respondents (32.6% of the physically disabled and 37.7% of the mentally ill) are high school graduates.

Most of the sample reported either having never been married (36.3%) or being divorced (36.7%). Thirteen percent are either separated (6.6%) or widowed (6.4%), and the remaining (14.1%) are married. The physically disabled and the mentally ill groups are significantly different on marital status ($p < .001$). The primary differences are in married, widowed, and never married categories, with slightly more of the mentally ill group (44.4%) than the physically disabled (31%) indicating they have never been married and about twice as many of the physically disabled than the mentally ill group reporting that they are either married or widowed (17.5% versus 8.7% and 8% versus 3.9%, respectively).

Approximately one third (35.7%) of the total sample live alone, and another third (33.5%) live with a relative who is not a spouse, while about 12% of the sample live with a spouse. The remaining sample members live with other nonfamily members (in a congregate setting). The two subsamples differ significantly on their living arrangements ($p = .0002$). Twice as many of the physically disabled group (14.4%) as the mentally ill (7.5%) stated that they live with a spouse, and significantly more of the mentally ill (23.1%) than the physically disabled group (16.4%) live with other nonfamily members.

Enabling Characteristics. Having more than one source of insurance has also been associated with the use of mental and physical health services. A few more than one third (36.7%) of the sample have another source of insurance. Forty-one percent of the physically

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disabled population have another source of insurance in addition to the OHP, compared with 29.8% of the mentally ill subgroup, a statistically significant difference ($p < .001$).

Almost all (95.9%) of the respondents reported having a regular doctor, and the majority of both the mentally ill and the physically disabled groups in this study reported having a regular doctor. There is a significant difference between the two groups ($p = .0244$), with 94.3% of the mentally ill population having a regular doctor, compared with 96.9% of the physically disabled population.

More than half (57.3%) of all respondents live in a metropolitan area. Slightly more than half (53.2%) of the physically disabled population live in a metropolitan area, while significantly more of the mentally ill population (63.9%) reported living in a metropolitan area ($p = .0002$).

Need Characteristics. Because the sample is disabled, it is not surprising that more than half (59.7%) reported being in fair or poor health. Although a little more than a third (36.2%) of the sample members indicated that they need assistance with three or more ADLs (such as bathing, eating, and dressing), more than half (51.3%) reported needing help with three or more IADLs (such as shopping, meal preparation, taking medications, and doing housework). Approximately one quarter of the sample need assistance with one or two ADLs, and about one third need assistance with one or two IADLs. As shown in Table 2, more of the population is impaired on IADLs than ADLs. A little less than two thirds reported at least some difficulty with ADLs, while about 80% reported difficulty performing IADLs.

The physically disabled and the mentally disabled groups differ significantly on all need characteristics included in this analysis. Similar to the statistics for the overall sample,

the majority of both groups self-reported being in fair or poor health, with the physically disabled group (62.1%) being in significantly poorer health than the mentally ill group (56%, $p = .005$).

There is a statistically significant difference ($p < .0001$) between the physically disabled and mentally ill groups on the level of impairments in both ADLs and IADLs. The mentally ill group, not surprisingly, is less impaired than the physically disabled in ADLs. Of the mentally ill, 52.9% have no ADL impairments, compared with 27.8% of the physically disabled. Only 22.7% of the mentally ill have three or more ADL impairments, compared with 44.8% of the physically disabled. Because more cognitive function is required to perform IADLs, one would expect that the mentally disabled group would be more impaired on these activities; however, in this study, almost all of the physically disabled (86.8%) reported having more trouble than the mentally ill group (76.9%) with IADLs.

The unweighted variable means and percentages are similar to the weighted variable means and percentages for both subgroups, with the largest difference between the weighted and unweighted univariate statistics occurring for other insurance. In this instance, the percentage of respondents with other insurance is lower by 5% for both groups when sample weights are taken into account. Because the univariate results for the weighted and unweighted data are similar, unweighted data are used for all additional analyses. Refer to the Appendix (Table A1) for detailed information on the weighted sample characteristics.

Multivariate Analyses

The health behavior model is used to test the effects of predisposing, enabling, and need characteristics on the odds of having a physical health visit for the physically disabled

and mentally ill populations enrolled in the OHP. This section first presents the logistic

regression models predicting the odds of a physical health visit for both the physically

disabled (Table 3) and mentally ill populations (Table 4). Using a hierarchical approach to

determine the best model for predicting the likelihood of this physically disabled population

having a doctor visit, analyses include five models: four nested models and the final model.

Model 1 uses only the predisposing characteristics (i.e., age, race, gender, education,

marital status, and living arrangements) to predict the odds of having a physician visit. The

second model includes only the enabling characteristics (i.e., additional source of insurance,

having a regular doctor, and geographic region), and the third includes only the need

characteristics (health status and functional status). The next model incorporates

predisposing and enabling characteristics into a single model, and the final model

incorporates all variables. A significance level of $p \leq .05$ was used to conduct all tests.

Determinants of Medical Service Use

Physician Visits: Physically Disabled

Predisposing Characteristics. Model 1 in Table 3 shows the effect of the

predisposing characteristics on physician visits. Being widowed is the only characteristic

that is statistically significant ($p < .05$). For this group, widows(ers) are 2.5 times more

likely than those who have never been married to have a physician visit, all other

predisposing variables constant. However, Model 1 is not statistically significant. Therefore,

predisposing characteristics alone do not predict whether a physically disabled person had a

physician visit for this sample, and hypothesis H1a is not supported by these data.

Enabling Characteristics. When enabling characteristics are used alone to predict

the odds of a physically disabled person having a doctor visit (Table 3, Model 2), only having

a regular source of care (i.e., a regular doctor or other place to receive care) is statistically significant ($p < .01$). This model shows that a physically disabled person who has a regular place to receive care is 3.3 times more likely ($p < .01$) than a physically disabled person who does not have a regular source of care to have had a physician visit in the 3 months prior to the interview, all other enabling variables in the model held constant. This finding is in line with those of several other researchers (Berk and Schur 1998; Jennings and White-Means 2001; Lim et al. 2002; Sox et al. 1998) who found that having a regular source of care is a significant predictor of health care use for nondisabled populations. Although the model is statistically significant (p < .01), this finding does not provide total support for hypothesis H2a since other insurance and geographic region are not statistically significant.

Need Characteristics. Model 3 examines the effects of the need characteristics on the likelihood of seeing a physician. For this sample of physically disabled OHP beneficiaries, only health status appears to have an impact on an individual having a doctor visit. Those in excellent or very good health are about a third less likely to have seen a doctor in the 3 months prior to the interview than those who are in fair or poor health ($p < .001$), all else held constant. The model is statistically significant ($p < .001$). Nevertheless, only partial support is found for hypothesis H3a since not all need characteristics are significant.

Table 3. Logistic Regression for Use of Physician Visits by Adult Physically Disabled Oregon Health Plan Members (N=773)

Explanatory Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Predisposing Characteristics					
Age	0.99 (.98 – 1.01)	-	-	.99 (.98 – 1.01)	0.98 (.97 – 1.00)
Gender					
Male	0.83 (.56 – 1.22)	-	-	.87 (.59 – 1.29)	0.94 (.62 – 1.41)
Female*					
Race					
White	1.10 (.67 – 1.78)	-	-	1.07 (.65 – 1.75)	0.99 (.60 – 1.65)
Non-White*					
Education					
High school	1.16 (.75 – 1.82)	-	-	1.15 (.73 – 1.80)	1.17 (.74 – 1.86)
Some college	1.40 (.85 – 2.30)	-	-	1.33 (.81 – 2.19)	1.31 (.79 – 2.19)
College graduate	1.74 (.80 – 3.78)	-	-	1.62 (.74 – 3.55)	1.84 (.82 – 4.17)
Less than high school*					
Marital status					
Divorced	1.62 (.97 – 2.71)	-	-	1.93 (.78 – 4.81)	1.48 (.86 – 2.53)
Separated	1.99 (.80 – 4.94)	-	-	1.59 (.95 – 2.67)	1.74 (.69 – 4.44)
Widowed	**2.53+ (1.01 – 6.36)**	-	-	**2.57+ (1.01 – 6.52)**	**2.80+ (1.08 – 7.31)**
Married	1.18 (.45 – 3.05)	-	-	.99 (.38 – 2.58)	0.95 (.36 – 2.56)
Never married*					
Living arrangement					
Lives with spouse	0.96 (.34 – 2.68)	-	-	1.14 (.41 – 3.22)	1.16 (.40 – 3.39)
Lives with other family	1.20 (.75 – 1.93)	-	-	1.26 (.78 – 2.03)	1.31 (.80 – 2.15)
Lives with nonfamily	1.40 (.78 – 2.49)	-	-	1.42 (.79 – 2.56)	1.53 (.83 – 2.81)
Lives alone*					
Enabling Characteristics					
Other insurance					
Has other insurance	-	1.35 (.92 – 1.98)	-	1.30 (.88 – 1.93)	1.28 (.86 – 1.90)
No other insurance*					

(continued)

Table 3. **Logistic Regression for Use of Physician Visits by Adult Physically Disabled Oregon Health Plan Members (N=773)**
(continued)

Explanatory Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Enabling Characteristics (cont.)					
Regular doctor					
Has a regular source	-	**3.31# (1.43 – 7.65)**	-	**3.08# (1.29 – 7.32)**	**3.47# (1.41 – 8.54)**
No regular source*					
Geographic region					
Metropolitan	-	0.81 (.56 – 1.17)	-	.79 (.54 – 1.15)	0.79 (.54 – 1.61)
Nonmetropolitan*					
Need Characteristics					
Health status					
Excellent or very good	-	-	**0.31‡ (.19 – .51)**	-	**0.25‡ (.15 – .44)**
Good			0.69 (.45 – 1.06)		**0.63+ (.40 – .99)**
Fair/poor*					
Activity limitations					
Limits in 1 or 2 ADLs	-	-	1.30 (.78 – 2.16)	-	1.25 (.74 – 2.10)
Limits in 3 or more ADLs			1.29 (.79 – 2.09)	-	1.10 (.67 – 1.85)
No limits in ADLs*	-	-	-		-
Limits in 1 or 2 IADLs			1.22 (.69 – 2.18)	-	1.08 (.59 – 1.97)
Limits in 3 or more IADLs			1.33 (.75 – .38)	-	1.24 (.66 – 2.30)
No limits in IADLs*					
Constant	1.15	0.30	1.34	.19	0.66
Model χ^2 (degrees of freedom)	15.10 (13)	**12.75# (3)**	**27.69‡ (6)**	**26.05+ (16)**	**54.61‡ (22)**
Difference in χ^2 (degrees of freedom)	-	-	-	Model 4 vs. 1 **10.95 (3) +** Model 4 vs. 2 13.30 (13)	Model 5 vs. 4 **28.56 (6) ‡**

* Reference category
^ Confidence intervals in parentheses
+ $p < .05$
# $p < .01$
‡ $p < .001$

Model Comparisons

To determine what effect the predisposing, enabling, and need characteristics together have on the likelihood of a physically disabled OHP beneficiary having a physician visit, the set of variables was added into the model using a hierarchical approach. First, the predisposing and enabling variables (Model 4) were added, and then all the variables were added (Model 5). The following section presents the results of this analysis.

Comparing the results of Models 1 and 2 with Model 4, the findings are basically identical. Being widowed and having a usual source of care are the only two characteristics that are statistically significant, and the odds ratios are virtually identical across models. In this study, regardless of the model being interpreted, a physically disabled person who is widowed is about 2.5 times more likely ($p < .05$) than a person who has never been married to have a physician visit, all other variables in the model held constant. Those with a regular place to receive care are more than three times more likely ($p < .01$) than a physically disabled person who does not have a regular source of care to have had a physician visit in the 3 months prior to the interview, all other variables in the model held constant. Thus far, Model 4 is the best model for predicting the odds of the physically disabled population enrolled in the OHP having a doctor visit. As shown at the bottom of Model 4 in Table 3, the difference between Model 1 and Model 4 chi-square values is 10.95 (df = 3), which is larger than the critical chi-square of 7.81, making Model 4 a better model than Model 1. Although the difference between Model 2 and Model 4 chi-square values is not statistically significant (13.30, df = 13), Model 4 is still the best model of the two because more of the variables predict the likelihood of a physician visit for this population.

Combining the predisposing and enabling characteristics with the need characteristics (Model 5) does not change the effects of the predisposing and need characteristics on physician visits a great deal. There is, however, a difference in which need characteristics become statistically significant. Although being in excellent or very good health is statistically significant both when need characteristics are examined alone and when they are combined with the predisposing and enabling characteristics, being in good health is only statistically significant when all the characteristics are examined together. Results of the final model show that the physically disabled OHP beneficiaries who report being in excellent or very good health are about a quarter less likely ($p < .001$) than those who report being in fair or poor health to have had a doctor visit in the 3 months prior to the interview, all else held constant; the results show only a slight difference when the need variables are examined alone. The key difference is the significance of good health. Although not statistically significant when need characteristics are examined alone, as in Model 3, results of the final model show that the odds of a physically disabled person in good health having a doctor visit are about two thirds less than the odds for those in fair or poor health, all else held constant ($p < .05$).

The same predisposing, enabling, and need variables that are statistically significant in Models 1, 2, and 3 are also statistically significant in Models 4 and 5, with one exception (have good health status). As was the case when the predisposing, enabling, and need factors were examined separately, including all components in the model (Model 5) yields results that only partially support hypotheses H1a, H1b, and H1c.

To determine which of the two models, Model 4 or Model 5, is best for predicting the likelihood of a physically disabled person having a doctor visit, the model chi-square values

were compared. The final model has a chi-square value of 54.61 (df = 22), compared with

the chi-square value of 26.05 (df = 16) for Model 4. The difference between the two model

chi-square values is 28.56 (df = 6), which is larger than the critical chi-square of 12.59;

therefore, the final model is the best of the two models for examining the determinants for a

physically disabled person having a doctor visit in the past 3 months, and the final model is

thus the basis for the discussion and comparisons with the mentally disabled group.

Physician Visits: Mentally Ill

The analysis was repeated for the mentally disabled population. Table 4 presents the

results of each model, beginning with the predisposing characteristics (Model 1), then

moving to the enabling characteristics (Model 2) and need characteristics (Model 3). Finally,

a model comparison was done to identify the best model to use for this group.

Predisposing Characteristics. Results of the model determining the effects of the

predisposing characteristics (Table 4, Model 1), unlike the results for the physically disabled,

show that gender is the only predisposing characteristic that is statistically significant in

determining the likelihood of a mentally disabled person having a physician visit. Males in

this mentally ill population are more than a third less likely ($p < .001$) than females to have

had a physician visit in the 3 months prior to the interview, all other variables in the model

held constant. Contrary to the results for the physically disabled group, this model is

statistically significant ($p < .001$); however, only limited support is found for hypothesis H1b

because only gender is statistically significant.

Enabling Characteristics. When enabling characteristics are used alone to predict

the odds of a mentally disabled person having a doctor visit (Table 4, Model 2), two of the

three characteristics are statistically significant. Having a regular source of care (i.e., a

regular doctor or place to receive care) is statistically significant ($p < .001$), as is having other insurance ($p < .05$). Results of this model show that a mentally disabled person with insurance in addition to OHP is more than 1.5 times more likely ($p < .05$) to have had a physician visit in the 3 months prior to the interview than a mentally disabled person who does not have insurance. In addition, a mentally disabled person with a regular doctor or place to receive care is slightly more than four times more likely than those who do not have a regular doctor ($p < .001$) to have had a physician visit in the 3 months prior to the interview, all other variables in the model held constant. Although the model is statistically significant ($p < .001$) and the results are compelling, they do not provide total support for hypothesis H2b because only two of the three enabling characteristics in the model are statistically significant.

Need Characteristics. Model 3 shows that health status is the only need characteristic that is statistically significant. Mentally ill OHP members who report that they are in very good or excellent health, as well as those who report that they are in good health, are slightly more than half less likely ($p < .01$) to have had a physician visit in the 3 months prior to the interview than those who report their health status to be fair or poor, all other variables in the model held constant. Similar to the results of the need characteristics for the physically disabled population, even though the model is statistically significant ($p < .05$), little support is found for hypothesis H3b because health status is the only statistically significant characteristic in the model.

Table 4. Logistic Regression for Use of Physician Visits by Adult Mentally Disabled Oregon Health Plan Members (N=493)

Explanatory Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Predisposing Characteristics					
Age	1.01 (.99 – 1.03)	-	-	1.006 (.98 – 1.03)	1.00 (.98 – 1.02)
Race					
White	0.78 (.44 – 1.37)	-	-	0.727 (.41 – 1.30)	0.80 (.44 – 1.45)
Non-White*					
Gender					
Male	**0.38‡ (.24 – .61)**	-	-	**0.423‡ (.26 – .68)**	**0.43‡ (.26 – .69)**
Female*					
Education					
High school	0.95 (.57 – 1.59)	-	-	0.949 (.56 – 1.60)	0.90 (.53 – 1.55)
Some college	1.71 (.95 – 3.07)	-	-	1.515 (.83 – 2.76)	1.57 (.85 – 2.90)
College graduate	1.82 (.68 – 4.93)	-	-	1.907 (.68 – 5.35)	1.82 (.64 – 5.18)
Less than high school*					
Marital status					
Divorced	0.99 (.57 – 1.70)	-	-	0.988 (.57 – 1.73)	0.91 (.51 – 1.62)
Separated	2.39 (.85 – 6.80)	-	-	2.639 (.91 – 7.69)	2.68 (.92 – 7.86)
Widowed	1.12 (.32 – 3.85)	-	-	1.118 (.32 – 3.90)	1.01 (.27 – 3.57)
Married	0.76 (.18 – 3.29)	-	-	0.754 (.17 – 3.27)	0.54 (.12 – 2.45)
Never married*					
Living arrangement					
Lives with spouse	5.97 (.95 – 37.34)	-	-	5.143 (.82 – 32.18)	7.18 (1.08 – 47.68)
Lives with other family	0.73 (.43 – 1.24)	-	-	0.725 (.42 – 1.24)	0.71 (.41 – 1.24)
Lives with nonfamily	0.92 (.53 – 1.60)	-	-	0.883 (.51 – 1.54)	0.89 (.49 – 1.61)
Lives alone*					
Enabling Characteristics					
Other insurance					
Has other insurance	-	**1.76+ (1.10 – 2.82)**	-	1.473 (.90 – 2.42)	1.54 (.92 – 2.56)
No other insurance*	-				

(continued)

Table 4. Logistic Regression for Use of Physician Visits by Adult Mentally Disabled Oregon Health Plan Members (N=493) (continued)

Explanatory Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Enabling Characteristics (cont.)					
Regular doctor					
Has a regular source		4.07‡ (1.86 – 8.94)	-	3.290# (1.41 – 7.69)	3.18# (1.34 – 7.59)
No regular source*	-				
Geographic region					
Metropolitan		0.75 (.49 – 1.15)	-	0.848 (.53 – 1.35)	0.85 (.53 – 1.37)
Nonmetropolitan*	-				
Need Characteristics					
Health status					
Excellent or very good	-	-	0.51# (.30 – .87)	-	0.55+ (.30 – 0.98)
Good	-	-	0.54# (.33 – .87)	-	0.53+ (.32 – .88)
Fair/poor*					
Activity limitations					
Limits in 1 to 2 ADLs	-	-	1.48 (.88 – 2.49)	-	1.17 (.67 – 2.06)
Limits in 3 or more ADLs			1.61 (.90 – 2.86)		1.21 (.65 – 2.28)
No limits in ADLs*	-	-	-	-	-
Limits in 1 to 2 IADLs			0.74 (.42 – 1.29)		0.76 (.42 – 1.36)
Limits in 3 or more IADLs			0.93 (.54 – 1.59)		1.23 (.68 – 2.25)
No limits in IADLs*			-		-
Constant	1.10	-0.30	1.21	0.144	0.50
Model χ² (degrees of freedom)	47.83‡ (13)	19.12‡ (3)	18.27+ (6)	57.74‡ (16)	70.76‡ (22)
Difference in χ² (degrees of freedom)	-	-	-	Model 4 vs. 1 **9.91 (3)+** Model 4 vs. 2 **38.62 (13) ‡**	Model 5 vs. 4 **13.02 (6)+**

* Reference category
^ Confidence intervals in parentheses
+ *p* < .05
# *p* < .01
‡ *p* < .001

Model Comparisons

To identify the effects the predisposing, enabling, and need characteristics together have on the likelihood of a mentally disabled OHP beneficiary having a physician visit, the set of variables was added into the model using a hierarchical approach. The predisposing and enabling variables (Model 4) were added first, and then all the variables were added to Model 5.

This section compares the results of Model 4, which includes both the predisposing and enabling characteristics, with those of the final model (which includes all variables) on the determinants of a physical health visit for the mentally disabled population. Results of Models 1 (predisposing characteristics) and 2 (enabling characteristics) are very similar to those of Model 4 (combination of predisposing and enabling characteristics). Gender is statistically significant in both Model 1 and Model 4, with males in this population being more than a third less likely than females to have a physician visit, all other variables in the model held constant ($p < .001$).

The odds of a mentally disabled person who has a regular doctor having a physician visit change only slightly when the enabling characteristics are combined with the predisposing characteristics (Model 4). When enabling characteristics are used alone, a mentally disabled person with a regular doctor is a little more than four times more likely than one without a regular doctor to have a physician visit, all other variables in the model held constant ($p < .001$). The odds change only marginally when the enabling and predisposing characteristics are included in the model together; a mentally disabled person with a regular source of care is almost 3.3 times more likely to have a physician visit than one who does not have a regular source of care, all other variables in the model held constant

($p < .01$). When the two types of variables are included together in the model, having other insurance is no longer statistically significant. Other insurance is barely significant when the enabling characteristics are examined alone.

Because the difference between the chi-square values for Model 1 and Model 4 is 9.91 ($df = 3$, $p < .05$) and is larger than the critical chi-square value of 7.81, Model 4 is the best of the two models to use for this analysis. The same holds true when comparing the results of Model 2 and Model 4 for predicting the odds of the mentally disabled OHP beneficiaries having a doctor visit, because the difference between Model 2 and Model 4 chi-square values is 38.62 ($df = 13$, $p < .01$), which is larger than the critical chi-square of 22.36.

Combining the predisposing and enabling characteristics with the need characteristics (Model 5) does not change the effects of the predisposing and need characteristics on physician visits for the mentally disabled (Model 4 versus Model 5). Overall, there is no change in the results for the need characteristics when they are combined with the predisposing and enabling characteristics and when they are used alone in the model, except for the level of significance.

To determine which of the two models, Model 4 or Model 5, is best for predicting the likelihood of a mentally disabled person having a doctor visit, chi-square values of the two models were compared. The final model has a chi-square value of 70.76 ($df = 22$), compared with the chi-square value of 57.74 ($df = 16$) for Model 4. The difference between the two model chi-square values is 13.02 ($df = 6$), which is larger than the critical chi-square of 12.59; therefore, the final model is the best of the two models for examining the predictors for the likelihood of a mentally disabled person having a doctor visit, and the final model serves as the basis for the discussion and comparisons with the physically disabled group.

Population Comparisons

The basis for the group comparisons will be the final models in Tables 3 and 4 (see Table 5). First, the results of the final models for the two populations were compared to identify differences and similarities. Next, to test for differences in the determinants of physician visits for physically disabled and mentally ill OHP members, t-tests of the model coefficients were performed.

Based on the literature review, it is not surprising that more of the predisposing characteristics are not statistically significant in this analysis of the physically and mentally disabled populations. Although gender is not a statistically significant predictor for the physically disabled population in this study, it is a strong predictor for the mentally ill group; men with mental illness are less than half as likely as women with mental illness to see a doctor, all other variables in the model held constant ($p < .001$). Based on what others have found, marital status, a proxy for social support, would also be a significant predictor of physician visits; however, the two populations are different on this determinant as well. In this analysis, the physically disabled OHP beneficiaries who are widowed are almost three times more likely than those who have never been married to see a physician, all else held constant ($p < .05$), but marital status is not statistically significant in the analysis conducted for the mentally disabled group.

Table 5.   Comparison of Models by Population Physician Visits

Explanatory Variables	Model 5 Physically Disabled	Model 5 Mentally Disabled
Predisposing Characteristics		
Age	0.98 (.97 – 1.00)	1.00 (.98 – 1.02)
Race		
White	0.99 (.60 – 1.65)	0.80 (.44 – 1.45)
Non-White*		
Gender		
Male	0.94 (.62 – 1.41)	**0.43‡ (.26 – .69)**
Female*		
Education		
High school	1.17 (.74 – 1.86)	0.90 (.53 – 1.55)
Some college	1.31 (.79 – 2.19)	1.57 (.85 – 2.90)
College graduate	1.84 (.82 – 4.17)	1.82 (.64 – 5.18)
Less than high school*		
Marital status		
Divorced	1.48 (.86 – 2.53)	0.91 (.51 – 1.62)
Separated	1.74 (.69 – 4.44)	2.68 (.92 – 7.86)
Widowed	**2.80+ (1.08 – 7.31)**	1.01 (.27 – 3.57)
Married	0.95 (.36 – 2.56)	0.54 (.12 – 2.45)
Never married*		
Living arrangement		
Lives with spouse	1.16 (.40 – 3.39)	7.18 (1.08 – 47.68)
Lives with other family	1.31 (.80 – 2.15)	0.71 (.41 – 1.24)
Lives with nonfamily	1.53 (.83 – 2.81)	0.89 (.49 – 1.61)
Lives alone*		
Enabling Characteristics		
Other insurance		
Has other insurance	1.28 (.86 – 1.90)	1.54 (.92 – 2.56)
No other insurance*		
Regular doctor		
Has a regular source	**3.47# (1.41 – 8.54)**	**3.18# (1.34 – 7.59)**
No regular source*		
Geographic region		
Metropolitan	0.79 (.54 – 1.61)	0.85 (.53 – 1.37)
Nonmetropolitan*		

(continued)

Table 5.   Comparison of Models by Population Physician Visits (continued)

Explanatory Variables	Model 5 Physically Disabled	Model 5 Mentally Disabled
Need Characteristics		
Health status		
Excellent or very good	**0.25‡ (.15 – .44)**	**0.55+ (.30 – 0.98)**
Good	**0.63+ (.40 – .99)**	**0.53+ (.32 – .88)**
Fair/poor*		
Activity limitations		
Limits in 1 to 2 ADLs	1.25 (.74 – 2.10)	1.17 (.67 – 2.06)
Limits in 3 or more ADLs	1.10 (.67 – 1.85)	1.21 (.65 – 2.28)
No limits in ADLs*		
Limits in 1 to 2 IADLs	1.08 (.59 – 1.97)	0.076 (.42 – 1.36)
Limits in 3 or more IADLs	1.24 (.66 – 2.30)	1.23 (.68 – 2.25)
No limits in IADLs*		
Constant	0.66	0.5
Model χ²	**54.61‡**	**70.76‡**
Degrees of freedom	22	22

* Reference category
^ Confidence intervals in parentheses
+ $p < .05$
# $p < .01$
‡ $p < .001$

The two populations are similar in the results for the enabling characteristics.

However, not all the enabling characteristics are statistically significant. Consistent with

what others have found, having a regular doctor or a usual source of care is a statistically

significant predictor for physical health visits. Results for both groups show that those with a

regular doctor are a little more than three times more likely to have a doctor visit than those

who do not have a regular doctor, all other variables in the model held constant ($p < .01$).

Surprisingly, geographic region does not seem to play a role in determining whether either

population has a physician visit.

Finally, of the need characteristics, health status is the only characteristic that is a

statistically significant determinant for both populations. Although the results are not exactly

the same, there is little difference between them. Physically disabled OHP beneficiaries in

excellent or very good health are a quarter less likely than those in fair or poor health to have a doctor visit, all else held constant ($p < .001$). In comparison, the mentally disabled OHP beneficiaries in excellent or very good health are about half less likely than those mentally disabled OHP beneficiaries in fair or poor health to have a doctor visit, all other variables in the model held constant ($p < .05$). The results are also very similar for those in good health for both populations. Mentally ill OHP beneficiaries who are in good health are about half less likely than those in fair or poor health to have a doctor visit, all else held constant ($p < .05$), whereas physically disabled beneficiaries in good health are almost two thirds less likely than those in fair or poor health to have a doctor visit, all other variables in the model held constant ($p < .05$).

Appendix Table A2 presents the results of the across-equation comparisons of the regression coefficients for the physically and mentally disabled. The first two columns of the table list the regression coefficients and the standard errors from the final models. The calculated t-value is listed in the next column, followed by the critical t-value at three levels of significance (.05, .01, and .001, respectively). Based on the results of the t-tests comparing coefficients for the final model, the two groups differ significantly on gender ($p < .05$). This finding suggests that in future analyses the two groups can be combined into the same model to predict physician use; however, if gender differences are important to the analysis, an interaction term (gender and type of disability) might also be included. This will allow researchers to capture gender effects if the two subgroups are included together in the model.

DISCUSSION AND CONCLUSION

The costs of medical services and the health care system itself are less favorable for the lower SES groups; however, federal programs such as Medicaid, and in this case OHP,

are supposed to eliminate the cost barrier and make it easier for low-income persons to seek medical care. Clearly, the majority of respondents in this study have the benefit of seeing a physician, as evidenced by the fact that 81% and 73% of the physically disabled and mentally disabled, respectively, reported having had at least one physician visit in the past 3 months. Unlike individuals with low SES who do not have financial resources to navigate the health care system, use of physician services by this population may be influenced by the fact that they have access to enabling resources (i.e., enrollment in the Oregon Health Plan). The majority of the respondents have a usual doctor (96%), and more than a third of the respondents have an additional source of insurance that enables them to afford the cost of a physician visit.

As discussed in the literature review, even when the cost of care is made more affordable to individuals, it is not necessarily enough to eliminate the differences in use of health care among SES groups. Individual predisposing, enabling, and need factors are also important to consider, especially when attempting to understand the differences, if any, in access to and use of health care. One of the goals of this study has been to contribute to the body of knowledge that exists on factors that predict medical service use by persons with disabilities. Results of this research provide some, though not complete, evidence that the traditional predisposing, enabling, and need factors used to examine predictors of physician use in a nondisabled population are also sufficient to identify determinants of physician use by disabled populations.

Predisposing Characteristics

Hypotheses 1a and 1b proposed that all else equal, predisposing variables, including age, gender, race, education, marital status, and living arrangement, will have a positive

impact on health service use for the physically disabled and mentally disabled OHP populations, respectively. Only two predisposing variables are statistically significant determinants of physician service use for the physically disabled and the mentally disabled, marital status and gender, respectively, which suggests that these hypotheses are only partially supported.

Some differences appear in the predisposing characteristics that are significant predictors of physician use for the physically disabled and mentally disabled in this study. Gender is not significant in the model for the physically disabled; however, it is the only predisposing characteristic that has a significant influence on physician use for the mentally disabled. In this study, men who are mentally disabled are less likely than women who are mentally disabled to have a physician visit. This finding is consistent not only with the literature on service use for the mentally ill, but also with the literature on the nondisabled population (Verbrugge 1985, 1990). Reasons for gender not being statistically significant for the physically disabled are uncertain, but other researchers have also found that gender has no influence on service use for nondisabled populations (Albizu-Garcia et al. 2001; de Boer et al. 1997). Perhaps the disability itself, which in some cases may be an indication of the need for medical care, has a greater influence on and is more important to service use for this population than gender.

Although marital status is significant for the physically disabled, it is not significant for the mentally disabled. Specifically, the physically disabled who are widowed are more likely than those who have never been married to have a physician visit. This difference could be because those who are widowed are older and therefore need medical care because of age-related illnesses. Additionally, those who are widowed may have an existing social

network as a result of marriage that can serve as encouragement to seek medical care, while those who have never been married do not have a social support network and therefore seek more formal care when they are ill.

By the same token, one would expect that married persons would be more likely to see a physician than those who have never been married because they have "social support." However, being married is not statistically significant for either the physically disabled or the mentally disabled. Declines in functioning experienced by the elderly increase their need for assistance, which can stretch informal support networks (Stoller and Pugliesi 1991). The same is likely true for persons with disabilities. This group may rely on formal support systems to help when they are ill or in need of assistance, such as personal assistants, home health aides, case workers, or mental health counselors, and not so much on a spouse or other informal social network. Thus, measures of informal support may need to be replaced by measures of formal support systems in models examining predictors of physician service use for this population. The remaining predisposing factors (age, race, education, and living arrangements) were not statistically significant for either disabled population included in this analysis.

Enabling Characteristics

Hypotheses 2a and 2b proposed that there is a positive relationship between enabling characteristics, especially other health insurance, a usual source of care, and geographic region, and health service use for the physically disabled OHP members. For both the physically disabled and the mentally disabled, having a regular doctor is the only enabling characteristic that is statistically significant in this study, which again suggests that these hypotheses are only partially supported.

The presumption is that because the cost of health care is often a barrier to receiving medical services, especially for those with low SES, having health insurance provides access to medical care. The literature supports this premise. Research has shown that having another insurance source is a significant predictor of service use for nondisabled populations, especially those with low SES. However, having other insurance is not significant in this study for either the physically disabled or the mentally disabled. One reason for this finding may be because the study population is a disabled population. There is a high probability that this group is eligible for Medicare and Medicaid because they are disabled, and they therefore have the added protection of public insurance coverage. Being enrolled in the plan may negate the effect of having other insurance for this particular low SES population. Including income information in the analysis might help efforts to understand the effect of other insurance on physician use for the disabled, even though the study population is a low-income population.[9]

As medically vulnerable groups, the physically disabled and the mentally disabled are prone to multiple health and functional issues. Not surprisingly, the majority of both the physically disabled and the mentally disabled have a regular doctor or clinic to use when they need medical attention (97% and 94%, respectively). Additionally, having a usual source of care was found to have a significant influence on physician use. This finding is similar to what other researchers have found with nondisabled populations (Aday 1993; Berk and Schur 1998; Broyles et al. 1999; Sox et al. 1998). In fact, having a usual source of care (i.e., a regular doctor) is the only enabling characteristic that proved to be a significant predictor of physician use across both groups. Geographic region is not statistically significant.

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[9] Income was not included as an explanatory variable in this study because all of the OHP members are, by definition, low income.

Need Characteristics

Hypotheses 3a and 3b suggested that there is a positive relationship between need characteristics, specifically health status and functional status, and physical health service use for the physically disabled OHP members. In fact, for both the physically disabled and mentally disabled in this study, health status is the only need characteristic that is statistically significant. While this finding is key, it suggests only partial support for the hypotheses.

Evidence of equity in use of physician services is supported if those who need care actually receive it, and inequities exist when the significant predictors of service use are found primarily among the predisposing and enabling characteristics (Aday 1993; Andersen 1968, 1995; Gelberg et al. 2000). Although further analysis would be required to determine if these groups have needs for services that have not been met, using health status as a proxy for need, results of this study seem to support the premise that those with a need for services receive them. For both the physically disabled and mentally disabled, those in excellent or very good health and those in good health are significantly less likely than those in fair or poor health to see a physician.

Few studies have used functional status as need variables, perhaps because so few studies have been published that examine service use for the disabled. In this study, functional status (i.e., measures of ADL and IADL impairments) was grouped according to the number of impairments. Neither measure of functional status was found to have a statistically significant influence on the use of physician services for the physically disabled and the mentally disabled OHP members in this study. Perhaps to determine whether functional status has an influence on physician service use, it is necessary to include each type of limitation, such as the ability to dress oneself or the ability to manage money, in the

model so that the effect of the type of limitation is not masked by being grouped or counted with other ADLs and IADLs and categorized as a number.

One interesting finding in this study is the level of IADL impairments among the physically disabled compared with the mentally disabled. The physically disabled are more impaired in IADLs than the mentally ill. Because of the cognitive function needed to perform IADLs, such as manage money and take medications, intuitively one would assume the opposite might be true. Perhaps the difference in this study has something to do with the level or type of physical disability. While the reason for disability was not explored in this study, it is possible that this physically disabled group has disabilities that would render them physically incapable of performing a variety of IADLs. For example, persons with cerebral palsy or spinal cord injuries are not able to perform such IADLs as light housekeeping, opening medication bottles, or using the telephone without an assistive device or assistance from another person.

Summary and Conclusions

Although the hypotheses of this study are not fully supported, results show that some of the predisposing, enabling, and need factors are significant, and the model does appear to work with this population. To improve its utility with the physically and mentally disabled, the behavioral model may need to be expanded—that is, additional or different predisposing, enabling, and need variables might be needed. For example, additional enabling variables, such as the use of formal support networks (e.g., case managers, personal assistance workers, and home health aides) and the size and proximity of the social network (e.g., the number of friends and family one can call upon for help, and how far away they live) might be added. Measures of chronic conditions and disabilities and an indication of type of functional

impairment might be included as need factors. Because this research revealed no significant

difference in the factors that affect physician service use among the physically and mentally

disabled populations, including a measure of disability and vulnerability as predisposing

variables in the model might also be appropriate. Including a measure for type of disability

in the model will also allow for further exploration of whether potential inequities in service

use exist by type of disability and whether type of disability has a significant influence on

physician service use.

LIMITATIONS OF THE STUDY

Because this study is based on secondary data, the analysis is limited by the variables

available in the dataset. Of particular note is the inability to construct sufficient measures of

social support to determine if social support is a statistically significant predictor of physician

visits for this disabled population. Marital status and living arrangement were collected by

the original researchers; although the two are used as proxies for social support in this study,

knowing how many people the respondents have to rely on for support and the number of

friends or relatives who live nearby would strengthen the measure of social support used in

the model. The significance of the social support variable might be different if more

information on social support and social networks was available.

The analysis relies on self-report data, which are limited by the respondents' ability to

recall the information requested of them. Some questionnaire items ask respondents to report

on events that occurred in the 3 months prior to the interview. The older a person is, the

harder it becomes to recall what happened in the past. The average age of the respondents in

this study is 46, and their ability to recall information accurately may have affected the

completeness of their response.

Although the sample was selected to be representative of the disabled population enrolled in the Oregon Health Plan, the response rate of 50% may raise some question as to whether the data actually are representative. Even if one could successfully argue that these data are representative of all physically and mentally disabled persons enrolled in OHP, the results cannot be generalized to the disabled population in the United States.

FUTURE RESEARCH

Research on the use of physician services by the disabled and the factors that predict their service use is scant. More research should be done to understand the patterns of service use for this group and the predisposing, enabling, and need factors that influence this use. Additional research is especially important because this population has complex health care needs and is at a continued risk for poorer health and inequities in health care. As De Jong et al. (2002) found in their focus groups conducted with persons with disabilities, primary care physicians may be so focused on the individuals' disability that they overlook the need for preventive and other services normally offered to the nondisabled. Studies should be expanded to examine not only physician service use, but use of preventive services and specialty services, such as mental health and rehabilitation services. To fully understand the determinants of physician use for the disabled population in the United States, a nationwide survey would be needed.

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APPENDIX

Table A1. Characteristics of Study Sample Weighted

Characteristic	Total Sample (%)	Mentally Disabled (%)	Physically Disabled (%)
Sample size	17,019 (100%)	7,340 (43.1%)	9,678 (56.9%)
Outpatient visits in past 3 months			
Physical health doctor visit	76.1	71.8	79.4
Mental health doctor visit	29.3	54.7	10.0
Predisposing Characteristics			
Mean age	47.7	44.2	50.4
Gender			
Male	39.1	39.8	39.1
Female	60.9	60.8	60.9
Race/ethnicity			
White	78.2	76.5	79.5
Non-White	21.8	23.5	20.5
Education			
Less than high school	35.0	32.0	37.3
High school graduate	33.7	37.1	31.1
Some college or college graduate	31.3	30.9	31.6
Marital status			
Married	15.7	10.2	19.8
Separated	7.0	7.8	6.9
Divorced	36.1	35.3	36.7
Widowed	6.8	4.3	8.7
Never married	34.4	43.0	27.8
Living arrangements			
Lives alone	34.9	35.9	34.2
With spouse	12.9	8.3	16.5
With other family members	34.0	33.7	34.1
Other nonfamily members	18.3	22.1	15.3
Enabling Characteristics			
Has usual source of care	95.5	94.0	96.7
Has other insurance	30.7	23.9	35.9
Geographic region			
Metropolitan	57.7	64.3	52.7
Nonmetropolitan	42.3	35.7	47.3

(continued)

Table A1. Characteristics of Study Sample Weighted (continued)

Characteristic	Total Sample (%)	Mentally Disabled (%)	Physically Disabled (%)
Need Characteristics			
Health status			
Very good/excellent	13.9	18.0	10.8
Good	25.7	25.8	25.6
Fair/poor	60.4	56.2	63.6
Needs assistance with ADLs			
None	40.3	54.8	29.4
1 to 2 ADLs	26.1	24.3	27.5
3 or more ADLs	33.5	21.0	43.1
Needs assistance with IADLs			
None	18.1	22.8	14.7
1 to 2 IADLs	31.3	29.0	33.1
3 or more IADLs	50.5	48.1	52.2

Table A2. Model Comparisons Across Groups

Explanatory Variable	Mentally Ill		Physically Disabled		t calc	T critical		
	Estimate	SE	Estimate	SE	t value	0.05	0.01	0.001
Predisposing Characteristics								
Age	0.00205	0.0111	-0.0163	0.00933	1.26549	1.97	2.6	3.34
Gender								
Male	-0.8552	0.2469	-0.0752	0.2085	**-2.4137**	1.97	2.6	3.34
Race								
White	-0.2189	0.3027	-0.0005	0.2598	-0.5475	1.97	2.6	3.34
Education								
High school	-0.1007	0.2755	0.1564	0.2373	-0.7071	1.97	2.6	3.34
Some college	0.4489	0.3141	0.2804	0.2617	0.41215	1.97	2.6	3.34
College graduate	0.5982	0.5341	0.6076	0.4163	-0.0139	1.97	2.6	3.34
Marital status								
Separated	0.9872	0.5483	0.562	0.4775	0.58481	1.97	2.6	3.34
Divorced	-0.0962	0.2943	0.4	0.2753	-1.2313	1.97	2.6	3.34
Widowed	0.0111	0.6441	1.0341	0.4894	-1.2646	1.97	2.6	3.34
Married	-0.6088	0.7684	-0.0468	0.5052	-0.6111	1.97	2.6	3.34
Living arrangements								
Spouse	1.9707	0.9663	0.1146	0.5507	1.66884	1.97	2.6	3.34
Lives with other family	-0.3445	0.2846	0.2457	0.2557	-1.5426	1.97	2.6	3.34
Lives with nonfamily	-0.1133	0.3019	0.3906	0.3187	-1.1479	1.97	2.6	3.34
Enabling Characteristics								
Has a usual source of care	1.158	0.443	1.2623	0.4614	-0.1631	1.97	2.6	3.34
Other insurance	0.4297	0.2598	0.2444	0.2043	0.56065	1.97	2.6	3.34
Metropolitan region	-0.1615	0.2414	-0.2451	0.1968	0.26842	1.97	2.6	3.34

(continued)

Table A2. Model Comparisons Across Groups (continued)

Explanatory Variable	Mentally Disabled		Physically Disabled		t calc	T critical		
	Estimate	SE	Estimate	SE	t value	0.05	0.01	0.001
Need Characteristics								
Health status								
Very good	-0.6046	0.2988	-1.3707	0.2791	1.87368	1.97	2.6	3.34
Good	-0.6382	0.2641	-0.4636	0.2322	-0.4965	1.97	2.6	3.34
Activity limitations								
Limits in 1 to 2 ADLs	0.1599	0.2881	0.2196	0.266	-0.1522	1.97	2.6	3.34
Limits in 3 or more ADLs	0.1935	0.3217	0.1033	0.2599	0.2181	1.97	2.6	3.34
Limits in 1 to 2 IADLs	-0.2808	0.3014	0.0794	0.3065	-0.8379	1.97	2.6	3.34
Limits in 3 or more IADLs	0.2102	0.307	0.2124	0.317	-0.005	1.97	2.6	3.34