AN ABSTRACT OF THE DISSERTATION OF

Alana D. Knudson-Buresh for the degree of Doctor of Philosophy in Public

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<u>Coverage and</u> Health Care Utilization in North Dakota.

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Chunhuei Chi

Access to health care in North Dakota, a frontier state, has been a widely

debated policy issue. Historically, the focus of North Dakota health policy efforts

has been directed to issues pertaining to the provision of health care services.

During the economic recession of the 1980s, an out-migration of North

Dakota residents left the state with a smaller population in 1990 than it had in

1930, the only state to experience this population shift. In response to these

demographic shifts, the North Dakota Health Task Force was formed to develop

a health care reform strategy that addressed geographical and financial health

care access issues. Over 2,000 North Dakota families were surveyed to provide

the Task Force and other policy makers with information about North Dakota

residents' health insurance coverage and health care utilization.

The purpose of this research was to examine what variables impact

access to health insurance coverage and utilization of health care services in

North Dakota. Three access areas were addressed: financial, geographical and

cultural. To examine financial access, health insurance coverage was

examined. Among the non-institutionalized ND residents, the greatest proportion

of uninsured were young adults; although, all North Dakotans were found to be

at risk. The health insurance findings mirrored many other studies' findings in which males, part-time workers and rural dwellers were the most likely to go without insurance. In addition, health insurance appears to serve as a gatekeeper for obtaining health care services. A surprising finding was that geographic barriers were not a hindrance to obtaining health care. Yet, Native Americans covered by Indian Health Service were less likely to obtain health care than the uninsured indicating there may be some cultural barriers for this population. Other findings included: the uninsured go without health care and report lower health status more frequently than the insured; poverty level is positively correlated with health status; among those with no regular source of health care, the insured report they do not need health care while the uninsured report they cannot afford it. Comparisons of rural and urban dwellers also are included in the analyses.

A Study of Health Insurance Coverage and Health Care Utilization

in North Dakota

by

Alana D. Knudson-Buresh

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Alana D. Knudson-Buresh, Author

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Soli deo gloria!!

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CHAPTER I

INTRODUCTION

1.1 Introduction

Access to health care services continues to be a hotly debated health

policy issue at the federal and state levels. Policy makers strive to understand

the factors that could be altered through policy actions to improve accessibility to

health care which is assumed to achieve the desired outcome of improving

health status. Yet, after over 30 years of debate, the seemingly simplistic

concept of access continues to elude policy makers and has evolved to become

a complex construct (Ricketts, Savitz, Gesler & Osborrne, 1994).

Underlying most social and political goals are the assumptions that

improved access to health care leads to improved health status (Patrick, Stien,

Porta, Porter & Ricketts, 1988). However, the major health status advancements

for the general population during this century can be primarily attributed to

improvements in living standards, diet, and sanitation rather than through health

care (McKeown, 1976). Yet, many health problems such as heart disease,

cancer, diabetes, and addictive disorders remain unsolved. Providing health

care to people and reducing social inequalities in both access and health status

are major challenges for our country.

A large group of citizens are without health care coverage and are generally at the low end of the income scale (Millman, 1993). This group also makes contact with medical providers about half as much as those with health insurance coverage. Millman concluded that "indicators that measure health outcomes suggest that for people from low-income neighborhoods the difference in health care use has a profound impact on their health and well-being" (p.3). For example, one of the Healthy People 2000 goals includes a goal of providing equal access to preventive and other health care services for all Americans (Centers for Disease Control, 1991). The complexities of operationalizing this goal becomes apparent when defining "equal access". Equal access to some means the guaranteed availability of health care services while to others it means insuring equal use for equal needs (Lewis, Fein, & Mechanic, 1976). This interpretive distinction impacts the way in which resources are allocated and ultimately who has entry to the health care system.

Concern about the accessibility to health care services for rural Americans has existed for decades. An extensive body of literature has documented the difficulties faced by rural hospitals and other providers and found that rural Americans often lack access to basic health care services (National Rural Health Association, 1994; Office of Technology Assessment 1990; Prospective Payment Assessment Commission, 1991; Rural Policy Research Institute, 1994). A variety of elements contribute to the decline in rural health care access including: a dwindling population; economic stagnation; shortages of physicians and other

health professionals; a disproportionate number of elderly, poor, and underinsured residents; and high rates of chronic illness.

Historically, rural has been defined as nonmetropolitan counties or counties that do not meet the Metropolitan Statistical Area (MSA) criteria. Although rural communities are distinguishable from their urban counterparts by the demographic and socioeconomic status of the population, intrarural differences have become more significant necessitating greater precision in the definitions used to distinguish rural areas (Office of Technology Assessment 1989). "Frontier counties" describe the most sparsely populated of all rural areas as counties with fewer than six people per square mile. Sixteen percent of the nation's 2,443 rural counties have been identified as frontier, accounting for 45 percent of the total land area in the United States (Ricketts, 1994). The majority of frontier counties are located in the Great Plains, the West and Alaska. Thirty-five of North Dakota's 53 counties are frontier counties and three counties have been designated as MSAs. North Dakota has an average of nine people per square mile; the US has an average of 69 people per square mile.

Rurality impacts rural residents' health insurance coverage and health status. Compared to urban residents, rural residents were less likely to have any private health insurance and somewhat more likely to have public health insurance (Braden and Beauregard, 1994). In addition, they tended to report lower health status than their urban counterparts and have more physical limitations. Rural living does not equate with better health.

A common assumption made about people living in sparsely populated areas is that they have limited access to health services resulting in decreased health status (Moscovice, 1987). Many of the early studies comparing rural and urban populations indicated that chronic conditions were more prevalent among the rural population. The Robert Wood Johnson Foundation Special Report on Access to Medical Care (1987) reported that rural Americans, on average, received about the same amount of medical care as their urban counterparts. However, since the publication of that report, rural communities have lost population leaving them with a higher proportion of elderly than urban communities and a declining number of health care providers. The availability of adequate and affordable health care for the elderly population is a major concern for rural areas.

The rural hospital has been the backbone in the delivery system of rural health care services. However, the health care system in rural America is changing rapidly due to significant social and economic changes taking place in rural America and in the larger health care system. In many rural and frontier communities local hospitals have been unable to respond to the pressures created by these changes. Hospital closure is often the result of a provider's inability to respond to environmental changes. Between 1990 and 1994 North Dakota lost five rural hospitals to closure -- a 10 percent reduction in hospitals. Four of these hospitals were classified as frontier hospitals. There is a growing perception that more rural and frontier hospitals are threatened and their demise will result in the loss of health care access to those who are most geographically

challenged. Yet, it is questionable if many of these facilities are functioning as full service hospitals.

Since the 1980s, North Dakota has sought to increase the availability of health care to its rural citizens. The state joined the Primary Care Cooperative Agreement program, a grant program assisting rural states in recruiting primary care physicians and mid-level practitioners (UND School of Medicine, 1996). In 1991, the state legislature established a program, the Physician and Mid-Level Provider Loan Repayment Program, to support local communities' recruiting efforts of primary care health professionals to underserved areas in the state (North Dakota Department of Health, 1995). This program provides medical education loan forgiveness of up to $40,000 for a physician and $20,000 for a mid-level provider. The state partners with the local community recruiting the health care professional and contributes half of the loan repayment.

The focus of research and policy efforts in North Dakota has centered on the issues pertaining to the provision of health care services. No follow-up research has been conducted to evaluate the outcomes of policy initiatives, such as the Physician Loan Repayment Program, on the health status of North Dakotans or access to health care. Yet, one of the health care issues identified by the North Dakota Health Task Force, appointed by the North Dakota State Health Council in 1990 to develop a health care reform strategy for the state, was geographic access to health care services. This task force was appointed in response to the out-migration of residents during the economic recession of the 1980s which decreased the population of the state to less than the 1930

population, the only state in the country to experience this population shift. State policy makers recognized that any efforts to save the declining state had to include health care reform.

The Robert Wood Johnson Foundation (RWJF) State Initiatives grant was secured by the North Dakota Health Task Force in 1992 to help support its efforts in mapping a course for health care reform for the state. As part of the RWJF State Initiatives Program, North Dakota was one of 10 states selected to participate in the RWJF Family Survey developed in collaboration with RAND and the Health Task Force. This survey was the first comprehensive survey that examined health insurance coverage, health status, and health care utilization in North Dakota.

1.2 Statement of the Problem

The purpose of this research was to examine what variables impact access to health insurance coverage and utilization of health care services in North Dakota. This research will help guide policy makers in allocating resources efficiently and effectively to expand access to health care. It will also help to determine who the uninsured are as well as identify unique characteristics of this population. In addition, population characteristics impacting health status and health care utilization will be identified. Therefore, the following objectives were developed for this study:

1)   Determine who are the uninsured in North Dakota.

2) Determine if there is a difference in health status among North Dakota subgroups.

3) Determine if insurance status impacts utilization of health care services.

4) Determine if insurance status impacts having a regular source of health care.

5) Compare characteristics of subgroups' utilization of ambulatory and hospital care.

Based on the stated objectives, the following study questions were developed:

Study Question 1: Why are North Dakotans uninsured?

Study Question 2: Is there a difference in the reported limits of activity between the insured and uninsured North Dakotans who are under 65 years of age?

2HO1: The proportion of reported limits on usual activity is equal among insured and uninsured under 65 years of age.

2HA1: The proportion of reported limits on usual activity is higher among the uninsured than the insured under 65 years of age.

2HO2: The proportion of reported limits of physical activity is equal among the insured and the uninsured under 65 years of age.

2HA2: The proportion of reported limits of physical activity is higher among the uninsured than the insured under 65 years of age.

Study Question 3A: Is there a difference in reported health status among non-elderly adults based on poverty levels in North Dakota?

Study Question 3B: Is there a difference in reported health status between the insured and uninsured non-elderly adults in North Dakota?

3AHo: Among the non-elderly population, there is no difference between reported health status among North Dakotans with different poverty levels.

3AHA: Among the non-elderly population, the proportion of respondents reporting excellent or very good health increases with reported poverty level.

3BHo: Among the non-elderly population, there is no difference between reported health status between North Dakotans who are insured and uninsured.

3BHA: Among the non-elderly population, a greater proportion of insured North Dakotans report excellent or very good health status than uninsured North Dakotans.

Study Question 4: Is there a difference in characteristics between North Dakotans who reported receiving and not receiving needed emergency and non-emergency health care services?

4Ho1: The proportion of insured respondents (with private health insurance and public health insurance) who report they needed emergency health care but did not obtain it is the same as the proportion of uninsured respondents who report they were unable to obtain needed emergency health care.

4Ho2: The proportion of respondents who report they needed emergency health care but did not obtain it is equal among those with private health insurance, public health insurance and the uninsured.

4Ho3: The proportion of people with health care coverage who report they needed non-emergency health care but did not obtain it is the same as the proportion of uninsured people who report they were unable to obtain needed non-emergency health care.

4Ho4: The proportion of respondents who report they needed non-emergency health care but did not obtain it is equal among those with private health insurance, public health insurance and the uninsured.

Study Question 5: Is there a difference in satisfaction with health care services between North Dakota's insured and uninsured?

5Ho1: The proportion of insured is equal to the proportion of uninsured who reported satisfaction with health care services.

5HA1: The proportion of insured who are satisfied with health care services is higher than the proportion of uninsured who are satisfied with health care services.

Study Question 6: Do people with health insurance coverage and people without health insurance coverage report having a regular place they receive health care?

6Ho1: The proportion of insured and uninsured North Dakotans who report having a regular place they receive health care is equal.

6HA1: Insured North Dakotans report more frequently than uninsured North Dakotans that they have a regular place they receive health care services.

Study Question 7: Why do some North Dakotans not have a regular source of health care?

Study Question 8: Is there a difference in characteristics among North Dakotans' utilization of health care services?

8Ho1: There is no difference in characteristics among non-elderly's utilization of health care services.

8HA1: There is a difference in characteristics between insured and uninsured North Dakotans' utilization of health care services.

8Ho2: There is no difference in characteristics among elderly's utilization of health care services.

8HA2: There is a difference in characteristics among elderly's utilization of health care services.

1.3 Limitations of the Study

1. The scope of this study is limited to the North Dakota population.

2. This study is a cross-sectional study which is weak in producing evidence of causal relationships. This study design can only infer causal relationships; causal relationships cannot be proven.

3.   Only one person (the respondent identified by the interviewer as the person who knew the most about the family's health care utilization and health care coverage) was interviewed per household; therefore, one person served as the spokesperson for the entire household.

4.   While it is recognized that there are numerous reason why people have health insurance coverage and why they choose to use or not use various health care services, this study was restricted to those reasons listed on the survey questionnaire. Respondents were provided with an "other" category for most questions.

1.4 Definitions

For the purpose of this study the following terms are defined.

Chi-square: A nonparatmetric test used with frequency data to determine if the data from two or more mutually exclusive categories are similar.

Frontier county: A country with six or less people per square mile.

Likert Scale: A survey instrument that asks individuals to respond to a set of questions based on an ordinal scale.

Logit regression: A procedure that allows one to assess the nature of the relationship between a binary variable and multiple predictor variables.

Medicaid (Title 19): Enacted by Congress in 1965 to finance health care services for the poor.

Medicare (Title 18): Enacted by Congress in 1965 to finance health care services for the elderly.

Multiple regression: "A procedure that allows one to assess the nature of the relationship between a single criterion variable and multiple predictor variables" (Hatcher and Stepanski, 1994).

Odds ratio: "The probability of occurrence over the probability of nonoccurrence" (Munro & Page, 1993).

P-value: "The probability of obtaining a result as extreme as or more extreme than the one observed" (Dawson-Saunders, p. 93.)

Private health insurance: Health insurance purchased in the private insurance market such as employer based insurance and individual health insurance.

Public health insurance: Health insurance coverage provided through the government such as Medicare, Medicaid, Indian Health Service, and Champus.

Rural counties: Generally considered to be counties that do not meet the criteria to be considered Metropolitan Statistical Areas (MSAs). However, in North Dakota, 49 counties of the 53 counties are considered to be rural counties because they do not have a regional trade center.

CHAPTER 2

REVIEW OF LITERATURE

Most people care about their health and what determines their health status. Although some people choose behaviors that are detrimental to their health, most people strive to enhance their health. Individuals, families, communities, states, and entire nations attempt to improve or maintain their health through legislation, education, environmental modification, behavioral change, and health care services.

The majority of people enjoy good health; however, many people experience times throughout their lives when health cannot be maintained. Factors such as disease, injury, genetics, lifestyle choices, poverty, and stress may cause health to decline. When health declines, people often turn to health care - a collection of personnel, facilities, goods and services (Patrick and Erickson, 1993). Health care serves a number of different functions: prevents disease through screenings; determines extent of disease or injury through diagnoses; cures diseases; relieves pain and discomforts; and provides palliative care when all other avenues are exhausted and there is little hope in finding an effective treatment. Evans (1984) points out that health, as a status rather than health care as a commodity, has value to its users.

The pervasive expectation of health care is that it will enhance health status and improve one's quality of life. This expectation is operationalized in the willingness of the United States, Canada and many other western nations to

devote a continually increasing proportion of their economic wealth to health care. The Health Care Financing Administration estimates that by the year 2000 the United States will spend almost $2 trillion annually on health care, or over 16 percent of the gross national product (GNP). In the United States, more resources are allocated to health care than on either education or national defense. Clearly, health care is highly valued the United States.

The value of health care to the society at large becomes an issue of policy. As funding of health care services continues to consume a greater and greater portion of our country's resources, there is an increasing concern among many health care policy experts that vulnerable populations in our country may not have "access" to health care services. The following sections address the fundamental policy issues that pertain to the distribution of health care services and its impact on health status.

2.1 Values Framework

The values underlying policy debates about how to improve access to health care historically have focused on the principles of social justice, or equity, that justify societal assurances of a right to health care (Aday, 1993). Social justice (or equity) is not a matter of preferences but is rather an issue of fairness. Social justice is derived from a set of principles concerning what a person ought to have as a right. Culyer (1980) states, "the whole point of making a judgment

about justice is to frame it so that it is (and can be seen to be) a judgment made independently of the interests of the individual making it" (p. 60).

Social justice is a goal pursued by many policy makers in various types of health care systems. Although differences arise in the distributional objectives in striving for social justice, there are a number of philosophical paradigms that contribute to the body of social justice theories.

Gillon (1986) summarized the following two philosophical theories of social justice which serve as the primary foundations for health policy:

- Libertarians emphasize respect for natural rights, focusing in particular on two of Locke's natural rights: the rights to life and to possessions. According to this viewpoint, health care is delivered in the private sector and is rationed by a willingness or an ability to pay for health care. The United States health care system is based on this ideology.

- Egalitarians view health care as a right; health care utilization ought not be influenced by income or wealth. Payments for health care are positively related to ability to pay; people who are able to pay more towards health care should do so. The British National Health Service is an example of this veiwpoint.

These theories include the concept of one 'good', health care, to be allocated through a redistribution using a single principle. However, disagreement arises in the way health care services are distributed.

Wagstaff and Doorslaer (1993) suggest that distributional objectives in social policy, and in health care, can arise from two sources: equity (social

justice) and altruism (caring). These two concepts are often confused and, as Culyer (1980), Goodin and Le Grand (1987) emphasize, they are quite distinct and have quite different implications for health policy.

Caring and altruism pertain to preferences. A caring person might be one who derives utility - e.g., an external benefit - from seeing another person receive health care (Culyer, 1980). In this example, the caring person prefers that the person in question receives health care and is prepared to sacrifice resources to ensure that the person actually obtains treatment. Mooney (1986) suggests that a caring individual might be one that derives utility from the act of providing or giving health care to others. The principal issue for both types of caring people is that "costs and benefits are balanced at the margin and... the level of provision ... is determined by the wealth of the community" (Culyer, 1980, p. 70). Pareto-optimal redistribution is a term used by economists to describe this act of giving.

Pareto-optimal redistribution is only possible if one individual experiences some benefit from giving to another individual - e.g., donations to the Red Cross (Pearce, 1994). Welfare economics is traditionally based on the Pareto principle which requires a change to make at least one person better off and no one person worse off before it may be regarded as an improvement. The basic assumptions underlying welfare economics are value judgments; they provide the context for the development and implementation of health policy in the determination of the level of "access" citizens should have to health care services. However, before any health policies can be developed to address

access to health care, policy makers must agree upon a common definition of access to health care which has proven to be a difficult task.

2.2 Access

The concept of "access" is a significant issue in health care policy and although it is frequently used when discussing health care services, there is no formalized conceptual or empirical definition of "access" (Penchansky and Thomas, 1981). However, Aday and Andersen (1974) developed a framework for the study of access to health care, General Health Systems Model, that has become the quintessential model used in health care access research. This model is based on the view that health policy is "designed to affect characteristics of the health care delivery system and of the population at risk in order to bring about changes in the utilization of health care services and in the satisfaction of consumers with those services" (p. 208). This framework follows a process that defines the health policy objective, assesses the characteristics of the health care system and of the populations at risk, and evaluates the outcomes or outputs.

The health policy component of this model is the basis for the "access" concept (Aday and Andersen, 1974). Health policies may include issues related to financing, education, health care professional availability or health care system reorganization as the objective. The effects of the implementation of health policy is primarily what policy makers are interested in evaluating.

The characteristics of the health delivery system component of the model include two elements – resources and organization (Aday and Andersen, 1974). Resources are the labor and capital required to produce health care services; whereas organization describes what the system does with its resources. This component requires analysis of the entire health care delivery system.

Aday and Andersen (1974) designed the characteristics of the population at risk component to describe the individual determinants of health care utilization. This component includes three elements: predisposing; enabling; and need.

- The predisposing element includes variables that describe the "propensity" of individuals to use health care services. These variables are present prior to the onset of an illness episode. They include demographic variables such as age, gender, race, religion, in addition to values and beliefs concerning health and illness.

- The enabling element describes the "means" individuals have available to them for the use of health care services. These resource are specific to the individual and his or her family, such as income or health insurance coverage, and attributes of the community such as being rural or urban.

- The need element refers to how healthy or ill the person is. Need can either be perceived by the individual or evaluated by the health care provider.

Implicit in the access concept is that some people have more or less access to health care than others. Health care policy makers must evaluate what elements in this component can be "manipulated" or influenced to increase access.

Utilization of health care services is one way that policy makers can evaluate the effectiveness of health policies targeted to improving access (Aday and Andersen, 1974). The level and pattern of the population's health care utilization is a measure that tests how different groups in the population, such as children, are positively or negatively effected by the policy. Health care utilization measures include the number of hospitalizations, emergency room visits, and ambulatory care visits. A time interval, for example one year after policy implementation, is required to determine policy effectiveness.

Consumer satisfaction also is an outcome of health policy (Aday and Andersen, 1974). This component measures users' satisfaction with the quantity or quality of the health care he or she received. Other dimensions of consumer satisfaction can be obtained such as the coordination of the health care system, the cost of health care services, and how much information was provided by the health care provider.

The General Health Systems Model is a clearly defined framework that assists policy makers in designing policies that meet policy objectives. However, the difficulty in defining health policy objectives targeted to health care access is attributable to the myriad of "access" interpretations. Some authors equate access with guaranteed entry into the health care system while others use the term to insure equal use for equal need (Lewis, Fein, & Mechanic, 1976). Other authors equate access with entry into or use of the system; an examples is "... the first barrier to access" (Fox, 1972).

Equity in access to health care is a substantially different goal than equity in health status. Equal access does not always imply equal health outcomes; it cannot be assumed that medical care is always effective (Levine, Elinson, and Feldman, 1983). Most European countries are committed to assuring all citizens have access to health care (Hurst, 1991). In many countries it is clear that access to and receipt of health care should depend on need, rather than on ability to pay. In some countries, such as Great Britain, equal access to health care implies a minimum level of health care services that are accessible or available to all people.

The United States employs a somewhat fragmented policy approach to assure access to health care; a minimum standard of health care is provided to the very poor through Medicaid and a generous package of health care services are available to the elderly through Medicare. The balance of Americans, the vast majority of Americans, receive their health insurance coverage as an employment benefit or by purchasing their own coverage in the individual insurance market. A growing minority, or about 35 million US residents, are without health insurance due in part to employers opting not to offer health care benefits (Millman, 1993).

Employees not provided with insurance are primarily low wage earners. The "working poor" are unable to pay for health insurance out of pocket; thus, the worker and his or her dependents remain uninsured. In addition, pre-existing clauses in most health insurance carriers' policies and under many managed care plans exclude people with a history of illness or serious injury. These

people may be denied coverage or offered coverage at such exorbitant rates that the coverage is unaffordable. Although health care was a major issue in the 1992 presidential election, Americans have not demonstrated a strong enough political will to provide health care to all citizens regardless of ability to pay. Thus, what constitutes an adequate level of health care services and the social obligation to provide it has not and is not easy to identify or negotiate (Patrick et al., 1988).

The United States continues to favor a market oriented approach or a libertarian approach whereby health care services are offered through the private sector to those who are willing and able to afford the cost of those services. For the majority of Americans, third-party payers (e.g., private health insurance received through employment or Medicare) have insulated the consumer from the cost of health care services by reimbursing providers for the full amount or a large percent of the charges. However, as the demands for health care resources become more burdensome on the country, Congress is shifting responsibility to the states for their leadership in determining an "appropriate" and financially feasible level of health care services that meet the unique needs of each state. Recognizing this responsibility shift, the Robert Wood Johnson Foundation (RWJF) developed the State Initiatives Program to support states that were taking a lead in developing health care reform strategies. The intent of the program was to gather information about participating states' various health care strategies which then could be used as models for the rest of the nation.

North Dakota was selected as one of the original 12 states to receive funding in support of developing health care reform strategies.

The North Dakota Health Task Force, appointed by the State Health Council in 1990, was charged with developing a North Dakota health care reform strategy that would address the issues of health care costs and access. The Health Task Force submitted the original grant application which outlined a plan for the development of an all-payer rate setting system, a system that sets uniform charges for health care services paid by all payers of health care. All payers, public and private, pay the same rate for services. An all-payer rate setting system has been used for long-term care in North Dakota since the mid-1980s. Included in the grant application was a global budget to determine rates with the intent of generating a small surplus which would be used to either cover the cost of health care for those who were uninsured or provide a fund that would be used to purchase health insurance coverage for the uninsured. After the RWJF grant was secured in 1992, a geographic access component was added. Therefore, North Dakota made a commitment to develop a health care strategy that addressed both geographic and financial access issues.

Examining more than one concept of access to develop health policy is suggested by some researchers. Penchansky and Thomas (1981) pointed out that a single concept of access could not be used to measure the factors that showed more consistent correlation in empirical studies of access. Those factors include: availability, accessibility, accommodation, affordability, and

acceptability. However, attempting to qualify access also lends itself to fragmentation.

The policy debates about rural health care access have focused on the perception of increased need and decreased access to health care services in rural communities (Patrick et al., 1988). Some of the legislation enacted by Congress have attempted to increase the availability of medical services to rural residents (Seiss, 1989). One example of federal legislation is the Rural Health Clinic Services Act that intended to increase access to primary care in rural areas by designating rural health clinics (RHCs) in areas that were determined to be health care professional shortage areas. However, the act has been under scrutiny by the Health Care Financing Administration because of the accelerated growth in the number of RHCs and associated increase in Medicaid and Medicare expenditures (Office of the Inspector General, 1996). All RHCs are reimbursed on a cost basis by Medicaid and Medicare increasing the amount of reimbursements to RHCs. The Office of the Inspector General has found that many RHCs fail to improve access to primary health care in rural areas due to the following issues: some communities have more than one RHC; no additional health personnel or services offered after certification; and some RHCs are located in communities that are no longer considered health care professional shortage areas or underserved.

North Dakota providers have taken advantage of this reimbursement mechanism as well. In January 1997, 73 RHCs served 71 communities; yet, only one RHC was a new provider, the other 72 RHCs were fully operational

clinics prior to their RHC designation (North Dakota Department of Health Rural Health Clinic Report, 1997). Muus (1997) reported that many of the North Dakota RHCs remained open because of the enhanced reimbursements of Medicare and Medicaid. It may be that RHCs have not so much expanded access to primary health care in rural North Dakota but rather, RHCs have sustained access.

North Dakota also has attempted to enact legislation to increase the availability of health care in the state. One program, the Physician and Mid-Level Repayment Program, was developed to support rural communities attract physicians and mid-level practitioners by paying part of their school loans. Yet, based on the physicians and mid-level practitioners who have participated in the program, it is questionable if this program had any impact on their decision to practice in the rural communities. A thorough evaluation of the program is necessary to determine its efficacy in attracting health care providers to rural areas and ultimately how it contributes to increasing access to health care.

The following sections discuss the four areas that must be considered when determining accessibility to health care: geographic access; financial access; cultural access; and other access issues.

2.2.1 Geographic Access

Analyzing access is complex, encompassing many interrelated factors and barriers (Ricketts et al., 1994). A geographic or spatial analysis of access

tends to focus specifically on access in terms of availability (location of consumers and points of medical care delivery as well as distance traveled). Aday and Andersen (1974) make a distinction between geographic and socio-organization access, whereby geographic accessibility refers to the 'friction of space' that is a function of the time and physical distance that must be traversed to get care and socio-organizational attributes include all those attributes of the resources, other than spatial attributes, that either facilitate or hinder the efforts of the client to obtain care. Spatial availability (distance to care) in rural communities tends to depict access more comprehensively than other factors because geographic distance factors outweigh other factors such as income, education, illness and values and beliefs (Joseph and Bantock, 1982; Thouez, Bodson and Joseph, 1988).

Distance to health care, especially in a frontier state such as North Dakota, is an important issue in the delivery of health care services and is known to be a barrier to access (Donabedian, 1973; Joseph and Phillips, 1984). Distance to care has been used to measure access and availability as well as a factor in the study of health care utilization (Joseph and Phillips, 1984). Hospital service areas are usually constructed using patient residence data or using a radius (e.g., 21 mile radius to approximate a thirty minute travel distance) to define a population base (Wright, 1990). Distance has been shown to be an important factor in utilization as well (McGuirk and Poreell, 1984). Please refer to the health care utilization section for discussion of this topic.

Joseph and Phillips (1984) examined the various measures of distance - travel time, linear distance, and road mileage - and expanded the concept of geographic accessibility to include location (physical proximity) and effective accessibility (dependent upon a facility's availability - office hours - and whether a person is able to use the facility based on his or her time and budget. Moreover, an issue that has greater importance to rural residents is that of perceived distance. For example, many rural residents are accustomed to traveling long distances, so a 60 mile trip may not be perceived to be long whereas an urban resident may view the trip as excessive. Consumers of health care services are likely to act upon perceived rather than real distances (Winter, 1986).

Proximity indicates that people will use services that are located nearest to them. Schematics have been developed using this concept to estimate different travel distances for varying levels of health care services. The relationship between distance and the type of health care service is dependent upon the type of service and varies by subgroups of the population as well as other factors such as race, age, income, education and other patterns of service consumption (e.g., shopping behavior, work and recreation paths) (Meade et al., 1988). In general, consumers are willing to travel longer distances for specialized services (e.g., cardiac surgery, cancer treatment and organ transplants) than for routine services (e.g., immunizations, physicals, well-baby care) (Ricketts and Savitz, 1994).

One of the major issues when examining geographic access to health care services is the need for a population base that can sustain health care services. After the out-migration of the 1980s, many of North Dakota's communities could no longer sustain resident physicians. Satellite clinics, affiliated with regional health care centers, have replaced solo practitioner clinics that have all but disappeared. More than 80 percent of North Dakota's physicians are members of group practices. Joseph and Bantock (1982) found that policies to increase the number of physicians in hopes of providing physician services in much needed areas - inner cities and rural communities - actually increased the number of physicians practicing in urban areas. In essence, the Rural Health Clinic Act has contributed to this phenomenon because RHCs must be affiliated with a hospital. The hospitals most often receiving the RHC designation are regional health care centers. Therefore, the physicians and mid-level practitioners who provide health care services to the RHCs are usually based in these regional centers increasing the number of physicians in "urban" North Dakota.

2.2.2 Financial Access

Access to health care services is greatly dependent upon financial resources. For most Americans, health insurance pays the majority of the costs associated with health care. Historically, health insurance has been linked to employment. Wages were frozen during World War II so employers used

various types of "fringe benefits" to maintain a stable labor force (Reinhardt, 1993). The most extensively used benefit during this time was providing health insurance to employees. Because employer contributions to their employees' health insurance plans were not part of the employee's taxable incomes, employers were able to increase employees' compensations while maintaining frozen wages. Employers' contributions to their employee's health insurance continues to be tax-free today (Feldstein, 1993). Approximately 33 percent of all health care spending has been paid by private employers providing health insurance to their employees (Reinhardt, 1993).

The effect of tax-free employer-purchased health insurance is a greater demand for insurance than if the employee had to pay for such coverage with after-tax dollars (Feldstein, 1993). Employees, insured through their employer, may opt to spend their earnings on other goods if given the opportunity to do so. Yet, purchasing health insurance with taxed dollars in the individual health insurance market is usually more expensive than purchasing with an employer group. In addition, individuals purchasing care for themselves or their families may be denied health insurance coverage due to pre-existing conditions such as illness or injury.

Employers will continue to "provide" health insurance benefits to maximize their firms' profits given the following conditions remain priorities for firms: improving labor productivity; avoiding disruptions to production due to illness; reducing turnover; and attracting high quality employees. Large employers, who employ over 99 employees, are at the greatest advantage for purchasing health

insurance for their employees due to their ability to purchase coverage at a discounted rate. Insuring a large employee group will drive down the cost of insurance per employee or per family covered. In contrast, small employers, firms with less than 25 employees, incur the highest cost per employee or per family covered. Therefore, employees of small firms are the least likely to be covered by employer health insurance plans (Long and Marquis, 1993).

Most employees want to receive their health insurance through their employer. As previously mentioned, purchasing health insurance through the individual insurance market is considerably more expensive than group coverage. It also is difficult to purchase health insurance if one (or a member of one's family) has any pre-existing conditions. Moreover, the costs to the individual are considerably higher than employer sponsored health insurance because the dollars used to purchase the health insurance are the employee's taxed dollars. Reinhardt (1993) argues that health insurance should not be thought of as a fringe benefit given to the employee by the employer, but rather as part of the employee's total compensation package (e.g., wage + benefits = total compensation). Because so many individuals and families have health insurance through their employers, researchers studying financial access to health care examine the variables that differ between employees and employees' families who are insured and uninsured. These differences may be attributable to many differences such as educational level, number of hours worked, firm size, length of employment, and number of employers.

Self-employed people are at a disadvantage when it comes to purchasing health insurance coverage because their health insurance premiums are not 100 percent tax deductible like those purchased by employers for employees. In addition, the self-employed pay more for their premiums than those enrolled in group plans and the cost of their premiums are rated according to age, gender, health status and occupation. Rural residents, who are often self-employed or are employed by employers of small firms, are less likely to have health insurance than their urban counterparts (Braden and Beauregard, 1994). Yet, health insurance is only piece of the financial access puzzle.

Many people find it difficult to gain access to needed health care primarily due to cost. People whose income is below the poverty level, the working poor, and people with chronic illnesses - especially the uninsured - find it very difficult to obtain health care services regardless if they are rural or urban dwellers (Patrick and Erickson, 1993). If insurance does not cover conditions or needed services, people with higher incomes may also experience difficulties in obtaining care. For example, many insurance companies refuse to cover treatments deemed as experimental. The person who requires the treatment has to pay out-of-pocket for all the costs associated with the treatment; many high tech treatments cost thousands of dollars. Thus, financial access is a potential barrier for most Americans.

People who qualify for Medicaid encounter numerous barriers to receiving health care although Medicaid is intended to provide health care to the nation's most vulnerable population. However, receiving health care services can be

most difficult if not impossible when providers refuse to take Medicaid patients.
The Physician Payment Review Commission found that in 1993, about a third of
physicians who were accepting new patients were not accepting new Medicaid
patients, uninsured patients, or patients insured through capitation. A health
economics survey of 442 physicians found that more than a third refuse to
accept Medicaid patients, citing low reimbursements as well as nonfiscal factors
such as hassle, malpractice risk, bureaucracy and/or perception that these
patients are more demanding and less compliant (Friedman, 1994).

Access is even more difficult for Americans without any health care
coverage. The working poor are at a significant disadvantage in the American
health care system because their income disqualifies them for Medicaid and they
are often not provided health care coverage in their employment compensation
packages. Because the individual health insurance market 'cherry picks' young,
healthy males, purchasing health insurance for a family may be cost prohibitive.
The working poor are caught in a system that provides a safety net for society's
most impoverished and a system that subsidizes middle and upper income
families' health insurance benefits by exempting employer sponsored health
insurance benefits from employees' taxable income. Based on findings of the
North Dakota Behavioral Risk Factor survey, approximately 12 percent of the
state's adult population was uninsured in 1994 (North Dakota Department of
Health, 1995).

Lack of health insurance has been found to impact health care utilization
and health status. Many of the working poor delay seeking health care until their

conditions escalate to the point of requiring emergency room access with possible hospitalization - the most expensive health care services. Aday and Andersen (1984) found that 6 percent of the population reported they were unable to get health care when they needed it and 2 percent of US families were totally refused medical care for financial reasons. In addition, Hicks (1992) reported that lower income individuals have poorer health status than do higher income individuals. In 1988, only one quarter of individuals with incomes under $10,000 reported their health status as excellent compared to almost half of the individuals with incomes above $35,000. The proportion of people with low incomes who are uninsured has consistently been higher than those with high incomes.

Insurance status also appears to differ among rural and urban dwellers. Aday and Anderson(1984) found more rural dwellers to be uninsured than urban dwellers. Ricketts et al. (1994) also reported that rural residents were less likely than their urban counterparts to be insured, especially by private insurance. Many rural residents are employed in the agriculture industry, an industry that has historically not provided health insurance benefits. In addition, many rural residents are self employed and must purchase health insurance out-of-pocket with only a partial tax exemption. These issues coupled with higher incidences of disease and injury in the agriculture industry contribute to the cost of health insurance premiums which can make the purchase of health insurance cost prohibitive for rural residents.

Health insurance coverage has historically guaranteed access to medical care. However, different cost-sharing structures (e.g., co-payments, deductibles and co-insurance) have been shown to be a barrier. Newhouse (1981) observed during the RAND Health Insurance Experiment that cost sharing reduces utilization of health care services irrespective of need or benefit. Based on the finding that utilization was reduced through cost-sharing, many health insurance policies and managed care plans have implemented various cost-sharing mechanisms in an effort to curb utilization which control costs. Cost-sharing mechanisms have also been introduced in some Medicaid and Medicare programs in an effort to reduce utilization and ultimately reduce costs. Future research needs to examine the impact of cost-sharing on health status for both publicly and privately insured populations.

Unless there is a shift in the philosophical paradigm in the US, people will continue to encounter barriers to health care based on one's ability to pay. This libertarian approach to the distribution of health care does not appear to be changing in the short term. Failure to enact health care reform at the national and state levels is evidence that the US is unwilling to make a shift in this paradigm.

2.2.3 Cultural Access

There are numerous social and cultural access barriers to receiving health care. Yet, the greatest barrier to obtaining health care is directly related to one's

socioeconomic position. Evans and Stoddart (1990) observed that people who live below the poverty level suffer more illnesses and injuries than people that are above the poverty level even after adjustments for the effects of specific individual and environmental hazards. In addition, they identified the following attributes to be most closely associated with poverty: color and ethnicity (race); low educational attainment; and family status (female headed household). An on-going debate among researchers is whether poverty causes poor health or poor health causes poverty. It is clear these two conditions are indelibly linked.

A person of color may encounter barriers to health care regardless of his or her insurance status (Friedman, 1994). This problem is found in the presumably egalitarian Veterans Administration (VA) health care system whereby all veterans are entitled to health care based solely on their military service. Friedman (1990) notes that white VA patients receive more intensive services than their black counterparts. Although most studies examine the difference between black and white patients, there is evidence that Asian Americans, Hispanic Americans and Native Americans experience differences in the level of health care services they receive as compared to white Americans. Many providers neglect to understand the barriers of language and culture that may contribute to people's reluctance to use health care services or their compliance. However, there are some efforts being made to accommodate people's cultural beliefs by third party payers paying for "alternative" medicine, for example, providing coverage for Native American Medicine Men. Overall,

nonwhites are less likely to see a physician and are more likely to seek care in a government sponsored clinic than whites (Aday and Andersen, 1984).

2.2.4 Other Access Issues

Another issue that hinders access to health care services is that of disease status. Friedman (1994) argues that people with acquired immune deficiency syndrome (AIDS), and chronic physical and mental illnesses are disadvantaged in the health care marketplace. First, insurers are reluctant to cover people with these conditions and if they offer coverage, it is often at a price that is unaffordable. Second, regardless of the insurance status of the person, chronically ill people are less likely to receive physician care than the acutely ill (Hafner-Eaton, 1993). Third, the chronically mentally ill have historically received fewer services than the chronically physically ill. It is counterintuitive that a health care system establishes financial and nonfinancial barriers to those in greatest need of health care services - the chronically ill. Additional research is needed to examine the utilization patterns of "illness" care and "health" care.

Lastly, the inflexibility of the health care system creates barriers to care. In a competitive market, the seller accommodates the buyer; however, in the health care market the buyer (patient) often must accommodate the seller (health care services). Friedman (1994) cites one example where health care services are often unavailable on Sundays. This situation builds a barrier to those who work all week and keep Saturdays as Sabbath. For rural areas, there are few

primary care clinics that provide evening or Sunday appointments. Access to health care providers is a key barrier to rural dwellers.

2.3 Availability of Rural Health Care Providers

Traditionally, most people have based their access to health care or the availability of a hospital. Rural hospitals are a significant component of the health care system at the community level because of the access they provide to acute and emergency care as well as a number of other services (Berry and Beaulieu, 1994). In addition to providing services to the community, hospitals are also the largest or the second largest employer and are recognized as a vital part of the infrastructure required for economic development (Cordes, 1989).

Rural hospitals are defined as hospitals not located in counties within Metropolitan Statistical Areas (MSAs) and are nonfederal, short-term general hospitals. Rural hospitals are usually small; over 71 percent have fewer than 100 beds and 39 percent have fewer than 50 beds. Six Midwestern states -- Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota and South Dakota -- have a concentration of over 22 percent of all rural hospitals. Overall, rural hospitals are more common west of the Mississippi River. Forty-one of North Dakota's 46 community hospitals are categorized as rural hospitals.

Frontier hospitals, the most geographically remote rural hospitals, are primarily located in the Great Plains - North Dakota, South Dakota, Montana, Wyoming, Nebraska and Kansas - and the West. Berry, Shelby, and Seavey

(1988) defined frontier hospitals as "non-federal, general acute care facilities under 50 beds in rural counties with a population density of less than six persons per square mile" (p. 483). There are 268 hospitals that meet this definition, about 13 percent of the rural hospitals with less than 100 beds. These facilities are often the sole provider for large geographic areas with sparse populations. There are 19 frontier hospitals in North Dakota; yet, approximately one-fourth of frontier counties do not have hospitals.

The number of rural hospital closures increased substantially during the 1980s (US General Accounting Office, 1991), and rural closures have continued to occur in the early 1990s (Prospective Payment Assessment Commission, 1993). During the decade of 1981-1991, the number of rural hospitals dropped 12.4 percent while urban hospitals showed only a 4.2 percent decrease (American Hospital Association, 1992). In 1991, there were approximately 2,421 rural community hospitals. The early 1990s proved most detrimental to North Dakota as five rural hospitals closed between 1990 and 1994, a 10 percent decrease in the total number of North Dakota hospitals (Gibbens and Muus, 1994). However, future research must evaluate the types of health care services provided in rural hospitals to determine if they are serving the needs of the communities where they are located.

Based on a study of North Dakota's frontier hospitals, the majority of admissions were for Medicare patients whose conditions required respite care such as congestive heart failure and pneumonia. In addition, some of these hospitals were used as an extension of long term care with up to 90 percent of

patient days allocated for swing bed care (Knudson-Buresh and Chi, 1996). Swing bed care is a classification of care used by the Health Care Finance Administration for Medicare and Medicaid patients in rural hospitals who have exhausted their allotted number of acute hospitalization days but are not able to return to their homes or long term care facility are allowed 'swing bed' days in rural hospitals.

The number of physicians in North Dakota appear to be comparable to national rates of physicians per population (Rice, 1996). As mentioned previously, the concentration of physicians is in North Dakota's urban counties where regional health centers are located; however, these physicians provide health care services in 118 clinics which are dispersed across the state. In addition, telemedicine has begun to extend health care services to all parts of the state. This technology holds great potential for bringing specialized health care consultations to rural patients in their own communities.

Historically, public health has not provided acute health care services in North Dakota (McDonough, 1989). Because of a sentiment to downsize government and rely more on the private sector, traditional public health functions, such as immunizations, have been transferred to private medical providers where possible. The North Dakota Department of Health is currently engaged in a comprehensive strategic planning program to determine what role public health has in the twenty-first century.

2.4 Health Care Utilization

Many factors have been shown to impact health care utilization. Aday and Anderson (1984) found rural residents to be less apt to have an ambulatory visit than urban residents. This finding was supported in the 1988 National Health Interview Survey where urban residents reported having visited physicians 5.5 times per year compared to rural residents with 5.1 (Hicks, 1992). Likewise, a higher percentage of urban residents (77.2%) than rural residents (75.1%) had one or more ambulatory contacts during the year previous to the survey. In addition, rural residents were more likely to be hospitalized. This higher rate of utilization is attributed to their reported lower health status. Given the lower rate of ambulatory utilization and higher rate of hospital utilization, it appears that rural residents are delaying health care. The stresses of rural living take a toll on health status and the subsequent use of health care services.

Income levels also contribute to health care utilization. Low-income people have historically higher rates of ambulatory visits and hospitalizations compared to higher-income individuals (Aday and Andersen, 1984). People with public health insurance are more apt to have been hospitalized than those who have private insurance or are uninsured. This higher utilization of care is primarily attributed to this population's lower health status.

Patients who do not identify a regular source of medical care often rely on local emergency rooms and hospital outpatient clinics for their primary health care needs (Millman, 1993). However, emergency care lacks the continuity

required to deal with many medical problems. As the rate of uninsured has increased, there has been a decrease in the use of physicians' offices as a regular source of care over time shifting to hospital based clinics and emergency rooms (Aday and Andersen, 1984). A greater proportion of urban residents (19%) reported having a regular source of health care than rural respondents (15%) according to a 1986 Robert Wood Johnson Foundation survey. Overall, people who do not have a regular source of health care are less like to have an ambulatory care visit.

2.5 Summary

This chapter presented an overview of the literature regarding access to health care including information pertaining to health insurance coverage and health care utilization issues. As part of the State Initiatives Program, The Robert Wood Johnson Foundation funded the RWJF Family Survey which gathered data about families' health insurance coverage and health care utilization for 10 states including North Dakota. The intent of the survey was to gather data about health insurance coverage and health care utilization in an effort to provide baseline information for each state. This information would serve as the foundation for developing health care reform strategies. The RAND Corporation developed a set of core survey questions; each state had an opportunity to add state specific questions. The surveys were conducted in late

1993 and early 1994 by the Mathematica Corporation. The following chapters are based on the findings of the survey data collected in North Dakota.

CHAPTER 3

METHODOLOGY

3.1 Description of the Research Methods and Rationale

The data analyzed in this study were collected primarily for the Robert Wood Johnson Foundation (RWJF) State Initiatives Program; North Dakota was one of 10 states funded in this program. The objective of this program was to develop health care reform strategies that fit the unique needs of each state participating. The purpose for collecting the RWJF Family Survey data was to obtain information about each state's residents' health insurance status, use of medical services, and perceptions about the health care system. A cross-sectional household interview survey was used to collect the data.

3.2 Method of Data Collection

The target study population for this study was North Dakota residents. The study population consisted of the North Dakota civilian, noninstitutionalized population, with different rates of insurance coverage. People who resided in long-term institutional settings, such as nursing homes, dormitories, prisons or military barracks were excluded from this survey. The household, which included all persons living in a unit, was the unit screened from survey eligibility. Households were subsampled based on screening reports of the health

insurance coverage of their members. The family, defined to reflect the grouping typically used by insurance carriers, was used as the interviewing unit.

3.2.1 Sampling Method

Three domains were defined in determining the sample stratification. A stratum is a subgroup of the study population that can be identified on the sample frame and sampled separately; a domain is a subgroup that will be examined during the analysis (Hall, Strouse, Carlson, Stapulonis, 1994). The three primary domains include: non-Medicaid/Medicare insured; uninsured; and Medicaid beneficiaries. Only Medicaid beneficiaries could be treated as a sampling stratum because they could be sampled directly from the North Dakota Medicaid list.

Table 1

Person Domain

Domain	Frequency	Percent
Medicaid	2,057	33.6
Uninsured	1,820	29.8
Insured	1,955	32.0
Medicare	284	4.6
Total	6,116	100.0

Telephone interviewing included three frames: list of Medicaid recipients and two frames for general population screening. One general population frame consisted of telephone numbers published in telephone directories while the other frame consisted of all unpublished household numbers.

The 1990 Census block group data were used to stratify variables of income (correlated with insurance status) and proportion receiving Social Security (an indicator of Medicare). Households with Medicaid beneficiaries and the uninsured were oversampled and those with only Medicare recipients were undersampled.

Table 2

Household Selection Test

Selection Criteria	Frequency	Percent
Medicaid recipients from Medicaid list	2,377	38.9
Self-reported Medicaid recipients	348	5.7
Self-reported uninsured households	1,915	31.3
Self-reported insured households	1,386	22.7
Self-reported Medicaid SSI or Medicare	90	1.5
Total households surveyed	6,116	100.0

3.2.2 Sampling Procedure

The sample size for the RWJF Family Survey was approximately 25,000 families for all 10 RWJF State Initiatives states participating. The North Dakota component of the survey included 2,501 families representing 2,756 households. Of the 10 states, North Dakota had the highest response rate of 83 percent.

Table 3

North Dakota RWJF Family Survey Response Rates

Survey Type	Eligibility Rate	Screener Response Rate	Interview Response Rate	Overall Response Rate
Phone	.542	.913	.903	.824
Field	.111	.829	.992	.823
Combined	.512	.912	.907	.828

The number of families who completed the telephone survey was 2,371 which represents 2,625 households. The number of families who completed the in-person surveys was 130 which represents 131 households. These surveys yielded 6,116 responses.

The eligibility rate for North Dakota responders was the lowest of all 10 states. Because of the stratum specific responses required for the survey, 6,512 households were eligible out of the 12,725 households examined which yielded a 51.2 percent eligibility rate. North Dakota has a homogeneous population

which makes it more difficult to identify potentially uninsured households than in other states that have a heterogeneous population; therefore more households were reviewed to determine eligibility for the study.

3.2.3 Telephone Versus In-person Interviewing

Several studies have shown that by omitting households without telephones, survey estimates may be biased (Thornberry and Massey, 1988; Marcus and Crane, 1986; and Corey and Feeman, 1990). Telephone coverage may be inadequate for the uninsured population and Medicaid beneficiaries; yet, the insured population would have high rates of telephone coverage. In addition, Current Population Survey-based estimates indicate that the income of families including Medicaid recipients and uninsured people without telephones is lower than the income of those with telephones. Thus, to ensure we collected information from households with low income, in-person interviewing was used.

3.3 Data Collection Methods

A letter describing the purpose and sponsorship of the survey, confidentiality, and data collection procedures was mailed to each household sampled for the telephone component that had published telephone numbers and presented to respondents in households sampled for the nontelephone component. The letters were signed by North Dakota Governor Edward T.

Schafer and were mailed on his letterhead. The North Dakota Department of Health also was referenced in the survey introduction.

3.4 Survey Content

The survey questions were grouped in the following four areas: health insurance coverage; health care utilization and satisfaction; demographic information; and North Dakota specific questions. Nine modules were used to ascertain information for the four interest areas:

1)   Current insurance status variables;

2)   Last year's insurance status variables;

3)   Access to health care;

4)   Prior utilization of health care;

5)   Health status;

6)   Employment and earnings;

7)   Family income;

8)   Family mobility; and

9)   North Dakota specific questions.

3.5 Instrumentation

The survey instruments were designed in collaboration with RAND, The Robert Wood Johnson Foundation, and the North Dakota Health Task Force staff. Two versions of the survey were developed. A computer assisted

telephone interviewing (CATI) version was used to conduct telephone interviews and a field version (hard copy questionnaire) to conduct in-person interviews with the households without telephones. The CATI instrument program was designed to sample and enumerate households, from families within households, randomly select one child per family, and obtain all family and person level interview data. Any household member 18 years of age or older could complete the survey; however, family and person level data were obtained from the adult in each family most knowledgeable about the family's health care utilization and health insurance.

Mathematica Policy Research, Incorporated, (MPR) contracted to conduct all telephone and in-person interviews. The interviews averaged 25 minutes in length. A total of 25,674 family interviews by telephone and 1,463 in-person interviews were completed in the 10 RWJF State Initiative states. The North Dakota component included 2,371 family interviews by telephone and 130 in-person interviews conducted between November, 1993 and February, 1994. The response rate for the North Dakota survey was 83 percent, the highest of the 10 states.

All telephone interviewers completed training to conduct the survey and were assisted by interviewing supervisors. In addition, the telephone interviews were monitored by interviewing supervisors to minimize nonresponse and nonresponse biases resulting from interview bias.

The in-person interviewers, all of whom had previous experience listing, completed a two-day training session on data collection procedures. Prior to

conducting the in-person interviews, local police departments were notified of the study. Field interviewers were supervised throughout the data collection phase. To augment the response rate from the Sioux Indian reservations, a Native American interviewer conducted the in-person interviews.

Using the CATI survey, most errors were identified and corrected during the interview. The program accepts only valid codes for each questions and skips automatically to the net appropriate item. Range, consistency checks, and logical checks are built into the survey. These same procedures were applied to the in-person interview data.

3.6 Limitations of the Data

1.   The scope of this study is limited to a list of possible explanatory variables selected by the investigators.

2.   Only one person (the respondent identified by the interviewer as the person who knew the most about the family's health care utilization and health care coverage) was interviewed per household; therefore, one person served as the spokesperson for the entire household.

3.   While it is recognized that there are numerous reasons why people have health care coverage and why they choose to use or not use various health care services, this study was restricted to those reasons listed on the survey questionnaire. Respondents were provided with an "other" category for most questions.

4.   The study is restricted to the description of existing conditions in North Dakota.

3.7 Proposed Study Questions and Variable Selection

Aday and Andersen's (1974) General Health Systems Model was used as the basis for determining what variables were used in the analyses. Based on this framework, explanatory variables used in the analytical models included predisposing factors (e.g., socio-demographic status); enabling factors (e.g., income, health insurance coverage, and measures of accessibility such as regular source of health care); and health needs factors (e.g., self-assessed health status and self-reported health conditions).

The proposed study questions were analyzed using different statistical methods appropriate for the response to each question. The following paragraphs describe each of the study questions, hypotheses and the methods of analysis.

Study Question 1: Why are North Dakotans uninsured?

Study question one was analyzed using a logistic regression model. Uninsured respondents were asked to indicate why they were not covered by health insurance. Two dependent variables, private health insurance status and health insurance status, were used to examine the explanatory variables appropriate to each subgroup. (See Table 4.) The subgroups included:

children, employed adults (ages 18 - 64), unemployed adults (ages 18 - 64), and

elderly women.

Table 4
Definition and Measurement of Key Variables

Variables	Definition & Measurement	Scale
INSURED (Dependent Variable)	The reported current insurance status of each respondent who indicated they had private health insurance. 1=private health insurance coverage, 0=no private health insurance coverage	Dichotomous
COVERED (Dependent Variable)	The reported current insurance status of each respondent who indicated they had any type of health insurance. 1=insured, 0 =uninsured	Dichotomous
EMERGENCY VISIT (Dependent Variable)	The reported emergency care visit. 1=at least one emergency care visit, 0 = no visits	Dichotomous
HOSPITAL ADMISSION (Dependent Variable)	The reported hospital admissions. 1=at least one hospital admission, 0 = no admissions	Dichotomous
AMBULATORY VISIT (Dependent Variable)	The reported number of ambulatory visits during the previous 12 months.	Ratio
# OF HOSPITAL ADMISSIONS (Dependent Variable)	The reported number of hospital admissions during the previous 12 months.	Ratio
GENDER	Gender of the respondent. 1= male, 0 = female	Dichotomous
AGE	Respondent's age at last birthday.	Ratio
MARITAL STATUS	Respondent's marital status. 1=married, 0=other	Dichotomous
EDUCATION LEVEL	Respondent's number of years of education	Ratio
POVERTY LEVEL	Poverty level of family based on 1992 federal poverty level.	Ratio
EMPLOYMENT STATUS	Respondent is employed. 1=Employed, 2=Unemployed	Dichotomous 1=yes
Employer Size	**Reference ~ Total number of employees employed by employer >99**	
SMALL EMPLOYER	Total number of employees employed by employer < 25	Dichotomous 1=yes
LARGE EMPLOYER	Total number of employees employed by employer 25-99	Dichotomous 1=Yes
RURAL	County of residence is rural (no regional trade center) 1=rural, 2 =not rural	Dichotomous 1=Yes
TIME	Time to get to health care provider in minutes	Ratio

Table 4 continued
Definition and Measurement of Key Variables

Variables	Definition & Measurement	Scale
Reported Health Status	**Reference ~ Respondent reports fair or poor health**	
EXCELLENT OR VERY GOOD HEALTH STATUS	Respondent reports excellent or very good health status.	Dichotomous 1=Yes
GOOD HEALTH STATUS	Respondent reports good health status.	Dichotomous 1=Yes
Type of Employment	**Reference ~ Other**	
AGRICULTURE INDUSTRY	Respondent employed in agriculture industry. 1 = yes, 0 = no	Dichotomous
RETAIL INDUSTRY	Respondent employed in retail industry. 1= yes, 0 = no	Dichotomous
PROFESSIONAL INDUSTRY	Respondent employed in professional industry. 1 = yes, 0 = no	Dichotomous
WORKS FORTY HOURS OR MORE	Respondent employed 40 or more hours. 1= yes, 0 = no	Dichotomous
MORE THAN ONE EMPLOYER	Respondent had more than one employer. 1 = yes, 0 = no	Dichotomous

Study Question 2: Is there a difference in the reported limits of activity between the insured and uninsured North Dakotans who are under 65 years of age?

2HO1: The proportion of reported limits on usual activity is equal among insured and uninsured under 65 years of age.

2HA1: The proportion of reported limits on usual activity is higher among the uninsured than the insured under 65 years of age.

2HO2: The proportion of reported limits of physical activity is equal among the insured and the uninsured under 65 years of age.

2HA2: The proportion of reported limits of physical activity is higher among the uninsured than the insured under 65 years of age.

Study question two was analyzed using nominal data. Respondents were asked if they had any limits on usual activities and if they had any limits on physical activities. Responses were categorized into the following three categories for usual activity: none; unable to perform certain kinds of activities; and prevented from performing activities at all. Responses were categorized into the following three categories for physical activity: no limits; limited in amount of moderate activity; and limited in amount of vigorous activity. Comparisons of responses among the covered and uninsured populations will be discussed using bivariate statistics.

Study Question 3A: Is there a difference in reported health status among non-elderly adults based on poverty levels in North Dakota?

Study Question 3B: Is there a difference in reported health status between the insured and uninsured non-elderly adults in North Dakota?

3AHo: Among the non-elderly population, there is no difference between reported health status among North Dakotans with different poverty levels.

3AHA: Among the non-elderly population, the proportion of respondents reporting excellent or very good health increases with reported poverty level.

3BHo: Among the non-elderly population, there is no difference between reported health status between North Dakotans who insured and uninsured.

3BHA: Among the non-elderly population, a greater proportion of insured North Dakotans report excellent or very good health status than uninsured North Dakotans.

Responses relating to study question three were ordinal data. Respondents were asked to report their health status on a five point Likert scale. The Likert scale used the following numbers corresponding to the self-reported health status:

1 Excellent;

2 Very Good;

3 Good;

4 Fair; and

5 Poor.

Two bivariate comparisons were made using two different stratifications. The first comparison examined differences based on poverty level; the second comparison examined differences between the insured and the uninsured populations.

Study Question 4: Is there a difference in characteristics between North Dakotans who reported receiving and not receiving needed emergency and non-emergency health care services?

$4H_O1$: The proportion of insured respondents (with private health insurance and public health insurance) who report they needed emergency health care but did not obtain it is the same as the proportion of uninsured respondents who report they were unable to obtain needed emergency health care.

$4H_O2$: The proportion of respondents who report they needed emergency health care but did not obtain it is equal among those with private health insurance, public health insurance and the uninsured.

$4H_O3$: The proportion of people with health care coverage who report they needed non-emergency health care but did not obtain it is the same as the proportion of uninsured people who report they were unable to obtain needed non-emergency health care.

$4H_O4$: The proportion of respondents who report they needed non-emergency health care but did not obtain it is equal among those with private health insurance, public health insurance and the uninsured.

Study question four was analyzed using nominal data. Respondents were asked if they had ever needed health care, emergency and non-emergency care, during the past year but had to go without care. Comparisons of the insured and uninsured respondents were made using a Chi-square and a t-test.

Study Question 5: Is there a difference in satisfaction with health care services between North Dakota's insured and uninsured?

5Ho1: The proportion of insured is equal to proportion of uninsured who reported satisfaction with health care services.

5HA1: The proportion of insured who are satisfied with health care services is higher than the proportion of uninsured who are satisfied with health care services.

Study question five was analyzed using ordinal data. Respondents were asked their overall feeling about health care services received. A four point Likert scale was used with the following numbers corresponding to the level of satisfaction:

1 Very satisfied;

2 Somewhat satisfied;

3 Somewhat dissatisfied; and

4 Very dissatisfied.

Nonparametric methods were used to compare the insured respondents' satisfaction ranking to the uninsured respondents' satisfaction ranking.

Study Question 6: Do people with health care coverage and people without health care coverage report having a regular place they receive health care?

6Ho1: The proportion of insured and uninsured North Dakotans who report having a regular place they receive health care is equal.

6HA1: Insured North Dakotans report more frequently than uninsured North Dakotans that they have a regular place they receive health care services.

Study question six compared the responses of the insured respondents and the uninsured respondents to determine if there was a difference in the number who report a regular place for health care services.

Study Question 7: Why do some North Dakotans not have a regular source of health care?

Respondents who reported not having a regular source of health care were asked why they did not have a regular source of health care. These responses were analyzed using a Chi-square comparing the insured and uninsured.

Study Question 8: Is there a difference in characteristics among North Dakotan's utilization of health care services?

8Ho1: There is no difference in characteristics among non-elderly's utilization of health care services.

8HA1: There is a difference in characteristics between insured and uninsured North Dakotans' utilization of health care services.

8Ho2: There is no difference in characteristics among elderly's utilization of health care services.

8HA2: There is a difference in characteristics elderly's utilization.

Respondents were asked if they had any ambulatory care visits or any hospitalizations during the year previous to the study. Logit regression models

were used to determine what explanatory variables (see Table 4) predicted having ambulatory visits and hospitalizations among the following subgroups: children, adults, and elderly.

Separate multiple regression models were run to determine what characteristics contributed to having multiple ambulatory care visits and multiple hospitalizations among respondents.

3.8 Strategy of Data Analysis

The data were analyzed at three levels. First, summary statistics were compiled for each variable, describing the demographic, socio-economic, employment, health insurance, health care utilization and distance to health care. Second, bivariate comparisons were made between different subgroups using the Chi-square statistic and the t-test to test the significance of group differences. Third, multivariate statistic models were used to examine individual variables for association with dependent variables.

3.8.1 Bivariate Comparisons

The alpha level for analysis of the bivariate comparisons was established at .05. Alpha is the probability of making a Type I error in which the true null hypothesis is rejected. The null hypothesis will be rejected if it the Chi-square or t-test is larger than the table value. The p-value is listed in each table. The p-

value is "the probability under the null hypothesis of observing a value as unlikely or more unlikely, than the value of the test statistic" (Fisher and van Belle, 1993).

3.8.2 Chi-Square Test

There are four theoretical assumptions that must be considered when using the Chi-square test (Munro and Page, 1993). The first assumption is the data are frequency data that have been categorized. Second, the sample size must be adequate with the cells having no expected frequency counts less than one and not more than 20 percent of the expected frequencies should be less than five. If there are fewer than five responses in a category, the data should be collapsed to meet the minimum criteria. Third, the measures should be independent of each other. The categories must be mutually exclusive; that is, no subject can be in more than one cell. Fourth, there must be some theoretical reason for the categories. Research questions should be established prior to data collection.

3.8.3 *t*-test

The *t* test is commonly used to compare two groups. The *t* statistic is equal to the square root of the *F* statistic (derived from the *t*-test formula). There are four assumptions underlying the *t*-test. The *t*-test requires a nominal-level independent variable and a dependent variable that is either interval or ratio level. However, ordinal-level data can be treated as interval-level data in *t*-test

analyses. Second, subjects must be independent; each subject can belong to one and only one of the two groups and contributes only one score. A third assumption is that the dependent variable must be normally distributed. If the distribution is seriously skewed, the *t*-test may be invalid. Lastly, the fourth assumption is that the groups we are comparing are similar in their variances. This assumption is referred to as the homogeneity of variance.

3.8.4 Multiple Linear Regression Model

The dependent variable used to analyze individual's use of physician and other medical professionals, such as advanced practice nurses, is the number of visits made to the aforementioned health care providers in the previous 12 months. The multiple regression model was chosen to analyze this continuous dependent variable because this model is well suited for studying the relationship between naturally occurring explanatory and dependent variables; that is, variables that are not manipulated by the researchers. Moreover, multiple regression can determine whether a given set of explanatory variables is useful in predicting a dependent variable. The explanatory variables used in multiple regression are generally continuous variables; however, categorical variable may be used by incorporating dummy variables. The equation for a multiple regression model is as follows:

$$Y' = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + ... b_k X_k$$

Y' = number of visits to health care provider (physician and other health care provider)

a = intercept constant

b_k = the nonstandardized multiple regression coefficient for the kth explanatory variable

X_k = the kth explanatory variable

The multiple regression coefficient for an X variable represents the average change in Y that is associated with a one-unit change in that X variable, while holding constant the remaining X variables. In other words, it is the weight that the X variable is given in computing Y' and is sometimes referred to as b weights. The a represents the intercept constant . The intercept is a fixed value that is either added to or subtracted from the weighted sum of X scores in computing Y' or the predicted number of health care visits. This constant improves the accuracy of the prediction.

3.8.5 Principle of Least Squares

Because the purpose of using multiple regression models is to predict what the dependent variable will be based on the explanatory variables, determining the 'optimal' intercept and b weights are essential to making accurate predictions. In order to estimate an 'optimal' intercept and b weights, the model must minimize the error of prediction. An error of prediction refers to

the difference between an observation's number of health care visits and his or her predicted number of visits.

3.8.6 Logistic Regression Model

The dependent variable used to analyze individuals' health insurance coverage was a binary variable indicating whether the individual had health insurance coverage; this variable was coded as 0 for the uninsured and 1 for the insured. Because a binary variable is discrete and discrete dependent variables are not normally distributed, a linear probability model is not appropriate. Agresti (1990) suggests using a logistic regression model to study the relationship between x and $\pi(x)$. Logistic regression was chosen as a modeling technique because it is a way of discriminating between two groups; it is considered the appropriate choice when modeling a binary dependent variable, such as insurance status. The equation for a linear logistic regression model for the binary dependent variable follows the form,

$\text{logit}(P[Y=1]) = \alpha + \beta_1 X_1 + \beta_2 X_2 ... + \beta_k X_k$ (Fisher and van Belle, 1993).

The constants $\alpha, \beta_1, ..., \beta_k$ are the regression coefficients; the variable Y takes on values 0 and 1 and define $P[Y=1] = \pi$, $P[Y=0] = 1 - \pi$. The variables X_1, $X_2,...X_k$ are the predictor variables or explanatory variables and can either be discrete or continuous. The data set is structured as follows:

Case	Y	X_1	...	X_j	...	X_k
1	Y_1	X_{11}	....	X_{1j}	...	X_{1k}
2	Y_2	X_{21}	...	X_{2j}	...	X_{2k}
...	...	...		..		...
i	Y_i	X_{i1}	...	X_{ij}	...	X_{ik}
...	...	...	...	...	...	...
n	Y_n	X_{n1}	...	X_{ni}	...	X_{nk}

3.8.7 Stochastic Component of the Logit Model

King (1989) defines a statistical model as "a formal representation of the process by which a social system produces output." Essentially, the goal is to learn about the underlying process that generates an output, such as whether or not people have health insurance coverage. Because no fascinating social systems generate outcomes conclusively, statistical models are assumed to have systematic and stochastic components. The stochastic component models the variation across hypothetical repeated experiments; the systems component models the variation across observations (Chi, 1990).

The binary random dependent variable Y_i, health insurance coverage, has only two outcomes; 0 indicating the individual does not have health insurance coverage and 1 indicating the individual has health insurance coverage. Therefore, π is the probability of an individual having health insurance coverage and $1 - \pi$ is the probability of an individual having no health insurance coverage. The Bernoulli distribution is an appropriate model of the stochastic component and is distributed as follows:

$Y_i \sim f_{bern}(y_i | \pi_i)$. For y$_i$ = 0,1, the probability of Y$_i$ = y$_i$ may be calculated as

follows: $f_{bern}(y_i | \pi_i) \equiv \Pr(Y_i = y_i | \pi_i) = \pi_i^{y_i}(1 - \pi_i)^{1-y_i}$.

In the Bernoulli distribution, the single unknown parameter has the expected

value of Y$_i$ as well as the probability Y$_i$ = 1 across repeated experiments:

$$E(Y_i) = \Pr(Y_i = 1 | \pi_i) = \pi_i.$$

3.8.8 Systematic Component of the Logit Model

The goal of specifying a systematic component in the model is to model

the variation of health insurance coverage (insured or uninsured) across

observations. King (1989) suggests the systematic component be set to

$\pi_i = g(x_i, \beta)$ with the functional form g based on the research problem. Since

π, the probability of having health insurance coverage, is bound between 0 and

1, a linear form for g is not appropriate.

The systematic component should not be affected by the coding. For

example, the coding for the binary dependent variable for health insurance

coverage could be reversed and 1 could indicate not having health insurance

coverage and 0 could indicate having health insurance coverage. The

systematic component's curve should be symmetric regardless of the dependent

variable coding (King, 1989). Thus, we expect a monotonic relationship that

produces an S-shaped curve. Both logit and probit functional forms meet these

requirements; however, the logit functional form for the systematic component is

mathematically simpler than the probit function form and was chosen for this model. The logit function form for the systematic component of this model is:

$$\pi_i = \frac{1}{1 + \exp(-x_i \beta)}.$$

An advantage of this model over other models using different functional forms is that the effects can be estimated whether the sampling design is prospective or retrospective (Agresti, 1990).

3.8.9 Maximum Likelihood Criterion

The regression coefficients in the logistic regression model are estimated using the conditional maximum likelihood criterion (Fisher and van Belle, 1993). First, one must consider how to estimate the parameter vector β. In order to accomplish this task, the full model for the stochastic component is derived by combining the equation with the assumption of independence of Y_i and Y_j for all $i \neq j$:

$$\Pr(y \mid \pi) = \prod_{i-1}^{n} \pi_i^{y_i} (1 - \pi_i)^{1-y_i}.$$

$$\Pr(y \mid \beta) = \prod_{i=1}^{n} [1 + \exp(-x_i \beta)]^{-y_i} [1 + \exp(x_i \beta)]^{-(1-y_i)} \quad \text{(3.A)}$$

The likelihood function $L(\beta \mid y)$ is proportional to Equation 3.A. The log-likelihood equation may be written as:

$$\ln L(\tilde{\beta} \mid y) = \sum_{i=1}^{n} \{-y_i \ln[1 + \exp(-x_i \tilde{\beta})] - (1 - y_i) \ln[1 + \exp(x_i \tilde{\beta})]\}$$

3.9 Summary

Data analysis was dependent on the results from a self-reported survey, conducted by telephone interview or in-person interview, of randomly selected North Dakota residents. Each family interviewed was asked to select the person in the family who best understood the family's health care coverage and utilization history. Data were analyzed using the SAS/PC V6.12 program.

CHAPTER 4

RESULTS OF ANALYSIS

4.1 Introduction

This chapter presents and discusses the results of the data analysis based on data collected for the Robert Wood Johnson Foundation Family Survey. A copy of the survey is included in the Appendix. The findings are divided into three topic areas: summary statistics; study questions related to health insurance coverage; and study questions related to health care utilization.

4.2 Survey Results

The demographic information obtained from the survey was descriptive and provided background data about various characteristics of the family. This demographic information included the following:

- Family size;
- Educational attainment;
- Income;
- Type of health care coverage; and
- Utilization of health care services.

4.3 Summary Statistics

A summary of the population's characteristics is presented in Table 5.

Slightly less than half of the population (48.4%) are males and 51.6 percent are

females. Twenty-eight percent of the population are less than 18 years of age

and almost 12 percent are over the age of 65; the majority of the non-

institutionalized population (60%) is between 18 and 64 years of age. Among

the adults, about 60 percent are employed and have 13 years of education.

The average annual family income in 1992 was $38,514 which was about 16

percent below the 1992 US average family income of $44,951 (North Dakota

State University Census Data Center, 1997). The mean North Dakota family

size was three with slightly over half of the residents (54.2%) residing rural

counties.

Table 5

Demographic Characteristics of Population

Characteristics	Number	%
Gender		
Male	299,115	48.4
Female	319,362	51.6
Age		
< 18	173,142	28.0
18 - 64	368,851	59.6
65 +	76.484	12.4
Educational Attainment (over 18)		
Less than high school	65,942	14.8
High school diploma or GED	152,565	34.3
Some college	133,969	30.1
Bachelors degree	64,322	14.4
Graduate school	28,537	6.4
Main activity (over 18)		
Working	270,181	60.7
Looking for work	2,526	0.6
Keeping house	71,793	16.0
Going to school	32,679	7.3
Unable to work	6,776	1.5
Retired	42,389	9.5
Other	42,389	4.3
Family Poverty Level (Based on 1992 Income)		
0 to 100%	93,250	15.1
101 to 199%	134,969	21.8
200 to 299%	138,591	22.4
300% and over	251,667	40.7
1992 Annual Family Income	$38,514	

The sample design was developed to oversample people who were Medicaid beneficiaries and the uninsured. Applying the weights assigned for each respondent, the sample data was inflated to reflect the North Dakota 1990 Census population. Table 6 illustrates the distribution of health care coverage for the sample and Table 7 shows the distribution of health care coverage for the non-institutionalized population after the weights have been applied to the sample responses. All analyses, unless otherwise stated, incorporate the weights to reflect the non-institutionalized North Dakota population.

Table 6

Insurance Coverage Without Weights

Current Coverage	Frequency	Percent
Medicare	284	4.6
Employer Based with Medicaid	210	3.4
Employer Based	1,585	25.9
Medicaid	1,854	30.3
Privately Purchased	369	6.0
Indian Health Service	172	2.8
Uninsured	1,642	26.8
Total Responses	6,116	100.0

Table 7
Insurance Coverage With Weights

Current Coverage	Frequency	Percent
Medicare	83,601	13.5
Employer Based with Medicaid	2,782	0.4
Employer Based	344,933	55.8
Medicaid	32,784	5.3
Privately Insured	81,805	13.2
Indian Health Service	11,062	1.8
Uninsured	61,509	9.9
Total Non-institutionalized Population	618,477	100.0

4.4 Findings Related to Health Insurance Study Questions

In the following section, each of the study questions related to health

insurance coverage will be discussed.

Study Question 1: Why are North Dakotans uninsured?

Table 8 displays uninsured North Dakotans by age and gender. Males

were more likely to be uninsured than females, especially males 18 to 35 years

of age, a finding that is consistent with studies conducted by Braden and

Beauregard (1994). Most of the uninsured population were under the age of

65; Medicare provides health care coverage for the cohort over age 64. Yet, a

small number of elderly females reported they were uninsured because they

were not eligible for Medicare. In order to qualify for Medicare, a person must

be employed a minimum of 40 quarters or be married to a spouse that was

employed 40 quarters (Cheney, personal conversation, May 16, 1997). These

uninsured elderly women apparently were not employed outside their homes

and either had spouses who were self-employed and did not pay into Social

Security or were never married.

Table 8

The Uninsured by Age Cohort and Gender

Age	Males	Percent of Age Group	Females	Percent of Age Group	Total	Percent of Age Group
Under 18	8,881	11%	6,632	7%	15,513	9%
18 - 26	8,431	22%	5,617	14%	14,048	18%
27 - 35	7,538	17%	5,552	13%	13,090	15%
36 - 45	5,015	12%	4,556	10%	9,571	11%
46 - 55	3,272	9%	2,757	8%	6,029	9%
56 - 64	1,387	6%	1,627	7%	3,014	6%
65 & Over	0	0%	244	1%	244	1%
Total	*34,524*	*12%*	*26,985*	*8%*	*61,509*	*9.9%*

Two logistic regression models were developed to examine

characteristics of the insured and uninsured populations using the following two

binary dependent variables: private insurance status and insurance status.

The private insurance status dependent variable indicated whether or not a

person had private health insurance. Private health insurance included

employer based health insurance and health insurance purchased through the

private health insurance market. The second dependent variable, insurance

status, indicated whether or not a person had any health insurance coverage.

This coverage included both public and private health insurance. Population

subgroups used in the analyses included: children; employed adults; unemployed adults; and the elderly.

4.4.1 Children

An increase in the family's poverty level slightly increased the likelihood that a child will have private health insurance; however, an odds ratio of one generated in the model indicated that poverty level was an equal predictor of being insured or uninsured. See Table 9. This result indicated that some children in families with low poverty levels must have public insurance for their children. Moreover, rural children are about half as likely to have private health insurance as their urban counterparts. Rural children's likelihood to have health insurance coverage increases to 90 percent of the urban when both private and public health insurance are examined. It appears that rural children are more likely to have some type of public health insurance than urban children. The data support this finding (Table 10).

Female children are more likely than male children to have some type of health insurance (see table 11). Table 12 shows that male children were only 67 percent as likely as female children to have any type of health insurance and 75 percent as likely as female children to have private health insurance. Overall, male children are more likely than female children to be uninsured.

Table 9

Logit Model Estimation for Private Health Insurance Status

Among Children

Variable	Parameter Estimate	Standard Error	P-Value	Odds Ratio
INTERCPT	-0.0623	0.020	0.0001	.
AGE	0.042	0.001	0.0001	1.04
GENDER	-0.300	0.013	0.0001	0.75
RURAL	-0.614	0.014	0.0001	0.54
POVERTY	0.010	0.000	0.0001	1.01

Dependent variable = Has Private Health Insurance
Number of observations = 2,479
Weighted number of observations = 173,132

Table 10

Rural and Urban Children's Health Insurance Coverage

Insurance	Rural	Urban	Total
Public	19,014 (20.0%)	5,903 (7.6%)	24,917 (14.4%)
Private	66,653 (70.0%)	66,058 (84.7%)	132,711 (76.7%)
Uninsured	9,478 (10.0%)	6,036 (7.7%)	15,514 (9.0%)
Total	95,145 (100.0%)	77,997 (100.0%)	173,142 (100.0%)

Chi-square = 6,025.1
$P < 0.001$

Table 11

Types of Health Insurance for Children by Age Cohort and Gender

Coverage	Males 0 - 12	Females 0-12	Males 13 - 17	Females 13-17
Public	10,868 (19.0%)	9,268 (15.5%)	2,458 (9.8%)	2,324 (7.6%)
Private	40,783 (71.0%)	46,198 (77.2%)	19,573 (77.6%)	26,157 (85.1%)
Uninsured	5,703 (19.0%)	4,377 (7.3%)	3,178 (12.6%)	2,256 (7.3%)
Total	57,354 (100.0%)	59,843 (100.0%)	25,209 (100.0%)	30,736 (100.0%)

Table 12

Logit Model Estimation for Health Insurance Status Among Children

Variable	Parameter Estimate	Standard Error	P-Value	Odds Ratio
INTERCPT	2.290	0.030	0.0001	.
AGE	-0.035	0.002	0.0001	0.97
GENDER	-0.399	0.017	0.0001	0.67
RURAL	-0.103	0.018	0.0001	0.90
POVERTY	0.003	0.000	0.0001	1.00

Dependent variable = Has Health Insurance
Number of observations = 2,479
Weighted number of observations = 173,132

4.4.2 Employed Adults

Two dependent variables were used to examine differences among employed adults ages 18 to 64. One model compared the employed adults with private health insurance to employed adults with either public health insurance or no health insurance (See Table 13). The second model compared employed adults with any type of health insurance to employed adults who were uninsured (See Table 14).

Employed adults who were married were three and one half times as likely to have private health insurance than unmarried employed adults, whereas marital status had only a two and a one half fold impact for employed adults with any type of health insurance. This difference indicates that a higher proportion of unmarried people has public health insurance rather than private health insurance. Overall, the high likelihood of married couples having health insurance may be attributable to the high proportion of employed women in North Dakota. The chances that a couple will have health insurance benefits doubles when both spouses are employed.

Full-time employment, defined as working 40 or more hours per week, significantly influences the likelihood of having health insurance. Employed adults working 40 or more hours per week were almost three times as likely to have private health insurance than those who work fewer than 40 hours. When public health insurance was included with private health insurance, full-time employed adults were still over twice as likely to be insured as those

working less than 40 hours per week. This result supports many other studies' findings where part-time employees, working fewer than 40 hours per week, do not qualify for health care benefits and are unable to afford health insurance (Millman, 1994). Yet, adults who have more than one employer were only 68 percent as likely as adults with only one employer to have any type of health insurance. This finding indicates that adults employed by more than one employer are more likely to be uninsured.

The type of industry in which one is employed also impacts whether or not a person has health insurance coverage. Adults who are employed in agriculture, retail, or professional industries appear to have a greater likelihood of having private health insurance than those employed in other industries. However, if all types of health insurance are considered, people in professional and retail industries are less likely to have coverage than people employed in other industries (88% and 76% respectively). This shift suggests that some people employed in these industries are not eligible for public health insurance and remain uninsured.

Other findings included:

- Adults who worked in small firms, firms employing less than 25 people, were 38 percent as likely to have private health insurance as adults who were employed in large firms employing 50 or more people; likewise, adults who worked in medium size firms, firms employing 25 to 49 people, were 68 percent as likely to have private health insurance as

adults who worked in large firms. However, adults who worked in small firms were 27 percent as likely as adults who worked in large firms to have any health insurance, whereas adults who worked in medium firms were 49 percent as likely as large firm employees to have any health insurance. Employees of small and medium firms appear to be more likely to have public insurance than employees of large firms.

- Self-employed adults were about 80 percent as likely as those employed by a business or firm to have any type of health insurance.

- Employed adults who reported they had excellent or very good health were almost twice as likely to have private health insurance as those with poor health. Yet, when all types of health insurance were included, the impact of health status decreased indicating that some people with poorer health status were able to obtain public insurance.

- Employed rural adults were 68 percent as likely to have private health insurance as their urban counterparts; however, they were almost 98 percent as likely to have some type of health insurance indicating that many rural adults had public insurance.

- Education levels were higher among those who had insurance than the uninsured. This finding is consistent with Braden and Beauregard's findings (1994) because people with high education levels are more often employed in positions that offer health insurance as part of the compensation package than people with less education.

Table 13

Logit Model Estimation for Private Health Insurance Status Among the Employed

Variable	Parameter Estimate	Standard Error	P-value	Odds Ratio
INTERCPT	-4.785	0.057	0.0001	.
AGE	0.042	0.001	0.0001	1.04
RURAL	-0.385	0.013	0.0001	0.68
POVERTY	0.003	0.000	0.0001	1.00
MARITAL	1.273	0.013	0.0001	3.57
EXVGHTST	0.683	0.023	0.0001	1.98
GHTST	0.395	0.024	0.0001	1.49
SELFEMP	-0.236	0.021	0.0001	0.79
EMPMEDI	-0.387	0.020	0.0001	0.68
EMPSMALL	-0.960	0.016	0.0001	0.38
FORTYHRS	1.072	0.015	0.0001	2.92
MTONEMPL	-0.054	0.020	0.0062	0.95
GENDER	-0.419	0.015	0.0001	0.66
EDUCATION	0.218	0.003	0.0001	1.24
AGINDUS	0.383	0.023	0.0001	1.47
RETAIL	0.076	0.017	0.0001	1.08
PROFESS	0.085	0.018	0.0001	1.09

Dependent variable = Private Health Insurance
Number of observations = 2,016
Number of weighted observations = 258,174

Table 14

Logit Model Estimation for Health Insurance Status Among the Employed

Variable	Parameter Estimate	Standard Error	P-Value	Odds Ratio
INTERCPT	-2.9995	0.0579	0.0001	
AGE	0.0362	0.0007	0.0001	1.04
RURAL	-0.0244	0.0140	0.0812	0.98
POVERTY	0.00228	0.0000	0.0001	1.00
MARITAL	0.9560	0.0142	0.0001	2.60
EXVGHTST	0.2689	0.0249	0.0001	1.31
GHTST	0.0685	0.0258	0.0078	1.07
SELFEMP	-0.2134	0.0206	0.0001	0.81
EMPMEDI	-0.7149	0.0207	0.0001	0.49
EMPSMALL	-1.3174	0.0169	0.0001	0.27
FORTYHRS	0.7598	0.0161	0.0001	2.14
MTONEMPL	-0.3801	0.0198	0.0001	0.68
GENDER	-0.5436	0.0154	0.0001	0.58
EDUCATION	0.2073	0.0035	0.0001	1.23
AGINDUS	0.2013	0.0236	0.0001	1.22
RETAIL	-0.2701	0.0177	0.0001	0.76
PROFESS	-0.1239	0.0196	0.0001	0.88

Dependent variable = Health Insurance
Number of observations = 2,016
Number of weighted observations = 258,174

A third logistic regression model was developed using the dependent variable of whether or not an employed adult was offered health insurance by their employer or union. (Refer to Table 15 for results.) The number of employees employed by the firm greatly influences whether or not adults are offered health insurance. Adults employed in small firms with less than 25

employees were only 4 percent as likely to be offered health insurance as adults employed in large firms. Additionally, adults employed in medium firms were 60 percent as likely as employees in large firms to be offered health insurance. This finding is consistent with studies documented by Chollet (1996) that small and medium firms often are unable or unwilling to offer health insurance benefits to their employees due the high cost of premiums charged for small group coverage.

Employees who indicated they worked 40 or more hours per week were almost three times as likely as other employees to be offered health insurance. Many employers only offer health insurance to employees who work at least a 40 hour week so this finding is not surprising. However, employees who reported having more than one job were more likely than employees with only one job to be offered health insurance. This finding is somewhat surprising because employees that have more than one employer often have two or more part-time jobs that do not provide health insurance. However, due to low per capita incomes in North Dakota, coupled with the high rate of part-time workers, this finding may be attributed to people having a part-time job in addition to their full-time job that may offer health insurance benefits.

Industry type also impacts whether or not an adult is offered health insurance. Employees in professional industries were more than twice as likely to be offered health insurance as other industries. Yet, employees in the agriculture industry were only half as likely as other industry employees to be

offered health insurance.   The retail industry was somewhat less likely to offer

health insurance at 98 percent of non-retail industries.

Table 15

Logit Model Estimation for Being Offered Health Insurance
Among the Employed

Variable	Parameter Estimate	Standard Error	P-Value	Odds Ratio
INTERCPT	1.5802	0.0161	0.0001	
EMPMEDI	-0.5107	0.0194	0.0001	0.600
EMPSMALL	-3.1363	0.0135	0.0001	0.043
FORTYHRS	1.0022	0.0147	0.0001	2.724
MTONEMPL	0.1606	0.0189	0.0001	1.174
AGINDUS	-0.6508	0.0178	0.0001	0.522
RETAIL	-0.0203	0.0157	0.1956	0.980
PROFESS	0.8070	0.0155	0.0001	2.241

Dependent variable = Offered Health Insurance
Number of observations = 2,016
Number of weighted observations = 258,174

4.4.3 Unemployed Adults

Because the majority of private health insurance is provided to

employed adults through their employers, predictors for private health

insurance were not examined for this population. Uninsured adults who were

also unemployed were most likely to be males; a finding that is not unusual

because it is difficult for male adults to qualify for most public insurance

programs. For example, North Dakota Medicaid will not cover most single

male adults unless they are medically needy. In addition, married unemployed adults were only 83 percent as likely to have health insurance as single unemployed adults. This finding may be attributable to a high proportion of the single, unemployed adult females being covered by public insurance.

Health status appears to impact the likelihood of unemployed adults' insurance status. Unemployed adults who reported excellent to very good health status are 31 percent more likely to have health insurance than unemployed adults with fair or poor health status. Yet, unemployed adults with good health status are almost half as likely as the unemployed adults with fair or poor health status to have health insurance. The unemployed adults with fair or poor health status appear to qualify for public health insurance whereas those with good health are not medically needy enough to qualify for public insurance and remain uninsured.

Rural unemployed adults are more likely to be uninsured than the urban unemployed adults. For rural unemployed adults, the likelihood of having health insurance is 88 percent of the urban unemployed adults.

Age was found to be somewhat positively correlated with having health insurance among the unemployed adults. In addition, income was positively correlated with having health insurance among this population. These findings, displayed in Table 16, mirror the employed adult's predictors for health insurance.

Table 16

**Logit Model Estimation for Health Insurance Status
Among the Unemployed**

Variable	Parameter Estimate	Standard Error	P-value	Odds Ratio
Intercept	0.881	0.070	0.0001	.
AGE	0.023	0.001	0.0001	1.02
GENDER	-0.591	0.019	0.0001	0.55
RURAL	-0.134	0.019	0.0001	0.88
POVERTY	0.001	0.000	0.0001	1.00
EDUCATION	0.017	0.004	0.0001	1.02
MARITAL	-0.186	0.023	0.0001	0.83
EXVGHTST	0.268	0.030	0.0001	1.31
GHTST	-0.724	0.030	0.0001	0.49

Dependent variable = Health Insurance
Number of observations = 1,411
Number of weighted observations = 110,677

4.4.4 Elderly

Only women were examined in this model because no elderly men reported being uninsured. Marital status had the most significant impact on the elderly women's health insurance status. Married elderly were over six times as likely to have health insurance as their unmarried counterparts. Because a spouse's work history also can be used in qualifying for Medicare coverage, marriage significantly increases the likelihood that an elderly woman would be

covered under Medicare. Today, because a large percentage of women are employed outside of the home, it is likely that most women will qualify for Medicare when the reach retirement. In addition, rural elderly women were about half as likely to have health insurance as urban elderly women. Because rural people are less likely overall to have health insurance, we would expect this similar finding for the elderly women. Interestingly, health status was not found to be a significant characteristic for the elderly population. Table 17 displays this model's results.

Table 17

Logit Model Estimation for Health Insurance Status Among Elderly Women

Variable	Parameter Estimate	Standard Error	P-Value	Odds Ratio
INTERCPT	10.168	0.749	0.0001	
AGE	-0.060	0.009	0.0001	0.94
RURAL	-0.620	0.175	0.0004	0.54
POVERTY	-0.001	0.000	0.0001	1.00
MARITAL	1.827	0.167	0.0001	6.22
EXVGHTST	-0.103	0.179	0.5638	0.90
GHST	0.259	0.181	0.1534	1.30

Dependent variable = Health Insurance
Number of observations = 210
Number of weighted observations = 76,484

Study Question 2: Is there a difference in the reported limits of activity between the insured and uninsured North Dakotans who are under 65 years of age?

2HO1: The proportion of reported limits on usual activity is equal among insured and uninsured under 65 years of age.

2HA1: The proportion of reported limits on usual activity is higher among the uninsured than the insured under 65 years of age.

2HO2: The proportion of reported limits of physical activity is equal among the insured and the uninsured under 65 years of age.

2HA2: The proportion of reported limits of physical activity is higher among the uninsured than the insured under 65 years of age.

Respondents were asked if they had any limits on usual activities and if they had any limits on physical activities. The responses included: none; unable to perform certain kinds of activities; and prevented from performing activities at all. Responses for physical activity included: no limits; limited in amount of moderate activity; and limited in amount of vigorous activity.

A statistically significant difference existed between the proportion of insured respondents who reported no health limitations on usual activities and the proportion of uninsured respondents who reported no health limitations on usual activities (p<0.001). The null hypothesis was rejected and it is concluded that a greater proportion of insured respondents reported no health limitations on usual activities.

Table 18 shows that the majority of the respondents (90.8%) indicated they have no health limitations on usual activities; the proportion of the insured group who reported no health limitations is larger (91.3%) than the uninsured group (87.8%). The remaining 9 percent of the respondents were almost equally distributed in the two other categories: health limitations for certain kinds or amounts of usual activity and health limitations that prevent a person from performing activities at all. The uninsured respondents had a higher proportion of respondents in the aforementioned categories than the insured respondents (12.1% versus 8.8%). This result indicates that the uninsured respondents usual activities were more limited by their health status than the insured respondents' activities.

Table 18

Health Limitations on Usual Activities by Insurance Status

Health Limitations on Usual Activities	Insured	Uninsured	Total
None	294,894 (91.3%)	40,185 (87.8%)	335,078 (90.8%)
Certain kinds or amounts	13,439 (4.2%)	2,716 (5.9%)	16,154 (4.4%)
Prevented from performing activities at all	14,786 (4.6%)	2,851 (6.2%)	17,637 (4.8%)
Total	323,118 (100.0%)	45,751 (100.0%)	368,869 (100.0%)

Chi-square = 570.2
$p < .001$

A statistically significant difference existed in the number of insured respondents who reported limits on physical activities and the number of uninsured who reported limits on physical activities (p<0.001). The null hypothesis was rejected and it is concluded that a greater number of insured respondents reported limits on physical activities than uninsured respondents.

Over three quarters of the respondents reported that they had no limits on physical activities as shown in Table 19. The proportion of uninsured respondents who indicated they had limits on moderate or vigorous physical activities was higher then the proportion of insured respondents (24.8% versus 20.8%). Based on these results, it appears the uninsured population experiences greater limitations on their physical activities than their insured counterparts. These findings parallel Millman's (1993) study results.

Table 19

Limits on Physical Activities by Insurance Status

Limits on physical activities	Insured	Uninsured	Total
None	255,951 (79.2%)	34,369 (75.1%)	290,320 (78.7%)
Moderate activities	48,308 (15.0%)	8,519 (18.6%)	56,827 (15.4%)
Vigorous activities	18,860 (5.8%)	2,862 (6.3%)	21,722 (5.9%)
Total	323,118 (100.0%)	45,751 (100.0%)	368,869 (100.0%)

Chi-square = 447.6
p<.001

Study Question 3A: Is there a difference in reported health status among non-elderly adults based on poverty levels in North Dakota?

Study Question 3B: Is there a difference in reported health status between the insured and uninsured non-elderly adults in North Dakota?

3AHo: Among the non-elderly population, there is no difference between reported health status among North Dakotans with different poverty levels.

3AHA: Among the non-elderly population, the proportion of respondents reporting excellent or very good health increases with increases in their poverty level.

3BHo: Among the non-elderly population, there is no difference between reported health status between North Dakotans who insured and uninsured.

3BHA: Among the non-elderly population, a greater proportion of insured North Dakotans report excellent or very good health status than uninsured North Dakotans.

Respondents were asked to report their health status on a five point Likert scale. The Likert scale used the following numbers corresponding to the self-reported health status:

1 Excellent;

2 Very Good;

3 Good;

4 Fair; and

5 Poor.

The general health status categories were collapsed into the following three categories: excellent and very good health status; good health status; and fair and poor health status.

4.4.5 3AHA

Table 20 shows the general health status categories by poverty level for North Dakota residents under 65 years of age. Based on the results in this table, it appears that as the level of poverty increases, the reported health status also improves; conversely, as the poverty level decreases, the reported health status declines. The majority of people (83.0%) who are at 300 percent or above the Federal poverty level report their general health status to be either excellent or very good. In contrast, just over half of the respondents (57.8%) at 100 percent or lower poverty level report having excellent or very good health status. The greatest proportion (33.3%) of respondents reporting their general health status to be either fair or poor were also in the lowest poverty level group. Numerous studies cite the relationship between poverty level and health status; this finding supports the paradigm that poverty is positively correlated with health status (Evans, Barer, and Marmor, 1994).

A statistically significant difference existed between the poverty categories and their reported health status (p<0.001). Results also were analyzed using an independent-samples t-test. This analysis also revealed a statistically significant difference between the four groups(p<.001). Therefore, the null hypothesis was rejected and it was concluded that as respondents' poverty level increased, the reported health status improved.

Table 20

Health Status by Poverty Level

General Health Status	< 101%	101 - 199%	200 - 299%	300% +	Total
Excellent or very good	44,031 (57.8%)	78,704 (71.1%)	90,675 (73.4%)	192,164 (83.0%)	405,574 (74.8%)
Good	20,178 (26.5%)	22,685 (20.5%)	25,941 (21.0%)	31,508 (13.6%)	100,312 (18.5%)
Fair or poor	12,024 (15.8%)	9,378 (20.5%)	6,857 (21.0%)	7,848 (13.6%)	36,107 (6.7%)
Total	76,233 (100%)	110,767 (100%)	123,473 (100%)	231,519 (100%)	541,993 (100%)

Chi-square = 39,574.2   t test = 316.2
p<.0001   p<.0001

4.4.6 3BHA

A statistically significant difference existed between the insured and uninsured respondents' reported health status (p<0.001). Results also were analyzed using an independent-samples t-test. This analysis also revealed a statistically significant difference between the two groups (p<.001). Therefore, the null hypothesis was rejected and it was concluded that the proportion of insured respondents who reported better health status is greater than the proportion of uninsured respondents.

The majority of respondents (74.8%) perceived their general health status to be excellent or very good. (See Table 21 for results.) However, when comparing the insured to the uninsured, the uninsured are less likely to report they have excellent or very good health status (63.4% versus 74.8%). Moreover, almost a quarter of the uninsured (27.2%) reported having good health whereas only 17.4 percent of the insured respondents reported having good health. This finding suggests that the uninsured perceive their health to be more mediocre than those with insurance. When the fair and poor categories are combined, over 9 percent of the uninsured reported their health status to be in this category while only 6 percent of the insured respondents felt their health status fit this category. Overall, the insured respondents report better health status than the uninsured respondents. This finding is not surprising because poorer health status has been found to be a barrier to obtaining affordable health insurance; therefore, some of the uninsured

respondents may be uninsured because of their health status (Ricketts et al.,

1994).

Table 21

Reported Health Status by Insurance Status

General Health Status	Insured	Uninsured	Total
Excellent or Very Good	366,829 (76.3%)	38,745 (63.4%)	405,574 (74.8%)
Good	83,700 (17.4%)	16,612 (27.2%)	100,312 (18.5%)
Fair or Poor	30,336 (6.3%)	5,771 (9.4%)	36,107 (6.7%)
Total	480,866 (88.7%)	61,127 (11.3%)	541,993 (100%)

Chi-square = 4,801.4   t test =316.2
$p < .0001$ $p < .0001$

4.5 Findings Related to Health Care Utilization Study Questions

In the following section, each of the study questions related to health

care utilization will be discussed.

Study Question 4: Is there a difference in characteristics between North

Dakotans who reported receiving and not receiving

needed emergency and non-emergency health care

services?

$4H_o1$: The proportion of insured respondents (with private health

insurance and public health insurance) who report they needed

emergency health care but did not obtain it is the same as the

proportion of uninsured respondents who report they were unable to obtain needed emergency health care.

$4H_O2$: The proportion of respondents who report they needed emergency health care but did not obtain it is equal among those with private health insurance, public health insurance and the uninsured.

$4H_O3$: The proportion of people with health care coverage who report they needed non-emergency health care but did not obtain it is the same as the proportion of uninsured people who report they were unable to obtain needed non-emergency health care.

$4H_O4$: The proportion of respondents who report they needed non-emergency health care but did not obtain it is equal among those with private health insurance, public health insurance and the uninsured.

Respondents were asked if they had needed emergency health care and non-emergency health care but did not obtain it during the past year. The responses were stratified into the following groups: insured, including both private and public health insurance; the privately insured; the publicly insured; and the uninsured.

4.5.1 4Ho1

Table 22 shows that only a small minority of the respondents (0.9%) indicated they had needed emergency care during the past year but did not obtain it. The proportion of uninsured who went without emergency care was higher than the proportion of insured (2.2% versus 0.7%). This finding indicates that most North Dakotans are getting needed emergency care; however, the uninsured are significantly more likely to go without needed emergency care than those with some type of health insurance (p-value < .001). The null hypothesis was rejected and it is concluded that the uninsured respondents went without needed emergency care more often than the insured respondents.

Table 22

Needed Emergency Care by Insurance Status

Needed emergency care but did not get it	Insured	Uninsured	Total
Yes	3,920 (0.7%)	1,319 (2.2%)	5,239 (0.9%)
No	552,175 (99.3%)	59,981 (97.8%)	612,156 (99.1%)
Total	556,095 (100.0%)	61,300 (100.0%)	617,396 (100.0%)

chi-square = 1,373.97
p <.001

4.5.2 4Ho2

Results indicated there was a statistically significant difference among the proportion of respondents foregoing needed emergency care based on insurance status. The lowest proportion of respondents who went without needed emergency health care was those with public health insurance (0.4%). The proportion of publicly insured respondents who reported not obtaining needed emergency care was about half of the proportion of privately insured respondents (0.8%). Yet, over 2 percent of the uninsured respondents reported they had gone without needed emergency care. This finding indicates that uninsured North Dakotans are almost three times as likely to go without needed emergency care than the privately insured and over five times as likely as the publicly insured. Studies by Aday and Andersen (1984) have documented similar findings where the uninsured are more likely to forego care than the insured.

There is a statistically significant difference (p< 0.001) in the proportion of respondents who reported foregoing needed emergency health care based on insurance status. The null hypothesis was rejected and it is concluded that the proportions of respondents who indicated foregoing emergency care are not equal among the insurance status groups (Table 23).

Table 23

Needed Emergency Care by Three Insurance Status Categories

Needed emergency care but did not get it	Privately Insured	Medicare, Medicaid & IHS	Uninsured	Total
Yes	3,355 (0.8%)	565 (0.4%)	1,319 (2.2%)	10,617 (0.9%)
No	425,447 (99.2%)	126,729 (99.6%)	59,981 (97.8%)	606,956 (99.1%)
Total	428,802 (100.0%)	127,294 (100.0%)	61,300 (100.0%)	617,573 (100.0%)

Chi-square = 1,507.6
p<.001

4.5.3 4Ho3

A small percentage of the respondents (1.7%) reported they needed non-emergency care during the past year but did not obtain it. (See Table 24.) The proportion of the uninsured respondents who reported not obtaining needed non-emergency care was significantly higher (8.8%) than for those who had insurance (0.94%). This data suggests that uninsured respondents are significantly more likely to go without non-emergency care than without emergency care (p < 0.001). The null hypothesis of equal proportions was rejected.

Table 24

Needed Non-Emergency Care by Insurance Coverage

Needed non-emergency care but did not get it	Insured	Uninsured	Total
Yes	5,209 (1.0%)	5,408 (8.8%)	10,617 (1.7%)
No	551,074 (99.0%)	55,882 (91.2%)	606,956 (98.3%)
Total	556,282 (100.0%)	61,290 (100.0%)	617,572 (100.0%)

Chi-square = 20,326.34
$p < .001$

4.5.4 4Ho4

Results indicated that the majority of the respondents (60.7%), who reported they needed non-emergency care during the past year but did not obtain it, were the uninsured. (See Table 25.) Almost 9 percent of the uninsured identified they did not obtain needed non-emergency care compared to about 1 percent of the privately insured and the publicly insured. This finding mirrors national studies that report the uninsured are the most likely group to go without needed non-emergency care (Braden & Beauregard, 1994).

A statistically significant difference ($p < 0.001$) existed in the number of people foregoing needed non-emergency care by insurance status. The null hypothesis was rejected and it is concluded that the proportions of respondents

by insurance status who had foregone needed non-emergency care was not equal.

A common pattern emerges when comparing the findings of 1Ho1,1Ho2, 1Ho3 and 1Ho4. The highest proportion of respondents who reported foregoing needed emergency and non-emergency health care were the uninsured. The differences between the uninsured and the insured were two fold for emergency health care and almost eight fold for non-emergency health care. Numerous studies have documented the difficulties experienced by the uninsured population obtaining necessary access to health care services (Ricketts et al., 1994). North Dakota's uninsured appear to forego needed health care services, both emergency and non-emergency, more frequently than those with private or public health insurance.

Table 25

Needed Non-Emergency Health Care by Three Insurance Categories

Needed non-emergency care but did not get it	Privately Insured	Medicare , Medicaid & IHS	Uninsured	Total
Yes	3,504 (0.82%)	1,705 (1.3%)	5,408 (8.8%)	8,912 (1.7%)
No	425,298 (99.2%)	125,776 (98.7%)	55,882 (91.2%)	481,180 (98.3%)
Total	428,802 (100.0%)	127,481 (100.0%)	61,290 (100.0%)	490,092 (100.0%)

Chi-square = 20,483.59
p<.001

Study Question 5: Is there a difference in satisfaction with health care services between North Dakota's insured and uninsured?

> 5Ho1: The proportion of insured is equal to the proportion of uninsured who reported satisfaction with health care services.

> 5HA1: The proportion of insured who are satisfied with health care services is higher than the proportion of uninsured who are satisfied with health care services.

Most of the respondents (91.2%) indicated they were very satisfied or somewhat satisfied with the health care services they had received. However, a larger proportion of the insured respondents (92.3%) than the uninsured respondents (82.8%) reported they were satisfied with their health care services. When overall dissatisfaction with health care services (somewhat dissatisfied and very dissatisfied) was examined, the uninsured respondents were over twice as likely as the insured respondents to report they were dissatisfied with health care services (17.3% versus 7.7%). Similarly, almost 7 percent of the uninsured respondents indicated they were very dissatisfied with health services compared to just over 1 percent of the insured respondents. The distribution of responses in Table 26 parallel other studies that indicate the uninsured are less satisfied with health services than their insured counterparts (Aday and Anderson, 1984).

A statistically significant difference existed in the proportion of insured who were satisfied with their health care services and the proportion of uninsured who were satisfied with their health care services (p<0.001). The

null hypothesis was rejected and it is concluded that the insured are more

satisfied with health care services than the uninsured.

Table 26

Satisfaction with Health Care Services by Insurance Status

Response	Insured	Uninsured	Total
Very Satisfied	132,673 (57.0%)	11,433 (35.4%)	144,105 (54.6%)
Somewhat Satisfied	82,294 (35.4%)	14,451 (14.9%)	96,745 (36.6%)
Somewhat Dissatisfied	14,590 (6.3%)	3,391 (10.8%)	17,981 (6.8%)
Very Dissatisfied	3,228 (1.4%)	2,008 (6.4%)	5,235 (2.0%)
Total	232,784 (100.0%)	31,282 (100.0%)	264,066 (100.0%)

Chi-square = 7,365.18
$p < .001$

Study Question 6: Do people with health insurance coverage and people

without health insurance coverage report having a regular

place they receive health care?

6Ho1: The proportion of insured and uninsured North Dakotans who

report having a regular place they receive health care is equal.

6HA1: Insured North Dakotans report more frequently than uninsured

North Dakotans that they have a regular place they receive

health care services.

Table 27 shows that over 90 percent of respondents indicated having a

place they usually go if they are sick or need medical advice. Overall, the

insured respondents are more likely to indicate a usual place to go for medical

needs than the uninsured respondents (92.6% versus 70.2%). Yet, almost one

third of those who do not have a place to go if sick or need advice are the

uninsured. Based on a Chi-square test, a statistically significant difference was

found between the proportion of insured and uninsured reporting a usual place

for health care (p<0.001).

Table 27

Regular Health Care Source by Insurance Status

Has usual place to go if sick or needs medical advice	Insured	Uninsured	Total
Yes	515,759 (92.6%)	43,058 (70.2%)	558,817 (90.3%)
No	41,347 (7.4%)	18,314 (29.8%)	59,660 (9.7%)
Total	557,106 (100.0%)	61,371 (100.0%)	618,477 (100.0%)

Chi-square = 31,878.87
p<.001

For those respondents indicating a usual source of care, they were asked to identify what type of place they usually go if they are sick. The majority of respondents (76.8%) identified either a physician practice (individual or group) or a hospital out-patient clinic. The next most frequent response regarding the place they receive care was other at 8 percent. There were, however, differences between the insured and the uninsured respondents' choice of care location; these differences were significant based on the Chi-square value of 7,961.4 with 11 degrees of freedom (p<.001).

Among the insured respondents, the physician's office was most frequently identified as their medical care source followed by the hospital out-patient clinic (38.9% and 38.3% respectively). Conversely, almost half of the uninsured respondents (45.4%) identified the hospital out-patient clinic as their most frequent care location choice followed by the physician's office (27.5%). Not surprisingly, a higher proportion of the uninsured respondents than insured respondents identified the community or migrant health centers and emergency rooms as the places to go if sick. Payment for care at these centers is free or based on a sliding fee schedule. Table 28 displays the responses and corresponding percentages for each group.

Table 28

Place Where Health Care Services Are Obtained By Insurance Status

Type of place usually goes if sick	Insured	Uninsured	Total
Doctor's office or group practice	197,268 (38.9%)	11,637 (27.5%)	208,905 (38.0%)
Health Maintenance Organization (HMO)	4,069 (0.8%)	45 (0.1%)	4,114 (0.8%)
Hospital out-patient clinic	194,546 (38.3%)	19,219 (45.4%)	213,765 (38.9%)
Hospital emergency room	6,295 (1.2%)	1,859 (4.4%)	8,154 (1.5%)
Community or migrant health center	17,408 (3.4%)	2,690 (6.4%)	20,098 (3.7%)
Indian Health Service (IHS)	19,529 (3.9%)	71 (0.2%)	19,600 (3.6%)
Public health department	1,731 (0.3%)	112 (0.3%)	1,843 (0.3%)
Company industrial clinic	4,567 (0.9%)	316 (0.8%)	4,883 (0.9%)
School clinic	3,298 (0.7%)	760 (1.8%)	4,058 (0.7%)
Walk-in center	16,147 (3.2%)	1,787 (4.2%)	17,934 (3.3%)
Other	42,872 (8.4%)	3,855 (9.1%)	46,726 (8.5%)
Total	507,730 (100.0%)	42,350 (100.0%)	550,080 (100.0%)

Chi-square = 7,961.41
$p < .001$

Study Question 7: Why do some North Dakotans not have a regular source

of health care?

The respondents who indicated they did not have a regular source of

health care were asked what was the main reason they did not have a usual

source of health care. Over half of these respondents (55.3%) indicated they

did not need a doctor because they rarely got sick. The second most

frequently reported reason was that they had no health insurance and could

not afford it (22.7%). About 1 percent of the respondents identified that care

was too far away indicating that geographic access was not a significant

access issue. Table 29 shows the distribution of responses for the main

reason why they did not have a usual source of health care. A statistically

significant difference was found between the insured and uninsured

respondents (p< .001).

Almost half of the uninsured (48.4%) reported that they did not have a

regular source of medical care because they had no insurance or could not

afford it; whereas the majority of the insured (63.5%) reported they did not

need a doctor because they rarely get sick. Based on these findings, it is clear

that the financial considerations for having a regular source of health care are a

greater concern for the uninsured than the insured. Yet, over 11 percent of the

insured respondents also indicated they could not afford health care even

though they had health insurance. This finding suggests that some of the

insured respondents' health insurance is not adequate to provide them with a

regular source of health care. Bazzoli (1986) argues that for some insured

people, having public or private health insurance, the limitations imposed by the insurer basically leaves them uncovered. For example, if a person uses all of the physician visits allowed under his or her insurance plan, any additional physician visits must be paid out of pocket.

Over a third of the uninsured (36.7%) reported they do not have a need for a doctor because they rarely get sick. This attitude regarding health care has been reported by young, healthy adults in other studies (Braden & Beauregard, 1994).

Geographic access does not appear to be an issue for not having a usual source of medical care. Only 1 percent of the respondents, all of whom were insured, reported that medical care was too far away. In fact, 87 percent of respondents with a usual source of health care reported traveling 30 minutes or less to reach their health care provider. These findings indicate that health care is geographically accessible but without insurance or financial means, a usual source for medical care is not established.

Table 29

Main Reason No Regular Source of Health Care by Insurance Status

Main reason does not have usual source of health care	Insured	Uninsured	Total
No insurance, cannot afford it	4,649 (11.4%)	8,675 (48.3%)	13,324 (22.7%)
No care available, doctor will not accept insurance	0 (0%)	50 (0.3%)	50 (0.1%)
Two or more usual doctors or places depending on condition	2,813 (6.9%)	308 (1.7%)	3,121 (5.3%)
Do not need a doctor -- rarely get sick	25,871 (63.5%)	6,599 (36.7%)	32,469 (55.3%)
Do not like/trust/believe in doctors	395 (1.0%)	101 (0.6%)	496 (1.0%)
Care too far away	461 (1.1%)	0 (0%)	461 (1.0%)
Other	6,560 (16.1%)	2,244 (12.5%)	8,804 (15.0%)
Total	40,748 (69.4%)	17,977 (30.6%)	58,725 (100.0%)

Chi-square = 10,166.3
$p < .001$

Study Question 8: Is there a difference in characteristics among North

Dakotans' utilization of health care services?

8Ho1: There is no difference in characteristics among non-elderly's

utilization of health care services.

8HA1: There is a difference in characteristics between insured and

uninsured North Dakotans' utilization of health care services.

8Ho2: There is no difference in characteristics among elderly's

utilization of health care services.

8HA2: There is a difference in characteristics among elderly's utilization

of health care services.

Two logistic regression models were developed to examine

characteristics of the respondents who utilized health care services and those

who did not utilize health care services. Two types of health care services

were examined: visit to a health care professional and a hospital admission.

The health care professional dependent variable was used to examine the

characteristics of the respondents who visited a health care professional,

physician or mid-level practitioner, during the previous year. The hospital

admission dependent variable was used to examine the characteristics of the

respondents who were admitted to a hospital during the previous year.

Population subgroups used in the analyses included: children (ages 0 - 17);

adults (ages 18 - 64); and the elderly (65 years of age and over).

Multiple regression models were used to examine the variables that

contribute to the utilization of health care services for the North Dakota

population. The dependent variables examined were the number of visits to a health care provider and the number of hospital admissions reported by respondents during the previous year. The explanatory variables examined are displayed in the accompanying tables.

4.5.5 Children

Less than one half of the children (45%) had at least one ambulatory visit to a health care professional during the previous year. Children with Indian Health Service coverage were 85 percent as likely to have an ambulatory visit as uninsured children. However, children with Medicaid coverage were almost 20 percent more likely to use ambulatory services as uninsured children. These findings indicate that children served by Indian Health Services are visiting health care professionals at a lower rate than children with other types of health insurance and uninsured children. This finding is somewhat different than what researchers found in the RAND Health Insurance Experiment that documented health care utilization rates for publicly and privately insured to be higher than the uninsured (Newhouse, 1981). Interestingly, income does not appear to be influential in whether or not children visit a health care professional. Results are displayed in Table 30.

Table 30

Logit Model Estimation of Ambulatory Visits for Children

Variable	Parameter Estimate	Standard Error	P-value	Odds Ratio
INTERCEPT	-0.181	0.021	0.0001	
AGE	-0.013	0.001	0.0001	.99
GENDER	-0.078	0.001	0.0001	0.93
RURAL	-0.027	0.010	0.0001	0.77
POVERTY	0.001	0.000	0.0001	1.00
IHS	-0.167	0.040	0.0001	0.85
PRIVINS	0.037	0.017	0.0318	1.04
MEDICAID	0.175	0.022	0.0001	1.19

Dependent Variable = Visit
Number of Observations = 2,479
Sum of Weights = 173,142

Among children who visited health care professionals, the average number of ambulatory visits during the previous year was 4.7. (See Table 31.) Results of the multiple regression model for children having one or more visits to a health care professional indicated that on average, rural children had one fewer ambulatory visits than urban children in a year (p=.08). The only other variable to significantly contribute to the model is Medicaid coverage with a parameter estimate of 3.84 (p=.004). We expect these children to have an average of 3.8 more ambulatory care visits then other children.

Table 31

Multiple Regression Model Examining Characteristics of Children With One or More Ambulatory Care Visit

Variable	Parameter Estimate	Standard Error	P-Value
INTERCEP	4.644	1.269	0.0003
AGE	-0.019	0.056	0.7308
GENDER	0.515	0.594	0.3862
RURAL	-1.062	0.611	0.0824
POVERTY	0.001	0.002	0.4551
MEDICAID	3.837	1.326	0.0039
HIS	0.890	2.385	0.7092
PRIVINS	-0.338	1.0921	0.7570

P<.0021
R-square = 0.0201
Adjusted R-square = .0139

A small minority of children (5%) had been admitted to the hospital during the previous year. Due to a very small number in the dependent variable, no linear regression model was estimated for children's hospital admissions.

4.5.6 Adults

The majority of adults (82%) reported having at least one ambulatory visit during the previous year. When insurance type was examined, Medicaid respondents were over one and a half times as likely as the uninsured

respondents to have a visit. In addition, men were about half as likely as women to have an ambulatory visit. This difference can be attributed in part to women's higher utilization of health care services during their child-bearing years. Not surprisingly, people who report themselves to be in excellent, very good or good health are less likely to see a health care professional than people who are in fair to poor health. Table 32 displays the results of this model.

Table 32

Logit Model Estimation for Ambulatory Care Visits Among Adults

Variable	Parameter Estimate	Standard Error	P-value	Odds Ratio
INTERCEPT	3.180	0.038	0.0001	.
AGE	-0.002	0.000	0.0001	1.00
GENDER	-0.584	0.011	0.0001	0.56
RURAL	-0.215	0.011	0.0001	0.81
POVERTY	0.000	0.000	0.0001	1.00
TIME	0.001	0.000	0.0001	1.00
MARITAL	0.207	0.013	0.0001	1.23
EXVGHTST	-1.653	0.032	0.0001	0.19
GHTST	-1.500	0.032	0.0001	0.22
MEDICAID	0.469	0.034	0.0001	1.60
IHS	0.127	0.035	0.0001	1.14
PRIVINS	0.223	0.012	0.0001	1.25
SATISFY	0.056	0.011	0.0001	1.06
EMPLSTAT	0.083	0.012	0.0046	1.09

Dependent Variable = Visits
Number of Observations = 2,833
Sum of Weights = 318,114

A multiple regression model for the adults with at least one health care professional visit during the past year was conducted to examine differences among the multiple users of ambulatory care. On average, these adults visited

the physicians about six times during the year previous to the survey. This frequency is slightly higher than the national data report for annual physician visits; however, North Dakota visits also include those to mid-level providers (Hicks, 1992). Table 33 shows that age, gender, rural dwellers, health status, time to provider, Medicaid and private health insurance displayed significant beta weights (p<0.05). Time to provider, Medicaid and private health insurance had positive parameter estimates. The parameter estimate for time to provider was small (0.101) but indicates that people who have multiple visits are traveling a longer time than those with fewer visits. This difference could be attributed to the location of specialty care. For adults who have health problems, they may need to see health care providers who practice in regional centers. The parameter estimates for private insurance and Medicaid were 1.376 and 6.302, respectively. These positive estimates indicate that adults with private insurance had on average 1.4 more ambulatory care visits than the uninsured and those with Medicaid had on average 6.3 more visits. The extremely high parameter estimate for Medicaid adults is due to the population of adults North Dakota Medicaid serves which are primarily pregnant women and the medically needy, both potentially high users of ambulatory health care.

The negative parameter estimates of health care visits mirrored the findings of the logistic regression. Adults who were younger, female and residing in urban counties had the greatest number of visits. As expected, adults with excellent and very good health on average reported 9.4 fewer visits

than those with fair to poor health status; likewise, those with good health

status on average had 6.7 fewer visits.

Table 33

Multiple Regression Model Examining Ambulatory Visits for Adults

Variable	Parameter Estimate	Standard Error	P-Value
INTERCEP	15.444	1.599	0.0001
EDUCATION	0.001	0.096	0.9922
AGE	-0.100	0.018	0.0001
GENDER	-1.834	0.416	0.0001
MARITAL	-0.023	0.501	0.9635
RURAL	-1.571	0.428	0.0002
EXVGHTST	-9.441	0.745	0.0001
GHTST	-6.719	0.791	0.0001
POVERTY	0.001	0.001	0.0609
TIME	0.101	0.007	0.0001
SATISFY2	0.421	0.425	0.3224
MEDICAID	6.302	1.218	0.0001
HIS	2.369	1.529	0.1213
PRIVINS	1.376	0.675	0.0417

P<0.0001
R-square = 0.1644
Adjusted R-square = 0.1599

About one in 10 adults indicated they had been hospitalized at least

once during the past year. Medicaid respondents were over four times as likely

to be admitted to the hospital than the uninsured. Because the Medicaid adult

population is comprised of women who are of child bearing age and the

medically needy, this finding is not surprising. Based on these results, having any type of coverage increases the likelihood of being hospitalized. Table 33 illustrates that Indian Health Service respondents were over twice as likely as the uninsured to be hospitalized; similarly, the privately insured respondents were over one and a half times more likely to be hospitalized. These findings suggest that insurance serves as a gatekeeper for hospitalization.

Younger adults are more likely to be hospitalized than older adults. This finding may be attributable to the large proportion of hospitalizations related to births. In addition, employed respondents were about 74 percent as likely as the unemployed respondents to be hospitalized. This difference may be attributable, in part, to mothers not working outside of the home while raising their children or perhaps the unemployed respondents were not as healthy as their employed counterparts.

Poverty level does not appear to influence whether or not people were admitted to the hospital with an odds ratio of one. This finding is not consistent with the literature that contends that people who come from low poverty levels are generally more ill than people from high poverty levels; therefore we would expect to see an inverse relationship between hospital admissions and poverty levels. However, the relationship of poverty level to hospital admissions may be more greatly influenced by the person's health insurance status than their health status. Millman (1993) has reported that uninsured patients have been denied admission to a hospital solely because of their insurance status. Because people at low poverty levels are more likely to be uninsured or have

public health insurance, their health insurance status may influence whether or not they are admitted to a hospital. On the other hand, if a positive relationship existed between poverty level and hospital admission in addition to an odds ratio above one, it would indicate that people's ability to pay was pivotal to hospital admission.

Table 34

Logit Model Estimate for Hospitalizations Among Adults

Variable	Parameter Estimate	Standard Error	P-value	Odds Ratio
INTERCEPT	-1.285	0.032	0.0001	.
AGE	-0.015	0.000	0.0001	0.99
GENDER	-0.385	0.013	0.0001	0.68
RURAL	-0.226	0.012	0.0001	0.80
POVERTY	0.000	0.000	0.0001	1.00
IHS	0.709	0.043	0.0001	2.03
PRIVINS	0.575	0.022	0.0001	1.78
MEDICAID	1.388	0.030	0.0001	4.01
TIME	0.005	0.000	0.0001	1.01
SATISFY	0.156	0.012	0.0001	1.17
EXVGHTST	-0.920	0.019	0.0001	0.40
GHTST	-0.676	0.021	0.0001	0.51
MARITAL	0.248	0.015	0.0001	1.28
EMPLSTAT	-0.308	0.013	0.0001	0.74

Dependent Variable = Hospital
Number of Observations = 2,833
Sum of Weights = 318,114

Three variables were found to be significant in the multiple regression model for adults with one or more hospital admissions as displayed in Table 35. Time to provider was found to be slightly correlated with hospital admissions having a parameter estimate of 0.008 (p<0.001). Marital and rural

variables generated negative parameter estimates indicating that multiple

hospitalizations were higher among single adults and those residing in urban

areas. Married respondents on average had 0.23 fewer hospitalizations than

single respondents and rural residents on average had 0.24 fewer

hospitalizations.

Table 35

Multiple Regression Model Examining the Characteristics for Adults Admitted One or More Times to the Hospital

Variable	Parameter Estimate	Standard Error	P-Value
INTERCEP	2.069	0.365	0.0001
EDUCATION	-0.032	0.022	0.1378
AGE	-0.002	0.004	0.6503
GENDER	-0.107	0.098	0.2749
MARITAL	-0.230	0.112	0.0397
RURAL	-0.241	0.101	0.0170
EXVGHTST	-0.111	0.153	0.4693
GHTST	-0.011	0.156	0.9449
POVERTY	-0.000	0.000	0.2740
TIME	0.008	0.001	0.0001
SATISFY2	-0.066	0.097	0.4948
MEDICAID	0.317	0.215	0.1413
INDIAN HEALTH SERVICE	-0.092	0.329	0.7792
PRIVINS	-0.033	0.169	0.8460

p<0.0001
R-square = 0.2522
Adjusted R-square = 0.2269

4.5.7 Elderly

The majority of the elderly (84%) made at least one visit to a health care professional during the year previous to the survey. Health status appears to be less of a predictor for the elderly than other adults because those with excellent and very good health were just 2 percent less likely than those with fair or poor health to visit a health care professional. This finding indicates the elderly of all health statuses are seeking ambulatory care.

Rural elderly are over three times as likely as urban elderly to visit health care professionals. This finding is opposite of what was found for rural adults; the rural adults were less likely to make a visit than their urban counterparts. Perhaps the rural elderly do experience more health problems than urban elderly as suggested by Gesler & Ricketts (1992). Additionally, because they are not accessing health care as frequently when they are younger adults, they may require more health care as they age. Rural adults also may perceive themselves to have more time to visit a health care professional due to retirement in addition to Medicare helping to defray the costs of health care. Interestingly, the time it takes to travel to a health care visit did not appear to hinder their utilization.

Table 36 displays results from the multiple regression model examining the characteristics of the elderly who had at least one health care visit produced only three significant variables (p<0.05). As expected, elderly with excellent, very good or good health status on average made fewer ambulatory

visits than those with fair or poor health status (5.4 fewer visits and 3.3 fewer

visits, respectively). The satisfaction with health care services produced a

-2.332 parameter estimate. This finding indicates that elderly who reported not

being satisfied with their health care services actually had on average 2.3 more

ambulatory care visits than the satisfied elderly. One possible explanation for

this finding is that the unsatisfied elderly attribute their health problems to their

health care provider. This population also may be more likely to suffer from

hyperchondriasis in which frequent visits are made to the health care provider

with no perceived resolve.

Table 36

Multiple Regression Model Examining Characteristics of Elderly Who Visited a Health Care Professional At Least Once During the Previous Year

Variable	Parameter Estimate	Standard Error	P-Value
INTERCEP	14.663	6.314	0.0215
EDUCATION	-0.247	0.177	0.1650
AGE	-0.043	0.073	0.5600
GENDER	-0.867	0.986	0.3807
MARITAL	0.011	1.222	0.9926
RURAL	2.283	1.193	0.0575
EXVGHTST	-5.390	1.244	0.0001
GHTST	-3.274	1.212	0.0077
POVERTY	0.00	0.002	0.7035
TIME	-0.004	0.008	0.6666
SATISFY2	-2.332	1.052	0.0281

$p < 0.0001$
R-square = 0.2060
Adjusted R-square = 0.1561

When hospital admissions were examined for the elderly, almost one in five (19%) reported being hospitalized during the previous year. Rural elderly were over five times as likely as urban elderly to be hospitalized. Coupled with the rural elderly's higher utilization rates of health professional visits, it appears that rural elderly experienced more health problems than the urban elderly. There may be a number of factors contributing to this difference in health care seeking behavior. One possible reason for the greater likelihood of rural adults being hospitalized is that the rural elderly may not have familial support or other support, such as home health care services, when they are ill or recuperating from surgery. Likewise, physicians may admit rural elderly to the hospital more frequently than urban elderly because of travel distances. Another reason for higher hospital admission rates may be attributed to the rural elderly's poorer overall health status (Aday and Andersen, 1984).

Marital status had a significant impact on hospitalization. Married elderly were over six times as likely as single elderly to be hospitalized. It appears that the married women are the cohort who are hospitalized. Elderly men are 37 percent as likely as elderly women to be hospitalized. This finding is consistent with studies that report elderly women have multiple chronic health conditions which increases the frequency of hospitalizations (Braden & Beauregard, 1994).

A linear model examining hospital admissions for the elderly is not discussed here due to insignificant findings.

4.6 Summary

This chapter provided a description of the various demographic variables in the study. Findings related to the study questions and hypotheses were discussed. In addition, all hypothesis that were rejected were discussed.

CHAPTER 5

CONCLUSIONS

The purpose of this study was to examine access to health care in North Dakota by addressing issues related to health insurance coverage and the utilization of medical care. Data relevant to these two areas were analyzed and discussed in the preceding chapters. The analysis was conducted to determine how geographic and financial factors impacted access and utilization of health care services in North Dakota. Based on the findings of this study, this chapter presents a review of the study limitations, summary of the study, policy implications, and recommendations.

Access to health care continues to be a hotly debated policy issue. As resources to expand health care access become increasingly limited, it is essential that the health policy options chosen by policy makers are the most efficacious. Thus, policy makers must have empirical evidence upon which to base their health policy decisions. Anecdotal data often contributes to the misdiagnosis of a problem; policies based on this misdiagnosis may in fact exacerbate the very problems the policies were intended to address. An impetus for The Robert Wood Johnson Family Survey was to collect data about North Dakota's health insurance coverage and health care utilization to provide empirical evidence upon which North Dakota policy makers could make health policy decisions.

North Dakota, like many other states, has implemented various fragmented health policies intended to expand access to health care. Most of these policies allocated limited dollars intended to enhance geographic access to health care services by enticing health care providers to practice in "underserved" areas. The majority of North Dakotans attending the North Dakota Health Task Force's community meetings (59%) identified geographic access problems as the primary health care issue facing the state (North Dakota Health Task Force, 1995). Based on the policy makers' choices and the public's beliefs, health policy in North Dakota has been driven primarily by anecdotal data with little or no empirical evidence. The Robert Wood Johnson Foundation Family Survey was the first comprehensive survey conducted in North Dakota that simultaneously examined health insurance coverage and health care utilization. The survey data collected were intended to provide the empirical basis for the development of health care reform strategies and ultimately, guide the direction of health policy for North Dakota.

5.1 Findings

Findings from this study were generalized to the study population, the non-institutionalized population of North Dakota. Based on the study's findings, characteristics of this population are summarized as follows:

A majority of the respondents (54%) reside in rural North Dakota counties. The mean age of the residents is 38 years of age. About 61 percent of the

population is employed. North Dakota has the highest rate of part-time employment in the country (North Dakota Job Service, 1995).

Compared with the national average, North Dakotans' family income is lower. While North Dakota's mean annual family income was $38,514 in 1992, the mean national family income was about 16 percent higher at $44,951 (North Dakota State University Census Data Center, 1997).

North Dakota's rate of uninsured at 9.9 percent of the non-institutionalized population is lower than the nation's uninsured rate of 15 percent (Millman, 1993). Compared to the other nine states in the RWJF Family Survey, North Dakota had the highest rate of private health insurance coverage. Conversely, North Dakota had one of the lowest rates of employer based insurance, indicating that North Dakota employers are either unwilling or unable to provide health insurance for their employees. It appears that some employees and self-employed people are purchasing health insurance coverage through the private health insurance market.

Based on the results of the survey, all North Dakotans under the age of 65 are at risk of being uninsured. The highest proportion of uninsured North Dakotans are young adults ages 18 to 35, a finding that is consistent with national studies (Patrick et al., 1988). Numerous studies have cited various explanations for this cohort's lack of insurance which include: college students who are no longer covered under their parents' health insurance; workers employed in low-wage positions that traditionally do not offer health insurance (e.g., some positions in the retail industry); workers employed part-time who do

not qualify for health insurance benefits; and a lack of recognition that one needs to purchase health insurance if it is not provided by the employer (Long & Marquis, 1996). Young adult males are more likely to be uninsured than females. This difference may be due to females obtaining public or private health insurance in anticipation of childbirth. Yet, a fairly high proportion of children and older adults also are uninsured.

About 9 percent of children have no health insurance. These children are most likely to reside in rural North Dakota counties. This finding is consistent with other studies that report rural people in general are more likely to be uninsured than their urban counterparts (Hicks, 1992). An interesting finding regarding children was that poverty level did not appear to be a significant predictor for health insurance status as it has been documented in other research (Aday and Andersen, 1984). This finding may be attributable to rural and urban families having similar incomes but working in different industries. Additional data need to be gathered regarding children's families, such as parents' employment, in order to better understand why some children have no health insurance.

Employed adults have a distinct advantage over unemployed adults for having health insurance coverage. Because health insurance often is included as part of an employee's compensation package, employed adults are most likely to obtain their health insurance through their employer. However, employers in small firms with less than 25 employees are the least likely to offer health insurance to their employees. This finding was confirmed in the RWJF

Employer Surveys as well as other surveys (Long & Marquis, 1996).

Historically, it has been difficult for the small employer to obtain small group

coverage due to the high cost of small group health insurance premiums and

underwriting of employees (Lipson, 1996). The Kassebaum-Kennedy Bill

included some small group insurance reform; however, the legislation has not

been enacted long enough to determine its effectiveness in extending coverage

in the small group market.

Unemployed adults also experience difficulties in obtaining health

insurance; a finding consistent with other studies (Aday and Andersen, 1984).

Among this cohort, unemployed males and rural dwellers were the most likely to

go without health insurance coverage.

A small group of elderly women (1%) was found to be uninsured. These

uninsured elderly women were most likely to be unmarried and residents of rural

counties. There is very little documented about this uninsured group because

Medicare covers almost the entire elderly population. It is possible, however, for

the uninsured elderly to purchase Medicare Part A and Part B if they do not

qualify for Medicare coverage but few of the uninsured elderly are willing or able

to purchase this coverage (Cheney, J., personal correspondence, May 16,

1997).

Results from study question two indicated that those with health insurance

reported fewer health limitations than the uninsured. Some research has

suggested that the uninsured population have greater health needs than the

insured population (Aday, 1993). This contention may be related to employment

status and the "healthy worker" phenomenon which implies that people who are employed are healthier than those who are unemployed. Thus, a person's health status may be the determining factor for his or her employment status.

Health status appears to discriminate based on a person's poverty level and insurance status. Evans (1994) argued that as poverty levels increase, health status improves. This relationship between poverty level and health status exists throughout the world, regardless of the type of health care system. The "stresses" of day to day living for those socio-economically disadvantaged appear to take their toll on health status. Therefore, any policies intended to improve the health of the population must also consider improving economic factors and not solely focus on the availability of health care services. For North Dakota, health policies must strike a balance between improving the economic viability of its citizens and improving access to health care services if the intent of health policy is to improve the health of North Dakotans.

Another interesting finding was that the uninsured report lower health status than the insured. It is not clear whether insurance status influences health status or health status influences insurance status. Other studies have provided evidence that people have been denied access to health insurance due to pre-existing health conditions; therefore, policies aimed at eliminating insurers' ability to discriminate based on health status may decrease the proportion of uninsured. However, in order for a community rating system, a system which does not discriminate on the basis of health status, to be effective and affordable, all insurers must provide community rating for their clients. Under

this system, healthy individuals would be subsidizing the less healthy individuals by paying the same premiums as those who use more health care services. Blue Cross Blue Shield health insurance plans used to insure individuals using community rating but most have discontinued this practice due to the competition of the for-profit health insurers. One policy option is to include an entire population under a community rating by mandating that all individuals purchase health care insurance. At this time in North Dakota, there is no political support to impose any public mandates. Without a mandate, it is virtually impossible to achieve universal health insurance coverage.

Results of data analysis for hypotheses related to study question four indicate there is a difference among North Dakotans who forego emergency and non-emergency health care based on health insurance status. Overall, the uninsured were more likely to forego health care than those with some type of health insurance. This difference was most profound when non-emergency services were examined. Studies by Ricketts and others (1994) report that the uninsured forego health care until the condition becomes an emergency when they seek care in emergency rooms, the most expensive health care delivery setting. Based on these results, most uninsured North Dakotans appear to be using emergency services when they feel they are needed but some are going without needed non-emergency health care.

The majority of North Dakotans appeared to be satisfied or somewhat satisfied with the health care services they had received; however, the uninsured reported more dissatisfaction than the insured. This finding was not surprising

because the uninsured experience more difficulties obtaining health care services than the insured (Millman, 1993). As managed care becomes a more dominant player in the health care market, it will be interesting to compare the satisfaction levels of those participating in fee-for-service plans and managed care plans with the uninsured. Maintaining comprehensive databases on patient satisfaction and outcomes will help guide health care market policy.

A greater percentage of the insured respondents reported having a regular health care place than the uninsured respondents. In addition, the uninsured were most likely to identify their usual source of health care as hospital out-patient clinics whereas the insured identified physician practices most frequently. Consistent with studies by Hicks (1992), the uninsured were almost four times as likely as the insured to report that the hospital emergency room was their main health care source.

Among the respondents who indicated they did not have a regular source of health care, over half stated they did not need a doctor. Yet, the most frequent response among the uninsured was not having health insurance or unable to afford health care; financial barriers prevent the uninsured from establishing a regular health care source. Lack of financial resources also was reported by over 11 percent of the insured respondents as the reason for not having a regular source of health care. A surprisingly small percent of respondents (1%), all of whom were insured, reported that health care was too far away. Based on these responses, geographic barriers do not appear to hinder access to health care and policies directed at improving geographic

access without addressing the financial aspects of health care access appear to be misdirected.

Utilization of ambulatory and hospital care differs among North Dakotans. Children were least likely to seek health care in ambulatory settings. Less than half of the children (45%) sought ambulatory health care compared to 82 percent of adults and 84 percent of elderly. Hospitalizations were reported by 5 percent of the children, 10 percent of the adults and 19 percent of the elderly. The utilization patterns for North Dakotans were comparable to national studies although children's utilization of health care was somewhat lower (Aday and Andersen, 1984).

Children who had at least one ambulatory visit were more often female, residing in urban counties and were covered by Medicaid or private health insurance. Children who reported using ambulatory care saw health care providers an average of five times during the previous year. Children with the most visits were likely to be covered under Medicaid, a population that traditionally has higher utilization. However, it is interesting to note that children served by the Indian Health Service were less likely to have an ambulatory care visit than the uninsured. This finding supports the concerns raised by Native Americans regarding the adequacy of the Indian Health Service (Friedman, 1994). The Native Americans living on North Dakota's reservations are among the poorest of all Native American nations and we would expect this population's health care utilization to resemble the Medicaid utilization rates. However, utilization of Native American traditional medicine was not ascertained in this

survey which may supplement health care services provided by the Indian Health Services. Additional research examining the use of Native American traditional medicine is needed to help policy makers better understand the relationship of traditional medicine and Western medicine. This awareness would enhance policy makers ability to develop health programs that recognize the cultural significance and contribution of traditional medicine to Native Americans' health.

The adult population's ambulatory care utilization rate is considerably higher than children's (82% versus 45%). Similar to children, adult Medicaid respondents were the most likely to have an ambulatory care visit. Among adults with at least one ambulatory care visit, adults with Medicaid and private health insurance were the most likely to have multiple visits. Proximity to health care providers does not appear to be a problem because the time to provider was positively correlated with multiple visits. However, respondents with multiple visits may be seeing specialists who are usually located in regional centers necessitating longer travel times. Adults who were younger than average, who were female and resided in urban counties had the greatest number of ambulatory visits. This finding is consistent with what would be expected because female adults would have a higher utilization rate than males due to issues related to child bearing.

One in 10 adults reported at least one hospitalization during the previous year. Medicaid respondents were the most likely to report being hospitalized. Based on the population of adults who are enrolled in Medicaid, primarily pregnant women and the medically needy, this finding is consistent with

expectations of this population's health care needs. Moreover, having any type of health insurance increased the likelihood of being hospitalized after controlling for health status.

The elderly had the highest percentage of ambulatory care utilization (84%) among all respondents. Interestingly, self-perceived health status' association with utilization was not statistically significant. One possible reason for this is that self-perceived health status as measured in this study is not a sensitive measurement for health care needs. Rural elderly were found to significantly be more likely to have an ambulatory care visit than the urban elderly; a finding that contrasted utilization patterns in the other age cohorts. Yet, travel time to providers did not appear to limit their utilization suggesting that the rural elderly seek ambulatory care from providers located in rural communities.

5.2 Limitations of the Study

Factors, such as the study design, data quality, and data analysis potentially limit any study's findings and policy implications. Therefore, it is essential that the limitations of this study be addressed in order to draw conclusions and develop policy recommendations that are appropriate to the scope of the study.

First, the cross-sectional non-experimental study design is weak in producing evidence of causal relationships. This study design can only infer

causal relationships; causal relationships cannot be proven. Moreover, the analysis of causal relationships between explanatory and dependent variables are based on theory and previous empirical findings.

Second, generalizing these findings to other time periods or should be limited. The objective of this study was to examine access and utilization of health care services in North Dakota. Because factors pertinent to health care are dynamic, such as changes in health insurance status and availability of health care providers, findings from this study can only be generalized to a short period of time. In addition, if the results of this study are generalized to a different population, the population should resemble the North Dakota study population. Therefore, results of this study should only be generalized to North Dakotans with similar characteristics to those living in North Dakota during a similar time period.

Third, the analyses of health care utilization are based solely on the demand side of health care. A comprehensive analysis examining both supply and demand of health care may provide more insight into factors that affected utilization behavior. For example, supply side data may provide information on how physicians influenced utilization.

5.3 Recommendations for Future Studies

This study presented data from the Robert Wood Johnson Foundation Family Survey which were intended to examine North Dakota's health insurance

coverage and health care utilization rates. When this study was developed, there was an anticipation that an extensive overhaul of the health care system would ensue. However, state and national political agendas shifted between the development of the survey instrument and the analysis of the data. Instead of considering a complete overhaul of the health care system, an incremental approach, relying on free market principles, was adopted. To determine how well these polices have worked to increase access to health care, it would be interesting to conduct this survey in 1998 following implementation of all of the health care reform legislation that has been enacted. In addition, this follow-up study could be expanded to explore issues regarding inadequate health insurance coverage, an issue not explored in this study.

The future holds many economic and health challenges for North Dakotans. The winter of 1997 has been devastating for the state's ranchers due to the enormous loss of livestock which is predicted to force many families into bankruptcy (Bismarck Tribune, 1997). Additionally, the 1997 flood has impacted the economic viability of the entire state while directly affecting over 20 percent of the state's population. Historically, when devastation has impacted large numbers of people, there has been an increase in the need for health care services. For example, Nebraska went from having the lowest rates of psychological distress in 1981 to the highest in 1986 when the economy plummeted and many farms were lost to bankruptcy (National Mental Health Association, 1988). The need for health care services is anticipated to increase following this disastrous winter and spring; policy makers must consider how

increased demand is going to impact the health care system and ultimately the health of North Dakotans.

5.4 Policy Implications from this Study

Based on the findings from this study, North Dakota should consider evaluating its current health policies. Policy implications from this study include developing health policies and programs that address financial access issues related to health care and designing a comprehensive health information system that incorporates both health insurance coverage and health care utilization data.

1) One program option that may help to reduce the number of uninsured children at a low cost to the state would be to expand the North Dakota Blue Cross Blue Shield Caring Program. This program currently provides free primary health care coverage to "gap kids", children whose family incomes do not qualify them for Medicaid but are 150 percent or below the Federal poverty level. The premium dollars for the program are privately raised and North Dakota Blue Cross Blue Shield pays for all administrative costs of the program. In addition, health care providers, physicians, dentists, and mental health care providers, provide care to the Caring kids at a discounted rate. With the public sentiment to forge more public/private partnerships, this program seems like an appropriate avenue to extend health care coverage for children. In addition, the cost per child is about $350 per year in contrast to about $1,100 per year for Medicaid. However, the benefits are limited and

an increase in the number of children may discourage some providers from discounting their services.

2) Adults working in small and medium firms were more likely to be uninsured than adults working in large firms which indicates employers either are unable or unwilling to provide health insurance for their employees. One option would be for the state to open the public employee insurance plan to employers in small and medium firms. Because the state of North Dakota is one of the largest purchasers of health insurance, there are over 40,000 people covered in the NDPERS plan. With this large of a pool, community rating can be used which will help to provide lower cost premiums than those available in the small group market and also stabilize the cost of premiums. In addition, due to the large number of self-employed farmers and ranchers in the state, the self-employed may also be considered to join the NDPERS plan.

3) One possible option would be to offer uninsured elderly women access to PERS because their anticipated higher utilization should not significantly impact the group's experience. However, the state may want to purchase additional stop-loss coverage, insurance coverage for health insurance pools that limits the exposure of the pool, to offset any high utilization costs associated with these women.

4) Resources should be allocated to design a health information system that incorporates both health care coverage and health care utilization data. Currently, the North Dakota Health Care Claims Database captures claims

data for UB-92 and HCFA 1500 claims from Medicaid, Medicare, North Dakota Blue Cross Blue Shield and 11 other commercial carriers and health maintenance organizations. However, data on the uninsureds' health care utilization is needed to better design policies to address this vulnerable population's health care needs.

Based on the findings of this study, developing policies that make health insurance and health care more affordable are key to increasing access to health care. This policy objective is supported by the findings from both this study and other empirical studies (Ricketts et al., 1994). These findings indicate that individuals with health insurance have a regular source of health care and are more likely to use health care than the uninsured. Additionally, some of the insured identified cost as a barrier to having a regular source of health care. Co-payment schemes designed to curb health care utilization should be carefully constructed not to become barriers to obtaining health care services.

Tough times require thoughtful action. Precious resources must be targeted to improving access to health care services based on empirical findings and not anecdotal data. As local, state and federal governments are continually challenged to do more with less, the impetus for gathering quantitative data and producing information that evaluates the success of past policies as well as predicting future behavior become paramount. The World Health Organization summarized it well, "The road leading to health for all by the year 2000 passes through information" (Wolfson, 1994). It is imperative that resources be

allocated for empirical research that serves as both summative and formative

evaluations of the entire health system.

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APPENDIX

Computer Disk of Survey Questions