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A Comparison of the Utilization of Health Services in the Presence or Absence of Prescriptive Drug Insurance in a Managed Care Environment

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A COMPARISON OF THE UTILIZATION OF HEALTH SERVICES
IN THE PRESENCE OR ABSENCE OF PRESCRIPTIVE DRUG
INSURANCE IN A MANAGED CARE ENVIRONMENT

by

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ABSTRACT

A COMPARISON OF THE UTILIZATION OF HEALTH SERVICES IN THE PRESENCE OR ABSENCE OF PRESCRIPTIVE DRUG INSURANCE IN A MANAGED CARE ENVIRONMENT

Martha Groblewski
Old Dominion University, 1995
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This study tested if the availability of third party payment for prescriptive drugs as part of employer sponsored health insurance was associated with a change in the utilization of four types of health services in an independent practice association (IPA). The study employed the individual determinants component of the Andersen-Newman theoretical framework for health services utilization. Groups of employees in companies that offered health insurance identical in all ways except for the presence or absence of the prescriptive rider were included in the study which resulted in a population of 122 companies (89 with prescriptive rider insurance and 33 without prescriptive rider insurance) involving 931 members. Two years of claims data were analyzed to identify differences in utilization of primary care providers, urgent care centers, emergency departments and hospitals. Using measures of central tendency to evaluate expenditures, utilization of the relatively lower-cost health services such as visits to the primary care provider and urgent care centers was greater in

the group of companies offering the rider benefit than the group of companies that did not include prescriptive drugs as part of the health care benefit. The two groups experienced similar utilization of emergency departments. The average expenditure per company for hospital utilization was 67.8% lower in the group with prescriptive insurance as compared to the group without prescriptive insurance. Taken together, average expenditures per company for the four health services totaled \$1573 more for the group without prescriptive insurance as compared to the group with prescriptive insurance. The results of this study suggest that the patient with financial barriers to prescriptive medication may not be utilizing office visits to the primary care provider or urgent care center and raises a question regarding the more costly hospital services that may result.

DEDICATION

This work serves as partial fulfillment of the requirements for the degree of Doctor of Philosophy from Old Dominion University. Neither this document nor the other degree requirements would have been completed without the encouragement and support of my best friend and husband, Harry P. Creemers. I am grateful for his confidence in my ability to return to school and his championing of my attempt to accomplish a lifelong goal. My pursuit of learning changed our lifestyle and focus. Harry's support for my work never wavered. The dedication of this work to him serves as a small attempt to thank him for his belief in me.

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CHAPTER ONE

INTRODUCTION

Tremendous changes have taken place in the United States health care delivery system in the past decade. America's health care system is in flux unlike ever before. In the conventional model of health care delivery, referred to as fee-for-service, providers of health care bill patients for health services received. Frequently, third party payers, in the form of work site health insurance, pay the fee. In this model the insurance company assumes the risk that the premiums charged will cover the cost of health care, administrative costs, and will result in a profit. Rapid increases in health care costs, disparities in the delivery of services, and a generalized slowing of economic growth have resulted in an increase in uncompensated care--health care rendered without financial reimbursement. As a result, providers of health care are shifting the costs of uncompensated services to the payers of health care. These factors have promoted the development of new finance and delivery mechanisms for medical care delivery. An emerging model, referred to as managed care, is a system of health care delivery that tries to manage the cost, quality and access to health care by providing reimbursement, usually at a fixed rate, to a panel of health care providers contracted

to provide preauthorized health care services (Kongstvedt, 1993). In this model, the financial risk of providing health care shifts to the provider.

Theoretical models exist that have been used to explain the accessing of health services. Many of the referenced models were developed in a fee-for-service health care environment that is changing (Merriman & Nyberg, 1993). Several authors (Mckinlay, 1972 and Cummings, Becker and Maile, 1980) have attempted to compare and contrast the most widely referenced health service utilization models, including Rosenstock's Health Belief model, Green's Adoption of Health Beliefs model, and Andersen's Utilization of Health Services framework. Policy makers raise the question: Do these frameworks apply when the financial risk for health care shifts to the provider?

THEORETICAL FRAMEWORK

The theoretical framework this study employed is based on the model developed by Andersen (1968) and refined by Andersen and Newman (1973) and now referred to as the Andersen-Newman framework. The framework suggests that a sequence of conditions contribute to the utilization of health services. The framework proposes that utilization of health services is a function of three determinants; the norms and technology of a society, the resources and organization of the health service system, and individual determinants. The individual determinants include 1)

predisposing, such as health belief, age, sex, and ethnicity; 2) enabling, such as access to and availability of services, the presence of health insurance, and income and; 3) the need for health care or illness level, as perceived by the individual. The Andersen-Newman framework suggests that the last condition in the sequence of determinants to the utilization of health services is the amount of choice, or discretion, the person has in the decision to seek health services. Behavior that is highly discretionary involves considerable choice.

This framework was selected for use in this study because of its reported sensitivity to both societal forces and the health care service system. The study tested the framework's application in an Independent Practice Association (IPA) managed care environment where the provider assumes the financial risk of health care.

PROBLEM STATEMENT

An example of a major change in the United States health care financing system is in the area of payment for pharmaceuticals. Research and technology have resulted in the development of new and improved drugs that are central components of prevention and treatment of illness in medical practice. The expense of the development and testing of these drugs is enormous and the out-of-pocket cost for these medications are often greater than the cost of the primary care visit (Reutzel, 1993). As the average cost of

prescriptive drugs has increased, there has been an increased demand for third party coverage for pharmaceuticals. In 1969, 12% of third party payers in the United States covered prescriptive drugs used on an outpatient basis (Smith, 1993). In 1981, 30% of health benefit plans included outpatient drugs. By 1991, 50% of the population that had employer sponsored health insurance had prescriptive drug insurance (Reutzel, 1993). Levy (1992b) reported that 95% of companies in the United States with 100 or more employees offer prescriptive drugs as part of the health benefit package.

While health and prescriptive drug insurance are viewed as important benefits in the workplace in America, as many as 58% of all business employers do not offer health benefits (Folland, Goodman, and Stano, 1993). Companies pay an additional cost to offer the drug rider component of the health benefit package. The added cost of the drug benefit may make the health plan unaffordable. The business employer may opt to eliminate the benefit or forgo health insurance altogether.

According to Reutzel (1993) there are several consequences that the person without prescriptive drug insurance may experience. The person may not seek health services knowing he or she will not be able to access prescribed medication or needed medication may not be prescribed when the physician believes the patient could

have difficulty affording a drug. The patient may leave the primary care provider's office with a prescription for medication but must make a choice, sometimes based on cost, to have it filled or not. A pharmacy can choose not to dispense a medication because of the patient's inability to pay for the prescription. Little research exists on the consequences of these barriers to acquiring medication and the resulting health status or treatment outcomes (Levy, 1992b).

Many of the studies done to determine the need for health services in the absence of drug insurance have focused on the Medicaid population. Health services utilization as affected by the presence or absence of prescriptive drug coverage as part of work site health insurance, has not been reported in the literature.

PURPOSE

The study had two purposes. First, it evaluated the applicability of the Andersen-Newman theoretical framework in an IPA, managed care environment. Second, it explored the relationship between prescriptive drug insurance and the utilization of specific health services.

This study evaluated the utility of the theoretical framework proposed by Andersen-Newman (1973) in the explanation of the utilization of selected health services in the absence or presence of prescriptive drug insurance by testing if third-party payment for pharmaceuticals was

associated with a change in the utilization of other health services in an IPA form of managed care. The study analyzed data to determine the utilization of health services associated with alterations made to employer sponsored health insurance.

SIGNIFICANCE

Because of emerging finance mechanisms for the payment of health services, previous models used to explain or predict health care utilization needed reevaluation. The study results can be used to better understand if the framework of health services utilization proposed by Andersen-Newman is applicable in an IPA managed care environment. The significance of this study comes from determining if the demand for health care in a managed care environment follows the sequence described by Andersen-Newman.

Because of the expense, prescriptive drug insurance plays a significant role in the accessing of prescriptive medications. Patients without prescriptive drug insurance may fail to secure the medication from the pharmacist (Levy, 1992b). However, as employers and other payers of health care are beginning to scrutinize health benefits plans in an effort to reduce the cost of the premium, the prescriptive rider is one element in the mix of costs that is coming under review.

Questions remain about the clinical consequences of

barriers to prescribed medication and the need for other health services. Little is known about the long-term consequences of the outpatient prescriptive drug benefit as part of health insurance and the associated utilization of other health services such as hospitals, emergency departments, urgent care centers and visits to the primary care provider.

The prescriptive drug benefit, for most providers of managed care, costs more to offer than it earns as part of the insurance premium (Blissenbach, 1993). The influence of prescriptive drug insurance in the utilization of health services needs evaluation. This study generated data needed to help in the understanding of the role of drug access on the utilization of other health services in an IPA, managed care environment.

RESEARCH QUESTION

Andersen and Newman (1973) state that as the proportion of medical care expenditures is covered by health insurance, access to health care is assumed (their word) to increase. Since health insurance is available through a variety of plans, policy planners should know to what degree an insurance plan can be altered before other health service utilization is affected. To test the utility of the Andersen-Newman framework in predicting the utilization of health services in an IPA managed care environment the following question was studied: "Does the presence or

absence of prescriptive drug insurance as part of a basic health insurance plan have any affect on the utilization of other health services?"

DEFINITIONS

Definitions of terms used in this study are as follows:

Emergency department utilization--Health services received at an emergency department of a hospital by members of the health insurance plan. This does not include ambulance service. This variable will be measured based on the dollar amount of insurance claims paid to the IPA for those services. This is a dependent variable of the study.

Group--Group refers to one of two treatment levels for the independent variable; groups of companies that have prescriptive drug insurance and groups of companies that do not have prescriptive drug benefit as part of the health insurance plan made available by the company.

Health services of interest--Health services of interest in this study are hospital services, emergency department services, urgent care center services, and visits to the primary care provider.

Hospital utilization--All hospital services received by members of the health insurance plan. This will include inpatient and outpatient insurance claims associated with hospital utilization. This variable

will be measured based on the dollar amount of insurance claims paid to the hospital for those services. This is a dependent variable of the study.

Independent Practice Association (IPA)--An organizational structure through which physicians, who continue to maintain private practice, are contracted to participate in a health maintenance organization (HMO) medical plan. Payment to the participating physicians is based on a reduced fee schedule.

Office visits to the primary care provider--All reimbursable services provided by the primary care provider to members of the health insurance plan. This variable will be measured based on the dollar amount of insurance claims paid to the IPA for those services. This is a dependent variable of the study.

Prescriptive drug insurance--Health insurance that pays for part of the cost of outpatient prescription medicines, also called prescriptive drug rider. For the purposes of this study the rider requires a \$50 annual deductible with a \$10 copayment per prescription or refill obtained. This is the independent variable in this study.

Selected health insurance plan of study--A specific health insurance benefit offering health insurance coverage to subscribing companies and, in turn, their employees. The services are rendered through an IPA. Expenditures

for services will be generated by persons employed by the companies and are members of the health insurance plan. The plan is described in Appendix A.

Urgent care center utilization--Health services being received at an urgent care center by members of the health insurance plan. For reimbursement, these visits must be pre-approved by staff from the managed care center. This variable will be measured based on the dollar amount of insurance claims paid to the IPA for those services. This is a dependent variable of the study.

Utilization--The utilization of health services of interest will be measured by the dollar amount of claims submitted by the health service provider and paid by the insurer over a two-year period.

ASSUMPTIONS AND LIMITATIONS

This study attempted to determine if a relationship exists between prescriptive drug insurance and the utilization of other health services. It was an epidemiological, retrospective study. The independent variable was not randomly assigned to each group, therefore selection bias is the major internal threat to validity. The study involved a population rather than a sample from a population. This limits the findings generalizability.

Companies enrolled in a specific health insurance plan were the subjects of this study. The study reported on two

years of expenditures for health services experienced by members of the health insurance plan. The study focused on companies and did not control for the entry and exit of individual employees in the health insurance plan.

A condition of eligibility as a subject in the study was company location in an urban setting. However, it is not known if the employees of the companies studied lived in rural or urban environments.

Although expenditures were used as the measure of utilization of health services, this study was not intended to be a cost analysis. Expenditures for services of interest were compared between two groups and not against other cost factors.

It is not known if the persons who have prescriptive drug insurance is compliant, that is, if they get their medication and take it as prescribed.

The following assumptions were made regarding this study.

It was assumed that:

- the influence of prescriptive insurance has a small effect on the utilization of health services and the difference can be detected in the population of the study.
- claims data for health services reflect utilization.
- the comparison populations differ only in prescriptive drug insurance status and do not differ in other ways that could influence access to medication, such as income, health

belief, illness level, age, sex or other influences associated with health care access.

-turn-over of members in each group is equal;

-employees are not going outside of the IPA for their health care.

-the availability to the health services of interest was similar in both groups.

CHAPTER TWO

REVIEW OF LITERATURE

Interest in quantitative data on health services utilization in this country can be traced to the late 1920's. It was during that time concerns about cost and distribution of medical care prompted formation of the Committee on the Costs of Medical Care (CCMC). This privately funded, independent group of economists, physicians and public health specialists conducted a social survey of 8,758 families between 1928 and 1931 to determine hospital, physician, and dental services sought by the American public each year (Andersen, 1968). The CCMC published a report detailing information on such aspects of American medicine as national health expenditures and estimates on the need for health services for that time. This report included information on the unmet need for health services in the United States (Starr, 1982).

To further understand health services utilization from the turn of the century until 1960, Lerner and Anderson (1963) charted types of health services, trends in the utilization of health services and how health care was financed. Their work represented baseline information about health services utilization in this country.

Odin Anderson, working for the National Opinion

Research Center and the Center for Health Administration Studies of the University of Chicago and funded by the Department of Health, Education, and Welfare (DHEW), continued the investigation on health services utilization from 1953-1971. He conducted four parallel studies of random samples of the nation's families in 1953, 1958, 1964, and 1971. Those studies were conducted to identify the distribution of medical care in the United States according to age, income, ethnicity, and residence (Andersen, Greeley, Kravits and Anderson, 1972).

During the 1970's models to explain health seeking behavior were being proposed. The Carnegie Grant Subcommittee on Modification of Patient Behavior for Health Maintenance and Disease Control (Becker, Hafner, Kasi, Kirschet, Maiman, & Rosenstock, 1977) reviewed two decades (1955-1977) of research on determinants of health action. This review considered hundreds of research reports and articles to discover and understand health-related behavior. The frameworks used by the Subcommittee to systematically summarize this 20-year literature review included the works of Kasl and Cobb, Kosa and Robertson, Suchman, Mechanic, Fabrega, Andersen, Anderson and Bartkus, and Rosenstock and associates. The committee produced a model for explaining and predicting individual health-related behaviors. The model emphasized individual health beliefs and perceptions but did not address social forces to explain health behavior

(Becker et al. 1977).

Historical Development of the Framework

Proposed by Andersen and Newman

Ronald Andersen, working with Odin Anderson at the Center for Health Administration Studies, University of Chicago, served as the Study Director for the 1964 survey of the use of health services funded by the Department of Health, Education, and Welfare (DHEW) (Andersen, 1967). This study was designed to be comparable to similar studies done in 1953 and 1958 to show trends of health services, and included the variable of the absence or presence of health insurance.

From the analysis of these data Andersen devised a model of utilization of health services (Andersen, 1968) that ultimately became the individual determinants component of the Andersen-Newman framework. Anderson, in writing the Forward of Andersen's 1968 monograph, indicated that the model developed by Andersen had gone beyond any work that Anderson had done and should be considered as an expansion and deepening of the 1953 and 1958 studies (Andersen, 1968).

Andersen had reviewed models that had been proposed to explain the utilization of health services up to that time. He divided them into two categories 1) economic and 2) social-psychological. The economic models focused on how people access health services by translating their perceived need into economic demand for medical care. The social-

psychological models focused more on perceived need for health services. Andersen's behavioral model of families' utilization of health services sought to explain why families differ in the amount of medical care they consume by incorporating the concepts from both categories. The thesis devised by Andersen proposed that utilization of health services could be graphically demonstrated by a model composed of "predisposing," "enabling," and "need" determinants. The level to which each component contributes to explaining health seeking behavior differed by the type of health service being accessed. The underlying assumption of the model was that health services utilization is a result of complex, interrelated sets of factors. The model went beyond a description of utilization patterns. Andersen contended that his model incorporated elements of the social-psychological model, was sensitive to perceptions about health and illness and had an emphasis on the family as the unit of analysis. Economic and social factors were accounted for separately. Specific analysis by types of health services and specifying causal paths leading to health services utilization was characterized by flexibility in choosing to use the health service, described by Andersen as discretionary and non-discretionary behavior (1968). Discretionary utilization behavior was considered to involve considerable choice on the part of the family.

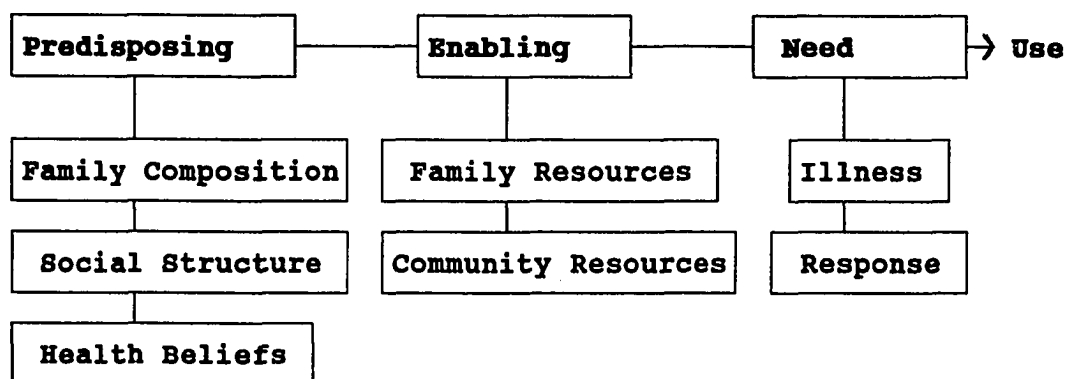
The model suggested that health services utilization is

based on a three-stage sequence of conditions. Use of health services is dependent on the predisposition of the family to utilization of services, the ability to access services, and the need for services. Further, the importance of each component depends on the discretion of the family. Table 1 is an illustration of the Andersen model.

Utilization of health services by a family is tied to the predisposition of a family to use health services. The family's composition, social structure and health beliefs comprise predisposing determinants. Family composition refers to the age, sex, family size, and marital status of family membership. Social structure reflects the location of the family in society as measured by employment, social class, occupation, education of the head of the family, race and ethnicity. Andersen noted that some of the characteristics may seem to be enabling elements, but for the purpose of the framework, social characteristics that largely "precede" the enabling determinant in time and are less subject to change are considered to be part of the predisposing determinants. Health beliefs are assumptions about medical care, care givers, and disease. It is differences in the health belief that explain why a family may be more or less predisposed to seek medical care.

The enabling determinant of the Andersen model refers to the condition that permits a family to act upon a value

**Table 1: Andersen's Utilization of Health Services Model,
Including Subcomponents.**



From Andersen, R., 1968, p. 14

or satisfy a need regarding health. In the framework enabling conditions are grouped into family resources and community resources. Family resources include income, savings, the availability of health insurance, having a regular source of care and the use of "welfare care." Community resources include the availability of services, the convenience of the source of care, and community norms for utilizing care. Andersen measured community resources by the physician-population ratio, hospital bed population, residence and region.

In the Andersen model the family must perceive illness or need for medical care if the health service system is to be tapped. Need represents the most important cause of health service utilization. Need is arranged into illness and response. In the Andersen model, illness refers to the report of a physical condition that is considered less than optimal. Illness is measured by health level, symptoms, disability days, and care received for major illnesses. Response to illness refers to how the family acts on the perception of illness. Since everyone does not engage the health service system for the same illnesses, response is measured by seeking medical attention and having a regular physical examination.

The final component of the model is the resulting use. Andersen (1968) first proposed that health service utilization could be characterized as discretionary and non-

discretionary. It is assumed that the more discretionary the behavior, the more important the predisposing and enabling determinants will be in explaining utilization. When need is the most important model determinant, family discretion is limited. Health services utilization is generally assumed to involve less discretion than the purchase of other consumer goods and services. Andersen proposed that within health services, discretion is least for hospitalization, and greatest for dental care, while physician services require intermediate discretion.

Andersen derived three hypotheses for his study to test the model. They are as follows:

Hypothesis I. The amount of health services used by a family will be a function of the predisposing and enabling characteristics of the family and its need for medical care. Each of the three components will make an independent contribution to the understanding of differences in use of health services.

Hypothesis II. The explanatory components of the model will vary in their contribution to the explanation of total use. Need will be more important than predisposing and enabling because it represents factors most directly related to use.

Hypothesis III. The contribution of each component will vary according to type of health services: (1) the contribution of need will be greatest for hospital services because these are defined as most necessary and the family has least discretion in choosing alternative actions; (2) the contribution of the predisposing and enabling components will be greatest for dental services because these are defined as least necessary and the family has most discretion in choosing alternative actions; (3) all of the components will contribute to understanding physician services because they are defined as less necessary than hospital services but more necessary than dental services. (Andersen, 1968)

Andersen used the 1963 nationwide social survey (Andersen and Anderson, 1967) as his data source. Andersen constructed seven scales and indices to measure the value of health services (1968). Andersen collected information from the heads of households, regarding that individual's perceived value of physicians, good health, health insurance, attitude toward health services, physician use, and knowledge of disease.

He concluded his first hypothesis was generally supported by the data analysis.

His second hypothesis testing if need would be the strongest predictor of health services utilization, also was supported. Need was shown to be the greatest predictor of utilization of health service even after the predisposing and enabling determinants were taken into consideration. In addition, predisposing determinants, generally, were found to be better predictors of utilization than the enabling determinants.

The third hypothesis contains three parts. Andersen concluded the contribution of the individual determinants did vary according to the type of health service. The determinant of need was the greatest predictor for hospital services. However, age of the youngest family member, which was a predisposing factor, was also a predicting condition. Andersen concluded that the results of his study indicated predisposing factors such as age are important predictors of

some types of services which are not highly discretionary.

Predisposing and enabling determinants contributed substantially to the explanation of variance in dental service utilization. Need was not found to be an important determinant to dental services utilization.

The prediction that each of the determinants would be important to explain physician use was only partially supported. The contribution of the enabling components were relatively small indicating that need and predisposing determinants were more important in predicting physician visits.

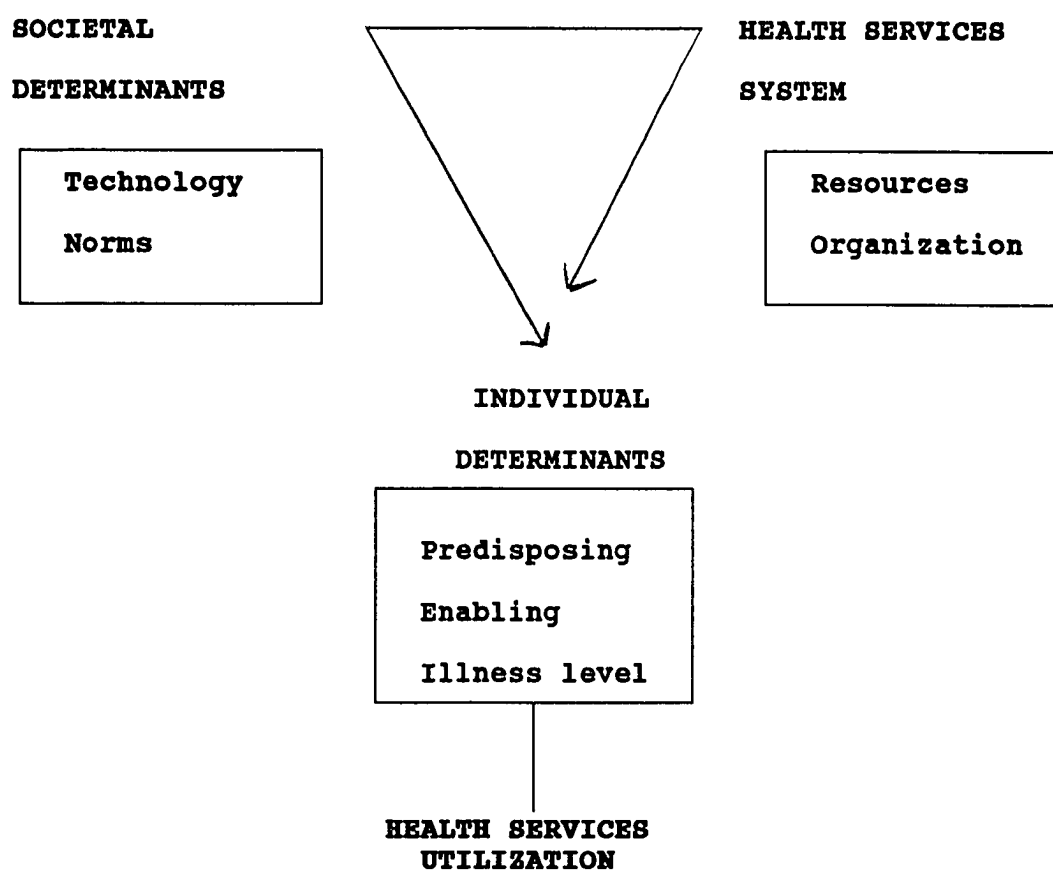
The concepts from Andersen's third hypothesis were incorporated into other models being developed to explain health services utilization. Andersen, Smedby & Anderson (1970) proposed a systems model in a comparative analysis of health care systems and accessing health care between the United States and Sweden. Newman (1971) provided an extension of the model with specific application to dental services.

Development of the Andersen model in collaboration with Newman appeared in 1973 (Andersen & Newman). Andersen and Newman indicated that most of the empirical studies and theories dealing with health services utilization at that time emphasized individual characteristics of the consumer and paid little attention to the community culture or delivery system. Together they suggested a framework for

viewing the utilization of health services taking into account 1) characteristics of the health services delivery system, 2) changes in medical technology and social norms relating to the definition and treatment of illness, and 3) individual determinants. The individual determinants component was Andersen's original model. The Andersen-Newman framework is illustrated using a triangle to develop the relationship between general societal forces, the health services system, and individual determinants to explain a population's utilization of health services. The framework is depicted in Table 2.

The Andersen-Newman framework for viewing health services utilization comprises three determinants that ultimately explain health services utilization. These are societal determinants, the health services system, and individual determinants. The main societal determinants are described as technology and norms. Andersen & Newman (1973) defined technology as "principles and techniques useful to bring about change toward desired ends." They defined norms as social "controls to induce or insure behavior compliance on the part of the members." The societal norm having the greatest effect on health services utilization has to do with how medical care is financed, according to Andersen and Newman (1973). The health service system includes resources and organization. Resources refer to labor and capital. Organization refers to how the system uses the resources. A

Table 2. The Andersen-Newman Framework of Health Services Utilization



From Andersen & Newman (1973).

health care environment of managed care encompasses both the societal determinants (financing) and the health services system (organization of health services).

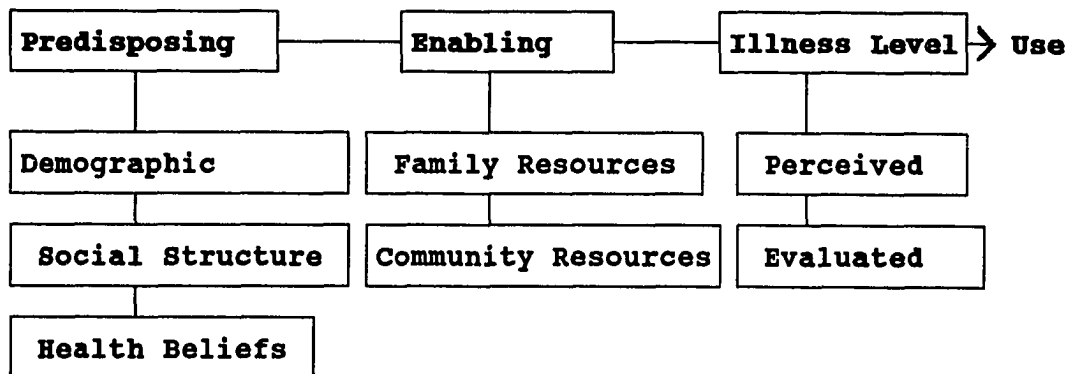
Individual Determinants Component

The final component of the Andersen-Newman framework is labeled as the individual determinants. Andersen and Newman defined this as "the individual characteristics of people which help to determine the health care they receive." It is the individual determinant component that is the focus of this dissertation. The basic assumption of this component of the framework is based on findings from Andersen when testing his original third hypothesis. That utilization of health services follows a sequence of conditions of predisposing, enabling and illness is central to the Andersen-Newman framework. A detailed illustration of the individual determinants component is shown in Table 3.

The nature of the term individual determinants will be explained as described by Andersen and Newman and as employed by other researchers.

The first component within the individual determinants is "predisposing" and it is defined as the characteristics of the individual that can be used to predict the utilization of health services. In the Andersen-Newman (1973) framework family composition was replaced with the variable "demographic." These can include demographic information, such as age, sex, marital status,

Table 3: The Individual Determinants Component from the Andersen-Newman Framework.



Andersen & Newman (1973)

and past illness of the individual. Social structure included religion and residential mobility. Health belief became values concerning health and illness, attitudes toward health services and knowledge about disease. The feature most important in considering a characteristic predisposing was its existence prior to the onset of illness. Age, race and education of the head of the house were used to measure predisposing determinants.

The next event is "enabling" and is defined as a set of conditions which better allow a person to act upon a value or to satisfy a need regarding health services utilization. The enabling determinant changed very little from Andersen's original model in the Andersen-Newman framework. Within the community measurement, urban-rural designation and price of health service were added. An enabler increases the individual's ability to secure services. Family resources such as income and insurance, and community resources are examples of enablers.

The last event in the sequence is "illness level" and this is defined as the need for health services because of the individual's perception of illness or the possibility of becoming ill. The Andersen-Newman (1973) framework replaced need with illness level which was divided into perceived and evaluated. Perceived need is measured by disability, symptoms, diagnosis and general state of health. Evaluated need is measured by symptoms and diagnoses. Andersen-

Newman, and in the literature reporting on the work of Andersen-Newman, interchange the terms illness level and need. Need was the term originally used in Andersen's model (see Table 1), while illness level is the term in the Andersen-Newman framework (see Table 2).

By 1973, Andersen and Newman had expanded the concept of discretionary or non-discretionary utilization of health service. Utilization of health services was further characterized by purpose, type and unit of analysis. Purpose was classified into primary care, secondary care, tertiary care, and custodial care. Primary care was defined as "stopping illness before it begins." Secondary care referred to treatment to return an individual to a previous level of function. Tertiary care was defined as providing stabilization for long-term irreversible illnesses. Custodial care provided for the personal needs of an individual but does not offer illness intervention. Type referred to the kind of health service secured including hospital, medical, drugs and medication, dental, and long-term care. The unit of analysis is defined as the type of service being rendered such as an initial contact with a physician, the number of services being provided or if a service is received or not.

Reviews of the Andersen and Andersen-Newman Frameworks

The first author found who referenced the Andersen

model was Douglass (1971). Douglass remarked that the practitioner seeking to understand health behavior in 1971 lacked adequate predictive models. He noted that the Andersen model could be used to understand the utilization of therapeutic services but was not directly applicable in explaining the utilization of preventive care.

McKinlay (1972) provided an extensive, systematic overview regarding the literature of research approaches to the study of the utilization of health services during the 1940-60's. McKinlay's review highlighted some of the limitations of the studies that had been done during that time-frame and provided clarity to some of the approaches which held potential. Six different analytical approaches to the study of health service utilization behavior were identified and compared. The early models of Parsons, Rosenstock, and Anderson (sic) were included in the analysis. Andersen's model was categorized under the social-psychological approaches to the study of health services utilization. McKinlay, commenting on the national studies done by Anderson and Anderson (sic), indicated that they had the advantage of being able to detect regional variations in utilization behavior as well as to detect and describe changes in the characteristics and behavior of specific groups.

Becker et al. (1977) attempted to systematically summarize the vast literature that had developed in the

previous two decades to explain health behavior. The eight most notable frameworks were chosen to be evaluated, including the Andersen (1968) behavioral model of families' utilization of health services.

In an attempt to reduce or group the many variables that had been identified with health action, Cummings, Becker, & Maile (1980) reviewed 14 of the most frequently cited theoretical frameworks advanced at that time. Andersen's framework was included in the analysis. The authors first identified 99 variables from the frameworks reviewed that were associated with facilitation or inhibition of access to health. A panel of judges was asked to combine or eliminate variables that were related. The investigator attempted to recruit as judges the then still living creators of the models being reviewed. Eight of the 11 agreed to participate in the study. Andersen was one of these judges. The conclusion was that the models were far from independent. The variables were clustered into six groups. The variables of predisposing, enabling, and need are found in three of the six categories.

The Andersen-Newman framework has been called the most widely employed behavior model of health services utilization (Padgett & Brodsky, 1992). The framework was described by Kempen and Suurmeijer (1991) as dominating the study of health care utilization by the aged in the United States in the seventies. The framework has been used

internationally to study health services utilization (Strain, 1991, Kempen & Suurmeijer, 1991).

Application of the Framework

The Andersen (first printing in 1968 and the second printing in 1974), and Andersen-Newman (1973) framework has been tested extensively. Although the framework was originally designed to be applied to the utilization of physician services, hospital utilization and dental services, it has been expanded to include other services such as nursing home utilization, mental health services, and home health care. The individual determinant of need or illness consistently has been shown to be the greatest predictor of service utilization (Wolinsky, 1978, Mechanic, 1979, and Leaf, Bruce, & Tischler, 1988). The following review of literature presents applications of the Andersen-Newman framework and evaluates the current status of the three determinants in predicting access to care.

An expanded version of the Andersen-Newman framework that includes the component of individual determinants was used by Urrutia-Ross and Aday (1991) to design and conduct a community assessment of a Hispanic immigrant and refugee community. The characteristics of the population were grouped in the predisposing, enabling and need determinants in order to study the population. The authors concluded that use of what is known as the individual determinants component of the Andersen-Newman framework for a community

assessment provided several benefits: a conceptual and empirical approach for measuring access to medical care was found useful in organizing a community health assessment and a developed tool and methodology could be used by other researchers. The results of the Urrutia-Ross and Aday community assessment documented the need for expanded health services for the target population.

The Andersen-Newman framework was applied in the prediction of the amount of home care used by the elderly in the Netherlands by Kempen & Suurmeijer (1991). The variables of the framework were evaluated for their ability to be reliable predictors of utilization of home services. Using multiple regression analysis the study showed that predisposing and enabling characteristics of the elderly had relatively little effect on the explanation of the utilization of home services. As found by Andersen (1968) the variable need (for the service) had the greatest strength as a predictor. The amount of variance explained by the Andersen-Newman framework in the regression analysis was 60%. These authors noted that previous studies using the Andersen-Newman framework had reported only 11-41.0% explanation of variance. The authors concluded that their results were due to the very specific measure which determined the utilization of professional home care.

In a study to examine the utilization of health services by the elderly in the United States, Strain (1991)

examined the influence of health belief, defined in the Andersen-Newman framework as being a predisposing determinant, to the utilization of health services. Beliefs studies were general health beliefs and not specific to a particular theorist and were measured by a questionnaire. Health service utilization was examined over eight health services. Strain found that need was the strongest predictor of physician visits, hospitalization, and overall health service utilization. He reported that individuals who were judged to be more skeptical of medicine are less likely to visit the physician. Health locus of control, as defined by Wolinsky and colleagues, was unrelated to health service utilization.

Studying non-urgent utilization of the emergency room, Padgett and Brodsky (1992) used a modification of the Andersen-Newman framework to provide a conceptual framework for organizing the factors found to effect emergency services. The authors cited references that indicate only 15% of emergency room use is for life-threatening conditions. The purpose of their study was to identify what determined the non-urgent use of the emergency room. The non-urgent use of an emergency room for health service disqualifies the variable "need" as a predictor variable. They used the framework to organize the reasons given for the emergency room visit for non-urgent conditions as reported in the literature. The reasons for emergency room

use were grouped by predisposing, enabling and need. The most common reason given for use was the absence of primary care, an enabling factor. Need was associated with predicting non-urgent use of the emergency room for psychosocial stressors such as alcohol abuse and psychiatric co-morbidity. The authors did not discuss the role of discretion in their report.

Application of the Individual Determinants

Component of the Andersen-Newman Framework

The individual determinants component of the Andersen-Newman framework has been utilized in numerous studies of access to medical care. It has provided a mechanism for organization and prediction of health services utilization. Following are some of the more recent applications of the individual determinants component of the Andersen-Newman framework.

Muldoon (1990) studied individual determinants, as described by Aday and Andersen (1974) and referenced to Andersen and Newman (1973), in the collection of information about how varied low-income Asian ethnic groups accessed the health care system in western Massachusetts. The study was conducted to investigate possible program strategies and health policies which could be implemented to better serve this population. Patterns of health services utilization were analyzed. Major findings indicated that predisposing variables were extremely important in influencing care

seeking for this population. Need, both perceived and unmet, did not increase use of health services. The individual determinants component of the framework was seen as being very useful in the needs assessment of this population.

In a similar use of the individual determinants component of the Andersen-Newman framework and also contained in the Aday-Andersen model (1974 & 1981), Risley-Curtiss (1993) determined selected factors to explain health care access and the completion of referrals for foster children in Maryland. The variables that explained health care access were presented, but the researcher did not indicate if these were enabling, predisposing, or need, as operationally defined by her study. The variables accounted for 48% of the variance in referrals of foster children for health services in the multivariate analysis. She concluded that only 45% of referrals for health services for foster children were being completed and that these children continued to have unmet health needs.

In an ex-post facto study, Matthews (1990) employed the individual determinants component of the Andersen-Newman framework to identify factors associated with diabetic patients' access to home health services. Patients that had been referred to home health were compared to patients not referred to home health. Discriminate analysis was used to identify the set of predictors of referral by the physician

and subsequent acceptance into home health service. The variable need, as defined by dependency, accounted for 33.5% of the variance and was considered to be the most powerful predictor of referral into home health services. Referral into home health service did not always result in acceptance by home health care. Further study was suggested to determine predictors for placement or acceptance of home health service following referral.

Medical health services utilization by the elderly in a Medicare sponsored prepaid health plan, was studied by Kolb (1988) using the individual determinants component of the Andersen-Newman framework as contained in the Andersen-Aday model. The study evaluated the impact of the predisposing, enabling, and need factors on utilization modeled through a computer simulation using LISREL software. Need factors were the most significant determinants of utilization. The predisposing and enabling factors were found to be secondary, but necessary links in the prediction.

Using the 1986 National Health Interview Survey to replicate Andersen's original work, Kubrin (1991) tested the expectations of predisposing, enabling, and need predictors on health services utilization. Health services evaluated were the types studied in Andersen's original work and included hospital utilization, dental services, and physician services. Logistic regression and least squares regression were used to estimate multivariate models of

health services contact and use. Attention was given to income and insurance status. As in Andersen's original work need was the greatest predictor of hospital utilization. Hospital services were not related to enabling financial factors (Andersen's Hypothesis III.1). Physician services were predicted by enabling and predisposing factors (Hypothesis III.3), and dental care had the highest level of discretionary utilization (Hypothesis III.2). The variation in utilization was greater for discretionary than for non-discretionary procedures. This was the first report found that tested Andersen's concept of discretionary behavior.

In an analysis of the utilization of six different Iowa hospital procedures, Chang (1992) employed the Aday-Andersen model of health services utilization. Chang developed an index to assess the availability of, and complexity of, hospital related services. Chang found there to be considerable variation in the utilization of hospital services and the magnitude of variation in utilization to be larger for discretionary than for non-discretionary procedures.

Finally, the latest related unpublished report found that used the concepts from the Andersen-Newman framework, as reported by Aday and Andersen was prepared by Porter (1994) on the utilization of emergency room care. The population of study was comprised of Medicaid pediatric patients in Ohio. Mothers of eligible children in the

treatment groups were provided information on the appropriate use of primary care, well baby care and immunizations. It was hypothesized given the knowledge and information about available health services, the treatment group would use emergency room services less and primary care services more than the mothers of a non-treatment group. However, there was no significant difference in the utilization of primary care or emergency room use between the two groups. Other predisposing factors were more likely to predict utilization than the knowledge of available services.

Andersen-Newman's framework appears to be widely employed in the study of health service utilization. The determinants of the framework have been used to explain the factors contributing to the utilization of health services (Porter, 1994) (Kolb, 1988), predict health service utilization (Curtiss, 1993) (Matthews, 1990), and organize the study of health service utilization (Muldoon, 1990). Andersen-Newman's 1973 work has been replicated using 1986 National Health Interview Survey data with results that confirm Andersen's original findings (Kubrin, 1991).

Limitations of the Andersen-Newman Framework

Kempen and Suurmeijer (1991) provided the most comprehensive report critical of the Andersen-Newman framework. They cited that the reports from the literature on the power of the three predictor variables to explain

total variance had been very low. This lead to the model being criticized for an overemphasis on the societal determinants of utilization, such as social health norms and technology, and an insufficient consideration of the social-psychological aspects of health behavior, such as perception of health. The Andersen-Newman framework was criticized for not contributing to an understanding of the decision making process of health services utilization. The authors claim that application of the framework had been done without consistent definition of the variables enabling, predisposing, and need, Kempen and Suurmeijer noted. The Andersen-Newman model was described by Kempen and Suurmeijer as appropriate for "occasional users of health services" but they suggested other models may be needed for the prediction of different levels of utilization. Finally, these authors noted that the model does not address the role of other types of health care beyond the medical community such as care provided by the family.

Strain (1991) also criticized the model for its failure to draw upon the process of using health services and for failing to consider the level of the utilization of health services. Strain indicated that content-specific and situational factors should be incorporated in future work in the area.

Andersen and Newman's position is that the salient determinants of health service utilization have been

identified and that the predictive power of their model would improve with advances in measurement of need and after the development of multivariate techniques (Strain, 1991). As was reported in the above literature review, studies since the 1991 article have produced 48-60% explanation of the variance using the Andersen-Newman framework (Kempen & Suurmeijer, 1991).

No reports were found describing the testing of health services utilization and the Andersen-Newman model in a managed care environment in which an Independent Practice Association was contracted by employers to provide care to employees.

Insurance as an Enabler

Health insurance is recognized as an enabling determinant of health service utilization by all of the participants in the development of the Andersen framework. This concept was in the original framework and has not been subject to revision. In the Andersen (1968) framework, health insurance is a family resource and is considered as an enabling determinant. Andersen-Newman reaffirmed health insurance as an enabler as measured by family resource.

Studies testing health insurance as an enabling determinant in the Andersen framework were not identified. However, in a study by Saver and Peterfreund (1993) health insurance status was the greatest predictor of ease of access to health care by clients being seen at the Seattle-

King County Department of Public Health. These researchers found that income had little predictive value for regular source of care (odds ratio 1.4). Health insurance was the greatest predictor of regular care (odds ratio 4.1) and deferring care (odds ratio 2.7). For perceived ease of access, insurance was a greater predictor for accessing prescriptive medicine (linear regression coefficient of .99) than being poor (linear regression coefficient -.89)

Hayward, Shapiro, Freeman and Corey (1988) concluded a nationwide survey to identify whether groups, other than the elderly and uninsured, have difficulty in obtaining medical care. They concluded that being uninsured was an independent predictor of low access to health care. However, they found that in the population studied, insured, non-poor, working-age adults have less access to care than the elderly.

Prescriptive Drug Insurance as an Enabler to Pharmaceuticals

Prescriptive drug insurance effectively reduces the cost of pharmaceuticals to the patient, resulting in greater accessibility (Reutzel, 1993). However, a 1989 survey by the National Pharmaceutical Council found that only six percent of companies pay all drug related costs and that 90% of the firms imposed copayments or coinsurance for prescriptive medications (Levy, 1992b). The intent of drug coverage restrictions and cost sharing policies is to reduce

prescriptive over-utilization, expenditures, and iatrogenic risks associated with drug use (Soumerai, Ross-Degnan, Fortess and Abelson, 1993).

There are several forms of drug coverage restriction mechanisms. Levy (1992b) identified cost sharing in the form of a fixed dollar amount for each prescription, a coinsurance as a percentage of the prescription price, and deductibles. In addition to cost sharing as a form of constraint, Soumerai et al. (1993) identified administrative restrictions in the form of prescription limits, formularies, drug category exclusion and requirements for prior authorization as barriers to medications.

Cost sharing is the most common form of drug coverage restriction and is emerging as a major form of cost-containment (Levy, 1992b).

The economic rationale for cost sharing is to reduce the overuse of goods and services through the evaluation by the consumer of the marginal benefit of the product in relation to the gain. Based on the literature surveyed, cost-sharing is the most frequently reported form of medication restriction. Consumer cost-sharing is emerging as an important theme in health care cost containment. There is a scarcity of data that demonstrate the impact of cost-sharing on health status, and the few studies reported have limited generalizability (Levy, 1992b).

In a meta analysis of state drug reimbursement

policies, Soumerai et al. (1993) evaluated all published and widely referenced unpublished reports in the United States between 1972-1993 on specific drug cost-containment policies of state pharmaceutical programs. They identified 19 studies, seven of which examined the effects of patient cost sharing. Six of the seven studies indicated a reduction in drug access.

In a study by Nelson, Reeder and Dickson (1984), the effect on drug access was evaluated following a fifty cents per prescription copayment in a Medicaid population. The results indicated a twenty percent prescription, per eligible recipient, per month decline as compared to the control group. Curiously, there was no significant savings in expenditures by Medicaid as a result of the copayment. The authors speculated that prescribers were increasing the prescription size in response to the per prescription copayment.

The effect of drug copayments on utilization of prescriptive drugs in a Health Maintenance Organization was studied by Harris, Stergachis and Reid (1990). Data were collected on the utilization of medication by two cohort groups, one that had increasing copayments assigned, and a control group. The results indicated that as the copayment level increased by \$1.50, \$3.00, and \$3.00 combined with other cost sharing conditions (\$5.00 copayment for physician services and the loss of nonlegend drugs) over a three-year

period, there was a drug utilization drop of 10.7%, 10.6% and ultimately 12%. Copayments were associated with a lower per-member drug cost and a higher prescription unit cost for the HMO.

Smith (1993) reported on a study of prescription drug users participating in a national managed care company receiving medication through a prescriptive drug card service. Companies that differed in the level of copayment paid by the employee for a prescription were compared. Data collected included use of and costs of prescription drugs during a one year study period. Total sample size was 212 employees. Smith developed an economic model to determine the use and cost effects of copayments. Through regression analysis it was determined that as the copayment increased from \$3.00 to \$5.00, drug utilization decreased by 5%.

Reutzel (1993) provided an analysis of the consequences of insurance policies developed to contain outpatient drug costs. He cited 11 empirical studies that demonstrate that when individuals face higher prices for pharmaceuticals they reduce their utilization of such products. He concluded that health insurance for pharmaceuticals effectively reduce the price of drugs and this lower price results in higher demand. Conversely, cutbacks in benefit coverage increases the price to the consumer, resulting in decreased demand.

Drug insurance limits on the number or value of prescriptions reimbursed in a given time-frame, usually one

month, are referred to as caps. Caps are a form of copayment since they require the patient to bear the cost for the uncovered medication. Caps are the most severe form of cost-sharing in that the burden is placed on the patient to identify which medication is most necessary and which medication will be discontinued (Soumerai, 1993).

Soumerai, Avorn, Ross-Degnan & Gortmaker (1987) investigated the effects of a limit of three-prescriptions per month in a New Hampshire Medicaid population. Using claims data for a 48-month time period, they noted a sudden, sustained drop of 30% in the number of prescriptions filled. The control state, New Jersey, did not experience the drop during the same time period. Before the cap, the group experienced a filling of 5.2 prescriptions per person per month average. After the cap this figure dropped to 2.8 prescriptions. After the cap had been in place 11 months it was replaced with a \$1.00 copayment by the recipient. There was a gradual return to the pre-cap prescription rate. The comparison state experienced little month-to-month variation. The study did not evaluate the effects of the cap on Medicaid expenses for other health services.

In a follow-up study, Soumerai, Ross-Degnan, Avorn, McLaughlin & Choodnovskiy (1991) explored the effects of drug payment limits on the use of other health services using the New Hampshire and New Jersey comparison described in the Soumerai et al., 1987 study. For this study the

authors analyzed non-drug claim data and enrollment data to determine if low-income, elderly Medicaid patients experienced increased rates of admission to nursing homes and hospitals following the three-prescription drug cap. Their results provided strong evidence of a direct relationship between the introduction of a three-drug limit for reimbursement and an approximate doubling of the rate of nursing home admissions among a population of frail elderly. Hospitalization use for this population was not significantly influenced.

In a separate study, Soumerai, McLaughlin, Ross-Degnan, Casteris & Bollini (1994) focused on the use of mental health services by schizophrenic patients following the New Hampshire cap on payment for pharmaceuticals. The data indicated there was an immediate reduction in the use of drugs associated with mental health management. This resulted in a two-to-three visit increase per month by patients to Community Mental Health Centers. According to the authors, the caps effectively shifted the burden of the medication cost from Medicaid to the outpatient setting. The estimated additional cost over the resulting savings provided by the caps for this population was about \$139 per patient per month.

The literature suggests that prescriptive drug insurance functions as an enabler to accessing drugs and medication, as advanced by the Andersen-Newman framework. A

question develops with regard to the utilization of other health services in relationship with the absence or presence of prescriptive drug insurance. What is the effect of the enhancement or reduction in access to prescriptive medication on the utilization of other health services? Does the presence or absence of an enabler to one form of health service have any relationship to the use of other health services?

There are abundant reports in the literature regarding the need for studies evaluating the results of barriers to pharmaceuticals on health status and the use of other health services. (Levy, 1992a, 1992b) (Hatoum & Akhras, 1993) (Reutzel, 1993). Increased accountability and financial risk have increased incentives for outcome analysis of health care policy. The changing health care environment has resulted in a need for data demonstrating the impact of decisions made regarding use of limited health care resources. The results of such data collection and analysis will ultimately improve the quality of patient care in the most cost-effective manner (Jones, 1993).

In a retrospective study of Medicare beneficiaries, Lingle, Kirk & Kelly (1987) studied the impact of a pharmaceutical assistance program on inpatient hospital care. Medicare does not include prescriptive drugs as part of benefits. However, since 1977 New Jersey has sponsored the Pharmaceutical Assistance to the Aged program providing

financial support for prescriptive drugs to persons over the age of 65, while Pennsylvania, the comparison state in the study because of its geographical proximity, does not have such an assistance program. The authors found that, on the average, the New Jersey Medicare recipient received \$238.50 less in inpatient hospital care under the Pharmaceutical Assistance to the Aged program. Hospital costs were controlled for in the study as was the participation by study subjects in Medicaid.

Studies of medication noncompliance have resulted in data linking the use of other health services with under-utilization of medicines. Kelly and Scott (1990), working with patients with chronic mental disorders, showed a 12% reduction in hospitalization associated with an educational program to improve medication compliance. Green (1988), in a retrospective review of patient charts, studied a group of community mental health patients hospitalized three or more times during an 18-month period. He found noncompliance with medication was associated with frequent hospitalization in 92% of these community mental health patients. Col, Fanale, & Kronholm, (1990) studied the role of medication noncompliance with hospitalization of the elderly. Twenty-eight percent of the admissions studied were drug related, of which 11.4% were due to noncompliance. Levy (1992a) estimated prescriptive drug noncompliance results in hospital and nursing home admissions costing \$30 billion

dollars annually.

Maronde, Chan, Larsen, Strandberg, Laventurier & Sullivan (1989) studied the association of under-utilization of hypertension control medication and acute-care hospitalizations. Drug compliance, as measured by a pill count, of readmitted hypertensive patients was compared to hypertensive patients not readmitted to the hospital. The ratio of days without antihypertensive drugs was significantly higher in the readmitted group of patients as compared to the non-readmitted patients. The authors concluded that the economic impact of noncompliance places an undue burden upon the health care system, and that methods to improve compliance would offer potential for an effective cost containment tool and improve the quality of patient care.

Mandelker (1993) reported on a study to improve medication compliance in hypertensive patients done by Sclar and Scholar. The study showed that reminders to take hypertensive medication mailed to patients increased compliance and lowered overall costs.

The work by Soumerai et al. (1991 and 1994) is the most referenced work linking restrictive prescriptive drug policies and the increased utilization of related health services. His work was done with a Medicaid population and the consequences of limits to the number of medications available per month. Schroeder and Cantor, commenting on

Soumerai's 1991 work, stated that it is unclear if the increased rates of admissions to nursing homes reported by Soumerai et al. resulted from declines in health status caused by the discontinuation of clinically necessary medication, or reflected patients entering nursing homes as a means of seeking in-patient drugs.

Substitution of Over the Counter Drugs for Prescriptive Drugs

Do patients substitute over the counter drugs in the absence of prescriptive drug insurance? Using data from the Health Insurance Experiment, a longitudinal study that experimentally increased the cost-sharing payment of families for drugs, Leibowitz (1989) evaluated the use of over the counter drugs and compared it with the copayment responsibility of the participant. He found that participants who faced higher cost sharing for pharmaceuticals purchased fewer over the counter medications than participants with no copayment. Participants with full drug coverage actually purchased more over the counter drugs. Leibowitz concluded that non-legend drugs are an adjunct to prescriptive medication and not a substitution for prescription medication.

Norwood, et al. (1981) studied pharmacy services to identify if pharmacists substituted over-the-counter drugs for more costly prescriptive drugs in a capitation payment plan. Capitation was associated with differences in over-

the-counter switching as compared with fee-for-service. The differences were small, but statistically significant and the absolute rates were small. Norwood, et al. concluded that pharmacists did not extensively adopt the use of over-the-counter drugs as substitutes for prescriptions. They noted the average dollar saving could be substantial if pharmacists and physicians were appropriately trained to identify over-the-counter therapeutic substitutes.

No study could be identified evaluating the utilization of prescriptive drug insurance as an enabler to health services utilization in an IPA managed care setting. The IPA providers of care may be paid a per member, per month, rate referred to as a capitated rate, be paid based on a fee schedule, by the participant or his employer or a combination of both types of payment. To manage costs, access to health care is more closely controlled as compared with the indemnity system in which a fee for service is paid to the health service provider retrospectively. Ambulatory and preventive care are given greater emphasis and restrictions are placed on physician prescribing and pharmacist dispensing behavior in managed care (Weiner, Lyles, Steinwachs, & Hall, 1991). The appropriateness of the Andersen-Newman model to predict utilization of health services in a managed care environment has received little attention to date.

In an extremely comprehensive analysis of persons

enrolled in seven different prepaid plans compared to those receiving care in a fee-for-service environment, Weiner et al. evaluated differences in drug utilization behavior. All settings provided prescriptive drug insurance as part of the benefit package. A maximum copayment of \$5.00 per prescription was set as a requirement for the plan to be included in the study. These authors found that HMOs had a significantly higher rate of pharmacy claims than the fee-for-service sector. An explanation offered by the authors regarding the higher rate was that the prescription pill count was lower for the HMO member, resulting in more refills. The authors tested this supposition. However, an analysis of the data did not support this assumption. In fact, the adjusted use rate of the HMOs was higher than the raw rates, rather than lower, as was expected.

Without providing any empirical support, Heenan (1994) asserts that a well-managed prescriptive drug benefit program in a managed care setting can decrease the utilization of other health services, lowering total costs. Providing medication to the managed care patient serves as an opportunity for total medical and pharmaceutical care, providing that the correct medications are being prescribed and the patient is taking the medication in the appropriate manner.

To assess employer perceptions of the value of the drug component of health insurance, Larson (1988) conducted

a survey of large employers in Phoenix, Arizona. He found that the prescriptive drug component was not a major factor in making an HMO attractive to employers. Larson felt that many employers are new and inexperienced purchasers of managed care and related drug services, and with premium costs being very important, each aspect or feature of an HMO must be weighted against its contribution to premiums.

Table 4 provides a summary of the literature on consequences of cost barriers to medication. The literature indicates that as the cost of the prescription increases to the patient, there is a reduction in accessing the medication. The association of prescriptive drug insurance and the utilization of other health services is not well described in the literature.

Several investigators have cited the need for research linking the consequences of financial barriers to medication and the utilization of other health services. This need for research serves as an ideal opportunity to test the Andersen-Newman framework. Little is known about total utilization of health services in a managed care setting when prescriptive drug insurance is excluded as part of the health benefit package. Excluding the drug benefit may result in a reduction in the utilization of health services, as suggested by the Andersen-Newman model. However, in the long run there may be increased utilization of other health services brought on by the lack of third party payment of

medication as indicated in the literature.

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Table 4. A Summary Of Literature On Cost Barriers To Medication.

Study Conclusions	Investigators	Summary of Findings
As cost for medication increases, access decreases.	Soumerai et al. (1993)	Meta analysis finding patient cost sharing for drugs resulted in reduction to drug access.
	Nelson et al. (1984)	\$.50 copayment in a Medicaid population resulted in a decrease in prescriptions filled.
	Harris et al. (1990)	Gradual increases in co-payments were associated with decrease medication utilization.
	Smith (1993)	
	Soumerai et al. (1987)	Drug cap of three prescriptions/month resulted in 30% drop in prescriptions filled.
	Reutzel (1993)	Cites 11 studies linking increase price for drugs to reduced use of drug.

Decrease use of medication increases use of health services.	Soumerai et al. (1991)	Showed a direct relationship between a 3 limit drug cap and nursing home admissions.
	Soumerai et al. (1994)	Increase use of mental health services following a 3 limit drug cap.
	Lingle et al. (1987)	Hospital costs were greater for a Medicare population that did not have financial support for purchase of medications.
	Kelly & Scott (1990)	Medication non-compliance resulted in frequent hospitalization of mental health patients.
	Col et al. (1990)	Increased hospitalization of elderly due to medication non-compliance.
	Maronde et al. (1989)	Acute-care hospitalization and costs were lower in hypertensive patients due to improved medication compliance.
	Mandelker (1993)	

CHAPTER THREE

METHODOLOGY

The Andersen-Newman model addresses three determinants of health services utilization. The utilization of health services by groups of employees organized and financed as an IPA managed care system as part of their employment compensation is incorporated in the societal and health services system determinants of the framework. This study, however, focused on the individual determinants component of the framework. Andersen hypothesized that three major components in the individual determinants aspect of his proposed model contributed to health services utilization. Andersen-Newman used the findings from Andersen's third hypothesis testing to develop their model. Andersen's third hypothesis reads:

Hypothesis III. The contribution of each component will vary according to type of health services: (1) the contribution of need will be greatest for hospital services because these are defined as most necessary and the family has least discretion in choosing alternative actions; (2) the contribution of the predisposing and enabling components will be greatest for dental services because these are defined as least necessary and the family has most discretion in choosing alternative actions; (3) all of the components will contribute to understanding physician services because they are defined as less necessary than hospital services but more necessary than dental services.

According to the Andersen-Newman framework, increases

in health services utilization are predicted as society provides enabling components of determinants. In this study, prescriptive drug insurance was an example of an enabling determinant.

This study tested the individual determinants component of the Andersen-Newman framework which was based on Andersen's hypothesis III described above. The study assessed if there are differences in the utilization of hospital services, emergency department services, urgent care centers and visits to the primary care provider, between groups of employees that had, as part of their health insurance, prescription drug insurance, as compared with the groups of employees that did not have prescription drug insurance. Dental services were not of interest in this study. Utilization was based on total expenditures for each service.

Following the Andersen-Newman framework, the added benefit of prescriptive drug insurance, considered an enabler, was predicted to positively effect health service utilization such as visits to the primary care provider and utilization of urgent care centers. Hospital and emergency department utilization was not predicted to change in the presence or absence of this enhanced enabler. If the framework of Andersen and Newman was applicable in an IPA managed care setting, the prediction of the utilization of health services would be as follows :

-Visits to the primary care provider are seen as the most discretionary behavior of this study and were thought to be related to the status of prescriptive drug insurance as part of the health insurance plan. Therefore, the first hypothesis of this study was;

Utilization of office visits to the primary care provider will be greater for groups of employees in companies having prescriptive drug insurance as compared to groups of employees in companies not having prescriptive drug insurance.

-Utilization of urgent care centers was not included in Andersen's hypothesis testing. However, utilization of these services was assumed to involve more discretion and less need. Urgent care center utilization was seen as similar to visits to a physician, as tested by Andersen. Therefore, the Andersen-Newman framework suggests that there would be differences in the utilization of this type of service based on the level of enabling factors such as prescriptive drug insurance as part of the health insurance plan. The second hypothesis of this study was;

Utilization of urgent care centers will be greater for groups of employees of companies having prescriptive drug insurance as compared with groups of employees of companies not having prescriptive drug insurance.

-Utilization of emergency departments was viewed as a

low discretionary decision on the part of the person and less a function of the enabling and predisposing elements. Therefore, the Andersen-Newman framework suggests that there would be no differences in the utilization of emergency department services based on the status of prescriptive drug insurance as part of the health insurance plan. The third hypothesis of this study was;

There will be no difference in the utilization of emergency departments by groups of employees of companies having prescriptive drug insurance as compared with groups of employees of companies not having prescriptive drug insurance.

In Andersen's hypothesis testing he found accessing hospital services to be a decision which allowed for little discretion in the decision to use or not use the service. In the Andersen-Newman framework, utilization of hospitals would not be reliant on the predisposing and enabling determinants. Therefore, the framework suggests that there would be no difference in the utilization of hospital services based on the status of an enabler such as prescriptive drug insurance as part of the health insurance plan. The fourth hypothesis of this study was;

There will be no difference in the utilization of hospital services by groups of employees of companies having prescriptive drug insurance as compared with groups of employees of companies not

having prescriptive drug insurance.

The study was presented for review by the Human Subjects Review Board of Old Dominion University, Office of Research and Graduate Studies. It was determined to be exempt from full review because it involved the collection of data from existing records and did not pose a risk to human subjects. A copy of the memorandum regarding the review and approval of the study protocol, dated December 14, 1994, is included as Appendices B. Names of participating companies, employees, and health care providers are not reported in this research. All reports and forms generated as part of the study were returned to the insuring company. The data was evaluated using the group number assigned by the insuring company.

DESIGN

This was an epidemiological, retrospective study with one treatment group and a comparison group. The study involved comparing expenditures for the services of interest between companies that had a prescriptive drug insurance benefit as part of their health insurance as compared with companies that did not. Health insurance claims as a measure of utilization were compared. Quam, Ellis, Venus, Clouse, Taylor and Leatherman (1993) reported on the use of claims data for epidemiological research, including cost and utilization studies. Using claims data from an IPA for medical service claims and pharmacy claims, Quam et al. were

able, with 96% accuracy, to identify health plan members with hypertension. They reported that this high level of accuracy from claims data compares to more costly medical record reviews. This study added to the growing body of literature which supports the appropriateness of using claims data for research.

Pollack and Ringen (1993) indicated that medical claims data are a useful tool in epidemiological and medical care research. However, they cited several challenges to the use of claims data. These included problems in comparing different health insurance plans, confounding factors due to health insurance being a condition of employment, and accuracy in diagnostic recordings. In the present study, all participants took part in the same health insurance plan. The groups differed only in the presence or absence of the prescriptive drug insurance benefit to control for problems in comparing groups with different health insurance plans. Only claims data for groups of employees that were enrolled in the health insurance plan were compared. This helped control for possible confounding factors referred to by Pollack and Ringen of health insurance claims being compared between groups of workers and nonworkers. Diagnostic recordings were not considered in this study.

The dependent variables of interest in this study were hospital utilization, emergency department utilization, urgent care center utilization, and office visits to the

primary care provider. Utilization was measured by payments made to the providers of the health services over a two-year period. Three months after the time-frame identified for the study the data were collected. This allowed for the processing of year-end claims. Three months is the normal lag time for this insurance organization to consider claims completed.

Because the prescriptive drug insurance benefit was not assigned to the participating companies by this study, ethical issues of providing the prescriptive drug rider to one group and not to another were avoided in this study. However, this study could not provide the safeguards, such as random assignment to groups, necessary for making inferences about causal relationships. Consequently, initial group difference on some unknown variable might have caused differences in utilization of health services. There was no manipulation of the independent variable, the presence or absence of prescriptive drug insurance. There is no way of knowing if a need for a health service came before or after the need for prescriptive medication.

Within the groups, there was no control for employee turnover or participation in the health insurance plan. Employee decisions to enroll or not to enroll in the health insurance plan is not known.

The two year analysis period was January 1, 1993 through December 31, 1994. Data were collected after April

11, 1995 to allow time for year-end claims to be processed.

The company profile data were used to select two study groups. Eligibility criteria for a company to be included in the study were established. To assure equality of benefits, all companies included in the study participated in the same selected health insurance plan and the core benefits in this health insurance plan could not have been modified. To assure that each company studied had completed two years of claims only companies that had been enrolled in the health insurance plan prior to 1993 were included. A fourth criterion for inclusion in the study was that the company be fully insured and not self-insured. A fully insured company does not assume any additional financial risk for medical expenses incurred by employees. A fifth criterion was that the company had been enrolled with the health insurance plan the entire time-frame of the study. If a company discontinued its participation with the plan it was disqualified for the study. A final criterion for study eligibility was that the company be located in an urban location. A location was considered urban if at least 60% of its area was designated urban, as defined by the Bureau of the Census (1993). Models of managed care have a high potential of cost effectiveness where there is a population base of over 360,000 (Woolsey, 1993). As a result, managed care networks have traditionally been found in urban locations. Allison and Stolz, 1993 noted that most managed

care networks operate in urban environments. They asserted that rural areas do not have networks of health service providers available to them. It was determined that employees of companies located in rural communities that participate in the IPA of study do not have comparable medical care choices when compared with their urban counterparts; therefore they were not eligible for the study.

These company characteristics are referred to as the eligibility criteria. In addition, companies that offered out-patient prescriptive drug insurance as part of benefits were eligible for the study if the annual benefit deductible was \$50 and the copayment per prescription or refill was \$10. Included as Appendices C-E is a description of the options for the health plans, an explanation of the fully insured arrangement, and the description of the core benefit package.

With the exception of the prescriptive rider, the same eligibility criteria were applied to select the companies that had prescriptive drug insurance coverage as was used to select the companies that did not provide prescriptive drug insurance for their employees. The claims data base was used to collect information on the payment made for every health service of interest used by the members. From this data source, claims for reimbursable visits to the primary care providers, urgent care center utilization, emergency

department utilization and hospital utilization were identified.

POPULATION OF STUDY AND TREATMENT GROUPS

The population of study comprised all companies that met the study's eligibility criteria participating in the selected health insurance plan under study. All of the companies were located in the Hampton Roads area of Virginia. Names of participating companies were not provided as part of the study.

Eligible companies offering the health insurance plan of study that included the prescriptive drug benefit were identified. This group was referred to as the "rider" group. Eligible companies that did not offer, as part of health insurance a prescriptive drug benefit were identified. This group was referred to as the "no-rider" group. Employees of member companies choose if they would participate in the health insurance plan as offered by the company. The groups were composed of employees that elected to enroll in the health insurance plan.

VARIABLES

Prescriptive drug insurance, called a prescriptive rider, was the independent variable in this study. The presence or absence of prescriptive drug insurance were the two levels of the independent variable. The "rider" group could access pharmaceuticals using prescriptive drug insurance and a copayment while the "no-rider" group did not

have prescriptive drug insurance available to help defray the cost of pharmaceuticals. The dependent variables are hospital utilization, emergency department utilization, urgent care center utilization, and office visits to the primary care provider experienced by the employees of eligible companies. These were measured as the expenditures for the dependent variables as experienced by a member company in a two-year period. Other data of interest in the study included the company's size, as measured by the number of employees reported, the number of employees enrolled in the health insurance plan, and date the company began participation with the health insurance plan.

STATISTICAL ANALYSIS

The use of a total population for analysis in this study eliminated the need for inferential statistics, the data were analyzed by descriptive statistics. Inferential statistics were computed only to estimate possible conclusions that could be made about companies in similar health insurance plans.

Descriptive statistics on company size, number of employees enrolled in the health insurance plan, and date of enrollment of the company with the health insurance plan, by groups, were computed.

To evaluate the distributions of expenditures between groups, histograms and box plots were developed for each dependent variable, by group.

To determine if there were disproportional enrollment rates between the two groups in the health insurance plan, enrollment was correlated with company size, by presence or absence of the rider, using Pearson's correlation coefficient.

Means, medians and modes for the average expenditures per company for each dependent variable were compared by group. Mean expenditures per member were calculated and compared by group. Failure to utilize any four of the health services during the two-year study time frame in the two groups was evaluated using a contingency table.

All statistical analyses were performed using SAS Institute (1989) software.

PROCEDURE

Using Comtec software operating on Sequoia hardware the claims data were accessed. An account summary report listing all companies participating in the IPA managed care plan was developed. All companies that did not have the prescriptive rider as part of the health benefit package were identified first. This was done by generating a report to identify any group participating in the IPA managed care plan that did not offer prescriptive drug insurance. These companies were evaluated against the eligibility criteria for inclusion in the study.

The account summary report listing all companies participating in the IPA managed care plan was used to

identify those eligible for the study. Eligibility was determined as follows:

- Companies were identified as eligible for the study based on the enrollment date in the health insurance plan on or before December, 1992.

- From this remaining group companies were evaluated for eligibility in the study by electronically accessing each company's marketing information and comparing the company against the eligibility criteria.

- This continued until all eligible companies were identified.

Those companies found eligible for the study constitute the study group referred to as the "no-rider" group.

Companies having the prescriptive benefit were identified. Eligibility was determined as with the "rider" group with the added criteria that the company had prescriptive drug insurance that included a \$50 annual deductible and required a \$10 copayment per prescription or refill.

Utilization reports were formatted to secure the expenditures on the services of interest. Three reports for each company were generated: 1) claims for emergency department utilization, claims for urgent care center utilization, and claims for office visits to the primary care provider; 2) claims for hospital outpatient utilization; and 3) claims for hospital inpatient

utilization. A total of 366 reports were needed for the study.

If a utilization report was not generated during this process client information from the main data bank was evaluated to check the assumption that the company did not have a claim for that specific service. The lack of claims was confirmed as the reason for the failure of a report to be generated in all but one (hospital inpatient claims) of the needed reports being received. A total of 365 reports contributed to the data sets.

The data were evaluated using SAS systems software. The data were checked for entry errors. For the analysis, some new variables were created. Average expenditure per company was calculated for office visits, urgent care center utilization and emergency department utilization. This was done by dividing total expenditures of a company for each service by the number of members in the health insurance plan. Average hospital expenditures were computed by adding the outpatient claims to the inpatient claims experienced by the company. This amount was divided by the number of members at that company. The results were then evaluated for differences between the two groups in the utilization of each of the health services.

CHAPTER FOUR

ANALYSIS OF THE DATA

The population for this research was drawn from all companies (n=891) that participate in the selected health insurance plan of study. Of these companies, 116 (13%) did not have prescriptive drug insurance as part of their health benefit package. From the 116 companies 81 were determined to be ineligible for the study. Reasons for study exclusion included: 26 did not offer the benefit package as required for eligibility in the study; 49 companies enrolled with the IPA managed care plan after December, 1992; two were not considered to be urban locations, two were not fully insured and two were identified as not renewing their contract with the health insurance plan during 1994. Two companies had inconsistent data for number enrolled in the health insurance plan and were therefore not included in the study. This selection process resulted in an initial sample size of 35 companies that did not offer prescriptive drug insurance as part of the health benefit package being eligible for the study as the no-rider group.

There were 775 companies enrolled in the health insurance plan under study that did offer prescriptive drug insurance as part of health benefits. Of these, 421 enrolled with the health insurance plan after December, 1992

and were not eligible for the study. The remaining 354 were evaluated for eligibility for the study. This was done in the same fashion as in the no-rider group. By reviewing each companies' profile from electronic records the company was evaluated against the study's criteria. All possible companies were evaluated by this process to get a size of 90 companies comprising the rider group. Frequency counts were not done, but the major reasons for study exclusion for this group included the benefit plan the group was enrolled in was not the one selected for study, the deductible the plan required for pharmaceuticals was not \$10, or the company discontinued coverage during the study's time-frame. The total population size was considered to be 125 companies.

Reports on the expenditures for office visits to the primary care provider, emergency departments, urgent care centers, and hospital for the two groups were requested. The reports indicated that three companies discontinued their health insurance coverage during 1994. One of these had been in the rider group and two of these companies had been in the no-rider group. These companies were dropped from the study resulting in a final group size of 33 no-rider companies and 89 rider companies to result in a final population of 122 companies.

Table 5 provides information about the population of study, by status of prescriptive drug insurance.

Table 5. Population of Study, by Status of Prescriptive Drug Insurance.

Drug Rider Available	Participating Companies in the IPA Plan:	Total of Eligible Companies:	Total Staff at Eligible Companies:	Total Members:
No	116	33	355	244
Yes	775	89	933	687
Totals	891	122	1288	931

One hundred twenty-two companies were included in the study involving 1288 employees. Employees electing to participate in the health insurance plan are referred to as members. There were 244 members not covered by prescriptive drug insurance and 687 members that had prescriptive drug insurance as part of their health benefits for a total of 931 members.

To compare company size between the two groups the average company size was calculated. The average company size for the rider group was 10.48 employees. The average company size for the no-rider group was 10.76 employees. The population of this study is similar in group size and is comprised of small companies. The largest company included in the study had 52 employees and was in the no-rider group. The smallest company in either groups employed only three people.

Groups were evaluated to determine if participation in the health insurance plan differed between companies that offered the prescriptive drug insurance and those that did not. This was done by dividing the number of members by the total number of employees at the company and converting it to a percentage. This is referred to as the penetration rate. Table 6 provides the total number of employees at the companies, the total membership in the health insurance plan, and the penetration rate. Collectively, in the companies that did not offer prescriptive drug insurance as

Table 6. Profile Information of Company Size, Enrollment in the Health Insurance Plan, and Penetration, by Status of Prescriptive Drug Insurance.

Drug Rider Available:	Total Employees:	Total Number Enrolled:	Penetration:
No	355	244	68.7%
Yes	933	687	73.6%
Totals	1288	931	72.3%

part of benefits, 68.7% of the employees chose to enroll in the health insurance plan. In the companies that did include the rider as part of the benefit plan, 73.6% of employees enrolled in the health insurance plan. Pearson's correlation coefficient was computed to evaluate the strength of the relationship of the size of the company and the enrollment in the health insurance plan. A value of .90 for the no-rider group and .93 for the rider group was found indicating there was a slightly stronger relationship of membership and company size in the health insurance plan when the prescriptive drug insurance was included as a benefit.

Table 7 provides information on companies' tenure with the health insurance plan. The table indicates that only 12 companies had enrolled in the plan before 1991. The majority of companies enrolled with the health insurance plan in 1992 in both groups.

The average member expenditure per company was calculated. This was done by dividing the total expenditures experienced by a company for the health service of interest by the number of members at that company. This resulted in adjusted company expenditure data. Means were calculated by taking the adjusted company expenditures and summing these for all the companies in that group (no-rider/rider) and dividing the sum by the size of the group

Table 7. Companies Enrollment Year Into the Health Insurance Plan, By Status Of Prescriptive Drug Insurance.

Year of Enrollment in Insurance Plan:	Number and percent of companies, without Rider	Number and percent of companies with Rider
1985		1 (1.1%)
1986		
1987		5 (5.6%)
1988		1 (1.1%)
1989	1 (3.0%)	2 (2.3%)
1990		2 (2.3%)
1991	6 (18.2%)	18 (20.2%)
1992	26 (78.8%)	60 (67.4%)

(33/89) to result in the average expenditure per company.

Histograms were constructed using these averages. A histogram is a graphic representation of the data's distribution. As an example, Tables 8 and Table 9 display histograms for the data set on office visits to the primary care provider, by group. The vertical axis indicates the frequency of the observation in the data set of expenditures for visits to the primary care giver. The horizontal axis represents the range for the average expenditure per company. The numbers listed along the horizontal axis represents the midpoint of the interval. In reference to the histogram in Table 8 for the average expenditures for office visits to the primary care provider for the no-rider group, the data are divided into six intervals. There were nine companies that had expenditures between \$25-75. The greatest frequency of utilization was 12 companies in the range of \$76-125. Six companies had expenditures between \$126-175, three companies had expenditures between \$176-225, one company had expenditures between \$226-275 and two companies had expenditures between \$275-325. The histogram indicates a right skewed distribution indicating that the data set had more entries in the lower range than in the upper range.

Table 9 contains the histogram for the rider group for expenditures for office visits to the primary care provider. While the distributions follow a similar pattern, the Table

8. Histogram for the Average Expenditures per Company for Office Visits to the Primary Care Provider in the No-Rider Group.

MEANS FOR OFFICE VISITS, NO RIDER GROUP

AVERAGE MEMBER EXPENDITURE PER COMPANY

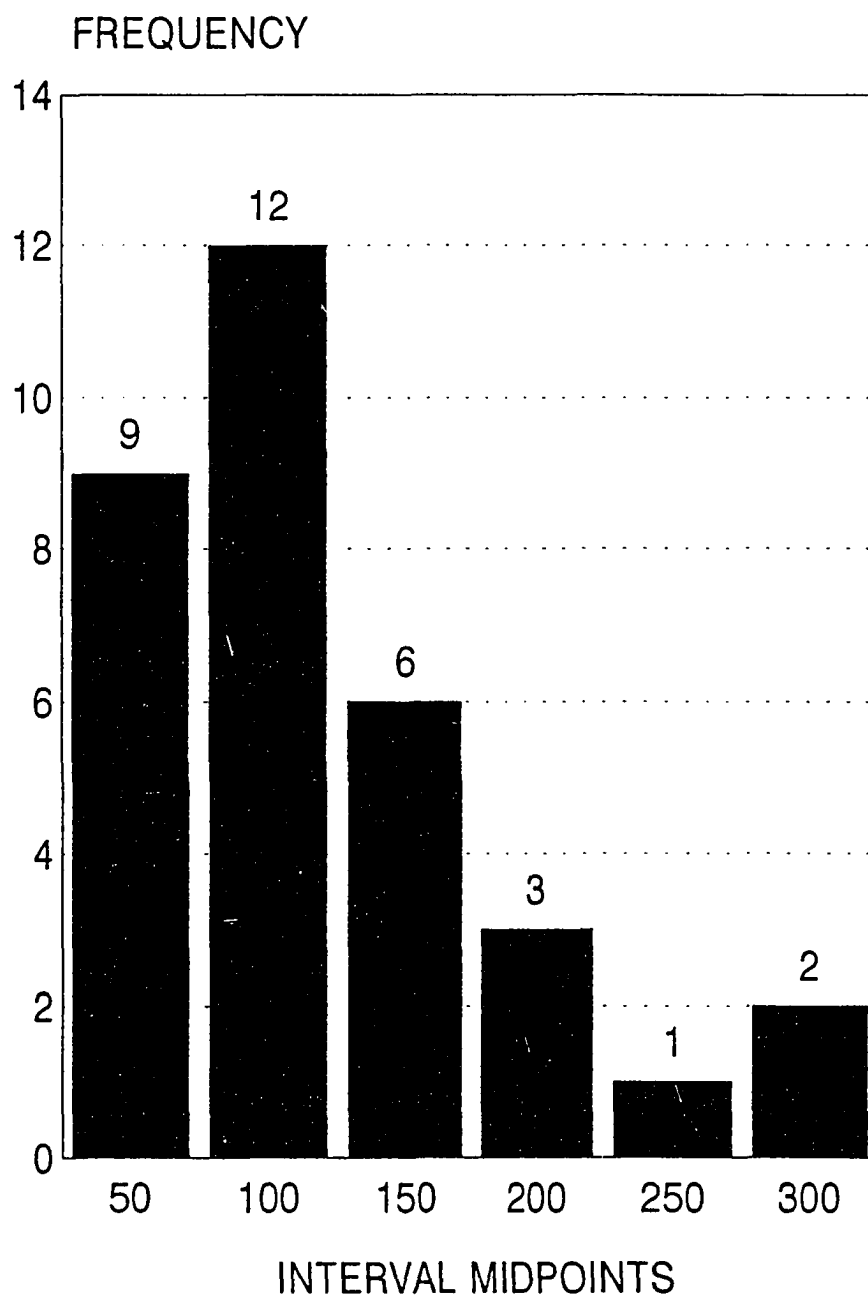
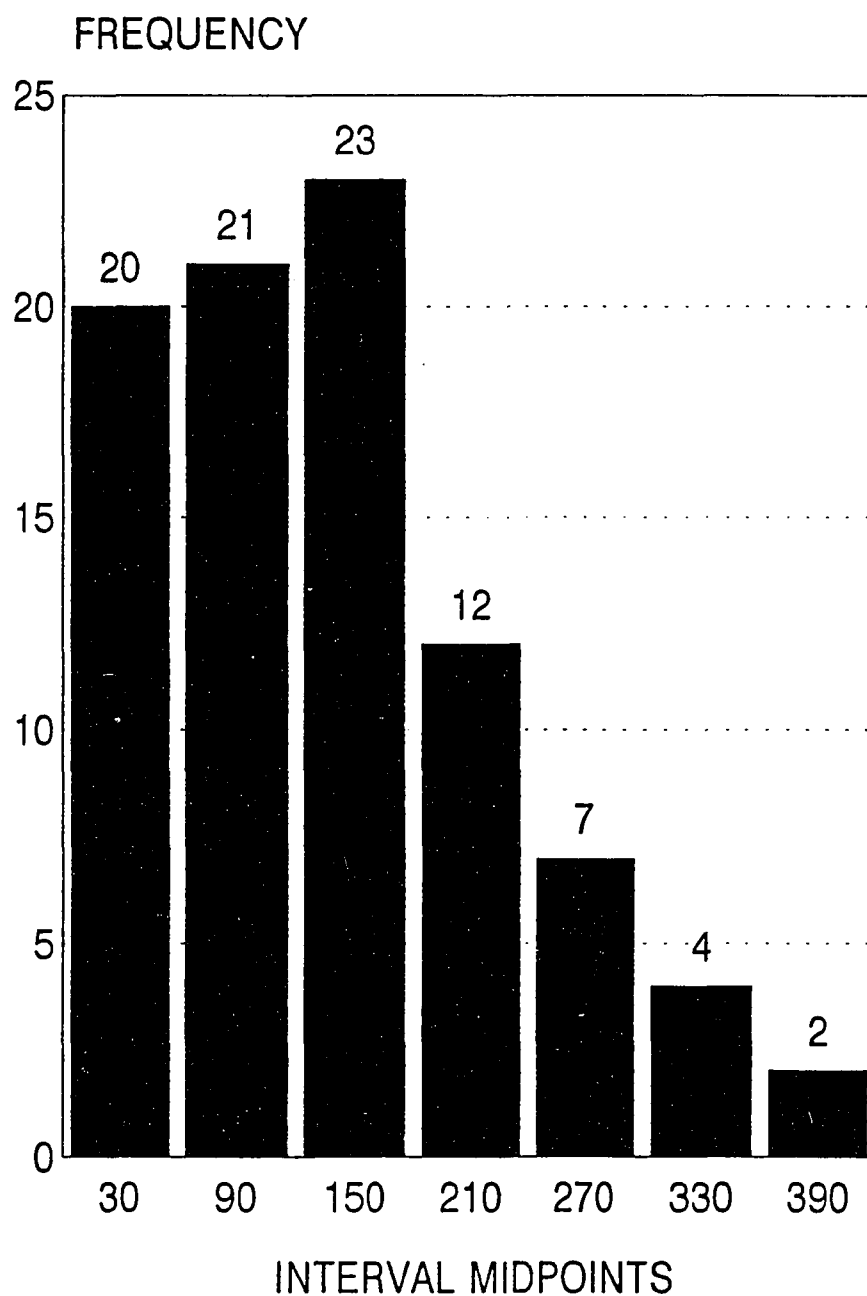


Table 9. Histogram for the Average Expenditures per Company for Office Visits to the Primary Care Provider in the Rider Group.

MEANS FOR OFFICE VISITS, RIDER GROUP

AVERAGE MEMBER EXPENDITURE PER COMPANY



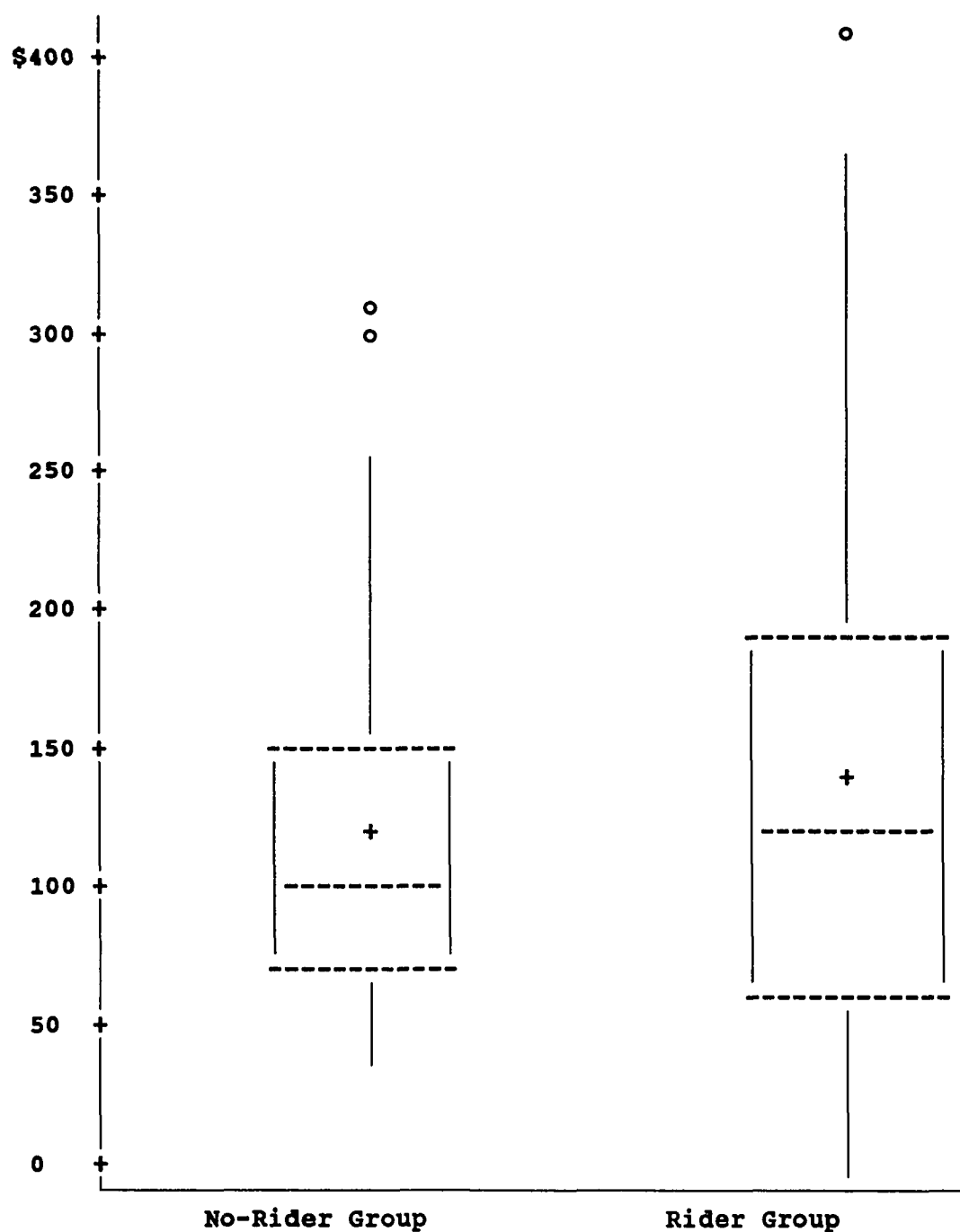
greatest frequency of utilization was in the \$120-180 range which was greater than the greatest frequency for the no-rider group. There were two companies with average expenditures over \$360. The data for the rider group are also skewed to the right.

The histograms for the other health services, by status of prescriptive drug insurance are included as Appendices F-K. All of the histograms depict data skewed to the right.

Box plots also were used to show distribution of the expenditure data and were used to detect unusual observations from the data set. Box plots for the average expenditures for office visits to the primary care provider for the no-rider group and rider group are shown in Table 10.

The vertical axis of the plot represents the observed variable of expenditures associated with the dependent variable. The horizontal axis represents the status of prescriptive drug insurance, with the first box plot representing the absence of the insurance and the second box plot representing the presence of the prescriptive insurance. The scale of the "box" represents the middle 50% of observed values. The broken horizontal line, usually inside the box, indicates the data set's median. The "+", usually in the box, indicates where the mean of the data set falls. The top end point of the box is the value that is greater than approximately 75% of the observation in the

Table 10. Box Plots for the Data Set for the Average Expenditures per Company for Office Visits to the Primary Care Provider by Status of Prescriptive Drug Insurance.



distribution. The bottom end point is the value that is larger than approximately 25% of the observations in the distribution. The difference between the top end point and the bottom end point is called the interquartile range. The interquartile range is a measure of dispersion of the data. The vertical lines protruding from the box are called whiskers. The whiskers extend a distance of approximately 1.5 times the interquartile range. A box that is evenly split by the median line with equal length whiskers indicates a symmetrical distribution. The "O" at the top of the plot represents mild outlier data. These are located between 1.5-3 times the interquartile range from the top or bottom of the box. The "*", usually at the very top of some plots represent extreme outliers which are located more than three times the interquartile range from the top of bottom of the box.

As an example, in Table 10, two box plots are shown for the data set on the expenditures for office visits to the primary care provider. The plot to the left represents the data from the no-rider group and the plot to the right is the rider group. The median for the no-rider group is approximately \$100, and the median for the rider group is approximately \$125. The mean for the no-rider group is \$120, and the mean for the rider group is \$140. The top value of the box is approximately \$150 for the no-rider group and \$190 for the rider group. The bottom value is

approximately \$75 for the no-rider group and \$65 for the rider group. The interquartile range value computes to \$75 for the no-rider group and \$125 for the rider group. The whiskers for the no-rider group extend to approximately \$250 from the top, and \$40 to the bottom. The whiskers for the no-rider group extend to approximately \$360 from the top and \$5 to the bottom. The no-rider group has two mild outliers at the \$300 level and the rider group has a mild outlier at approximately \$400. There are no extreme outliers in either group. The box distributions and whiskers indicate that the data for the rider group has a greater range than the no-rider group and that distributions for both groups are not symmetrical.

The box plots for emergency department utilization, urgent care center utilization, and hospital utilization are included as Appendices L-N. All eight box plots for expenditures for health services indicate that the distributions of the data were not symmetrical and that the data were skewed to the right. There were mild and extreme outliers in the rider and no-rider data for emergency department expenditures. There were mild and extreme outliers for the rider group in both the urgent care center expenditure data set and hospital expenditure data set. In the no-rider group, there are extreme outliers for the urgent care center expenditure data set and hospital expenditure data set.

Ranges for the average expenditures per company were evaluated to identify the dollar amounts of the extremes for the health services of interest. These are presented in Table 11. The range was greatest for the rider group in expenditures for office visits, urgent care centers, and emergency departments. The range was greatest for hospital expenditures in the no-rider group. Together, the histograms, box plots and ranges provide information about the distribution of the data for each of the health service.

Distributions provide useful delineations of the data, specific central tendencies of the data can be used for data comparisons. Table 12-15 compare the mean, median, and the mode of the average expenditure for the health services of interest. Again, these numbers were calculated by dividing the total expenditures experienced by a company for the health service of interest by the number of members at that company to get the adjusted company expenditure. Means were calculated by taking the adjusted company expenditure and summing these for all the companies in that group (no-rider/rider) and dividing the sum by the size of the group (33/89). The median is the middle point of the adjusted company expenditures when arranged from lowest to highest. The mode is the most frequent number in the adjusted company expenditures. The resulting expenditures per company were evaluated as follows:

Table 11. Ranges for the Average Expenditures per Company for Office Visits, Urgent Care Centers, Emergency Departments and Hospitals, By Status of Prescriptive Drug Insurance.

Rider Present	Office Visits	Urgent Care	Emergency Departments	Hospital
No n=33	\$39-308	\$0.-36	\$0.-269	\$0-25603
Yes n=89	\$6-408	\$0.-120	\$0.-625	\$0-9586

-Office Visits to the Primary Care Provider, Table 12.

The mean calculated in this way for office visits to the primary care provider for the no-rider group was \$120.21 which is less than the rider group at \$139.38. The median at \$96.03 was also less for the no-rider group than the \$125.51 median for the rider group. The mode for the no-rider group at \$39.01 was greater than the \$5.57 mode for the rider group.

-Urgent Care Centers, Table 13.

The mean for the no-rider group for urgent care center at \$2.34 was less than the rider group mean of \$4.53. Both the median and mode had a value of \$0.00. This is because more than 50% of the companies did not experience claims for this services.

-Emergency Departments, Table 14.

The mean expenditures per company for emergency department utilization was \$49.31 for the no-rider group which was less than the rider mean of \$80.79. The median of the average expenditure per company for emergency department utilization was slightly higher at \$23.39 for the no-rider group than the \$21.08 for the no-rider group. The most frequent observation for emergency department expenditures was \$0.00 for both groups

-Hospitals, Table 15.

Mean hospital expenditure at \$2397.99 was greater for the no-rider than the \$772.40 expenditure for the rider

Table 12. The Mean, Median, and Mode for the Average Expenditure per Company for Office Visits to the Primary Care Provider, by Status of Prescriptive Drug Insurance.

Rider Present	Mean	Median	Mode
No	\$120.21	\$ 96.03	\$ 39.01
Yes	139.38	125.51	5.57

Table 13. The Mean, Median, and Mode for the Average Expenditures for Urgent Care Centers, by Status of Prescriptive Drug Insurance.

Rider Present	Mean	Median	Mode
No	\$ 2.34	\$ 0.00	\$ 0.00
Yes	4.53	0.00	0.00

Table 14. The Mean, Median and Mode for the Average Expenditures per Company for Emergency Department Utilization, by Status of Prescriptive Drug Insurance.

Rider Present	Mean	Median	Mode
No	\$49.31	\$23.39	\$ 0.00
Yes	80.79	21.08	0.00

Table 15. The Mean, Median, and Mode for the Average Expenditures per Company for Hospital Utilization, by Status of Prescriptive Drug Insurance.

Rider Present	Mean	Median	Mode
No	\$2397.99	\$474.88	\$ 0.00
Yes	772.40	307.28	0.00

group. Likewise, the median expenditure was greater in the no-rider group (\$474.88) as compared to the rider group (\$307.28). The mode for both groups was \$0.00, again due to this being the most frequent observation for this health service.

Table 16 consolidates the average expenditures per company for each dependent variable and indicates the percent of change, by status of prescriptive drug insurance. The difference was calculated as the value for the no-rider group minus the value for the rider group. The percent change was then calculated as this difference divided by the amount for the no-rider group. The results indicated that there is a 15.9% increase in the rider group's utilization of office visits over the no-rider group. Urgent care center utilization for the rider group was 94% greater than the no-rider group, although the actual dollar value is small. Emergency department utilization was 39% greater for the rider group over the no-rider group. Average expenditure per company was \$52.83 less for these three services in the no-rider group as compared to the rider group. However, the rider group had 67.8% less hospital utilization than the no-rider group. Taken together, average expenditure per company for the health services of interest was \$1572.76 more for the no-rider group as compared to the rider group.

Table 17 consolidates the median average expenditures

Table 16. Average Expenditures per Company for the Health Services of Interest, and Percent Difference, By Status of Prescriptive Drug Insurance.

Rider Present	Office Visits	Urgent Care Centers	Emergency Departments	Hospital
No	\$120.21	\$2.34	\$49.32	\$2397.99
Yes	139.38	4.53	80.79	772.40
Difference	- \$19.17 - 15.9%	- \$2.19 - 93.6%	- \$31.47 - 63.8%	\$1625.59 67.8%

Table 17. Median Expenditures per Company for the Health Services of Interest, and Percent Difference, By Status of Prescriptive Drug Insurance.

Rider Present	Office Visits	Urgent Care	Emergency Departments	Hospital
No	\$ 96.03	\$0.00	\$23.39	\$474.88
Yes	125.51	0.00	21.08	307.30
Difference	- \$29.48 - 30.7%	\$0.00	\$2.31 10.0%	\$167.58 35.3%

per company for each dependent variable and indicates the percent of the difference, by status of prescriptive drug insurance. The difference was calculated as the value for the no-rider group minus the value for the rider group. Taking this difference, the percent change was calculated as the amount of the difference divided by the amount for the no-rider group. The results indicated that the median expenditures per company were 30.7% greater for the rider group in office visit utilization as compared to the no-rider group. Medians for urgent care center utilization were both \$0.00. Emergency department utilization was 10% lower in the rider group as compared to the no-rider group. Median hospital expenditures were 35.3% less for the rider group as compared to the no-rider group.

Another way the utilization of the health services of interest were evaluated was by comparing the average expenditure by members. This was done by totaling the expenditures for each dependent variable, by group (no-rider/rider) and dividing the total by the number of members in that group (244/687). This is referred to as the mean expenditure per member. Differences in the mean expenditure per member for the two groups for each health service of interest were calculated. This was done by subtracting the expenditures of the rider group from the expenditures for the no-rider group. The percentage of the difference was calculated as the differences divided by the expenditures

for the no-rider group. Table 18 compares these means and percentage change for the health services of interest.

The mean expenditure per member for office visits to the primary care provider, for the rider group was \$125.10 which is 14.9% greater than the no-rider group at \$108.89.

The mean expenditure per member for urgent care centers at \$3.87 is 50.6% greater for the rider group than the \$2.57 for the no-rider group, although these expenses are very small.

The mean expenditure per member for the rider group for emergency department utilization was \$77.39 which is 35.5% greater than the \$57.12 for the no-rider group.

Hospital expenditures, at \$637.63 are 50.6% less for the rider group as compared to the \$1290.26 expenditures for the no-rider group. The pattern seen in the average expenditure per company was repeated in the mean expenditure per member. The two year expenditure per member totaled \$614.85 greater for all the health services of interest for the no-rider group as compared to the rider group.

A comparison was made to determine if the frequency of experiencing claims differed by groups. Companies that had membership to experience claims for the health services of interest were identified by group. The percent of health service utilization was calculated as the number of companies that had at least one claim per health service of interest divided by the number of companies in that group

Table 18. Means, Calculated as Total Expenditures per Member for the Health Services of Interest, and Percent Difference, By Status of Prescriptive Drug Insurance.

Rider Present	Office Visits	Urgent Care	Emergency Departments	Hospital
No	\$108.89	\$2.57	\$57.12	\$1290.26
Yes	125.10	3.87	77.39	637.63
Difference	- \$16.21 - 14.9%	- \$1.30 - 50.6%	- \$20.27 - 35.5%	\$652.63 50.6%

Table 19 shows the frequency and percentage of utilization for the health services by status of prescriptive drug insurance. The data indicate every company had membership with at least one claim for office visits during the two-year period.

Urgent care center utilization in the no-rider group had only 30.3% of companies (10 out of 33) having had at least one claim generated for this service. Utilization of urgent care centers was greater for the rider group with 33.7% of companies (30 out of 89) having had at least one claim for urgent care center services. Members in 82 of the 122 companies in the study did not utilize urgent care centers during the two years.

Emergency departments were used by 57.6% of the no-rider group (19 out of 33). In the rider group, 57.3% of the companies (51 out of 89) experienced claims for emergency department services. Collectively for the two groups, during the two years, no one in 42.6% of the companies (52 out of 122) experienced emergency department utilization.

Hospital utilization was greater for the no-rider group. Close to 70 percent of companies (23 out of 33) in the no-rider group had at least one claim for hospital services. Companies in the rider group had 62.9% (56 out of 89) of companies with at least one claim for hospital

Table 19. Percentage and Numbers of Companies Experiencing Claims for the Selected Health Services, by Status of Prescriptive Drug Insurance.

Rider Present	Office Visits	Urgent Care	Emergency Departments	Hospitals
No n=33	100 % n=33	30.3% n=10	57.6% n=19	69.7% n=23
Yes n=89	100 % n=89	33.7 n=30	57.3% n=51	62.9% n=56

services. During the two year period no one in 34.4% of the companies (42 out of 122) experience hospital utilization. Table 20 summarizes the total population claims experience, by percentage and number of companies for each of the health services of interest during the two year time frame. The table indicates moderate utilization of all health services of interest, excluding office visits to the primary care provider where claims were experienced by all companies. Hospital services were the second most utilized service. Emergency department services were the third most used service and urgent care center services were the least utilized.

SAMPLE VS. A POPULATION

If the data had consisted of samples rather than populations an appropriate test for inferences from the samples to the population would have been the t-test. The t-test is an appropriate procedure to be used with populations that have normal distributions. SAS computes p-values for equal and unequal population variances, when calculating the t-statistic. The hypothesis of equal variance was tested by SAS on the four dependent variables using the calculations for the average expenditures per company. The variances for the expenditures for office visits to the primary care provider can be concluded to be equal. Variances for emergency department expenditures, urgent care center expenditures and hospital expenditures

Table 20. Total Population Claims Experience, by Percent and Number of Companies, by Health Services of Interest During the Two Year Time Frame.

If Claims Were Experienced During The Two Years:	Office Visits	Urgent Care	Emergency Departments	Hospitals
Companies that Experienced Claims	100% n=122	32.8% n=40	57.4% n=70	64.8% n=79
Companies That Did Not Experience Claims	0	67.2% n=82	42.6% n=52	35.2% n=43

can be concluded to be unequal.

The t-test evaluates the difference between the group means to determine if the differences are statistically different. Table 21 provides a summary of the data sets, with group average expenditures per company for the health services of interest and the p-values based on the equality of the variances. Despite what appears to be marked differences between the means, none of the means would be concluded to be significantly different.

Table 21. Results of T-Tests for Average Expenditures of Health Services of Interest, by Status of Prescriptive Drug Insurance.

Rider Present	Office Visits	Urgent Care	Emergency Departments	Hospitals
No	\$120.21	\$2.34	\$49.31	\$2397.99
Yes	\$139.38	\$4.53	\$80.79	\$772.40
p- value	.26 (equal variance)	.23 (unequal variance)	.07 (unequal variance)	.15 (unequal variance)

CHAPTER FIVE

HYPOTHESES

The purpose of this research was to test the utility of the theoretical framework developed by Andersen and Newman (1973) in predicting the utilization of selected health services in the presence or absence of an enabler in the form of prescriptive drug insurance. This was done by testing if third-party payment for pharmaceuticals is associated with a change in the utilization of other health services in a managed care environment. The study generated data to help establish parameters regarding the prediction of the utilization of health services due to enhanced health insurance.

To study the applicability of the Andersen-Newman framework in the prediction of the utilization of health services in an IPA, managed care environment the following hypotheses were tested:

Hypothesis one;

Utilization of office visits to the primary care provider will be greater for groups of employees in companies having prescriptive drug insurance as compared to groups of employees in companies not having prescriptive drug insurance.

Hypothesis two;

Utilization of urgent care centers will be greater for groups of employees in companies having prescriptive drug insurance as compared with groups of employees in companies not having prescriptive drug insurance.

Hypothesis three;

There will be no difference in the utilization of emergency departments by groups of employees in companies having prescriptive drug insurance as compared with groups of employees in companies not having prescriptive drug insurance.

Hypothesis four;

There will be no difference in the utilization of hospital services by groups of employees in companies having prescriptive drug insurance as compared with groups of employees in companies not having prescriptive drug insurance.

DISCUSSION

By collection of data from an entire population, problems of inference are avoided. Discussion of suggested effects on the total population of interest are replaced with discussion of factual effects on that particular population. This research was conducted using the total population eligible for inclusion in the study. Consequently, references to statistical significance are replaced with exact observations about the population

studied. These findings are true for this population, exclusively. This is implied throughout the discussion.

The type of health insurance available to the two groups was identical except that one group of companies had prescriptive drug insurance as part of the benefit package while the other did not. The groups came from companies that averaged 10.6 employees per company. The groups were composed of employees who chose to participate in the work site health insurance plan. More employees in the companies that offered prescriptive drug insurance elected to participate in the health insurance plan. Having prescriptive drug insurance available as part of the benefit plan may be influencing the decision of the employee to participate in the health insurance plan.

Tenure with the health insurance plan for both groups was short, with the majority enrolling in 1992, the last year to be eligible for inclusion in the study. There were only 12 of the 122 companies that enrolled in the plan from 1985 to 1990 indicating that experience in the utilization of the IPA was fairly recent and equal for both groups.

The highly skewed distributions of the data sets were a result of the infrequency in which claims were experienced during the two year-time frame for the selected health services of interest. This is expressly depicted in urgent care center utilization where 67.2% of the population did not have any experience with this service in the two year

time frame. Over time, it would be expected that companies would convert from a "no user" of service to a "user" of service, resulting in claims that would contribute to a more normal distribution and have few outliers.

Comparing the no-rider companies to the rider companies the following summation can be made:

Office Visits

The mean and median for the average expenditure per company and the average expenditures per member for office visits were lower in no-rider companies. This indicates that members in companies without the prescriptive drug insurance utilized office visits less than members with the drug insurance. All companies had employee utilization of office visits to the primary care giver.

Urgent Care Centers

The mean for the average expenditure per company and the average expenditures per member for urgent care centers were lower in companies without the drug rider. A higher percentage of rider companies had employees to experience at least one claim for urgent care centers. All of these results demonstrate that members in the no-rider companies utilized urgent care centers less. Urgent care center utilization was the least used health service of interest for both groups.

Emergency Departments

The mean for the average expenditure per company and

the average expenditures per member for emergency department were lower in companies without the drug rider. However, the median for the no-rider group was greater than the rider group for this service. Both groups had employees to experienced at least one claim for emergency departments equally.

Hospitals

The mean and median of the average expenditure per company and the average expenditures per member for hospital services were greater in the no-rider group than in the rider group. The no-rider group had more employees to experience at least one claim for this service than the rider group. These findings indicate that the no-rider group utilized hospital services more than the rider group.

Using any measure of central tendency of this study to evaluate expenditures, utilization of office visits and urgent care centers was lower in the no-rider group. Using either method to calculate the mean for emergency department utilization was lower for the no-rider group but the median was greater than the rider group. Hospital utilization was greatest for the no-rider group using any measure of central tendency.

INTERPRETATIONS REGARDING THE FRAMEWORK

Andersen describes visits to the primary care provider as involving more discretionary behavior than hospital services. The Andersen-Newman framework would suggest that

utilization of office visits to the primary care provider would be affected by the richness or breath of the employee's health insurance. This study found companies that include prescriptive drug insurance as part of the health benefits package have greater utilization of this health service than companies that exclude prescriptive drug insurance. Data from this study supports this theoretical perspective.

Urgent care centers are a relatively new development in the health care arena. Urgent care centers were developed to offer an alternative to inappropriate utilization of emergency departments. The utilization of an urgent care center by a member of the health insurance plan requires that the visits be pre-approved by staff from the managed care center. Urgent care centers were not part of Andersen's work. However, utilization of these services are assumed to involve more discretion than emergency department utilization or hospital utilization. Therefore, the Andersen-Newman model would suggest that there would be a difference in the utilization of these services between groups with, and those without, prescriptive drug insurance. Using either method to calculate the mean expenditure the no-rider group utilized urgent care centers less than the rider group. These findings suggest support for the Andersen-Newman model.

Utilization of emergency departments was not evaluated

in Andersen's original work on utilization of health services. Based on Andersen's definition of discretionary and non-discretionary behavior, the utilization of emergency departments was assumed to be a low discretionary decision on the part of the person. The Andersen-Newman model would suggest that utilization of this service would not be affected by the richness of the employee's health insurance. Therefore emergency department utilization, like hospital utilization, would be less a function of the enabling and predisposing elements. It would be expected that the differences in utilization would be fairly small. The mean of the average expenditure per company and the mean expenditure per member were lower in the no-rider group but the median for this expenditure was greater in the no-rider group. The percentage of companies experiencing utilization of emergency departments in both groups was 57%. The data is inconclusive to declare that emergency department utilization differs between the groups. The Andersen-Newman framework would predict no difference in the utilization of this service. This study suggests support for the Andersen-Newman model.

Grounded in the work of Andersen and Newman, there should be no difference between the two groups in the utilization of hospital services because of the difference in the health benefit package. The utilization of hospital services was described by Andersen and Newman as being a low

discretionary decision on the part of the person and was less a function of the enabling and predisposing elements. In the health services utilization framework, need of the service was the greatest predictor for hospital services and utilization was not reliant on health insurance as an enabling determinant. However, on every measure of utilization, hospital services were greater in the no-rider group than the rider group. This was not the expected finding when using the Andersen-Newman framework for prediction of the utilization of hospital services. This finding is not consistent with the Andersen-Newman framework for this health service in this population for this type of enabler.

CONCLUSIONS

This research explored the relationship between prescriptive drug insurance and the utilization of specific health services. This study showed a relationship between the utilization of health services in the presence or absence of prescriptive drug insurance in this population. The relatively lower-cost health services such as visits to the primary care provider had greater utilization in the presence of the rider. It is speculated that the person without prescriptive drug insurance may not seek health services, as suggested by Reutzel (1993), as compared to the person with prescriptive drug insurance. In this population it does not seem that the person without prescriptive drug

insurance were substituting urgent care centers for primary care visits, for these were also higher in the rider group. Emergency department utilization was equal for both groups.

The large and consistent difference in the utilization of hospital services between the two groups was of great interest. This is consistent with the findings of Levy (1992a), Maronde et al. (1989) and Soumerai et al. (1991) in which barriers to prescriptive drugs resulted in hospital admissions. This finding should be interpreted with caution. Certain hospital services can be extremely expensive. A few expensive procedures in one group could be inflating the average expenditures. Speculation about the role of prescriptive drugs in hospitalization is inconclusive when it is not known if the need for hospitalization or the need for prescriptive medication came first. Further study is needed to better understand the link between the lack of outpatient prescriptive drug insurance and hospital utilization.

An assumption of the study is that the predisposing and illness determinants are equal for both groups. Both groups having membership equal in age is an example of the assumption of equal predisposing determinants. If this were not the case than other determinants may be explaining hospital utilization between the two groups.

The retrospectiveness of the study creates limitations. The study design is limited because of the lack of control

in the assignment of the prescriptive drug insurance benefit. Also, other variables in the Andersen-Newman model are not controlled or measured. The two groups may differ in elements of the predisposing and need determinants.

Does the financial barrier to pharmaceuticals, such as hypertension medication as described by Maronde et al. (1989), result in a greater utilization of hospital services? The results of this study suggest that the patient with financial barriers to medication may not be utilizing office visits to the primary care giver or urgent care center and suggests that more costly hospital services may be resulting.

RECOMMENDATIONS

It would be illuminative if this population were followed for two more years to evaluate the pattern of health service utilization. If the population were given more time to utilize health services the patterns observed in this study could be further evaluated.

This study looked at claims for employees of participating companies. Claims for a dependent or spouse were not considered. A study to evaluate these other groups from this total population could add to the conclusions made by this study.

Other health services of interest that have direct links to prescriptive drugs could be evaluated. Examples of other health services this could include are obstetrics,

diabetes care, hypertension care, and asthma care.

In addition to the findings about the relationship to prescriptive drugs and health services, two other observations are provided that might be evaluated. The insuring organization may need to evaluate why the use of urgent care centers was the least utilized health service. The requirement to have preauthorization for use of this service may be an unnecessary barrier that could be resulting in increased emergency room utilization. Also, the fact that the insurance coverage penetration rate is five percent greater in companies that offer the rider may need additional study.

REFERENCES

Aday, L. A. & Andersen, R. (1974). A framework for the study of access to medical care. Health Services Research, 9 (3), 208-220.

Aday, L. A. & Andersen, R. (1981). Equality of access to medical care: A conceptual and empirical overview. Medical Care, 19(12), 4-27.

Andersen, R. (1968). A behavioral model of families' use of health services. Research Series No. 25. Chicago: Center for Health Administration Studies, University of Chicago.

Andersen, R. & Newman, J. F. (1973) Societal and individual determinants of medical care utilization in the United States. Milbank Memorial Fund Quarterly, 51, 95-124.

Andersen, R. & Anderson, O. W. (1967). A Decade of Health Services: Social Survey Trends in Use and Expenditures. Chicago, University of Chicago Press.

Andersen, R., Smedby, B., & Anderson, O. W. (1970). Medical care use in Sweden and the United States: A comparative analysis of systems and behavior. Research Series No. 27. Chicago: Center for Health Administration Studies, University of Chicago.

Becker, M. H., Hafner, D. P., Kasi, S. V., Kirschet, J. P., Maiman, L. A. & Rosenstock, I. M. (1977). Selected

Psychosocial models and correlates of individual health--related behaviors. Medical Care, XV(5), 27-46.

Blissenbach, H. F. (1993). Pharmaceutical services in managed care. In P. P. Kongstvedt (Ed.), The managed health care handbook (pp 142-160). Gaithersburg, MD: Aspen Publishing.

Chang, W. (1992). Analysis of variation in utilization of six common procedures in Iowa (Health services utilization). Dissertation Abstracts International, B, 53/07, 3387.

Col, N., Fanale, J. E., & Kronholm, P. (1990) The role of medication noncompliance and adverse drug reactions in hospitalizations of the elderly. Archives of Internal Medicine, 150(4), 841-5.

Cummings, A. M., Becker, M. H., & Maile, M. C. (1980). Bring the models together: An empirical approach to combining variables used to explain health actions. Journal of Behavioral Medicine, 3(2), 123-145.

Douglass, C. W. (1971). A social-psychological view of health services research. Health Services Research, 6, 6-14.

Folland, S., Goodman, A. C., and Stano, M. (1993). The Economics of Health and Health Care. Macmillan Publishing Company, New York.

Green, J. H. (1988) Frequent rehospitalization and noncompliance with treatment. Hospital and Community Psychiatry, 39, 963-966.

- Harris, B. L., Stergachis, A., & Reid, D. (1990). The effect of drug co-payment on utilization and cost of pharmaceuticals in a health maintenance organization. Medical Care, 28, 907-917.
- Hatoum, H. T. & Akhras, K. (1993). 1993 Bibliography: a 32 year literature review on the value and acceptance of ambulatory care provided by pharmacists. Annals of Pharmacotherapy, 27, 1106-19.
- Hayward, R. A., Shapiro, M. F., Freeman, H. E., & Corey, C. R. (1988). Inequities in health services among insured Americans. The New England Journal of Medicine, 318, 1507-1512.
- Heenan, J. (1994). Prescription drug benefits in a managed care plan: balancing quality and costs. Medical Interface, 7(1), 84-6, 88, 91-2.
- Jones, K. R. (1993). Outcomes analysis: methods and issues. Nursing Economic\$, 11(3), 145-152.
- Kelly, G. R. & Scott, J. E. (1990) Medication compliance and health education among outpatients with chronic mental disorders. Medical Care, 28, 1181-1197
- Kempen, G. I. J. M. & Suurmeijer, T. P. B. M. (1991) Professional home care for the elderly: An application of the Andersen-Newman model in the Netherlands. Social Science Medicine, 33, 1081-1089.
- Kolb, M. M. (1988) Utilization behavior of the elderly in an HMO: a causal analysis. Dissertation Abstracts

International, B, 50/07, 2872.

Kubrin, A. I. (1991). Modeling the use of health services: an application of the behavioral model with particular reference to the role of financial access, using the 1986 National Health Interview Survey. Dissertation Abstracts International, B, 52/05, 2521.

Larson, L. N. Employer perspectives of HMO prescription drug benefits. (1988) Journal of Pharmaceutical Marketing & Management, 2(2), 129-140.

Leaf, F. D., Bruce, M. L. & Tischler, G. L. (1988). Factors affecting the utilization of specialty and general medical mental health services. Medical Care, 26, 9-14.

Leibowitz, A. (1989). Substitution between prescribed and over-the-counter medications. Medical Care, 27, 85-94.

Lerner, M. & Anderson, O. W. (1963) Health Progress in the United States, 1900-1960. Chicago:University of Chicago Press.

Levy, R. A. (Ed.). (1992a). Summaries of recent articles. Emerging Issues in Pharmaceutical Cost Containment, 2(2).

Levy, R. A. (1992b). Prescription cost sharing economic and health implications for health policy. PharmacoEconomics, 2(3), 219-237.

Lingle, E. W., Kirk, K. W., & Kelly, W. R. (1987). The impact of outpatient drug benefits on the use and costs of health care services for the elderly. Inquiry, 24(3),

203-11.

Mandelker, J. (1993). Monitoring drug compliance can reduce total medical plan costs. Business & Health, 11(6), 26-7, 31-5.

Maronde, R. F., Chan, L. S., Larsen, F. J., Strandberg, L. R., Laventurier, M. F., & Sullivan, S. R. (1989). Underutilization of antihypertensive drugs and associated hospitalization. Medical Care, 27, 1159-1166.

Matthews, J. A. (1990). Predictors of hospitalized patients' access to postdischarge home health services. Dissertation Abstracts International, B, 52/03, 210.

McKinlay, J. B. (1972). Some approaches and problems in the study of the use of services--an overview. Journal of Health and Social Behavior, 13(6) 115-152.

Mechanic, D. (1979). Correlates of physician utilization. Journal of Health and Social Behavior, 20, 387-398.

Muldoon, J. D. (1991). New immigrants and their health: Southeastern Asian refugees in Western Massachusetts. Dissertation Abstracts International, B, 51/08, 3801.

Nelson, A. A., Reeder, C. E., & Dickson, W. M. The effects of a Medicaid drug copayment program on the utilization and cost of prescription services. Medical Care, 22, 724-735.

Newman, J. F. (1971). The utilization of dental services. Unpublished doctoral dissertation, Emory

University, Georgia.

Newman, J. F. & Anderson, O. W. (1972). Patterns of dental services utilization in the United States: A nationwide social survey. Research Series No. 30. Chicago: Center for Health Administration Studies, University of Chicago.

Norwood, G. J., Helling, D. K., Burmeister, L. F., Jones, M. E. Yesalis, C. E., Fisher, W. P., & Lipson, D. P. (1981). Effects of capitation payment for pharmacy services on pharmacist-dispensing and physician-prescribing behavior: II. Therapeutic category analysis, over-the-counter drug usage, and drug interaction. Drug Intelligence and Clinical Pharmacy, 15, 656-664.

Pollack, E. S. & Ringen, K. (1993). Risk of hospitalization for specific non-work-related conditions among laborers and their families. American Journal of Industrial Medicine, 23, 417-425.

Porter, J. E. (1994). An experimental design to study the utilization of Pediatric health care services by Medicaid mothers. Dissertation Abstracts International B, 54/12, 6156.

Quam, L., Ellis, L. B. M., Venus, P., Clouse, J., Taylor, C. G., & Leatherman, S. (1993). Using claims data for epidemiologic research. Medical Care, 31, 498-507.

Reutzel, T. J. (1993) The nature and consequences of policies intended to contain costs in outpatient drug

insurance programs. Clinical Therapeutics, 15, 752-764.

Risley-Curtiss, C. (1993). Health care utilization by children entering foster care: factors associated with provider-initiated health referral and referral completion. Dissertation Abstracts International A, 54/3, 1096.

SAS Institute, Inc. (1989). SAS/STAT user's guide, Version 6, 4th Edition. (Software manual). Cary, NC. SAS Institute.

Saver, B. G., & Peterfreund, N. (1993). Insurance, income, and access to ambulatory care in King County, Washington. The American Journal of Public Health, 83, 1583-1588.

Schroeder, S. A., & Cantor, J. C. (1991). On squeezing balloons: cost controls fail again. New England Journal of Medicine, 325, 1099-1100.

Smith, D. G. (1993). The effect of copayments and generic substitutions on the use and cost of prescriptive drugs. Inquiry, 30(2), 189-98.

Soumerai, S. B., Avorn, J., Ross-Degnan, D., & Gortmaker, S. (1987). Payment restrictions for prescription drugs under Medicaid: Effects on therapy, cost, and equity. The New England Journal of Medicine, 317, 550-556.

Soumerai, S. B., McLaughlin, T. J., Ross-Degnan, D., Casteris, C.S., & Bollini, P. (1994). Effects of limiting medicaid drug-reimbursement benefits on the use of psychotropic agents and acute mental health services by

patients with schizophrenia. The New England Journal of Medicine, 331, 650-655.

Soumerai, S. B., Ross-Degnan, D., Avorn, J., McLaughlin, T. J. & Choodnovskiy, I. (1991). Effects of Medicaid drug-payment limits on admission to hospitals and nursing homes. The New England Journal of Medicine, 325, 1072-7.

Soumerai, S. B., Ross-Degnan, D., Fortess, E.E., & Abelson, J. (1993). A critical analysis of studies of state drug reimbursement policies: research in need of discipline Milbank Memorial Fund Quarterly, 71(2), 217-52.

Soumerai, S. B., Ross-Degnan, D., Gortmaker, S. & Avorn, J. (1990). Withdrawing payment for nonscientific drug therapy. Journal of the American Medical Association, 263, 831-839.

Starr, P. (1982). The Social Transformation of American Medicine. Basic Books.

Strain, L. A. (1991) Use of health services in latter life: the influence of health beliefs. Journal of Gerontology, 46(3), 8143-50.

Urrutia-Ross, X. & Aday, L. A. (1991) A framework for community assessment: designing and conducting a survey in a Hispanic Immigrant community. Public Health Nursing, 8(1), 20-26.

U.S. Department of Commerce, Bureau of the Census (1993). 1990 Census of population and housing: Population

and housing unit counts, Virginia. (1990 CHP-2-48).

Washington, DC: U.S. Government Printing Office.

Weiner, J. P., Lyles, A., Steinwachs, D. M., & Hall, K. C. (1991). Impact of managed care on prescription drug use. Health Affairs, 10(1), 140-154.

Wolinsky, F. (1978). Assessing the effects of predisposing, enabling, and illness-morbidity characteristics on health services utilization. Journal of Health and Social Behavior, 19, 384-396.

Woolsey, C. (1993). Managed competition. Business Insurance, 27(5), 1, 29.

AUTOBIOGRAPHICAL STATEMENT

The author of this work was born on February 1, 1952 in Massachusetts. She was awarded a Masters of Public Health, from the University of North Carolina, Chapel Hill in December, 1992. She received a Masters of Science in June, 1976 from Virginia Polytechnic Institute and State University. Her Bachelor of Science was received in May of 1974 from Winthrop University. She has held positions at the Medical College of Hampton Roads, the Catawba-Wateree Health Education Consortium, Inc., and the Gaston County Health Department. Academic honors include membership in Phi Kappa Phi, 1995, membership in Alpha Eta, 1995, 1990 Educator of the Year, South Carolina Hospital Association, Society of Educators, listed in Who's Who Community Health Centers, 1978, United States Public Health Traineeship, 1974-76, recipient of the Elizabeth Burris Memorial Scholarship, Outstanding Student in Nutrition, South Carolina, 1974, and membership in Phi Upsilon Omicron. Published works includes:

Groblewski, M. (1991). Providing the Tools and Training to Access Grateful Med in South Carolina. SEA Currents, 9, (6), 4.

Groblewski, M. (1992). Scholarship Support for Continuing Education in South Carolina. National AHEC Bulletin, IX, (2), 16.

Groblewski, M. (1992). Application of New Technology at a Rural Site. National AHEC Bulletin, IX, (2), 15.

Groblewski, M., Powers, J. & Mann, J. (1990). The Consortium Concept: Collaboration in Health Manpower Training in Rural South Carolina (Abstract). The Journal of Rural Health, 6, 3.

OPTIMA HEALTH PLAN/IPA MODEL HMO:

OPTIMA Health Plan (OHP) is an independent practice association (IPA) model Health Maintenance Organization (HMO) which began in 1984. OHP is jointly owned by Sentara Health System and Bons Secours, Inc. The IPA physicians who participate with the Plan are actively involved in setting the standards of care for OHP patients, monitoring the appropriateness of care, and in working with other OHP providers to manage patient care effectively.

How OPTIMA is Sold:

HMO's have been recognized as an effective and cost-efficient method of health care delivery because the Plan is able to carefully monitor patient services. Members of OPTIMA must select a primary care physician (PCP), from a list of contracted physicians.

The Network:

Over 300 primary care physicians participate in the OPTIMA network. These physicians are independent practitioners who have agreed to contract with the plan and follow established criteria for medical care management. Employer groups and employees themselves are attracted to OPTIMA since most new members find that their current doctors are part of the OHP network. A network of specialists are also contracted by OPTIMA to provide care to patients who have been referred by their PCP.

Reasons for offering OPTIMA:

Like Sentara Health Plan, OPTIMA can offer employer groups within the Hampton Roads area a variety of benefits plans from which to choose. As a managed care plan, comprehensive benefits can be offered at an affordable price because patient care is monitored to determine whether care is appropriate and necessary. The primary care physician is in a position to direct the patient's medical care and either provides the services needed or refers to contracted specialists. The focus of an HMO is on wellness and OHP is committed to the practice of preventive care. Some employer groups are seeking plans like OHP in order to have coverage for well baby care, routine physicals, immunizations and preventive care for women's health: annual gyn exams and mammography screening.

OLD DOMINION UNIVERSITY

Office of Research and Graduate Studies
Norfolk, Virginia 23529-0013
804-683-3460

APPENDIX B

MEMORANDUM



DATE: December 14, 1994

TO: Ms. Martha Groblewski
College of Health Sciences

FROM: Mr. Steven Hoagland *Steven Hoagland*
Research Administrator

SUBJECT: Review and approval of protocol

Your dissertation proposal on file with this office, titled "A Proposal for an Outcome Assessment of Prescriptive Drug Insurance on the Utilization of Health Services in a Health Maintenance Organization," was reviewed against criteria for the use of human subjects in research. Consequently, it was determined that the proposed research was exempt from review because it involves the collection of data from existing records and does not appear to present extraordinary risk to subject's financial standing, physical health, or social reputation. Consequently, the proposed research was approved under due consideration to the issues of confidentiality, informed consent, and minimal risk.

Further attention, however, should be given to how the data will be coded to further protect the identities of subjects, and whether the accessible data is confidential (identity known) or anonymous (identity unknown).

If you have any questions or comments please do not hesitate to contact me.

THE CONTINUUM OF SENTARA HEALTH CARE PRODUCTS

	Managed Indemnity	PPO	POS	HMO
Product Name	Sentara Comprehensive, (Comp plans): Out-of-Area coverage	Sentara PPO	Sentara POS	OPTIMA Sentara Health Plan
Individual selection of providers	Complete freedom of choice	Choose in-network or out-of-network	Must select PCP, can choose in-network or out-of-network	Choose in- network only
Restrictions on Selection of Hospital for Admissions	None	Use network hospitals or be responsible for a greater portion of expenses	Use network hospitals or be responsible for a greater portion of expenses, (using indemnity benefits, greater penalty than PPO)	Network hospitals only, (unless emergency)
Restrictions on Individual Self- Referral to Specialists	None	Stay within group of preferred providers or be responsible for a greater portion of expenses	Stay within network or be responsible for a greater portion of expenses, (using indemnity benefits, greater penalty than PPO)	Must go through primary care physician
Benefits	Leanest	→ → → → → → →	→ → → → → → →	Richest
Management of Patient Care Costs	Minimal cost management	→ → → → → → →	→ → → → → → →	Most Cost Management

ADS Product Orientation Revised 3/94-Kathy Cramer

GROUP FUNDING OPTIONS

Employer groups, depending on their size, may choose to offer health benefits to their employees on a **Fully-Insured** or **Self-Funded** financing basis. ADS has a variety of benefit plans and services to meet the employer needs whether they are fully-insured or self-funded. The following are major characteristics of the two financing arrangements:

Fully-Insured Arrangements:

Fully-Insured employers pay premiums to ADS who in turn accepts the responsibility for paying claims for the group. In this type of financial arrangement, ADS is at risk for paying the group's medical claims, regardless of the amount. Other features of fully-insured financial arrangements include:

- ▶ The insurer (ADS) determines the premium rates for coverage.
- ▶ The insurer (ADS) develops and determines the benefit plan coverage.
- ▶ The insurer (ADS) is subject to state regulations regarding benefit coverage and procedures.
- ▶ ADS bears the financial risk, meaning that if incurred claims for employees are greater than the premium dollars collected, ADS must pay the excess claim expenses.
- ▶ If the total claims dollars are less than premium dollars, the insurer (ADS) manages the surplus dollars.

Self-Funded Arrangements:

Self-Funded employer health plans are becoming more popular among larger employer groups. When an employer chooses to self-fund, the employer is responsible for paying the claims with money ordinarily set aside for premiums paid to an insurance company. Depending on the amount of claims submitted by the group, self-funded plans have the potential to save the employer money since they pay only for claims incurred rather than premiums. Additional self-funded features include:

- ▶ The self-funded employer sets aside their projected health care dollars in a bank account or trust fund.
- ▶ The employer designs the health plan benefits to meet their specific needs, and have the benefits flexibility they desire.
- ▶ In self-funded plan designs, the employer is exempted from certain government health plan regulations and may not have to offer state mandated benefits.
- ▶ Employers that self-fund their health benefits bear the financial risk themselves as opposed to an insurance company taking the risk. Most Self-Funded plans, however, do insure their plan after some maximum amount of claims dollars have been spent, (this is called **stop-loss insurance**).
- ▶ Employers that self-fund often choose the services of a Third Party Administrator (TPA) for a variety of administrative services. These include claims processing, member services, provider network access, medical care management, as well as other services. ADS is able to serve as the TPA for self-funded groups.

**SENTARA HEALTH PLAN
COPAY COMPARISONS
SMALL GROUP HMO PRODUCTS**

*****COPAY COMPARISONS TO BE USED FOR INFORMATIONAL PURPOSES ONLY*****

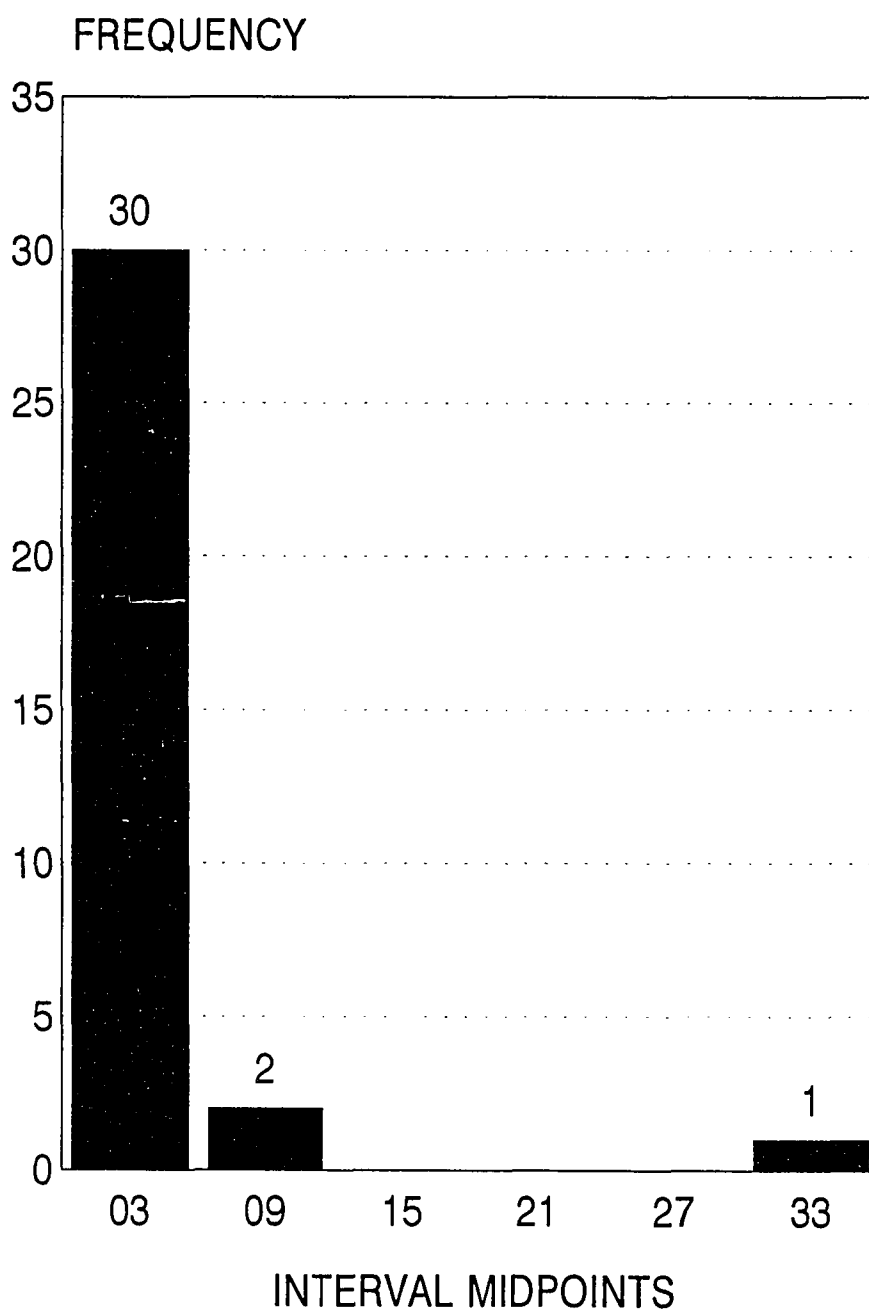
BENEFIT	250	350	400
Primary care visit	\$5	\$10	\$15
Specialist visit	\$10	\$15	\$25
Maternity Care (Global)	\$50 for outpatient OB services	\$100 for outpatient OB services	\$350 for outpatient OB services
Prescription Drugs	\$6 per RX unit or refill (\$4000 max per contract yr.)	\$10 per RX unit or refill (\$4000 max per contract yr.)	\$10 copay after a \$50 deductible per RX unit or refill. Can be sold without RX. (\$4000 max per contract yr.)
Inpatient Care	\$75 per DAY \$375 max per stay	\$100 per DAY \$500 max per stay	\$150 per DAY \$750 max per stay
Emergency Room visit	\$50	\$50	\$100
Urgent Care Center visit	\$25	\$25	\$50
Ambulance (each way)	\$25	\$25	\$25
Mental Health Inpatient (30 days per contract year, combined max. with inpatient substance abuse)	\$100 per DAY	\$100 per DAY	\$150 per DAY
Skilled Nursing Facility (100 days per contract year)	\$75 copay per DAY \$375 max per stay	\$100 copay per DAY \$500 max per stay	\$150 copay per DAY \$750 max per stay

BENEFIT	250	350	400
Mental Health & Substance Abuse Outpatient visits. (20 visits per contract year)	\$25	\$35	\$35
Substance Abuse Inpatient (30 days per contract year, combined max with inpatient MH. 90 days lifetime max.)	\$150 copay per DAY	\$150 copay per DAY	\$200 copay per DAY
Tubal Ligation (In addition to any applicable in-or outpatient surgery copay)	\$150 copay to physician	\$150 copay to physician	\$150 copay to physician
Vasectomy (In addition to any applicable in-or outpatient surgery copay)	\$50 copay to physician	\$50 copay to physician	\$50 copay to physician
Outpatient Surgery	\$75	\$100	\$150
Physical, Speech or Occupational Therapy (90 consecutive days per illness or condition)	\$10 per visit	\$15 per visit	\$25 per visit
Vision Exam (1 visit/2 yrs.)	\$5	\$5	\$5
Preventive Dental (2 visits per yr.)	\$20	\$20	\$20
Allergy Care	\$5 per injection Serum not covered \$25 for testing	\$5 per injection Serum not covered \$25 for testing	\$5 per injection Serum not covered \$25 for testing

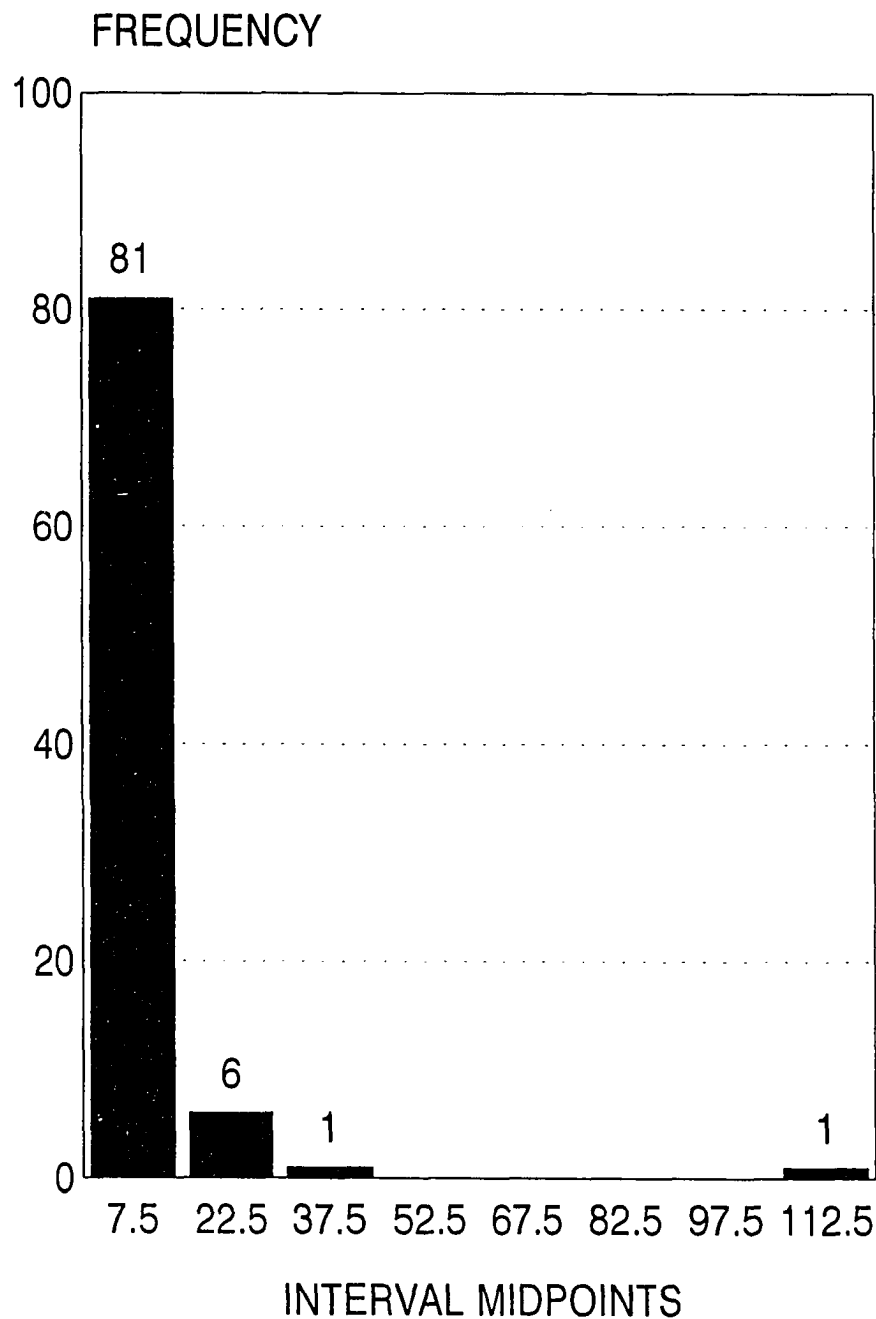
7/93-K. Cramer-Update

MEANS FOR URGENT CARE, NO RIDER GROUP

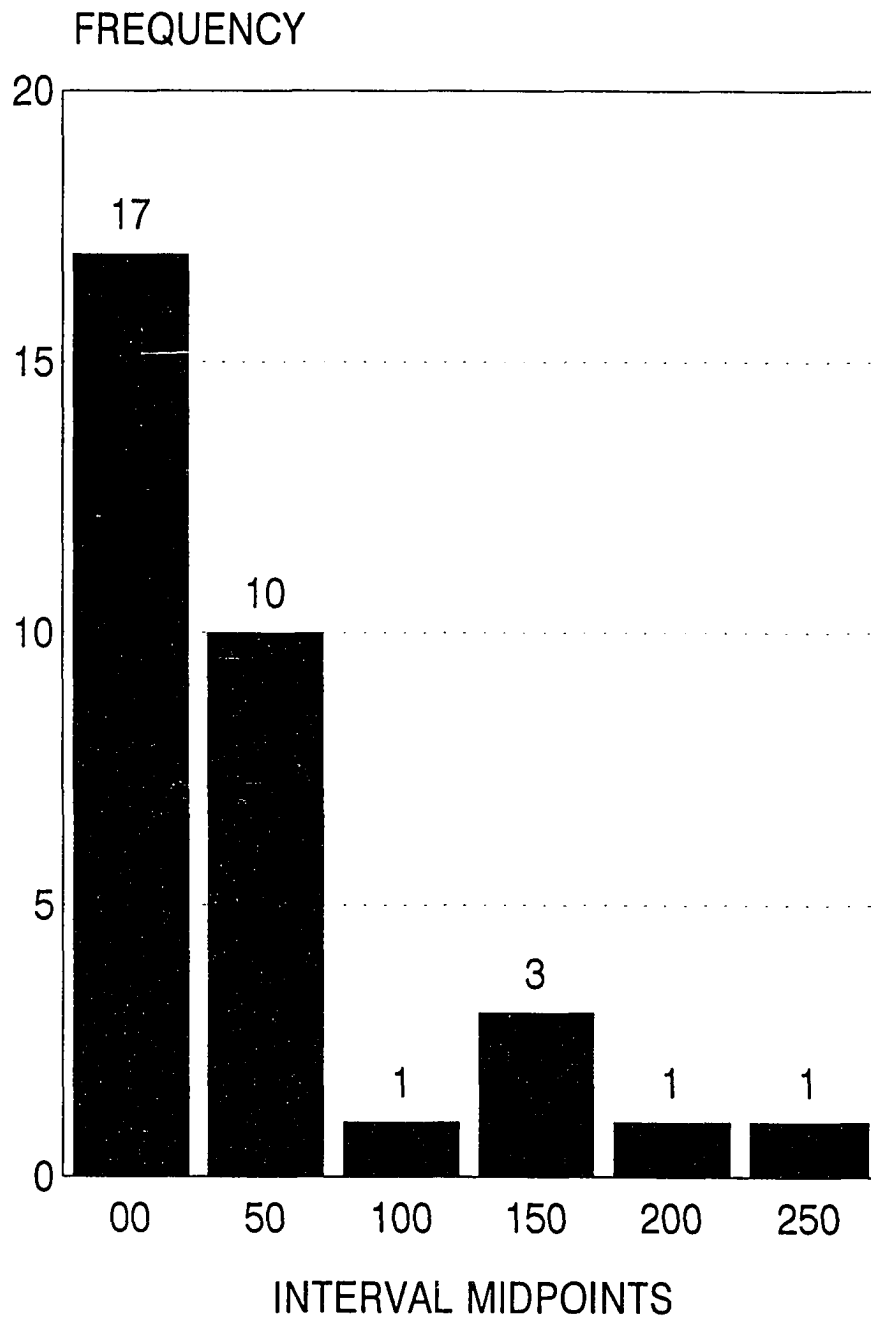
AVERAGE MEMBER EXPENDITURE PER COMPANY



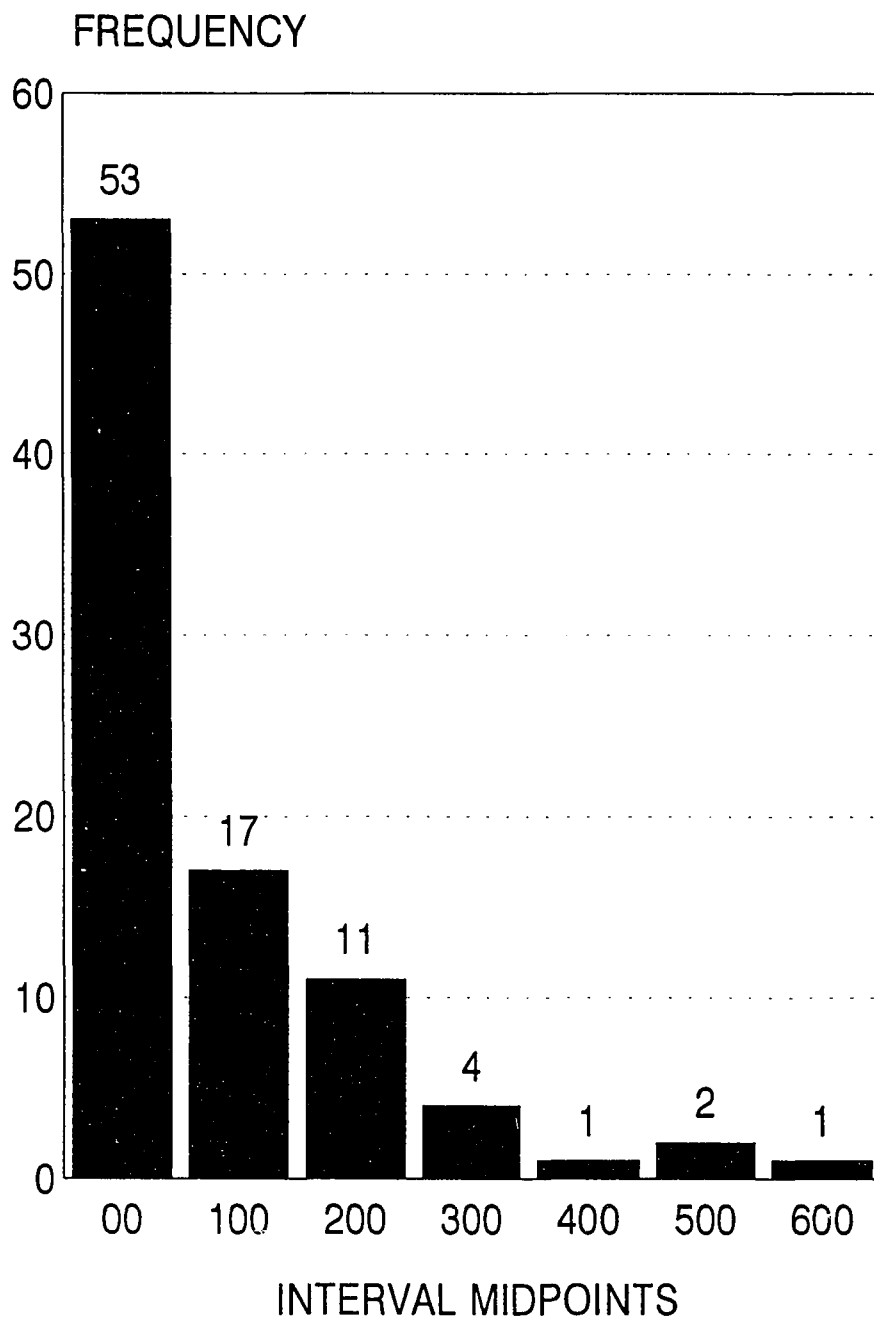
MEANS FOR URGENT CARE CENTERS, RIDER GROUP
AVERAGE MEMBER EXPENDITURE PER COMPANY



MEANS FOR EMERGENCY DEPARTMENTS, NO RIDER GROUP
AVERAGE MEMBER EXPENDITURE PER COMPANY

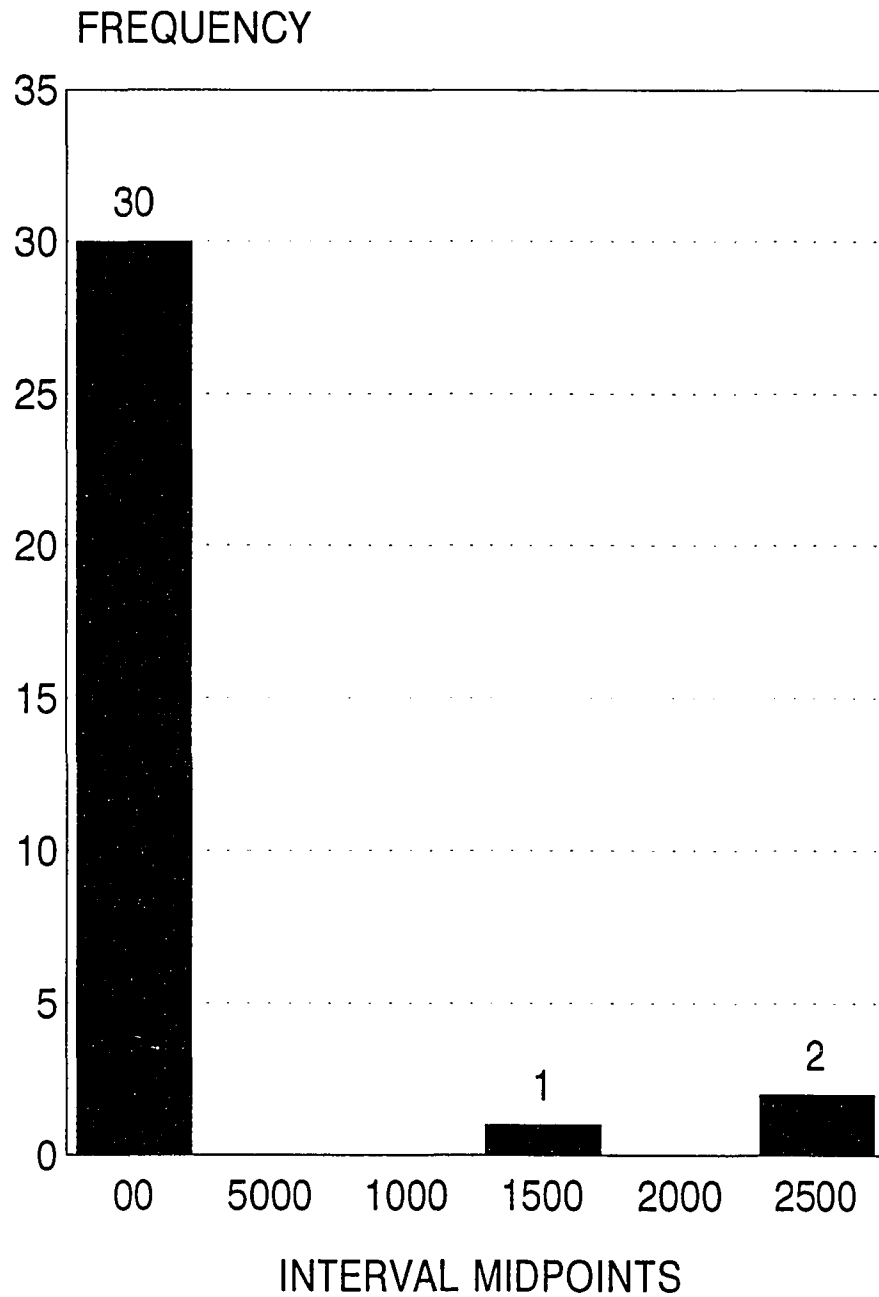


MEANS FOR EMERGENCY DEPARTMENTS, RIDER GROUP
AVERAGE MEMBER EXPENDITURE PER COMPANY



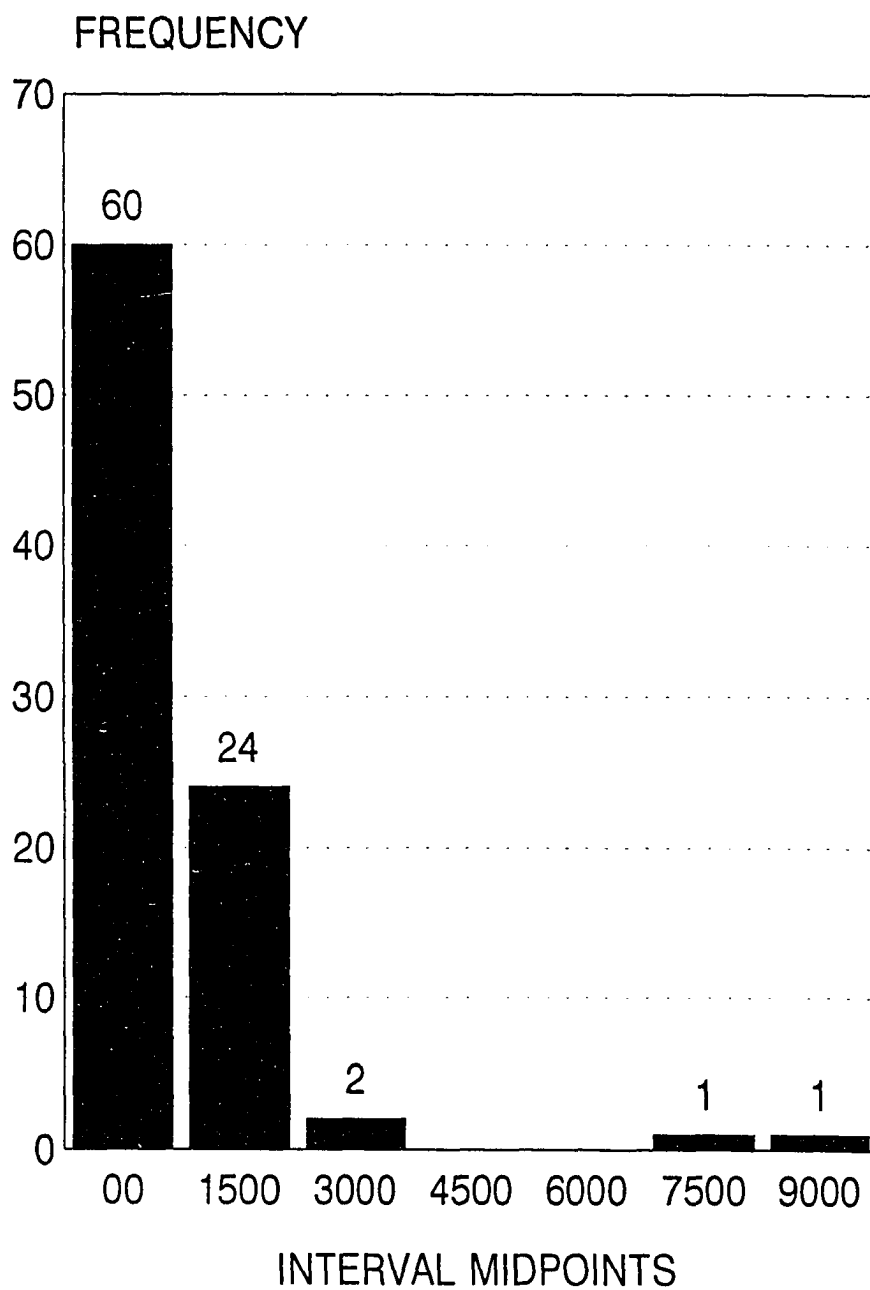
MEANS FOR HOSPITALS, NO RIDER GROUP

AVERAGE MEMBER EXPENDITURE PER COMPANY

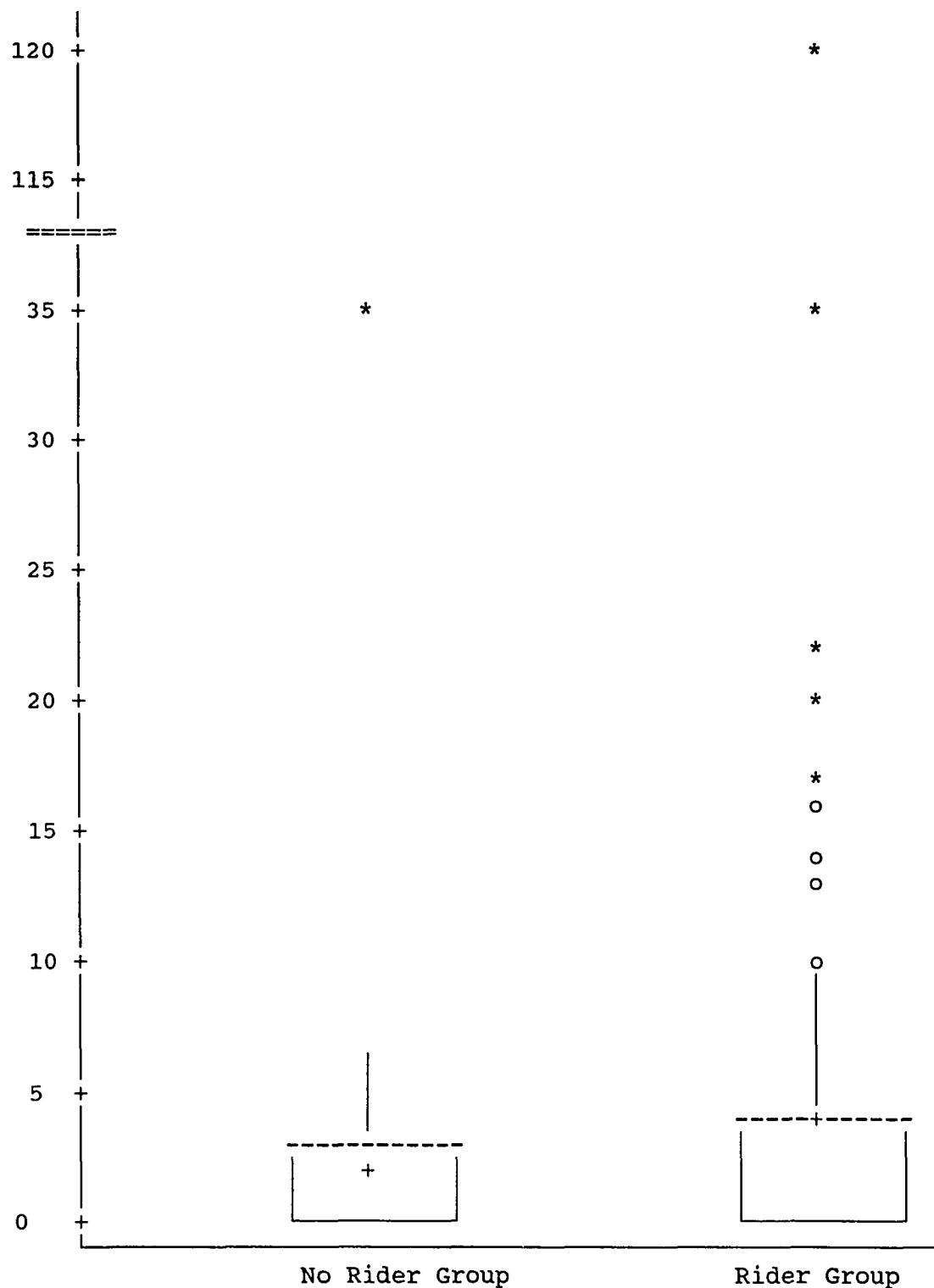


MEANS FOR HOSPITALS, RIDER GROUP

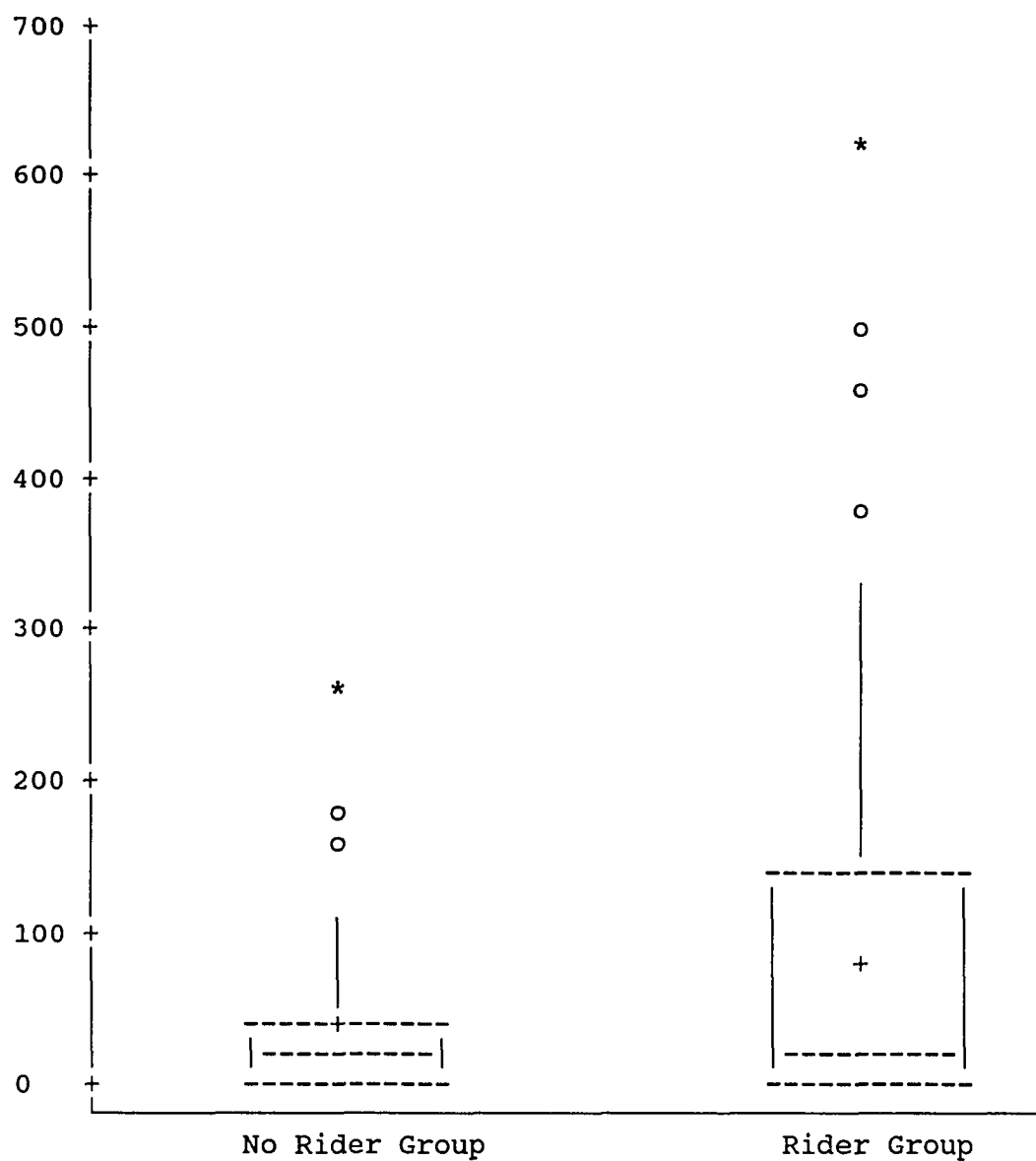
AVERAGE MEMBER EXPENDITURE PER COMPANY



APPENDIX L: Box Plots for the Average Expenditure per Company for Urgent Care Center Services by Status of Prescriptive Drug Insurance.



APPENDIX M: Box Plots for the Average Expenditures per Company for Emergency Department Service by Status of Prescriptive Drug Insurance.



APPENDIX N: Box Plot for the Average Expenditure per Company for Hospital Services by Status of Prescriptive Drug Insurance

