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ALCOHOLISM TREATMENT AND ITS EFFECT ON SUBSEQUENT
HEALTH CARE COSTS: A MEDICAID STUDY OF
COST DIFFERENCES BY TREATMENT SETTING

by

Edmund Paul Kemp

A Dissertation
Submitted to the
Faculty of The Graduate College
in partial fulfillment of the
requirements for the
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Western Michigan University
Kalamazoo, Michigan
June 1987

ALCOHOLISM TREATMENT AND ITS EFFECT ON SUBSEQUENT
HEALTH CARE COSTS: A MEDICAID STUDY OF
COST DIFFERENCES BY TREATMENT SETTING

Edmund Paul Kemp, D.P.A.

Western Michigan University, 1987

In an attempt to slow and reduce this nation's costs for alcoholism services under the Medicare and Medicaid programs, the Health Care Financing Administration and the National Institute on Alcoholism and Alcohol Abuse in 1981 collaborated and jointly developed the Alcoholism Services Demonstration (ASD). The major project goal of the Alcoholism Services Demonstration was to demonstrate that cost savings could be derived by providing alcoholism services to Medicare- and Medicaid-eligible recipients in freestanding alcohol treatment centers.

The purpose of this research was to evaluate Michigan's experience under the national demonstration project with a major focus on the following questions: (a) Did the provision of alcoholism treatment result in a subsequent reduction in total health care expenditures for Michigan Medicaid recipients? and (b) Was there a difference in Medicaid costs among recipients treated for alcoholism in the acute care inpatient hospital setting versus the freestanding demonstration setting?

The research design chosen was a quasi-experimental time series analysis using a nonequivalent control group. The data used were

Medicaid-reimbursed total health care claims for the entire alcohol-treated Medicaid population over a 36-month period. The original study design was to compare the Medicaid costs between the inpatient-hospital-treated recipient and the demonstration-treated recipient. However, a third comparison group was added when it was found that a number of recipients used both treatment settings during the study period.

Multiple classification analysis was selected as the statistical technique in this research because it enabled the researcher to compute means for the dependent variable (adjusted average quarterly Medicaid costs) for each treatment setting while controlling for other independent variables (age, race, gender, and county of residence).

The findings of this research showed that none of the alcoholism treatment provided in the various treatment settings reduced subsequent total health care costs and that alcoholism treatment provided in the demonstration setting was less costly than the alcoholism treatment provided in the acute care inpatient hospital setting.

A secondary finding was that a significant portion of the alcoholism-treated Medicaid population used the various treatment-setting options at will due to the state's inability to mandate specific treatment providers for Medicaid recipients.

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I accept full responsibility for the contents of this dissertation, and the opinions and conclusions expressed within are solely mine.

Edmund Paul Kemp

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CHAPTER I

THE PROBLEM AND ITS SIGNIFICANCE

In the last few years there has been a tremendous resurgence of interest in the impact of alcohol consumption, its causes, and cost to American society. This recent interest has been fueled by public concern over alcohol-related highway fatalities and rising health care costs. The general public and, more specifically, the health care industry realize that alcoholism and alcohol abuse are among the major public health problems facing the American society.

Overall, American health care costs have grown tenfold over the past two decades, from \$27 billion in 1960 to \$287 billion in 1981 (National Institute on Alcohol Abuse & Alcoholism, 1981). Alcoholism plays a significant role in these health care expenditures. It has recently been estimated that the economic burden of alcohol costs the United States more than \$116 billion, with more than \$14 billion in treatment costs alone on an annual basis (Harwood, Napolitano, Kristiansen, & Collins, 1984). These spiraling health care costs and the realization that alcohol abuse is one of this country's major health problems are forcing the health care industry, in both the public and private sectors, to develop alternatives to costly hospitalization and traditional methods of alcohol treatment.

The historical development of alcohol treatment in hospital-based settings can be traced back to the establishment of the

Medicare and Medicaid programs. Our national Medicare program was instituted by Congress in 1965 as Title XVIII of the Social Security Act. This "Great Society" program was established under President Johnson's administration to protect the aged and disabled against catastrophic financial loss resulting from acute-care medical conditions. Primary coverage under the Medicare program was directed at hospitalization, related care, physician's care, and ancillary medical expenses. The coverage was directed at those medical costs that were most difficult to pay.

Because alcoholism treatment was and continues to be defined as a mental disorder under the Medicare program, alcoholism treatment has been concentrated in traditional institutional psychiatric settings and acute-care-level inpatient hospitals. Provisions for allowing Medicare reimbursement to freestanding or outpatient alcoholism programs was not addressed. Currently, the benefit coverage under the Medicare program includes hospital insurance under Part A (inpatient hospital care, inpatient care in a skilled nursing facility, and home health care). Part B of the Medicare program covers physician's services, outpatient hospital care, outpatient physical therapy, speech pathology services, home health care, and other health care services and supplies.

The Medicaid program, also established in 1965 under Title XIX of the Social Security Act, is a health insurance program that provides medical assistance to low-income, medically needy individuals. The states and the federal government share in the

costs of treatment, and specific basic health services must be provided by the state in accordance with federal statutes. Federal funds are provided to the states on a match-formula basis, which ranges from 50% to 80% federal participation. Individual states have a certain degree of discretion in the expansion of these basic services, but coverage under the Medicaid program is also primarily provided in inpatient and outpatient hospital settings by physicians.

Under the Medicaid program, as under the Medicare program, alcoholism is defined as a mental disorder. Therefore, the limitations on the treatment of alcoholism include the general limitations applying to psychiatric services. A complicating limitation under the Medicaid program is the policy decision on the part of the federal government to exclude federal financial participation for care in psychiatric institutions for persons between the ages of 22 and 64. However, there have been no age restrictions in psychiatric units of general hospitals. This decision is based on the fact that care for the mentally ill between the ages of 22 and 64 has historically been the responsibility of the states.

As a result of these severe reimbursement limitations and restrictions, this country's low-income individuals needing alcoholism treatment are believed by some health care administrators to be significantly underserved. The people who do receive alcoholism treatment are doing so in high-cost inpatient hospital

settings at substantial costs to the Medicaid program and, finally, the taxpayer.

Concern for rising health care costs and the growth of the alcoholism treatment system have led national, state, and local health policymakers to question the cost effectiveness of different types of alcohol treatment services. The alcohol treatment system now includes treatment settings of (a) inpatient care in a hospital or freestanding residential facility; (b) outpatient care provided by private practitioners, outpatient clinics, mental health centers, and Alcoholics Anonymous (AA) groups; and (c) intermediate care in halfway houses or recovery homes.

In addition to the recent diversification of the alcohol treatment setting, the alcohol treatment reimbursement mechanism has also changed. Before the late 1970s and early 1980s, the majority of funding for alcoholism treatment came in the form of direct federal grants or formula funds returned to the states from tax revenues. In addition to these federal funds, individual states sought state appropriations and local donations to enhance their treatment system. Increasing awareness on the part of state legislators that alcoholism constitutes a serious health and social problem in our society has enabled the majority of states to pass and enact laws mandating health insurers, in their respective states, to provide alcoholism treatment coverage.

The major funding sources of the alcohol treatment system are federal (Medicare, Medicaid, Federal Alcohol and Mental Health Block

Grant) (20%), state (48%), and local taxes and appropriations (7%); third-party reimbursement from public or private payors; direct client fees; and other contributions and grants (25%). The availability of third-party funding through mandated coverage of alcohol treatment has contributed to the rapid development of the alcohol treatment system. According to the 1982 National Drug and Alcoholism Treatment Utilization Survey (NDATUS) prepared by the National Institute on Alcoholism and Alcohol Abuse (NIAAA, 1983), of the \$1.1 billion spent on alcohol treatment in 1982, more than 40% was provided by third-party payors. Medicare provided \$150 million, or 34% of these costs.

Benefit payments for the Medicare and Medicaid programs are escalating at an extraordinary rate, far exceeding the general rate of inflation. The Office of Public Affairs, Health Care Financing Administration (1984), indicated that from the period of 1978 to 1984, total Medicare benefit payments, in real dollars, have increased from \$24.2 billion to \$63.9 billion or 260%. Medicaid benefit payments have also increased at a remarkable rate between 1978 and 1984. For 1978, national Medicaid benefit payments reached \$18 billion, and in 1984, the total had risen to \$38.2 billion, a 178% increase. The Michigan Medicaid budget has also grown at an accelerated rate. The Michigan Department of Social Services, in its 1984 report entitled Containing Medicaid Costs, indicated that Michigan's Medicaid budget has grown from a little over \$400 million in fiscal year 1973 to over \$1.2 billion in fiscal year 1983. Total

Medicaid benefit payments have increased over 300% in the last 10 years.

As can be seen, total health care costs as well as costs for alcoholism treatment within the United States have been rising at alarming rates. In fiscal year 1980-81, the Health Care Financing Administration (HCFA) and the National Institute on Alcoholism and Alcohol Abuse (NIAAA) collaborated and jointly developed the Alcoholism Services Demonstration (ASD). The development of this national demonstration project was based on the recognition that an attempt to slow and reduce the cost of alcoholism services and to provide greater access to treatment for the nation's needy had become a national priority.

Overview of the Alcoholism Services Demonstration

The major project goal of the Alcoholism Services Demonstration was intended to demonstrate cost savings expected from providing alcoholism services to Medicare and Medicaid eligibles in freestanding residential alcohol treatment centers, including halfway houses, and freestanding outpatient alcohol treatment centers. The Alcoholism Services Demonstration allowed for federal waivers to be granted to six participating states to test the feasibility of using freestanding detoxification, residential, and outpatient alcohol treatment centers to provide alcoholism services.

Under the demonstration project, the following services were rendered by properly licensed and funded providers:

Detoxification: Detoxification is short term, usually 24 to 72 hours of care, with services provided under the observation and supervision of personnel trained in the treatment of alcoholism. The objective is to restore an alcohol-free state to an alcohol-dependent individual who may experience threatening withdrawal symptoms if not carefully monitored and treated in the appropriate setting. Detoxification treatment was allowed on an unlimited basis, not to exceed 5 days in any one episode.

Residential: Residential services were provided on a 24-hour basis to any alcohol-dependent individual whose condition indicated a need for a controlled and structured environment while receiving alcoholism treatment and evaluation or rehabilitation services. Up to 30 days of residential treatment per 12-month period could be rendered per recipient.

Outpatient counseling (individual/group): Outpatient counseling provides alcoholism treatment and services on an ambulatory basis to alcoholic individuals who can benefit from either a one-on-one or a group counseling scheduled service on a nonresidential basis. Up to 45 hours per 12-month period of combined individual/group counseling could be rendered per recipient.

Michigan, Illinois, Oklahoma, New York, New Jersey, and Connecticut were the six states that participated in the national demonstration project. Under the project, Medicare and Medicaid waivers were obtained, which extended coverage and federal financial participation to freestanding providers of alcoholism treatment. The

participating states selected and enrolled freestanding alcoholism treatment facilities that provided detoxification and residential and outpatient counseling services to Medicare beneficiaries and Medicaid-eligible recipients. In Michigan, 24 individual treatment facilities were selected throughout the state. These treatment facilities were geographically distributed in the Upper and Lower Peninsulas and actively pursued and treated Medicare beneficiaries and Medicaid-eligible recipients as part of the national demonstration project for 3 years.

The national demonstration project was originally scheduled to end in December 1985. However, due to the Reagan Administration's efforts to reduce the national budget deficit, the expiration date of the project was advanced to May 1985 for Michigan. The end of the national demonstration project also brought to an end the current federal waivers that allowed Medicare and Medicaid reimbursement for alcoholism treatment in freestanding facilities. As the project came to an end, the Congress had to determine if reimbursement for alcoholism treatment in freestanding treatment settings would become a continued allowable and reimbursable benefit under the Medicare and individual-state-administered Medicaid programs. To date, Congress has not made a determination due to the incomplete national evaluation of the six participating states.

Research Problem and Focus of the Study

In an attempt to contribute critically needed evaluation data to address this issue, the research problem and major focus of this study were to determine if the provision of alcoholism services did demonstrate cost savings and a reduction in total medical care expenditures for the Michigan Medicaid alcohol-treated population.

This study focused on the Michigan Medicaid population who participated in the first year of the demonstration project. The research did not entail an analysis of the Michigan Medicare population who participated in the demonstration project because the federal government maintains the Medicare data, and confidentiality and data-accessibility issues were beyond the scope of this researcher. Also, the issues of "quality of care" and the presence or absence of desirable "treatment outcomes" were outside the scope of the study.

The researcher focused on medical care expenditures for alcohol-treated Michigan Medicaid recipients. The study was intended to determine if cost savings did occur to Michigan's Medicaid budget and if, indeed, the freestanding facilities offer a less costly alternative to the traditional inpatient hospital setting.

The results of the research are important in that they will contribute to the growing body of literature on issues of alcoholism treatment. Ideally, the findings will be used by individual states, the national Health Care Financing Administration, and Congress in determining if national legislation should be changed to allow for

ongoing Medicare and Medicaid reimbursement for alcoholism services in freestanding treatment facilities.

CHAPTER II

REVIEW OF SELECTED LITERATURE

The purpose of this chapter is to provide a methodological critique of the alcoholism treatment literature capturing the historical development of the generalization that the provision of alcoholism treatment reduces future total health care expenditures. The literature review covers two time periods. The first time period reviewed is the 1970s. The second time period reviewed is between the years of 1979 and 1985.

The analysis begins with Jones and Vischi's (1979) comprehensive literature review of alcoholism treatment studies conducted before 1979. In this literature review of the then-current status of alcoholism treatment and its subsequent effect on total health care use, 12 separate studies were reviewed. Jones and Vischi found significant reductions in medical care use following the provision of alcoholism treatment in all 12 studies. The individual studies reported reductions in both sick-day use, and accident benefits paid ranged from 26% to 69% with a median of a 40% reduction following alcoholism treatment.

The initial development of the generalization that alcoholism treatment reduces subsequent total health care use can be traced back to these early studies. A case-by-case critique of these early

alcoholism studies is necessary if one is to understand fully the developmental path the generalization has taken.

By reviewing these early studies, one can trace the development, direction, and motivational factors inherent in the alcoholism treatment field's current belief that alcoholism treatment results in a subsequent reduction in total health care use.

Alcoholism Treatment Studies of the 1970s

One of the earliest studies in the alcoholism treatment literature dealt with the Illinois Bell Telephone Company (Hilker, 1974). The aim of this employee-based alcoholism treatment study was to determine the effect of alcoholism treatment on alcoholic employees by examining job rehabilitation and changes in the number of sickness disability cases. This Alcoholics Anonymous structured program studied 402 employees who received alcoholism treatment for 5 years before and 5 years after treatment intervention.

The measure used in this study to assess the effect of alcoholism treatment was "cases of sickness disability." The study design called for a comparison of cases of sickness disability, cases due to off-duty accidents, and cases due to on-duty accidents before and after alcoholism treatment. The author concluded that following alcoholism treatment there was a 46% reduction in sickness disability cases, a 63% reduction in off-duty accident cases, and an 81% reduction in on-duty accidents.

This finding was the earliest evidence in the literature that there appeared to be a relationship between alcoholism treatment and subsequent health care use. However, although there appeared to be support for the development of the generalization, the study contained noted methodological limitations. The study contained strengths in its lengthy pre- and postalcoholism treatment time periods and large study group. However, the study contained no comparison group, and other measures of health care use, namely expenditures, were not used.

Following this employee-based study came two additional employee-based studies. These studies were the Philadelphia Police Department Study and the Philadelphia Fire Department Study ("Two Tales of One City," 1975). The purpose of the Philadelphia Police Department Study was to determine the costs and benefits of its alcoholism counseling unit. The study group was comprised of 170 problem drinkers who received alcoholism counseling from recovered alcoholism treatment staff. The variable used to assess the effect of the alcoholism program was average sick leave and injury day use.

The study concluded that there was a 38% reduction in sick day use and a 62% reduction in injury day use for the study group 1 to 2 years following alcoholism treatment. This study, like the employee-based Illinois Bell Telephone Study of 1975, used the single measure of sick and accident day use to ascertain the effect of its alcoholism treatment program. The authors concluded that there was a

relationship between alcoholism treatment and the reduction in sick and accident day use following alcoholism treatment.

However, the study lacked a comparison group, and the relative amounts of health care use before, during, and after alcoholism treatment were not indicated. Again, what was carried forward by the alcoholism treatment field in this particular study was the fact that there appeared to be a relationship between alcoholism treatment and a subsequent reduction in health care use. The methodological weaknesses were overlooked in order to justify the in-house alcoholism treatment program.

The Philadelphia Fire Department Study of 1974 ("Two Tales of One City," 1974) was very similar to the Philadelphia Police Department Study. The purpose of the project was to determine the relative costs and benefits to the Philadelphia Fire Department by providing alcoholism counseling to its firemen. Seventy-seven problem-drinking firemen were counseled by trained, recovered alcoholic firemen. To measure the effect of the counseling received, a comparison between average alcoholism treatment costs and average savings from reduced sick leave use was done. Although the comparison did show savings to the Philadelphia Fire Department, the researchers failed to take into account savings to the individual and the insurance carrier. Also, no indication of before, during, and after health care use was noted.

This study was one of the earliest attempts to identify the "costs" of alcohol counseling. The fact that the authors concluded

that savings could be expected from the provision of alcoholism treatment again gave legitimacy to the developing generalization that alcoholism treatment reduces subsequent health care costs.

In 1975 the generalization was supported again in an employee-based alcoholism treatment program at General Motors Corporation in Lansing, Michigan (Alander & Campbell, 1975). The purpose of this study was to determine whether the cost of an industrial drug and alcohol rehabilitation program is offset by savings to the company in terms of reduced sickness and accident benefits. One hundred seventeen hourly employees who volunteered for therapy were studied for 1 year before and 1 year following treatment. These employees were compared to a group of 24 workers who were known to management as having drug or alcohol problems, but did not seek treatment. The measures used to determine the effect of the alcoholism treatment were average lost man-hours and average sickness and accident benefits.

The findings of the study indicated a 33% reduction in sickness and accident benefits and a 52% reduction in lost man-hours for the study group up to 1 year following alcoholism treatment. The comparison group, on the other hand, showed a 66% increase in sick and accident benefit use and a 10% increase in lost man-hours during the same time period.

The generalization was again supported by an employee-based alcoholism treatment program. This time additional strength was added to the generalization because this study included the use of a

comparison group. However, only the positive findings were emphasized, and the methodological weaknesses were given little, if any, consideration. While the study introduced the use of a comparison group and multiple measures in ascertaining use of the health care system, it also erred in using a small nonrepresentative comparison group, and it failed to capture the amount of money spent on outpatient services.

The Kennecott Utah Copper Study (1976) added momentum and new measurement techniques to the generalization that alcoholism treatment reduces total health care use. The purpose of this employee-based study was to determine the effect of counseling on alcoholic workers' health care use. The study group comprised 12 male employees known to have a drinking problem, who sought treatment. A second group of 18 male employees with drinking problems, but not seeking treatment, were used for comparison purposes. The effect of alcohol treatment was determined by measuring the use of monthly sick days; monthly indemnity costs; and monthly hospital, medical, and surgical costs 1 year before and 1 year after alcoholism treatment.

The findings of this study indicated a 50% reduction in monthly sick day use; a 64% reduction in monthly indemnity costs; and a 48% reduction in monthly hospital, medical, and surgical costs for the study group 1 year following alcoholism treatment. The control group experienced a 4% increase in monthly sick day use; a 40%

increase in monthly indemnity costs; and an 8% increase in monthly hospital, medical, and surgical costs during the same time period.

The fact that this study used multiple measures of monthly sick day use; monthly indemnity costs; and monthly hospital, medical, and surgical costs, and found a favorable relationship between alcoholism treatment and a subsequent reduction in these measures, added new strength to the generalization that was developing in the alcoholism treatment literature. Again, the methodological weakness of the extremely small study group and comparison group size took a back seat to the stated findings.

In 1976 the generalization that alcoholism treatment reduces total health care use was applied to a large, publicly funded population for the first time (JWK Corporation, 1976). In this study the JWK International Corporation attempted to determine the degree to which benefits exceeded costs for the National Institute on Alcohol Abuse and Alcoholism Treatment Center Program.

The study group comprised more than 4,000 clients who were treated for alcoholism in publicly funded inpatient, residential, and individual and group counseling settings. Patients were asked to "self-report" on the number of alcohol-related hospitalizations for 1 month before and 6 months following alcohol treatment. These numbers were then multiplied by 12 to obtain a yearly average number of hospitalizations and then further multiplied by estimates for the average length of stay and average cost per day. This figure was then multiplied by 156% to arrive at total health care costs. The

difference between these figures was reported as the savings attributed to the alcoholism treatment. Patient self-reporting was used as the basis for making cost-estimate projections and cost-savings projections. Instead of using actual health care expenditures, unreliable estimations and projections were used throughout the study.

Once again, severe methodological limitations went unchecked, while obtaining additional data to continue to support the development of the generalization.

The generalization that alcoholism treatment results in a subsequent reduction in total health care use continued to gain both visibility and acceptability in the mid- and late 1970s. In 1976, the General Motors Corporation of Canada also studied the relationship between alcoholism treatment and use of sickness, accident, and workmen's compensation benefits (Lunn, 1976).

The study group in this employee-based study contained 104 active General Motors Canadian employees who received alcoholism treatment. Sickness, accident, and workmen's compensation benefits were studied for 1 year before and 1 year after alcoholism treatment. Benefit use for this group was compared to the benefit use of a comparison group of 48 employees who did not undergo active treatment even though it had been recommended.

Again, the stated findings were impressive. The study group experienced a 48% reduction in sickness and accident benefit use and a 64% reduction in workmen's compensation use 1 year following

alcoholism treatment. The comparison group, on the other hand, experienced a 127% increase in sickness and accident benefit use and a 79% increase in workmen's compensation benefit use for the same time period. The generalization received international recognition even though this study also contained methodological weaknesses--namely, in the small comparison group size of 48.

In 1976, Holder and Hallan released the results of their study, which also examined the relationship between alcoholism treatment and its effect on the overall health care use and expenditures by alcoholics and their families. The purpose of their comprehensive study was to determine the feasibility of providing model health insurance coverage for alcoholism for 158,000 state employees and their families.

The generalization that alcoholism treatment reduces subsequent total health care costs was not only used to justify in-house employee-based alcoholism treatment programs, but it was being advocated to justify model health insurance coverage for California state employees and their families. The California Pilot Program studied 240 families that had at least one alcoholic member who had received alcoholism treatment. The families were studied for 1 year before treatment and 3 to 20 months following treatment.

The findings of this study are more complex and difficult to interpret due to the multiple measure of the effect of alcoholism treatment that were used by the authors. Inpatient stays showed a 22% reduction for the alcoholic members following alcoholism

treatment. However, outpatient visits increased by 28% during the same time period. Mean monthly medical costs showed a similar pattern: while inpatient-stay costs decreased by 26%, costs for outpatient visits increased by 12%.

What is particularly interesting about this study is the expansion of the parameters guiding the established generalization. The relationship between alcoholism treatment and health care use was taken to a new level when the authors tested the hypothesis that, when treatment for alcoholism is not reimbursable, alcoholism will be treated under co-morbid (conditions caused, contributed to, or exacerbated by alcoholism), closely related diagnoses that are reimbursable. The authors examined the frequency of various diagnoses such as gastrointestinal, psychiatric, and other related diagnoses before and after alcoholism treatment. They found the frequency of these diagnoses was much higher in the before-alcoholism-treatment period as compared to the after-alcoholism-treatment period.

Average length of stay and average cost per inpatient stay were also examined for the alcoholic family members and nonalcoholic family members before and after alcoholism treatment. The alcoholic family members experienced a 50% increase in the average length of inpatient stay and a 34% increase in costs per stay following alcoholism treatment. The nonalcoholic family members experienced a 53% reduction in the average length of stay and a 14% reduction in costs per stay following the alcoholic's treatment. The alcoholic

family members consumed more of the health care resources than did the nonalcoholic family members.

It is not clear from this study whether the patients experienced a reduction or an increase in total health care use following alcoholism treatment. However, what is abundantly clear is that this study added considerable strength to the ongoing refinement of the developing generalization in the alcoholism treatment literature.

The next study that examined the relationship between alcoholism treatment and health care use was a 1977 U.S. Navy Study (Edwards, Bucky, Coben, Fichman, & Berry, 1977). The purpose of this study was to test the hypothesis that patients who receive alcoholism treatment will experience a reduction in the number of work days lost due to hospitalization and have fewer alcohol- and nonalcohol-related diagnosed illnesses. One hundred forty-eight active enlisted men were studied for 2 years before and 2 years following alcoholism treatment. The findings indicated a 46% reduction in work days lost due to hospitalization, a 52% reduction in alcohol-related diagnoses, and a 54% reduction in other nonalcohol-related diagnoses 2 years following alcoholism treatment.

This study was innovative in examining work days lost due to hospitalization and alcohol- and nonalcohol-related diagnoses. However, it could have been strengthened considerably by adding a comparison group and using total health care dollars expended as the measure for the effect of the alcoholism treatment. Again, as in many of the other studies, only a partial measure (hospital days) was

used to measure the relationship between alcoholism treatment and total health care use.

The literature dealing with the effect of alcoholism treatment on subsequent health care use has focused predominantly on public- and private-sector employee-based alcoholism treatment programs and military-based programs. In 1978, the generalization again appeared in the alcoholism research literature. This time the study involved a federally qualified health maintenance organization (HMO) with an enrollment of 40,000 patients located in Phoenix, Arizona (Hunter, 1978).

The purpose of this study was to determine how alcoholism treatment affects both use and expenditures for other health services. Ninety alcoholism-treated patients were matched on age and sex variables to a comparison group with total health care expenditures being measured before, during, and after alcoholism treatment. The findings revealed that the study group experienced a 57% increase in medical care expenditures during the first 6 months after entry into the program, but during the second 6-month period they reduced their total health care expenditures to 38% below their starting level.

The Arizona Health Plan Study also reviewed medical care expenditures for the spouse of the alcoholic family member. Spouses' medical care expenditures decreased by 25% in the first 6-month time period and decreased 59% in the second 6-month time period after their spouses began alcoholism treatment. This study was innovative

in presenting cost and use data not only on the HMO member, but also on the spouse and family members of the alcoholic studied.

The HMO setting was used again in 1979 to test the relationship between alcoholism and subsequent health care use. Two additional studies can be cited. The first one was the Group Health Association of America Study (Brock & Boyajy, 1978), and the second was the Kaiser-Permanente of Southern California Study (Sherman, Reiff, & Forsythe, 1979).

The purpose of the Group Health Association of America Study was to implement comprehensive alcoholism treatment services in three geographically separate prepaid group practice plans and to collect and analyze data on treatment outcome and changes in health care use. Comprehensive alcoholism treatment services were incorporated into the primary health care setting in Portland, Oregon; Phoenix, Arizona; and Detroit, Michigan. Seven hundred four alcoholics who had been admitted for alcoholism treatment were studied for up to 2 years before and 36 months following alcoholism treatment.

In this study, mean health care encounters per person per month were used as the measure to determine the effect alcoholism treatment had on health care use. Mean health care encounters were reported to have dropped by 23% from the time period before entering an alcoholism treatment program to the time period 13 to 18 months after treatment.

The composition of the health care encounters changed from physician intensive to the use of nonphysician providers. The

findings indicated a reduction in health care encounters; however, calculations of health care costs in dollars were not performed. Again, only a partial measure was used to indicate a reduction in health care use.

The next HMO-based study involved the Kaiser-Permanente Medical Care Program of Southern California in 1979 (Sherman et al., 1979). The purpose of this study was to examine the costs and use of medical services by alcoholics participating in an outpatient alcoholism treatment program. Sixty-four patients who had received alcoholism treatment within the program were studied for 2 years before and 2 years following alcoholism treatment. These patients were generally matched against a comparison group of 85 patients who made zero to three visits to the same alcoholism program.

Mean health expenditures per person per year were used as the measure for the effect of alcoholism treatment on total health care expenditures. The findings indicated a 2% reduction in total health care costs 2 years after alcoholism treatment for the study group. The comparison group experienced a 56% increase in total health care costs for the same time period. This HMO-based study incorporated methodological improvements of significance testing and a good presentation of the data on health care cost.

The review of the alcoholism treatment literature written during the 1970s revealed a number of interesting findings. The first notable finding is the fact that the studies overwhelmingly reported a reduction in subsequent health care use following the alcoholism

treatment intervention. A more striking finding, based on a thorough analysis of this research, is that these early studies were flawed by methodological and design limitations.

The next major set of research studies that explored the relationship between alcoholism treatment and its effect on subsequent health care use appeared in the early and mid-1980s. This body of literature is reviewed next in an effort to trace further the development of the generalization that the provision of alcoholism treatment reduces future total health care expenditures.

Alcoholism Treatment Studies of the 1980s

One of the earliest and most comprehensive alcoholism studies of the 1980s was conducted by Holder and Hallan (1981). The study analyzed California's program to provide comprehensive insurance benefits for the treatment of alcoholism for enrollees of the public employees retirement system health insurance plan.

The California pilot began July 1, 1974, and ended May 30, 1976. The program affected all employees of the state; employees of certain public and county municipalities that contracted with the state for employee health benefits. Approximately 337,000 beneficiaries, employees and family members, were covered under the program. Uniform alcoholism treatment benefits were offered by nine different insurance carriers and prepaid plans.

A number of special reports and studies were conducted as a result of this major initiative undertaken by the California

legislature. The most pertinent study relating to this research dealt with a longitudinal study of health care for alcoholic families. The primary question in this aspect of the California study was: "Does the provision of alcoholism treatment to a problem-drinking family member reduce the cost and/or utilization of general health care for the individual problem-drinking family member, as well as other family members?" (p. 10).

To address the research question, all health care costs and use data were obtained for 90 families (245 individuals) enrolled with Blue Cross/Blue Shield Insurance with at least one family member who received alcoholism treatment during the pilot project between July 1, 1974, and November 30, 1975.

Total medical care use and cost data were obtained for the alcoholics and their family members for 12 months before alcoholism treatment and 43 months after alcoholism treatment. This study group was matched to a control group of 83 families (291 individuals) on family composition according to age and gender, and total health care data were obtained for the same time periods.

Therefore, this study compared cost and use data between alcoholic and nonalcoholic families and family members. The findings concerning individual use and costs of this study were reported as follows:

1. At the end of the follow-up period the individual alcoholic family member experienced a substantial reduction in inpatient admissions per month as did other members of his/her family. In like manner, the per person monthly costs for inpatient care dropped by a factor of 8;

2. At the end of the study period the family member utilization and costs of inpatient care converged to the experiences of matched control family members;
3. As might be expected, families with alcoholic members had many more outpatient visits at the beginning of the study than the control group members and there is an increase in such care during the pilot project. However, while control group family members are using outpatient care at a much higher rate than before, alcoholic family members are utilizing outpatient care less frequently and even less than control family members. Correspondingly, control group members experienced monthly costs for such care over twice as high as the alcoholic families by the end of the study; and
4. There was considerable disparity between the average total medical care costs per month for members of alcoholic families in the initial study period, but by the fifth follow-up year costs which were being experienced by the alcoholic family members were from \$4 per month lower than that experienced by the control group. This appears to be caused by the increased use of outpatient care by control family members. (Holder & Hallan, 1981, p. 56)

This study added considerable methodological strength to the field of alcoholism research by using large study groups; lengthy pre- and postalcoholism treatment time periods; an in-depth analysis of use and cost data; and a comparison group with families matched on age, gender, family size, and years of plan enrollment.

This study also continued to perpetuate the generalization that alcoholism treatment reduces subsequent total health care use. The authors provided both the pretreatment period and the posttreatment average total monthly mean cost for the alcoholic and control groups. In neither the pretreatment nor the posttreatment period were the average monthly mean costs significantly different between the two groups.

Also, it is not clear from the findings presented if the authors tested for significant differences between the pretreatment and posttreatment total average monthly mean costs over the entire study. The findings clearly indicated that total health care expenditures decreased after alcoholism treatment was introduced. However, it is not certain that total average monthly health care expenditures ever dropped below prealcoholism treatment total average monthly costs.

In 1985, Holder again provided a major contribution to the alcoholism treatment literature with the federal Aetna study. The National Institute on Alcohol Abuse and Alcoholism (NIAAA), in cooperation with the Federal Office of Personnel Management and the Aetna Life Insurance Company, sponsored a study to examine the effect of alcoholism treatment services on use and costs of health care of individuals and families filing claims with the Aetna Life Insurance Company under the Federal Employees Health Benefits Program over a 4-year period.

This 4-year study examined the effect of alcoholism treatment on overall health care use by using two study groups. The experimental group was a treatment group consisting of families with at least one member filing a claim for alcoholism treatment during calendar years 1980 through 1983. The comparison group consisted of a random sample of families who filed no alcoholism claims during the 1980 through 1983 period.

The specific objectives of the study were as follows:

- [1]. Compare the health care costs and utilization of families with a member receiving alcoholism treatment with the costs and utilization of a random sample of families with no known alcoholic member.
- [2]. Examine the utilization of alcoholism treatment services.
- [3]. Determine if overall health care utilization and costs change for treated persons after they begin alcoholism treatment.
- [4]. Examine the potential health care costs savings associated with alcoholism treatment. (Holder, 1985, p. 6)

Mean monthly per person costs were used as the measure to determine the differences in overall health care use. While all four of Holder's study objectives are interesting, the third objective is the most relevant for purposes of the present study. Simply restated, Holder was trying to determine if alcoholics used less overall health care after they began alcoholism treatment.

What is critical to understand in this discussion is, at what point are specific measures taken, and how are the data explained and presented? Holder's data as well as previously cited studies indicated that alcoholism treatment reduces total health care use. These findings were based on the fact that overall health care expenditures begin to rise 6 to 12 months before alcoholism treatment, peak 2 to 3 months after alcoholism treatment is initiated, and decline rapidly after the onset of alcoholism treatment for several months.

This cost pattern is now well established in the alcoholism treatment literature and is readily accepted. However, when the findings are presented in this manner, only a portion of the issue is

presented. The remaining issue is usually passed over or not addressed at all. That is, do posttreatment average monthly total health care costs ever drop below pretreatment average monthly total health care costs?

It is misleading to take the highest-treatment-month costs and compare those costs to a monthly cost 6 to 12 months after treatment started, find significant differences, and state that alcoholism treatment reduces total health care use. It is quite a different situation when prealcoholism average monthly total health care costs are compared to postalcoholism average monthly total health care costs over time.

Holder's federal Aetna study provides a good illustration of this point. Holder reported that "it is clear from the data that after alcoholics start alcoholism treatment, their health care costs drop fairly rapidly for at least 12 months" (p. 18). However, he also reported that for older age groups total health care costs did not drop as low as the level for total health care costs several years before treatment (p. 20).

Several methodological strengths were contributed to the alcoholism treatment literature as a result of this work. Large sample sizes were used, lengthy pretreatment and posttreatment time periods were constructed, and multiple measures were used to confirm health care costs and use patterns. This study contained methodological and analytical strengths over previous studies, but its findings like those of many other studies were confounded.

The findings indicated that health care use decreased after alcoholism treatment was initiated. The findings also indicated that postalcoholism treatment costs did not drop below prealcoholism treatment costs. Again, this study, like the earlier studies, continued to report a reduction in subsequent health care use following the alcoholism treatment intervention. It is this biased, partial presentation of the findings that continues to attract attention and discussion in the alcoholism treatment field.

All of the studies cited above concluded and supported the generalization that the provision of alcoholism treatment results in a reduction in total medical care use. However, all of these studies focused on subscribers of HMOs, active military personnel, and employed or retired public- and private-sector employees covered by health insurance programs or HMO plans. More important, all of these studies had methodological limitations that may have contributed to reported reductions in total health care use that may, in fact, not be evident or as apparent as advocated by the authors.

The next area addressed in the literature review is the environment of a low-income, publicly assisted population. Published research on alcoholism treatment and its effect on total health care use for a low-income population is scarce. The first studies addressing this particular population were recently completed by Becker and Sanders (1984, 1985).

The 1984 Illinois Medicaid study (Becker & Sanders, 1984) focused on the initial 176 Medicaid recipients who received alcohol

treatment under the Illinois Health Care Financing Administration Demonstration Project. The major research question addressed was to determine if there was a cost savings in overall health care costs by providing alcoholism treatment. The methodology used in this study was the analysis of total health care expenditures recorded monthly per recipient before, during, and after alcoholism treatment. The writers concluded that a net savings of \$151,000 accrued to the State of Illinois through the provision of alcoholism treatment to these 176 Medicaid recipients.

A review of the methodology revealed that major assumptions and gross projections were used to arrive at estimated cost savings. The cost-savings estimates were based on projections of what total health care costs would have been without alcoholism treatment. Total health care costs just before alcoholism treatment were used as a point to project future health care costs. The costs were projected by drawing an estimated "cost line" into future months using the high pretreatment months as the reference point. A second line was drawn which plotted actual total health care costs with alcoholism treatment. The distance between the estimated total health care costs without treatment and the actual total health care costs was used for estimating the savings.

In this particular study as in many of the studies cited earlier, the findings indicated a reduction in total health care costs by providing alcoholism treatment. However, one must be cautious as to what is being presented. These findings indicated

that total health care costs can be reduced, thus saved, by providing alcoholism treatment. However, the measure was again made at the highest project point to a power point in the future. The measure that should have been made was the difference between pretreatment total health care costs and posttreatment total health care costs.

The argument that alcoholism treatment reduces total health care costs is not sufficient. The question must be, does alcoholism treatment reduce future health care costs to a point that is lower than pretreatment total health care costs?

In addition to this projection technique being used in the Becker and Sanders study, other methodological issues presented problems with the reported findings. The study group comprised a heterogeneous population: 92% white and 58% male, with total health care costs being compared to a nonalcoholic general Medicaid cohort. Medicaid eligibility was also handled in a questionable manner. In attempting to gather total health care costs for recipients, noneligible Medicaid months created a problem. If breaks in Medicaid eligibility occurred for recipients, adjustments were made by using monthly average costs generated for noneligible months. Therefore, in months in which it was not possible to determine "use of the benefit," previous use was averaged and this average figure was used for months in which actual expenditures could not be obtained.

Given these methodological limitations, it is questionable if a true reduction in Medicaid costs occurred following alcoholism treatment. In fact, Becker and Sanders in 1985 reported additional

findings on these 176 recipients that countered their original findings. Their second study included additional analysis of the original 176 "downstate" recipients and added an additional 120 Chicago-area recipients. The Chicago-area group comprised 7 white, 83 black, and 30 Hispanic recipients.

The findings of the second study indicated that total health care expenditures were beginning to rise for females and other recipients with multiple treatment episodes in the original group of 176 recipients. The authors concluded that "normally there is a significant decrease in Medicaid health care costs after treatment for alcoholism" (p. 30). However, the authors indicated that "the most notable exception to this general trend was female blacks treated in Chicago" (p. 30). The authors also recommended that any supplemental analysis not combine this group of recipients (the Chicago 120) with the balance of the other recipients in Illinois.

Table 1 presents a summary of the current literature on alcoholism treatment and its effect on subsequent medical care use. As can be seen, the majority of the literature supported the assumption that alcoholism treatment reduces total health care costs. However, as noted, all of the studies had methodological limitations, and only the Becker and Sanders studies (1984, 1985) analyzed a Medicaid population.

Table 1
Alcoholism Treatment and Its Effect on Subsequent Medical Care Use--A Summary of the Literature

Study	Setting	Alcohol Treatment Time Periods Before After	Study Group Size	Comparison Group Size Variables Matched	Findings	Critique of Methodology
1. Illinois Bell Telephone Hiker (1974)	Employee	5 years 5 years	402	None --	46% reduction in disability cases.	Large N size, lengthy pre & post periods, no comparison group, no \$ values given.
2. Philadelphia Police Department (1975)	Employee	Unclear 1-2 years	170	None --	38% reduction in sick days, 62% reduction in injury days.	No comparison group, no values given, no time period trend analysis.
3. Philadelphia Fire Department (1975)	Employee	Unclear 6-12 months	77	None --	47% reduction in sick days, 24% reduction in injury days.	No comparison group, small N size in sub-studies, no \$ amounts of health care used
4. Oldmobile Aflander (1975)	Employee	1 year Up to 1 year	117	24 History of alcohol or drug problem.	33% decline in sick & accident benefits, 52% decline in lost man hours in the study group. Comparison group up 68% and 10%.	Pre & post treatment time periods could have been longer, small comparison group with very high age.
5. Kennecott Utah Copper (1976)	Employee	1 year 1 year	12	18 Males with history of drinking--employee but not receiving treatment.	48% reduction in hospital surgical costs for study group, 8% increase for comparison group.	Strength in matching--very small study and comparison groups. Pre & post time periods could have been longer.
6. JMK International Funded Treatment Centers (1976)	Publicly Funded Programs	1 month 6 months	4,777	None --	Hospitalization reprimed for alcohol-related health care spending, \$1,000 reduction per client.	Self-reporting by clients. No comparison group projected for 12 months--multiplication of estimates introduced bias. No comparison group--short posttreatment data.

Table 1--Continued

Study	Setting	Alcohol Treatment Time Periods Before After	Study Group Size	Comparison Group Size	Variables Matched	Findings	Critique of Methodology
7. G.M. Canada Lunn (1976)	Employee	About 1 year	104	48	Employee referred for treatment, but did not undergo active treatment.	48% reduction in sick and accident benefits and a 64% reduction in women's comp benefits for study group.	Small comparison group; differences in pre-treatment total health care costs between the 2 groups appear unequal, short time periods.
8. California Pilot Holder (1976)	Employee	1 year	240+	None	--	26% reduction in medical use, 41% savings in medical expenditures for every \$1 spent on alcohol treatment.	Examines diagnostic patterns over time, length of stay and cost per unit of service. No comparison to untreated alcoholics.
9. U.S. Navy Edwards (1977)	Active enlisted men	2 years	148	None	--	69% reduction in hospital days used.	No comparison group, only data for first days, no cost data.
10. Arizona Health Plan Hunter (1978)	HMO	6 months	90	90	Age and sex.	38% reduction in inpatient and outpatient medical expenditures for the study group, comparison group down 9%.	Matched patients on age and sex, gave use and cost data.
11. Group Health Association of America Brock (1978)	HMO	0-24 months	704	None	--	40% reduction in outpatient medical care use.	Provides consistent methodology over treatment settings and time, no comparison group.
12. Kaiser-Permanente Southern California Sherman (1979)	HMO	2 years	64	85	General comparable groups, no specific matching.	27% reduction in inpatient and outpatient medical care expenditures for study group, or 53% increase for the comparison group.	Good comparison group, good data presentation, significant testing methods. Study groups could have been larger, self-selection vs. random selection of clients.

Table 1--Continued

Study	Setting	Alcohol Treatment Time Periods Before After	Group Size	Comparison Group Size	Variables Matched	Findings	Critique of Methodology
13. California Pilot Follow-up Holder & Hallan (1981)	Employee	1 year	245+	83	Nonalcoholic families matched on age, sex, family size, years of plan enrollment.	Inpatient hospitalization down; outpatient care up; \$4 monthly mean difference in total medical costs between study and comparison group (study group lower).	Strength of study lies in length of pre and post time periods, use and cost analysis. Comparison group could have been larger, more specific inclusion and exclusion criteria could have strengthened the study.
14. Illinois Medicaid Sanders & Becker (1984)	National demonstration sites, Medicaid recipients	6 months	9 months	176	176	Reduction in total health care use exceeded \$500,000 for the 176 recipients over a 27-month period.	The homogeneity of the study group may not be representative of the Illinois Medicaid population and the study site. Medicaid eligibility not controlled. Comparison to nonalcoholic cohort, strength is in analysis of treatment cycles.
15. Illinois Medicaid Follow-up Sanders & Becker (1985)	National demonstration sites, Medicaid recipients	6 months	Up to 36 months	Unclear	General Medicaid average monthly cost figures.	Total Medicaid health expenditures rising for females and recipients with multiple treatment episodes.	Stronger, expanded study dealing with longer follow-up and sub-study groups of Chicago recipients.
			Original 176 (downstate)		Compared back to the original downstate 176 recipients.	No reduction of total Medicaid health expenditures for Black females or for recipients with multiple treatment episodes.	Strength lies in rigor of analysis, no specific client matching.
			120 City of Chicago recipients	176			
16. Federal Astma Holder (1985)	Federal employees	Up to 36 months	Up to 36 months	3,600	3,000	The average alcoholic treatment cost was offset by reduction in other health care costs within 2-3 years following the onset of treatment.	Strength lies in the size of study, inclusion of pre and post alcoholism treatment time periods. No specific client matching.

Summary

As indicated by the preceding critique of the literature on alcoholism treatment and its effect on subsequent medical care use, there is a well-established and advocated premise in the alcoholism treatment field. This premise supports the notion that the provision of alcoholism treatment results in a subsequent reduction in medical care use. However, a methodological review of the studies indicated that the "point in time" and "measures" used to determine the effect of alcoholism treatment are critical in presenting the data. In addition to how and when this measurement is made, the previous literature also had other methodological weaknesses. These weaknesses included (a) short pre- and postalcoholism treatment time periods, (b) small study group sizes, (c) lack of appropriate comparison groups, (d) little if any variable matching, (e) client self-reporting of health care use, (f) lack of controls for program eligibility, and (g) partial measures for health care use.

Not only did these studies contain methodological shortcomings, but also all of the studies except those of Becker and Sanders (1984, 1985) studied individuals covered by HMO plans, third-party payors, and those who had been active local, state, federal, or military personnel.

Given these known limitations and methodological inadequacies, the alcoholism treatment field continues to advocate that alcoholism treatment reduces future health care costs. The belief is built upon

the uncritical review and acceptance of previous research findings and a disregard for the shortcomings in the original research.

10-11-1978

CHAPTER III

DESIGN AND METHODOLOGY

Study Background

The Medicare and Medicaid programs constitute vitally important financial resources for the health care of aged, low-income, and low-income medically needy individuals. Current Medicare and Medicaid regulations, however, contain programmatic constraints that restrict the availability of alcoholism treatment services to Medicare beneficiaries and Medicaid recipients by limiting reimbursement to only inpatient hospitals and outpatient programs affiliated with hospitals, nursing homes, and physicians. Excluded from enrollment and reimbursement are freestanding detoxification, residential, and outpatient treatment facilities.

In response to Congressional concerns regarding dramatically increasing health care costs (including those related to alcoholism), the Health Care Financing Administration (HCFA) and the National Institute for Alcoholism and Alcohol Abuse (NIAAA) in 1980 solicited applications from states to participate in a 4-year Medicare/Medicaid Alcoholism Treatment Demonstration Project. The overall purpose of this project was to test the feasibility and effectiveness of providing alcoholism treatment services for Medicare beneficiaries and Medicaid recipients in lower cost, freestanding settings. The

Office of Substance Abuse Services (OSAS) and the Department of Social Services (DSS), on behalf of the State of Michigan, responded and were jointly awarded the initial grant on September 30, 1981. Michigan was one of six states granted participation in this national Demonstration Project.

The start-up phase lasted almost 9 months; reimbursement began with dates of service on and after July 1, 1982. Detoxification, residential, and outpatient counseling were designated as covered treatment services. Ultimately, 23 freestanding facilities geographically distributed throughout the state were enrolled as Medicare and Medicaid alcoholism treatment services providers. The last reimbursable date of service for Medicare beneficiaries was September 29, 1985, and the last reimbursable date of service for Medicaid recipients was November 29, 1985.

In July 1984, the Michigan Office of Substance Abuse Services (OSAS) was awarded an additional grant by the Health Care Financing Administration to perform an evaluation of the Medicaid component of the demonstration project, which was also the basis for this study. The major emphasis of this study was to determine if the provision of alcoholism treatment resulted in a subsequent reduction in total health care expenditures for Michigan Medicaid recipients. A second research question was to determine if there was a difference in mean average Medicaid costs between recipients who were treated for alcoholism in the acute care inpatient hospital versus those who were treated for alcoholism in the freestanding demonstration program.

Design and Methodology

The overall evaluation strategy of the research was to determine whether or not there was a decrease in total health care costs for Michigan Medicaid recipients following alcoholism treatment. The evaluation strategy was performed in two phases. The first phase compared prealcoholism treatment average monthly total health care costs to postalcoholism treatment average monthly total health care costs for 3,685 alcohol-treated Medicaid recipients.

The research design chosen to respond to the second research question was a quasi-experimental time series analysis using a nonequivalent control group (Campbell & Stanley, 1963; Cook & Campbell, 1979). The second phase of the evaluation built in methodological strengths by including in the analysis only those recipients who were continuously eligible for Medicaid benefits for the entire study period and whose pre- and posttreatment time periods had been adjusted for the onset of alcoholism treatment.

The research design for both phases sought to obtain paid-claims data for the most lengthy pretreatment and posttreatment time periods obtainable within the administrative realities of accessing and retrieving the health claims data. This was done to determine whether there were changes in pre- and postalcoholism treatment health care costs over time. The research design was additionally influenced in the posttreatment time period by the fact that under the Michigan Medicaid program individual providers have up to 1 year from the date of service to submit Medicaid invoices for payment

unless previous billing activity can be proven. Based on these factors an 18-month posttreatment period was selected.

The literature review in Chapter II indicated that average monthly total health care costs escalate just before the onset of alcoholism treatment and peak shortly after alcohol treatment intervention. Consequently, in analyzing for any patterns in health care use, the longer the posttreatment intervention time period, the more likely it is that such patterns may appear.

The following three time periods were established for the first-phase design of the analysis: July 1, 1982, to June 30, 1983, as the alcoholism treatment period; January 1, 1982, to June 30, 1982, as the prealcoholism treatment period; and July 1, 1983, to December 31, 1984, as the postalcoholism treatment period. The time periods for the second phase of the analysis, involving the continuously eligible recipients, were 6 months before the onset of alcoholism treatment and 18 months following the onset of alcoholism treatment.

Data Collection

The research design called for a retrospective analysis of paid-claims data encompassing total health care expenditures for all alcoholism-treated Medicaid recipients. The first step in the data-collection plan involved identifying all Medicaid recipients who participated in alcoholism treatment at the demonstration sites during the first year of service delivery. This was accomplished by retrieving data from the health care claims records maintained at the

state office. These records contained the unique Medicaid identification number, alcoholism diagnosis, date of service, provider of the service, quantity of service provided, and the charges. As a result of this data-collection process, it was determined that 830 individual Medicaid recipients received alcoholism treatment at the participating demonstration sites during the time period from July 1, 1982, through June 30, 1983.

Following the identification of the total demonstration-treated group, the next step in the data-collection plan was to obtain these recipients' total Medicaid use and costs data from the Michigan Department of Social Services, Medical Services Administration. This was done by accessing the automated Paid Claims History File for the demonstration-treated recipients.

The paid claims cost and program eligibility data for both the demonstration and hospital alcoholism-treated Medicaid recipients were obtained as part of the interagency agreement executed by the Department of Social Services and the Office of Substance Abuse Services. The data-collection process and programming necessary to format the data before analysis entailed numerous meetings, programming hours, and the running and rerunning of the data. This entire process took over a year and was successful because of the professional commitment and personal friendships of several individuals in both agencies. Without these personal commitments and relationships, it would have been virtually impossible to conduct this research.

Total health care expenditures were aggregated on a monthly basis for these recipients for the entire time period from January 1, 1982, through December 31, 1984. Although 830 recipients were treated at the demonstration site, the Paid Claims Data File contained payment histories for only 761 recipients. The reduction in the recipient history was a result of claims being rejected for payment due to billing errors that were never corrected and resubmitted for payment.

The research design incorporated a hospital-treated comparison group, which was constructed from the same data base. Recipients were identified and selected for this comparison group if they had been treated in an acute care inpatient hospital setting for an alcoholism diagnosis during the first year of the demonstration project.

Using the International Classification of Diseases (9th Revision), Volume 1 Clinical Modification Manual (ICD-9-CM) (1978) alcoholism diagnostic codes and searching the same Paid Claims History File referred to above resulted in the identification of 2,924 individual Medicaid recipients who were treated for alcoholism in an acute care inpatient hospital setting during the time period from July 1, 1982, through June 30, 1983. Therefore, the entire alcoholism-treated Medicaid population appeared to be 3,685 people. However, in reviewing the Medicaid identifier data for the demonstration-treated group and the hospital-treated group, it was found that 311 of the demonstration-treated recipients also received alcoholism treatment in

the acute care inpatient hospital setting during the same time period. Because of this finding a third group, the dual-treated group, was identified for separate analysis. Therefore, the total statewide alcoholism-treated population was actually 3,374 people.

To evaluate whether or not there was a reduction of average monthly total health care costs following alcoholism treatment (phase one), the average monthly recipient costs during the postalcoholism treatment period (T3) were compared to the average monthly recipient costs during the prealcoholism treatment period (T1).

The comparison involved all average monthly total health care costs for the entire alcoholism-treated population of 3,374 people. This phase of the analysis determined on a statewide basis for all alcoholism-treated Michigan Medicaid recipients if the alcoholism treatment intervention contributed to a reduction in subsequent average monthly total health care costs.

The second phase of the analysis attempted to determine if there were differences in average monthly total health care costs for particular subgroups of recipients depending on where they received their alcoholism treatment. To perform the second phase of analysis and make such a determination, additional methodological techniques were introduced.

As noted in the review of the literature, not accounting for or making inappropriate gross adjustments in program eligibility has been a methodological weakness in previous alcoholism treatment studies. Only by checking for continuous program eligibility can the

researcher account for all Medicaid-reimbursed health care costs. Therefore, phase two of the analysis involved only those recipients who were determined to be continuously eligible for the entire study period. These recipients were identified by an individual case-by-case, month-by-month, manual review of each recipient's Medicaid eligibility history.

This review process resulted in the identification of 927 hospital-treated recipients, 253 demonstration-treated recipients, and 83 dual-treated recipients.

A second methodological strength incorporated in phase two of the analysis was to align the paid-claims data to adjust the starting date for treatment to the onset of alcoholism treatment month for each continuously eligible recipient. By identifying the date of the first alcoholism diagnosis during the time period from July 1, 1982, through June 30, 1983, it became possible to use this onset of treatment month as a focal point of analysis. Aligning the data for each continuously eligible recipient based on the onset of alcoholism treatment month incorporated considerable strength into the study design by making the 6 months of prealcoholism treatment consistent across all recipients and by making the 18 months of postalcoholism treatment equivalent.

Figure 1 presents the phase two study design. This design uses average monthly total Medicaid expenditures for 6 months before the alcoholism treatment intervention and 18 months of average monthly total health care expenditures data, including the costs for

alcoholism treatment following the onset of alcoholism treatment. This design assured equal comparisons of prealcoholism treatment costs and equal cost comparisons for the time period beginning with the onset of alcoholism treatment month for all recipients. Thus, the potential for discovering the effect of alcoholism treatment on subsequent health care use began at the same time for all recipients in all study groups.

	Pre-Alcoholism Treatment Period By Quarter	Post-Alcoholism Treatment Period by Quarter
Hospital- Treated Group <u>N</u> = 927	XXX XXX	[X]XX XXX XXX XXX XXX XXX
Freestanding- Treated Group <u>N</u> = 253	XXX XXX	[X]XX XXX XXX XXX XXX XXX
Both Settings Treated Group <u>N</u> = 83	XXX XXX	[X]XX XXX XXX XXX XXX XXX

[X] = Onset of alcoholism treatment month

Figure 1. Phase Two Study Design: Continuously Eligible Medicaid Recipients Data Adjusted for Onset of Treatment Month.

Data Analysis

The research design developed for this study called for a retrospective analysis of actual Medicaid-paid claims over time. Data analysis for this study was performed in two phases. The first phase of the analysis involved reviewing total monthly reimbursed

Medicaid costs (alcoholism treatment costs included) for the entire alcoholism-treated population of 3,374 people for a 30-month period. This was a monthly trend analysis to determine if total reimbursed Medicaid costs increased after alcoholism treatment for the entire alcoholism Medicaid population. The demographic characteristics of this population were also described.

The second phase of the analysis used average quarterly total Medicaid costs reimbursed for the continuously eligible Medicaid recipients within the total alcoholism-treated Medicaid population. Using these data the three treatment setting groups were compared.

Multiple classification analysis (MCA) was selected as the statistical technique for phase two of the data analysis for the following reasons: (a) the MCA is appropriate where the dependent variable is at the interval level of measurement and the independent variables are measured at the nominal level, and (b) the MCA allows for comparison of data for the dependent variable among categories of one of the nominal variables while controlling for the other independent variables.

Other statistical techniques, for example multiple regression analysis, were considered, but the MCA was selected as the most appropriate statistic for the types of data being analyzed and the type of audience, health care administrators in decision-making roles, that would be using the findings of this research for policy-making purposes.

The MCA is a technique for examining the interrelationships between several independent variables and a dependent variable within the context of an additive model. The statistics produced by the MCA show how each independent variable relates to the dependent variable, both before and after adjusting for the effects of the other independent variables (Andrews, Morgan, & Sonquist, 1967, pp. 8-17).

The independent variables used in this MCA were (a) race, (b) gender, (c) county of residence, (d) treatment setting, and (e) age. The dependent variable was actual average quarterly total Medicaid costs. Total reimbursed Medicaid health care expenditures were obtained on a quarterly basis (3-month intervals) for the three continuously Medicaid-eligible subgroups: (a) hospital-treated only, $N = 927$; (b) demonstration-treated only, $N = 253$; and (c) dual-treated, $N = 83$) for 6 months before the onset of alcoholism treatment and 18 months following the onset of alcoholism treatment.

Using the independent variables of race, gender, county of residence, treatment setting, and age, it was possible to generate the dollar-amount effect each variable had on Medicaid expenditures generally and while controlling for the other factors. Eight separate MCAs, one for each quarterly time period, were produced using the Statistical Package for the Social Sciences (SPSS) program.

For interpretation purposes one MCA is presented in detail in this chapter. Sixteen of the 32 MCAs are included in the Appendix. The method of interpretation of each individual MCA was the same;

however, the findings and trends differed depending on the specific quarter of data reviewed and the treatment settings included.

Table 2 presents the MCA for the first 3-month time period after the onset of alcoholism treatment for the three treatment groups: dual treated, hospital treated, and demonstration treated. Table 2 should be read in the following manner. The grand mean for the 1,263 continuously eligible Medicaid recipients for this quarterly time period was \$2,384.12. For the variable of race the MCA shows that white recipients generated average quarterly total Medicaid costs that were less than the grand mean by more than \$325, specifically \$327.14. With the variables of gender, county of residence, treatment setting, and age statistically controlled, the average quarterly total Medicaid costs for whites were \$104.14 less than the grand mean (Adjusted Difference From Grand Mean). The nonwhite recipients generated average quarterly total Medicaid costs that were \$110.08 greater than when the grand means of these variables were controlled.

The variable of gender should be interpreted in the following manner. Of the 1,263 recipients, 642 were female and 621 were male. The males as a group generated quarterly health care costs that fell below the grand mean by \$307.96 when race, county of residence, treatment setting, and age were statistically controlled. The females, on the other hand, generated quarterly health care costs that exceeded the grand mean by \$297.89 when these variables were controlled.

Table 2

Multiple Classification Analysis of Quarterly Medicaid Costs
by Race, Gender, County of Residence, Treatment Setting,
and Age: 1 Through 3 Months After the Onset of
Alcoholism Treatment (in Dollars)

Demographic Variable	N	Unadjusted Difference From Grand Mean (\$)	Adjusted Difference From Grand Mean (\$)
<u>Race</u>			
White	649	-309.50	-104.14
Nonwhite	614	327.14	110.08
<u>Gender</u>			
Male	621	-223.42	-307.96
Female	642	216.11	298.89
<u>County of Residence</u>			
Bay, Genesee, Saginaw	247	-656.92	-437.19
Kent	84	-831.58	-506.02
Wayne	484	640.74	490.40
Other	448	-174.12	-193.89
<u>Treatment Setting</u>			
Dual treatment settings	83	1113.27	1239.15
Hospital only	927	271.25	206.96
Demonstration only	253	-1359.11	-1164.82
<u>Age</u>			
Less than 30	244	-319.06	-150.25
30-39	403	88.25	-29.22
40-49	298	108.64	109.05
50 and older	318	31.17	50.13

Grand Mean = \$2,384.12; \bar{N} = 1,263

The county of residence variable contains the subcategories of (a) Bay, Genesee, Saginaw; (b) Kent; (c) Wayne; and (d) Other. Of the 1,263 recipients, 247 claimed residency in either Bay, Genesee, or Saginaw Counties; 84 recipients resided in Kent County; 484 recipients resided in Wayne County; and the remaining 448 recipients resided in Other counties throughout the state.

The 247 recipients residing in Bay, Genesee, or Saginaw counties generated average quarterly total Medicaid costs that fell below the grand mean by \$656.92. After controlling for the other variables in the MCA, their average quarterly total Medicaid costs remained below the grand mean by \$437.19.

The 84 recipients from Kent County demonstrated a similar pattern. The unadjusted group mean for this group was \$831.58 below the grand mean. After controlling for the remaining variables, average quarterly total Medicaid costs fell below the grand mean by \$506.02.

Reviewing the Medicaid costs for the 484 Wayne County residents presented a very different picture. These 484 recipients generated average quarterly total Medicaid costs that exceeded the quarterly grand mean by \$640.74. After controlling for the remaining variables, average quarterly total Medicaid costs exceeded the grand mean by \$490.40.

The remaining 448 recipients residing in the Other counties generated average quarterly total Medicaid costs that fell below the grand mean by \$174.12. After controlling for the remaining

variables, the adjusted difference from the grand mean fell to \$193.89.

When looking at variables of treatment setting, the 83 dual-treated recipients generated average quarterly total Medicaid costs that exceeded the grand mean by \$1,113.27. With race, gender, county of residence, and age statistically controlled, the average quarterly total Medicaid costs for these 83 recipients exceeded the grand mean by \$1,239.15.

The 927 hospital-treated group members presented a somewhat similar picture. As a group, the hospital-treated recipients generated average quarterly total Medicaid costs that exceeded the grand mean by \$271.25. When controlling for race, gender, county of residence, and age, the grand mean was exceeded by \$206.96.

The 253 demonstration-treated recipients presented a very different picture. As a group, the demonstration-treated recipients generated average quarterly total Medicaid costs that fell \$1,359.11 below the grand mean. Again, when statistically controlling for race, gender, county of residence, and age, average quarterly total Medicaid costs remained \$1,164.82 below the grand mean.

The variable of age in this MCA should be read in the following manner. Age as a variable was categorized into four groups: those recipients who were less than 30 years of age, those between 30 and 39, those between 40 and 49, and those 50 years of age and older.

The 244 recipients in the less-than-30 age group generated average quarterly total Medicaid costs that fell below the grand mean

by \$319.06. When controlling for race, gender, county of residence, and treatment setting, average quarterly total Medicaid costs remained \$150.25 below the grand mean.

The 403 recipients in the 30-39 age group generated average quarterly total Medicaid costs that exceeded the grand mean by \$88.25. However, after controlling for the other variables, average quarterly total Medicaid costs generated by this age group fell below the grand mean by \$29.22.

The 298 recipients in the 40-49 age group generated average quarterly total Medicaid costs that exceeded the grand mean by \$108.64 and remained \$109.05 above the grand mean after controlling for the remaining variables.

The final group of 318 recipients in the 50-and-older age group generated average quarterly total Medicaid costs that exceeded the grand mean by \$31.17. After controlling for race, gender, county of residence, and treatment setting, the adjusted difference from the grand mean increased to \$50.13 for this group.

In interpreting the MCA, one should note that for any variable and for any quarterly time period the following patterns could result through the process of statistically controlling for the other variables:

1. The unadjusted and adjusted differences could remain approximately the same.
2. A negative unadjusted difference could become a smaller negative adjusted difference under the controlled situation.

3. A negative unadjusted difference could become a larger negative adjusted difference under the controlled situation.

4. A negative unadjusted difference could become a positive adjusted difference under the controlled situation.

5. A positive unadjusted difference could become a smaller positive adjusted difference under the controlled situation.

6. A positive unadjusted difference could become a larger positive adjusted difference under the controlled situation.

7. A positive unadjusted difference could become a negative adjusted difference under the controlled situation.

The meaning of these adjusted and unadjusted Medicaid cost differences in sign (+,-) and magnitude is that the unadjusted Medicaid cost differences are descriptive data with no statistical controls, whereas the adjusted Medicaid cost differences are descriptive data where a series of additional variables is held constant.

The MCA presented in Table 2 represents one quarter of time, namely 1 to 3 months following the onset of alcoholism treatment. For all MCAs the variables of race, gender, county of residence, treatment setting, and age are included. Sixteen completed MCAs are included in the Appendix.

A major emphasis in this study was the cost differences between different treatment settings. Therefore, the variable of treatment setting (where the alcoholism treatment took place) was the main

variable analyzed, and the remaining variables of race, gender, county of residence, and age are generally not described.

As indicated earlier, the MCA was selected as the statistical technique in presenting the data because of the ease of interpretation and the identification of overall patterns in the data. An additional advantage in using the MCA is that the entire continuously eligible study group of 1,263 recipients is taken into account, and a concise description of what happened with Medicaid costs as a whole over time is presented. The MCA also by design involves the simultaneous consideration of several independent variables and their relationships to a dependent variable. Therefore, one can identify the variable or combination of variables, within each quarterly time period, having the largest effect on the dependent variable (Medicaid average quarterly total costs).

CHAPTER IV

FINDINGS

Introduction

The purpose of this chapter is to present a clear description of the findings of the analysis of the data as outlined in Chapter III, Design and Methodology. The data are presented in two parts. Part one presents the findings for the entire alcoholism-treated population of 3,374 Medicaid recipients. Part two of the findings presents more detailed data on the second level of analysis. This analysis incorporated controlling for continuous Medicaid eligibility, adjusting each recipient's health care claims data for the onset of alcoholism treatment month and using the multiple classification analysis (MCA) as the statistical technique for determining cost differences in health care expenditures by treatment setting.

Part One Findings

Demographic Variables

Table 3 reflects the distribution of the variables of age, race, gender, and county of residence for the total alcoholism-treated population of 3,374 recipients. The typical Medicaid recipient who received alcoholism treatment was a young (60% were 39 years of age

Table 3
Demographic Variables for All Alcoholism-Treated
Medicaid Recipients

Demographic Variable	N	%
<u>Age</u>		
19 or less	101	3.0
20-39	1,922	57.0
40 and older	1,351	40.0
Total	3,374	100.0
<u>Race</u>		
White	2,022	60.0
Black	1,171	34.7
Other	181	5.3
Total	3,374	100.0
<u>Gender</u>		
Male	2,038	60.4
Female	1,336	39.6
Total	3,374	100.0
<u>County of Residence</u>		
Bay	114	3.4
Genesee	286	8.5
Kent	202	6.0
Saginaw	136	4.0
Wayne	1,274	37.7
Other	1,362	40.4
Total	3,374	100.0

or less), white (60%), male (60%) who resided in Wayne County (37.7%).

Total Medicaid Health Care Costs

The primary interest of this study was to determine if the provision of alcoholism treatment resulted in a subsequent reduction in total health care expenditures for Michigan Medicaid recipients. To determine if total Medicaid health care expenditures decreased after alcoholism treatment, total health care costs were aggregated monthly before, during, and following the alcoholism treatment intervention for all 3,374 recipients.

These monthly costs were grouped into three time periods: (a) pretreatment period: 6 months after the onset of the alcoholism treatment period, (b) treatment period: the next 12-month period, and (c) posttreatment period: 18 months following the treatment period.

As can be noted by examining Table 4, the trend of the data indicated that total Medicaid expenditures increased dramatically for this group just before the treatment time period, peaked during the treatment period, and began to fall during the postalcoholism treatment time period.

However, contrary to expectations, postalcoholism total health care costs and postmonthly average costs per recipient were higher than prealcoholism total health care costs and premonthly average costs per recipient 18 months after alcoholism treatment. This table

Table 4

Total Medicaid Health Care Expenditures for Alcoholism-Treated Medicaid Recipients ($N = 3,374$)

Month	Monthly Total Medicaid Health Care Expenditures	Monthly Average Per Recipient	
1	\$ 149,698	\$ 44	
2	440,600	131	
3	742,798	220	Pretreatment
4	788,086	234	Time Period
5	850,083	252	
6	1,194,939	354	
7	971,790	288	
8	1,305,276	387	
9	2,078,464	616	
10	2,028,590	601	
11	2,289,801	679	
12	2,401,018	712	Treatment
13	1,871,987	555	Time Period
14	2,589,362	767	
15	2,983,805	884	
16	3,010,948	892	
17	2,557,208	758	
18	3,344,469	991	
19	2,277,878	675	
20	2,447,061	725	
21	1,596,353	473	
22	2,186,169	648	
23	2,413,596	715	
24	1,412,569	419	
25	1,254,619	372	
26	2,457,451	728	
27	1,591,651	472	Posttreatment
28	1,239,702	367	Time Period
29	1,788,280	530	
30	1,471,109	436	
31	1,234,652	366	
32	1,697,606	503	
33	1,302,305	386	
34	1,399,154	415	
35	851,338	252	
36	1,252,453	371	
Total	\$61,472,868	\$18,218	

also shows that the Michigan Medicaid Program spent \$61,472,868 over this 36-month period, for the total health care costs of these 3,374 alcoholism-diagnosed and treated recipients.

The average monthly recipient cost for these recipients for the 36-month period was \$506.11. In comparison, the average monthly recipient cost for all treated Medicaid recipients was \$247.32 during the same time period (Medical Assistance Data Reporting Section, March 1985, HCFA-2082). Thus, the alcoholism-diagnosed and treated Medicaid recipient costs were more than twice as costly to the Michigan Medicaid Program on the average as those of other Medicaid recipients treated for all diagnoses.

Part Two Findings: Cost Differences by Treatment Setting

The second level of analysis was directed at determining if there were any differences in recipients' average total health care costs depending on the specific setting in which the alcoholism treatment was rendered. Specifically, was it less expensive to treat alcoholism in a freestanding outpatient mode than in the traditional inpatient mode?

To conduct the second phase of the analysis, it was decided to use only those Medicaid recipients with continuous Medicaid eligibility for the entire study period. This decision guaranteed that all recipients had an equal opportunity to generate costs. It was also decided to align the health care claim data for these recipients for their onset of alcoholism treatment month. This

decision assured equal comparisons in the prealcoholism and postalcoholism treatment time periods.

As indicated earlier, the second phase of the analysis was conducted to determine if there were differences in average quarterly total health care costs for particular subgroups of recipients depending on where they received their alcoholism treatment. Multiple classification analysis was selected as the statistical technique for this phase of the analysis. In using this statistical technique the dependent variable (average quarterly medical dollars) was measured at the interval level while controlling for age, race, gender, and county of residence. Therefore, it was possible to compare the different treatment settings while controlling for this set of independent variables.

The approach used in the second phase of the analysis required formatting total reimbursed medical health care expenditures into quarterly (3-month intervals) time periods for the three continuously Medicaid-eligible subgroups: (a) hospital treated, $N = 927$; (b) demonstration treated, $N = 253$; and (c) dual treated, $N = 83$. Total health care expenditures were obtained for 6 months before the onset of alcoholism treatment and 18 months following the onset of alcoholism treatment.

After accounting for continuous Medicaid eligibility and aligning the data for the onset of treatment month, the multiple classification analysis was performed four different times on various combinations of recipients, depending on the setting in which the

alcoholism treatment was provided. The results of this analysis are presented in four separate tables. All four tables are formatted in the same fashion. The column identifiers and definitions for the tables are as follows:

1. Time Period. Each table consists of eight quarters of time. Time period one is 4 to 6 months before the onset of alcoholism treatment. Time period two is 1 to 3 months before the onset of alcoholism treatment. Time period three is the quarter in which the alcoholism treatment began and is defined as 1 to 3 months after the onset of alcoholism treatment. Time period four is 4 to 6 months after the onset of alcoholism treatment. Time period five is 7 to 9 months after the onset of alcoholism treatment. Time period six is 10 to 12 months after the onset of alcoholism treatment. Time period seven is 13 to 15 months after the onset of alcoholism treatment, and the eighth time period is 16 to 18 months after the onset of alcoholism treatment.

2. Treatment Setting. This is the particular setting in which the alcoholism treatment was rendered. The hospital setting was an acute care inpatient hospital. The demonstration was one of the free-standing residential programs that were designated as part of the national demonstration project. The dual treated were those recipients who received alcoholism treatment in both an inpatient hospital and a demonstration program during the original treatment time period from July 1, 1982, through June 30, 1983.

3. N. This heading indicates the number of Medicaid recipients who received alcoholism treatment in the various treatment setting options.

4. Quarterly Grand Mean. This column represents the quarterly grand mean for each time period, in dollar amounts, of actual total Medicaid health care costs that were generated by the various treated recipients.

5. Unadjusted Difference From Mean. This column reports the dollar difference or deviation from the quarterly grand mean when the independent variables of race, gender, county of residence, and age are not statistically controlled.

6. Adjusted Difference From Grand Mean. This column reports the dollar difference or deviation from the quarterly grand mean when the independent variables of age, race, gender, and county of residence are statistically controlled.

7. Adjusted Average Quarterly Medicaid Costs. This column reports the average quarterly Medicaid costs that were generated by the 927 hospital-treated recipients and the 253 demonstration-treated recipients after controlling for age, race, gender, and county of residence differences.

8. Difference. This row is the actual quarterly dollar difference in total health care costs between the hospital-treated recipient and the demonstration-treated recipient.

The typical MCA presentation stops at the Adjusted Difference From the Grand Mean column. However, the MCA analysis was expanded

to compute the actual dollar differences between the different groups of recipients depending on the specific treatment setting.

Multiple Classification Analysis:
Hospital-Treated Versus Demonstration/
Dual-Treated Recipients Combined

The first MCA as presented in Table 5 is an analysis of quarterly Medicaid costs for the eight time periods for the 927 hospital-treated recipients and the combined 336 demonstration- and dual-treated recipients. The findings in this table show that generally the hospital-treated recipient generated adjusted average quarterly Medicaid costs that exceeded those costs generated by the demonstration/dual-treated recipient. In particular, time period three, when the onset of alcoholism treatment began, showed a difference of \$745.84 in quarterly costs.

Multiple Classification Analysis:
Dual-Treated Versus Demonstration-
Treated Recipients

The second comparison in this phase of the analysis compared the dual-treated recipient costs to the demonstration-treated recipient costs. Table 6 is presented to show the extreme difference in adjusted average quarterly Medicaid costs between these two groups of alcoholism-treated recipients. In this comparison, time period three showed a \$2,357.87 difference in costs, with the dual-treated recipient generating the higher costs. The demonstration-treated recipient generated adjusted average quarterly Medicaid costs that

Table 5

Multiple Classification Analysis of Quarterly Medicaid Costs
by Time Period and Alcoholism Treatment Setting: Hospital-
Versus Demonstration/Dual-Treated Recipients
(in Dollars)

Time Period	Treatment Setting	N	Quarterly Grand Mean	Unadjusted Difference From Mean	Adjusted Difference From Grand Mean	Adjusted Average Quarterly Medicaid Costs
1	Hospital Demo/Dual	927	771.67	38.05	18.95	796.62
		336		-104.97	-52.29	725.38
					Difference	71.24
2	Hospital Demo/Dual	927	790.38	-17.80	-42.91	747.47
		336		49.11	118.39	909.77
					Difference	162.30
3	Hospital Demo/Dual	927	2384.12	271.25	198.42	2582.54
		336		-748.37	-547.42	1836.70
					Difference	745.84
4	Hospital Demo/Dual	927	1002.66	5.23	-30.21	972.45
		336		-14.42	83.35	1086.01
					Difference	113.56
5	Hospital Demo/Dual	927	826.87	52.60	24.12	850.99
		336		-145.12	-66.55	760.32
					Difference	90.67
6	Hospital Demo/Dual	927	906.70	36.37	7.81	914.51
		336		-100.35	-21.55	885.15
					Difference	29.36
7	Hospital Demo/Dual	927	882.09	96.70	55.75	937.84
		336		-266.79	-153.80	728.29
					Difference	209.55
8	Hospital Demo/Dual	927	938.95	79.11	37.05	976.00
		336		-218.26	-102.23	836.72
					Difference	139.28

Table 6
Multiple Classification Analysis of Quarterly Medicaid Costs
by Time Period and Alcoholism Treatment Setting: Dual-
Versus Demonstration-Treated Recipients
(in Dollars)

Time Period	Treatment Setting	N	Quarterly Grand Mean	Unadjusted Difference From Mean	Adjusted Difference From Grand Mean	Adjusted Average Quarterly Medicaid Costs
1	Dual Demo	83	666.70	265.54	256.25	922.25
		253		-87.12	-84.07 Difference	582.63 339.62
2	Dual Demo	83	839.49	940.26	878.96	1718.45
		253		-308.46	-288.35 Difference	551.14 1167.31
3	Dual Demo	83	1635.75	1861.64	1775.42	3411.17
		253		-610.74	-582.45 Difference	1053.30 2357.87
4	Dual Demo	83	988.24	767.16	719.25	1707.49
		253		-251.68	-235.96 Difference	752.28 955.21
5	Dual Demo	83	681.74	793.48	769.89	1451.63
		253		-260.31	-252.57 Difference	429.17 1022.46
6	Dual Demo	83	806.35	1004.80	984.75	1791.10
		253		-329.64	-323.06 Difference	483.29 1307.81
7	Dual Demo	83	615.30	323.49	292.73	908.03
		253		-106.12	-96.03 Difference	519.27 388.76
8	Dual Demo	83	720.70	233.82	207.22	927.92
		253		-76.71	-67.98 Difference	652.72 275.20

were consistently below the quarterly grand mean for every time period.

Multiple Classification Analysis:
Hospital-Treated, Demonstration-Treated,
and Dual-Treated Recipients Compared

The third comparison in this phase of the analysis was performed to obtain the differences in actual quarterly total Medicaid costs between the three treatment groups of (a) hospital-treated recipients, (b) demonstration-treated recipients, and (c) recipients treated in both settings.

The data in Table 7 indicate that for all eight quarterly time periods the dual-treated group generated the highest costs, the hospital-treated group's costs were the next highest, and the demonstration-treated group generated the lowest adjusted average quarterly costs for the entire study period, well below the grand mean for every quarterly time period.

To answer the question of whether total Medicaid costs decreased after alcoholism treatment for the total alcoholism-treated group of 1,263 recipients, quarterly grand means over time were compared. As can be seen in Table 7, the quarterly grand means for time period one (\$771.67) and time period two (\$790.38) were lower than the postalcoholism treatment quarterly grand mean for time periods seven (\$882.09) and eight (\$938.95). Thus, total Medicaid health care expenditures for this alcoholism-treated group of recipients increased during the study period.

Table 7

Multiple Classification Analysis of Quarterly Medicaid Costs
by Time Period and Alcoholism Treatment Setting: Dual-
Hospital-, and Demonstration-Treated Recipients Compared
(in Dollars)

Time Period	Treatment Setting	N	Quarterly Grand Mean	Unadjusted Difference From Mean	Adjusted Difference From Grand Mean	Adjusted Average Quarterly Medicaid Costs
1	Dual	83	771.67	160.57	196.43	968.10
	Hospital	927		38.05	20.14	791.81
	Demo	253		-192.09	-138.24	633.43
2	Dual	83	790.38	989.37	1032.82	1823.20
	Hospital	927		-17.80	-38.54	751.84
	Demo	253		-259.35	-197.63	592.75
3	Dual	83	2384.12	1113.27	1239.15	3623.27
	Hospital	927		271.25	206.96	2591.08
	Demo	253		-1359.11	-1164.82	1219.30
4	Dual	83	1002.66	752.74	812.34	1815.00
	Hospital	927		5.23	-26.73	975.93
	Demo	253		-266.10	-168.57	834.09
5	Dual	83	826.87	648.36	698.58	1525.45
	Hospital	927		52.60	27.78	854.65
	Demo	253		-405.43	-330.97	495.90
6	Dual	83	906.70	904.44	945.80	1852.50
	Hospital	927		36.37	12.44	919.14
	Demo	253		-429.99	-355.86	550.84
7	Dual	83	882.09	56.69	100.50	982.59
	Hospital	927		96.70	56.96	939.05
	Demo	253		-372.92	-241.69	640.40
8	Dual	83	938.95	15.56	73.74	1012.69
	Hospital	927		79.11	39.90	976.85
	Demo	253		-294.97	-163.04	775.91

Multiple Classification Analysis:
Hospital-Treated Versus
Demonstration-Treated Recipients

The fourth and final comparison in this phase of the analysis is presented in Table 8. This table presents the findings of the data analysis for the study as originally designed. Simply stated, it is the comparison of the hospital-treated (control group) recipient costs with the demonstration-treated (experimental group) recipient costs with the dual-treatment group eliminated. In this particular MCA, the 927 hospital-treatment recipients' adjusted average quarterly health care costs are compared to those of the 253 demonstration-treated recipients for eight quarters.

During the first quarterly time period, the hospital-treated recipients generated adjusted average quarterly Medicaid costs that exceeded the quarterly grand mean by \$38.58. During the same quarterly time period, the demonstration-treated recipients generated adjusted average quarterly Medicaid costs that were \$141.36 below the quarterly grand mean. On an individual basis there was a \$179.94 difference between quarterly means, with the hospital-treated recipient having the higher pretreatment health care costs.

The second quarterly time period presents the same finding, but to a greater degree. In this time period the adjusted difference between quarterly means was \$212.13.

Time periods three through eight are the quarterly time periods that begin with the onset of alcoholism treatment and continue for 18

Table 8

Multiple Classification Analysis of Quarterly Medicaid Costs
by Time Period and Alcoholism Treatment Setting: Hospital-
Versus Demonstration-Treated Recipients (in Dollars)

Time Period	Treatment Setting	N	Quarterly Grand Mean	Unadjusted Difference From Mean	Adjusted Difference From Grand Mean	Adjusted Average Quarterly Medicaid Costs
1	Hospital Demo	927	760.37	49.34	38.58	798.95
		253		-180.79	-141.36 Difference	619.01 179.94
2	Hospital Demo	927	720.79	51.79	45.48	766.27
		253		-189.76	-166.65 Difference	554.14 212.13
3	Hospital Demo	927	2305.81	349.56	301.17	2606.98
		253		-1280.80	-1103.49 Difference	1202.32 1404.66
4	Hospital Demo	927	949.71	58.17	38.72	988.43
		253		-213.15	-141.88 Difference	807.83 180.60
5	Hospital Demo	927	781.26	98.21	84.38	865.64
		253		-359.83	-309.16 Difference	472.10 393.54
6	Hospital Demo	927	843.08	99.99	77.63	920.71
		253		-366.37	-284.44 Difference	558.64 362.07
7	Hospital Demo	927	878.10	100.69	63.36	941.46
		253		-368.93	-232.16 Difference	645.94 295.52
8	Hospital Demo	927	931.06	80.20	46.64	984.50
		253		-293.87	-170.89 Difference	766.97 217.53
Hospital-Treated Recipients Average Medicaid Costs From Onset of Treatment to 18 Months Posttreatment						7307.72
Demonstration-Treated Recipients Average Medicaid Costs From Onset of Treatment to 18 Months Posttreatment						4453.80
Difference						2853.92

months beyond the onset of the alcoholism treatment. In time period three, the alcoholism treatment was initiated either in the hospital setting or the demonstration setting. It is in this time period that most, if not all, of the alcoholism treatment took place. The quarterly grand mean for this time period was \$2,305.81. After adjusting for age, race, gender, and county of residence, the hospital-treated recipients generated an adjusted average quarterly Medicaid cost that exceeded the grand mean by \$301.17, or an adjusted average quarterly Medicaid cost of \$2,606.98. The demonstration-treated recipients generated an adjusted average quarterly cost that was \$1,103.49 below the grand mean, or an adjusted average quarterly Medicaid cost of \$1,202.32.

The cost difference between the two treatment settings was \$1,404.66. On a one-to-one basis, the hospital-treated recipient averaged \$1,404.66 more in total health care costs than the demonstration-treated recipient for this 3-month time period.

In time period four the hospital-treated recipient generated adjusted average quarterly Medicaid costs of \$988.43, which were \$38.72 above the quarterly grand mean of \$949.71. The demonstration-treated recipient generated adjusted average quarterly Medicaid costs of \$807.83, which fell below the quarterly grand mean by \$141.88. The difference between the two adjusted means was \$180.60.

Time period five (7 to 9 months after the onset of alcoholism treatment) indicates the same cost pattern. The hospital-treated recipient generated adjusted average quarterly Medicaid costs of

\$865.64, which exceeded the quarterly grand mean by \$84.38. On the other hand, the demonstration-treated recipient generated adjusted average quarterly Medicaid costs of \$472.10, which were \$309.16 below the quarterly grand mean. The difference between the two means was \$393.54.

In time period six the same expenditure pattern continued, with the hospital-treated recipient generating adjusted average quarterly Medicaid costs of \$920.71, which were \$77.63 above the quarterly grand mean. The demonstration-treated recipient generated adjusted average quarterly Medicaid costs of \$558.64, which were \$284.44 below the quarterly grand mean. The actual difference between time period six group means was \$362.07.

The seventh time period contained the same trend in the data. The hospital-treated recipient generated adjusted average quarterly Medicaid costs of \$941.46, which were \$63.36 above the quarterly grand mean. The demonstration-treated recipient generated adjusted average quarterly Medicaid costs of \$645.94, which were \$232.16 below the quarterly grand mean. In this time period the actual difference between the group means was \$295.52.

The eighth and final time period contained the same cost pattern. The hospital-treated recipient generated adjusted average quarterly Medicaid costs of \$984.50, which were \$46.64 above the quarterly grand mean, while the demonstration-treated recipient generated adjusted average quarterly Medicaid costs of \$766.97, which

were \$170.89 below the quarterly grand mean. The difference between the two group means during this time period was \$217.53.

What is of particular importance in Table 8 is the adjusted average cost differences in health care expenditures between the two groups once alcoholism treatment was started. The hospital-treated recipients had adjusted average Medicaid health care costs of \$7,307.72 during the 18-month period after the onset of alcoholism treatment. The demonstration-treated recipients had average Medicaid health care costs of \$4,453.80 for the same time period. The difference between the hospital-treated and the demonstration-treated recipients in total health-care expenditures was \$2,853.92 per recipient for the 18-month time period. The hospital-treated recipient consumed more of the Medicaid budget, particularly in time period three, during which the majority of the alcoholism treatment was rendered.

An additional area of importance noted in Table 8 is the overall expenditure pattern of the data for all eight quarterly time periods. As noted earlier, total health care costs for the hospital-treated recipients and the demonstration-treated recipients (quarterly grand means) showed the same general pattern. Health care costs peaked during the onset of treatment time period and declined following treatment. However, health care costs did not drop below prealcoholism treatment costs.

The same pattern can be seen for the hospital- and demonstration-treated groups when viewed separately. The

hospital-treated adjusted average quarterly means for time periods one and two were \$798.95 and \$766.27, respectively. The hospital adjusted average quarterly means for time periods seven and eight were \$941.46 and \$984.50, respectively.

When viewing the data for the demonstration-treated recipients, a similar pattern was found. The demonstration-treated adjusted average quarterly means for time periods one and two were \$619.01 and \$554.14, respectively. The demonstration-treated adjusted average quarterly means for time periods seven and eight were \$645.94 and \$766.07, respectively.

Summary of the Findings

The findings as presented in this chapter indicated that total health care costs for the 3,374 Michigan Medicaid alcoholism-treated recipients did not decrease after the alcoholism treatment intervention. On the contrary, total health care costs increased after the recipient received the alcoholism treatment.

The introduction of the methodological strengths of accounting for continuous Medicaid eligibility and adjusting each recipient's total health care data for the onset of alcoholism treatment month did not result in a reduction in subsequent total health care costs for any treatment group. The hospital-treated recipient group, the demonstration-treated group, and the dual-treated group all experienced an increase in total health care expenditures 18 months after the onset of alcoholism treatment.

Therefore, the findings did not support a reduction in total health care costs after the alcoholism treatment was rendered in the three treatment setting options available to the Medicaid recipient. These findings counter the majority of the findings that have been presented in the alcoholism treatment research literature currently available.

Additional findings, however, indicated considerable cost differences in adjusted average quarterly health care costs among recipients treated in the various treatment settings. The dual-treated recipients, those who received alcoholism treatment in the hospital and demonstration settings during the study period, generated adjusted average quarterly total Medicaid costs that consistently exceeded the Medicaid costs generated by recipients treated in either the hospital or the demonstration program. The fact that these recipients used both treatment setting options at will contributed to a nonreduction in total Medicaid costs for the state Medicaid account after the introduction of the National Demonstration Project.

The hospital-treated group generated adjusted average quarterly total Medicaid costs lower than the dual-treated group, but these costs were also consistently higher than those of the demonstration-treated group. Health care costs for both the dual-treated group and the hospital-treated group started higher, were considerably higher during the onset of treatment time period, and remained higher 18 months following alcoholism treatment.

The adjusted average quarterly total Medicaid costs for the demonstration-treated recipients presented different findings. These recipients generated adjusted average quarterly total Medicaid costs that were consistently lower than those of the dual-treated or hospital-treated recipient. In particular, the costs generated during the initial alcoholism treatment period were well below the quarterly grand mean (\$1,103.49). On an overall basis during the 18 months following the onset of alcoholism treatment, the demonstration-treated recipient generated adjusted average total health care costs that were \$2,858.92 below the hospital-treated recipient's total health care costs for the same time period.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The major reasons for conducting this study of alcoholism treatment and its subsequent effect on total health care use were (a) to determine if overall cost savings did occur to the Michigan Medicaid budget after the initiation of alcoholism treatment for Medicaid recipients, (b) to determine if there were cost differences in total health care use between groups of recipients based on the alcoholism treatment setting, and (c) to introduce new methodological and analytical techniques not previously used in alcoholism-treatment-effect studies.

Previous studies on the provision of alcoholism treatment and its effect on subsequent total health care use have concentrated mainly on active employees in the public and private sectors, HMO members, and retirees. Little research has been conducted on an indigent Medicaid population. The central thrust of this research was to introduce new analytical and statistical techniques in studying an alcoholism-treated Michigan Medicaid population. The primary reason for such an approach was to permit an accurate review of the dynamics of alcoholism treatment on future total health care use in a descriptive and explanatory sense. In this regard, the

results of the research are expected to contribute to Medicaid alcoholism treatment studies.

As indicated in Chapter I, there has been a tremendous resurgence of interest in the effect of alcohol consumption, its causes, and costs to American society. This recent interest has been fueled by public concern over alcohol-related highway fatalities and rising health care costs. In an attempt to harness these spiraling health care costs and the realization that alcohol abuse is one of this country's major health problems, the health care industry is attempting to develop alternative treatment settings to the traditional acute care inpatient hospital setting.

One such alternative to the traditional acute care inpatient hospital settings was jointly developed by the federal Health Care Financing Administration and the National Institute on Alcoholism and Alcohol Abuse. This alternative was the national demonstration project known as the Alcoholism Services Demonstration (ASD). The major project goal of the Alcoholism Services Demonstration was to demonstrate cost savings expected from providing alcoholism services to Medicare and Medicaid eligibles in freestanding residential alcohol treatment centers, including halfway houses, and freestanding outpatient alcoholism treatment centers.

The national demonstration project allowed for federal waivers to be granted to six participating states to test the feasibility of using freestanding detoxification, residential, and outpatient alcohol treatment centers to provide alcoholism services. Under

these waivers extended coverage and federal financial participation was granted to freestanding providers of alcoholism treatment services. A continuum of detoxification, residential, and outpatient services was made available to eligible participating recipients.

In Michigan, 24 freestanding individual treatment facilities that were geographically distributed throughout the Upper and Lower Peninsulas actively served and treated Medicare beneficiaries and Medicaid-eligible recipients during the 3-year demonstration project. The Michigan demonstration project ended in May 1985. The end of the national demonstration project also brought to an end the federal waivers that allowed Medicare and Medicaid reimbursement for alcoholism treatment to freestanding facilities.

As a result of the conclusion of this national demonstration project, Congress needs now to determine if reimbursement for alcoholism treatment in freestanding treatment facilities will become a continued, allowable and reimbursable benefit under the national Medicare and individual state-administered Medicaid programs. One of the major reasons for undertaking this study was to contribute critically needed evaluation data that would allow Congress to make an informed decision on this matter.

In Chapter II a methodological review of the previous studies on alcoholism treatment and its effect on subsequent health care use was presented. Along with this literature review the historical development of the generalization that the provision of alcoholism

treatment reduces future total health care costs was traced through time.

As cited earlier, the generalization that the provision of alcoholism treatment reduces subsequent health care use can be traced back to the works of Jones and Vischi (1979). In this initial review of the then-current alcohol treatment effect studies, Jones and Vischi found significant reductions in medical care use following the provision of alcoholism treatment. However, a case-by-case critique of these early studies and the more current alcoholism-treatment-effect studies revealed major design problems and analytical weaknesses in the majority of these studies. In addition to these weaknesses it was also found that the interpretation of the data and the presentation of stated findings also presented a biased view that contributed to the continuation of the belief that alcoholism treatment reduces future health care costs.

The major design and analytical weaknesses found were:

1. Small population and sample sizes.
2. Short prealcoholism and postalcoholism treatment time periods.
3. Nondiagnosis-specific comparisons.
4. Lack of or inappropriate adjustments for program eligibility.
5. Lack of individual adjustments for the onset of alcoholism treatment.
6. Use of partial measures for health care use.

7. Inappropriate projection and measurement techniques used in assessing the effect of the alcoholism treatment on future health care costs.

8. Improper generalization of specific study findings to other populations.

In addition to these weaknesses it was also found that the majority of the studies reported a reduction in health care use following the alcoholism treatment intervention. However, as shown in Chapter II, there were also major weaknesses in the interpretation and presentation of the findings in many of the studies. What was presented as a postalcoholism treatment reduction in total health care use could easily be explained away by reviewing the methodology and statistical presentation in these studies.

The review of the literature presented in Chapter II revealed that the generalization that alcoholism treatment reduces subsequent total health care costs was used for a variety of purposes. The major purposes found were to justify "in-house" alcoholism treatment programs, to justify model health insurance coverage for substance-abuse treatment, and to present quantitative measures that alcoholism treatment does in fact have a positive effect on the health and well being of the individual. The critique of the alcoholism-treatment-effect literature also revealed that despite known limitations and methodological inadequacies, the alcoholism treatment field continues to advocate that alcoholism treatment reduces future health care costs.

Chapter III provided the methodology and design of this research. As indicated, the major emphasis of the study was to determine if the provision of alcoholism treatment resulted in a subsequent reduction in total health care expenditures for Michigan Medicaid recipients.

A second question was to determine if there were differences in mean average quarterly Medicaid costs among recipients who were treated for alcoholism in the acute care inpatient hospital, versus recipients who were treated in freestanding demonstration programs.

The research design chosen was a quasi-experimental time series analysis using a nonequivalent control group. The data used were Medicaid-reimbursed total health care claims for the entire alcoholism-treated Medicaid population over a 36-month period. The original study design was to compare the Medicaid costs between the inpatient-hospital-treated recipient and the freestanding-treated recipient. However, a third comparison group was added when it was found that a number of recipients used both treatment settings during the study period.

Multiple classification analysis (MCA) was selected as the statistical technique in this research because it enabled the researcher to compute means for the dependent variable (adjusted average quarterly Medicaid costs) for each treatment setting while controlling for other independent variables (age, race, gender, and county of residence). Therefore, it was possible to compare the

Medicaid costs derived from the different treatment settings while controlling for these independent variables.

The MCA was performed four different times on various combinations of recipients, depending on the "setting" in which the alcoholism treatment was provided. The adjusted average quarterly Medicaid costs for each treatment setting were computed from the quarterly grand mean and the adjusted difference from the grand mean.

Phase one of the analysis found that the entire alcoholism-treated population of 3,374 recipients generated Medicaid health care expenditure costs that were similar to previously studied alcoholic populations. Total health care expenditures rose sharply just before the alcoholism treatment intervention, peaked shortly after the treatment intervention, and declined following alcoholism treatment.

However, postalcoholism treatment total health care costs did not drop below prealcoholism total health care costs. This finding contradicts the majority of the studies described in Chapter II.

Phase two of the analysis showed that the expenditure pattern generated by the three treatment groups of (a) hospital treated, (b) demonstration treated, and (c) dual treated were similar to the total alcoholism expenditure pattern of the treated population studied in phase one of the analysis. Total health care costs peaked shortly after alcoholism treatment started and dropped sharply after alcoholism treatment was rendered. However, postalcoholism treatment total health care costs never dropped below prealcoholism total health care costs for any of these three treatment option groups even

18 months after treatment. It was demonstrated that total health care costs did not decrease after the alcoholism treatment for any of the three different treatment setting groups.

Use of the MCA did, however, reveal real cost differences in adjusted average quarterly total health care costs between recipient groups based on the setting in which the alcoholism treatment was rendered while controlling for age, gender, race, and residence differences.

The dual-treated recipient group consistently generated the highest health care expenditures, with the hospital-treated group next, followed by the demonstration-treated group. When comparing the adjusted average quarterly hospital-treated recipient costs to the adjusted average quarterly demonstration-treated recipient costs, beginning with the onset of alcoholism treatment, major dollar differences were found. During the 18 months following the onset of alcoholism treatment, the demonstration-treated recipients generated adjusted average quarterly Medicaid costs that were approximately \$3,000 (\$2,858.92) below the hospital-treated recipients' adjusted total average quarterly Medicaid costs for the same time period.

Conclusions and Recommendations

The conclusions and public policy recommendations of this study are controversial and far-reaching. The findings indicate that the provision of alcoholism treatment to an indigent Medicaid population did not result in a reduction in subsequent total health care use.

This finding counters the previous research and the general belief that is advocated in the alcoholism treatment field.

The future policy recommendations based on this study are clear. First and foremost, the Health Care Financing Administration and Congress should not look at the expansion of freestanding residential and outpatient alcoholism treatment as a cost-containment effort unless strong case-management components are part of any proposed legislation.

Specifically, the "freedom of choice" issue in provider selection on the part of the Medicaid recipient must be addressed head on if the Medicaid recipient is to be properly assessed and placed in the most appropriate treatment setting based on individual need. Furthermore, the recipient's health care must be managed throughout the health care delivery network. The recipient should not have the ability to move in and out of both the hospital treatment setting and the freestanding residential treatment setting at will. Medically justified constraints, based on individual need, must be put in place if freestanding alcoholism treatment services are to become an ongoing reimbursable benefit under the Health Care Financing Administration.

Second, the alcoholism treatment field should discontinue using the argument that alcoholism treatment reduces future health care costs. On the contrary, alcoholism treatment contributes to an increase in future health care costs because of the identification of co-morbid conditions related to alcoholism. When

the alcoholism-diagnosed Medicaid recipient encounters the health care delivery network, total health care needs are addressed. Alcoholism cannot be and is not treated in isolation from other health needs.

It appears that once the Medicaid recipient is in the health care system, total health care needs are identified. It also appears that the alcoholism-diagnosed Medicaid recipient has more unmet health needs that are in addition more costly to treat than the nonalcohol-diagnosed Medicaid recipient's health needs.

A third policy recommendation based on the results of this study focused on the alcohol treatment setting. Given the facts that freestanding alcoholism treatment is considerably less costly than alcoholism treatment rendered in the traditional hospital setting, and that no form of the alcoholism treatment reduced subsequent health care costs, it makes economic sense to treat the patient in the most cost-effective setting that does not sacrifice the quality of the service. There is an urgent need to assess adequately the individual and treat only the acutely ill patient in the acute care inpatient hospital setting. Those Medicaid recipients not needing this high level of medical care should more appropriately be treated in the less costly freestanding settings.

To implement such a policy there must be a Congress-initiated effort to address the issue of the Medicaid recipient's "freedom of choice" in provider selection. In addition, the substance abuse service delivery network needs to develop and use standard assessment

instruments that work, match the recipients to specific treatment modalities based on individual need, and recognize that limited residential services coupled with intensive outpatient treatment services are viable options to the traditional inpatient hospital treatment setting.

Based on the findings of this study, the need for further research in the area of alcoholism treatment and its effect on subsequent health care costs for indigent populations is needed. This study, like the majority of alcoholism treatment effect studies before it, used total health care costs as the measure to evaluate treatment outcome. What is needed but very difficult to obtain is a study that incorporates multiple measures of outcome of the alcoholism treatment.

Additional areas of research that need to be addressed are the level of illness and co-morbid conditions associated with the alcoholic Medicaid recipient. It is apparent from the findings of this research that the Michigan Medicaid recipient who is diagnosed as alcoholic is a higher-than-average user of the Medicaid system. Research needs to be conducted on this population to identify other health conditions strongly associated with alcoholism and to determine if there are changes in these co-morbid conditions after alcoholism treatment is received. In particular, the recipients who were the dual-treated, high users need to be studied as an individual group to determine the most effective method of treatment.

The methodology used in this research obtained total reimbursed Medicaid Program costs for recipients treated in different treatment settings. It is conceivable that this methodology can also be used in other program areas. An example would be in costing out the difference in total program costs before and after the deinstitutionalization of mental health patients as a result of the community placement policy implementation.

APPENDIX A

MULTIPLE CLASSIFICATION ANALYSIS OF QUARTERLY MEDICAID COSTS: HOSPITAL-TREATED, DEMONSTRATION-TREATED, AND DUAL-TREATED RECIPIENTS COMPARED

Table A-1

Multiple Classification Analysis of Quarterly Medicaid Costs
by Race, Gender, County of Residence, Treatment Setting,
and Age: 4 Through 6 Months Before the Onset of
Alcoholism Treatment (in Dollars)

Demographic Variable	N	Unadjusted Difference From Grand Mean (\$)	Adjusted Difference From Grand Mean (\$)
<u>Race</u>			
White	649	-102.14	-87.52
Nonwhite	614	107.96	92.51
<u>Gender</u>			
Male	621	-26.45	-59.72
Female	642	25.59	57.76
<u>County of Residence</u>			
Bay, Genesee, Saginaw	247	-95.10	-50.09
Kent	84	-117.37	-90.45
Wayne	484	113.80	58.54
Other	448	-48.50	-18.67
<u>Treatment Setting</u>			
Dual treatment settings	83	160.57	196.43
Hospital only	927	38.05	20.14
Demonstration only	253	-192.09	-138.24
<u>Age</u>			
Less than 30	244	-43.86	-11.15
30-39	403	-81.43	-117.48
40-49	298	33.09	37.57
50 and older	318	105.84	122.23

Grand Mean = \$771.67; N = 1,263

Table A-2

Multiple Classification Analysis of Quarterly Medicaid Costs
by Race, Gender, County of Residence, Treatment Setting,
and Age: 1 Through 3 Months Before the Onset of
Alcoholism Treatment (in Dollars)

Demographic Variable	N	Unadjusted Difference From Grand Mean (\$)	Adjusted Difference From Grand Mean (\$)
<u>Race</u>			
White	649	-40.17	24.31
Nonwhite	614	42.46	-25.69
<u>Gender</u>			
Male	621	-59.14	-103.54
Female	642	57.21	100.15
<u>County of Residence</u>			
Bay, Genesee, Saginaw	247	- 82.73	- 82.86
Kent	84	-284.26	-347.88
Wayne	484	203.88	231.50
Other	448	-121.35	-139.19
<u>Treatment Setting</u>			
Dual treatment settings	83	989.37	1032.82
Hospital only	927	- 17.80	- 38.54
Demonstration only	253	-259.35	-197.63
<u>Age</u>			
Less than 30	244	67.27	66.53
30-39	403	-120.27	-166.23
40-49	298	31.00	37.26
50 and older	318	71.75	124.70

Grand Mean = \$790.38; N = 1,263

Table A-3

Multiple Classification Analysis of Quarterly Medicaid Costs
by Race, Gender, County of Residence, Treatment Setting,
and Age: 1 Through 3 Months After the Onset of
Alcoholism Treatment (in Dollars)

Demographic Variable	N	Unadjusted Difference From Grand Mean (\$)	Adjusted Difference From Grand Mean (\$)
<u>Race</u>			
White	649	-309.50	-104.14
Nonwhite	614	327.14	110.08
<u>Gender</u>			
Male	621	-223.42	-307.96
Female	642	216.11	298.89
<u>County of Residence</u>			
Bay, Genesee, Saginaw	247	-656.92	-437.19
Kent	84	-831.58	-506.02
Wayne	484	640.74	490.40
Other	448	-174.12	-193.89
<u>Treatment Setting</u>			
Dual treatment settings	83	1113.27	1239.15
Hospital only	927	271.25	206.96
Demonstration only	253	-1359.11	-1164.82
<u>Age</u>			
Less than 30	244	-319.06	-150.25
30-39	403	88.25	-29.22
40-49	298	108.64	109.05
50 and older	318	31.17	50.13

Grand Mean = \$2,384.12; N = 1,263

Table A-4

Multiple Classification Analysis of Quarterly Medicaid Costs
by Race, Gender, County of Residence, Treatment Setting,
and Age: 4 Through 6 Months After the Onset of
Alcoholism Treatment (in Dollars)

Demographic Variable	N	Unadjusted Difference From Grand Mean (\$)	Adjusted Difference From Grand Mean (\$)
<u>Race</u>			
White	649	-111.52	-62.84
Nonwhite	614	117.88	66.43
<u>Gender</u>			
Male	621	-65.80	-110.81
Female	642	63.65	107.19
<u>County of Residence</u>			
Bay, Genesee, Saginaw	247	-254.53	-240.36
Kent	84	-73.07	-117.78
Wayne	484	222.69	190.57
Other	448	-86.55	-51.28
<u>Treatment Setting</u>			
Dual treatment settings	83	752.74	812.34
Hospital only	927	5.23	-26.73
Demonstration only	253	-266.10	-168.57
<u>Age</u>			
Less than 30	244	-47.10	-12.64
30-39	403	-44.48	-95.74
40-49	298	-21.57	-13.32
50 and older	318	112.73	143.51

Grand Mean = \$1,002.66; \underline{N} = 1,263

Table A-5

Multiple Classification Analysis of Quarterly Medicaid Costs
by Race, Gender, County of Residence, Treatment Setting,
and Age: 7 Through 9 Months After the Onset of
Alcoholism Treatment (in Dollars)

Demographic Variable	N	Unadjusted Difference From Grand Mean (\$)	Adjusted Difference From Grand Mean (\$)
<u>Race</u>			
White	649	-134.95	-69.22
Nonwhite	614	142.64	73.17
<u>Gender</u>			
Male	621	-24.17	-61.58
Female	642	23.38	59.57
<u>County of Residence</u>			
Bay, Genesee, Saginaw	247	-155.36	-81.13
Kent	84	-226.66	-191.94
Wayne	484	222.78	154.96
Other	448	-112.52	-86.70
<u>Treatment Setting</u>			
Dual treatment settings	83	648.36	698.58
Hospital only	927	52.60	27.78
Demonstration only	253	-405.43	-330.97
<u>Age</u>			
Less than 30	244	-142.37	-90.70
30-39	403	29.44	-11.10
40-49	298	-72.58	-74.32
50 and older	318	139.95	153.30

Grand Mean = \$826.87; $N = 1,263$

Table A-6

Multiple Classification Analysis of Quarterly Medicaid Costs
by Race, Gender, County of Residence, Treatment Setting,
and Age: 10 Through 12 Months After the Onset of
Alcoholism Treatment (in Dollars)

Demographic Variable	N	Unadjusted Difference From Grand Mean (\$)	Adjusted Difference From Grand Mean (\$)
<u>Race</u>			
White	649	-52.60	-2.35
Nonwhite	614	55.60	2.48
<u>Gender</u>			
Male	621	13.05	-15.21
Female	642	-12.62	14.71
<u>County of Residence</u>			
Bay, Genesee, Saginaw	247	-179.89	-126.39
Kent	84	-264.64	-236.27
Wayne	484	157.91	128.86
Other	448	-21.80	-25.23
<u>Treatment Setting</u>			
Dual treatment settings	83	904.44	945.80
Hospital only	927	36.37	12.44
Demonstration only	253	-429.99	-355.86
<u>Age</u>			
Less than 30	244	-129.45	-95.37
30-39	403	4.62	-1.74
40-49	298	101.42	89.90
50 and older	318	-1.57	-8.86

Grand Mean = \$906.70; $N = 1,263$

Table A-7

Multiple Classification Analysis of Quarterly Medicaid Costs
by Race, Gender, County of Residence, Treatment Setting,
and Age: 13 Through 15 Months After the Onset of
Alcoholism Treatment (in Dollars)

Demographic Variable	N	Unadjusted Difference From Grand Mean (\$)	Adjusted Difference From Grand Mean (\$)
<u>Race</u>			
White	649	-212.18	-106.10
Nonwhite	614	224.28	112.15
<u>Gender</u>			
Male	621	60.98	8.51
Female	642	-58.99	-8.23
<u>County of Residence</u>			
Bay, Genesee, Saginaw	247	-267.63	-179.00
Kent	84	355.14	-254.22
Wayne	484	382.92	296.26
Other	448	-199.55	-173.71
<u>Treatment Setting</u>			
Dual treatment settings	83	56.69	100.50
Hospital only	927	96.70	56.96
Demonstration only	253	-372.92	-241.69
<u>Age</u>			
Less than 30	244	-250.37	-129.94
30-39	403	-130.56	-172.84
40-49	298	376.54	367.91
50 and older	318	4.70	-26.03

Grand Mean = \$882.09; $N = 1.263$

Table A-8

Multiple Classification Analysis of Quarterly Medicaid Costs
by Race, Gender, County of Residence, Treatment Setting,
and Age: 16 Through 18 Months After the Onset of
Alcoholism Treatment (in Dollars)

Demographic Variable	N	Unadjusted Difference From Grand Mean (\$)	Adjusted Difference From Grand Mean (\$)
<u>Race</u>			
White	649	-117.78	-25.98
Nonwhite	614	124.49	27.47
<u>Gender</u>			
Male	621	132.76	57.47
Female	642	-128.42	-55.59
<u>County of Residence</u>			
Bay, Genesee, Saginaw	247	-299.93	-188.54
Kent	84	-198.20	-177.84
Wayne	484	314.87	273.61
Other	448	-137.64	-158.30
<u>Treatment Setting</u>			
Dual treatment settings	83	15.56	73.74
Hospital only	927	79.11	37.90
Demonstration only	253	-294.97	-163.04
<u>Age</u>			
Less than 30	244	-238.62	-139.40
30-39	403	-183.17	-193.79
40-49	298	64.72	50.62
50 and older	318	354.56	305.11

Grand Mean = \$938.95; $N = 1,263$

APPENDIX B

MULTIPLE CLASSIFICATION ANALYSIS OF QUARTERLY MEDICAID COSTS: HOSPITAL-TREATED VERSUS DEMONSTRATION- TREATED RECIPIENTS COMPARED

Table B-1

Multiple Classification Analysis of Quarterly Medicaid Costs
by Race, Gender, County of Residence, Treatment Setting,
and Age: 4 Through 6 Months Before the Onset of
Alcoholism Treatment (in Dollars)

Demographic Variable	N	Unadjusted Difference From Grand Mean (\$)	Adjusted Difference From Grand Mean (\$)
<u>Race</u>			
White	603	-106.87	-88.02
Nonwhite	577	111.68	91.98
<u>Gender</u>			
Male	577	-60.95	-82.99
Female	603	58.32	79.41
<u>County of Residence</u>			
Bay, Genesee, Saginaw	224	- 58.91	- 16.83
Kent	71	-178.09	-106.44
Wayne	456	106.78	50.32
Other	429	- 53.27	- 27.08
<u>Treatment Setting</u>			
Hospital only	927	49.34	38.58
Demonstration only	253	-180.79	-141.36
<u>Age</u>			
Less than 30	222	-35.91	- 5.63
30-39	376	-44.17	- 86.93
40-49	278	58.14	67.47
50 and older	304	27.68	49.93

Grand Mean = \$760.37; N = 1,180

Table B-2

Multiple Classification Analysis of Quarterly Medicaid Costs
by Race, Gender, County of Residence, Treatment Setting,
and Age: 1 Through 3 Months Before the Onset of
Alcoholism Treatment (in Dollars)

Demographic Variable	N	Unadjusted Difference From Grand Mean (\$)	Adjusted Difference From Grand Mean (\$)
<u>Race</u>			
White	603	- 27.12	47.54
Nonwhite	577	28.35	- 49.68
<u>Gender</u>			
Male	577	-111.47	-137.05
Female	603	106.67	131.14
<u>County of Residence</u>			
Bay, Genesee, Saginaw	224	- 43.81	- 22.06
Kent	71	-380.93	-308.25
Wayne	456	180.40	210.96
Other	429	-105.83	-161.71
<u>Treatment Setting</u>			
Hospital only	927	51.79	45.48
Demonstration only	253	-189.76	-166.65
<u>Age</u>			
Less than 30	222	72.25	81.73
30-39	376	- 81.96	-130.89
40-49	278	68.95	82.21
50 and older	304	- 14.44	27.02

Grand Mean = \$720.79; N = 1,180

Table B-3

Multiple Classification Analysis of Quarterly Medicaid Costs
by Race, Gender, County of Residence, Treatment Setting,
and Age: 1 Through 3 Months After the Onset of
Alcoholism Treatment (in Dollars)

Demographic Variable	N	Unadjusted Difference From Grand Mean (\$)	Adjusted Difference From Grand Mean (\$)
<u>Race</u>			
White	603	-346.76	-139.81
Nonwhite	577	362.39	146.11
<u>Gender</u>			
Male	577	-269.57	-354.01
Female	603	257.94	338.75
<u>County of Residence</u>			
Bay, Genesee, Saginaw	224	-719.94	-447.94
Kent	71	-858.45	-310.14
Wayne	456	636.09	458.32
Other	429	-158.29	-201.94
<u>Treatment Setting</u>			
Hospital only	927	349.56	301.17
Demonstration only	253	-1280.80	-1103.49
<u>Age</u>			
Less than 30	222	-317.40	-108.15
30-39	376	58.40	- 68.17
40-49	278	127.99	142.78
50 and older	304	42.51	32.73

Grand Mean = \$2,305.81; N = 1,180

Table B-4

Multiple Classification Analysis of Quarterly Medicaid Costs
by Race, Gender, County of Residence, Treatment Setting,
and Age: 4 Through 6 Months After the Onset of
Alcoholism Treatment (in Dollars)

Demographic Variable	N	Unadjusted Difference From Grand Mean (\$)	Adjusted Difference From Grand Mean (\$)
<u>Race</u>			
White	603	- 99.63	- 41.73
Nonwhite	577	104.12	43.61
<u>Gender</u>			
Male	577	- 87.86	-129.09
Female	603	84.07	123.53
<u>County of Residence</u>			
Bay, Genesee, Saginaw	224	-259.27	-214.81
Kent	71	- 32.40	19.64
Wayne	456	205.49	174.13
Other	429	- 77.69	- 76.18
<u>Treatment Setting</u>			
Hospital only	927	58.17	38.72
Demonstration only	253	-213.15	-141.88
<u>Age</u>			
Less than 30	222	-104.35	- 56.38
30-39	376	- 34.65	- 83.28
40-49	278	12.61	26.87
50 and older	304	107.52	119.61

Grand Mean = \$949.71; N = 1,180

Table B-5

Multiple Classification Analysis of Quarterly Medicaid Costs
by Race, Gender, County of Residence, Treatment Setting,
and Age: 7 Through 9 Months After the Onset of
Alcoholism Treatment (in Dollars)

Demographic Variable	N	Unadjusted Difference From Grand Mean (\$)	Adjusted Difference From Grand Mean (\$)
<u>Race</u>			
White	603	-140.99	- 62.13
Nonwhite	577	147.34	64.93
<u>Gender</u>			
Male	577	- 24.03	- 62.66
Female	603	22.99	59.96
<u>County of Residence</u>			
Bay, Genesee, Saginaw	224	-145.88	- 31.19
Kent	71	-202.34	- 71.63
Wayne	456	225.99	151.85
Other	429	-130.55	-133.26
<u>Treatment Setting</u>			
Hospital only	927	98.21	84.38
Demonstration only	253	-359.83	-309.16
<u>Age</u>			
Less than 30	222	-189.96	-116.63
30-39	376	7.52	- 33.58
40-49	278	- 40.91	- 39.77
50 and older	304	166.83	163.07

Grand Mean = \$781.26; N = 1,180

Table B-6

Multiple Classification Analysis of Quarterly Medicaid Costs
by Race, Gender, County of Residence, Treatment Setting,
and Age: 10 Through 12 Months After the Onset of
Alcoholism Treatment (in Dollars)

Demographic Variable	N	Unadjusted Difference From Grand Mean (\$)	Adjusted Difference From Grand Mean (\$)
<u>Race</u>			
White	603	- 52.93	13.61
Nonwhite	577	55.31	14.22
<u>Gender</u>			
Male	577	- 23.37	- 47.41
Female	603	22.37	45.37
<u>County of Residence</u>			
Bay, Genesee, Saginaw	224	-284.19	-212.77
Kent	71	-307.15	-165.52
Wayne	456	135.06	157.24
Other	429	2.52	- 28.65
<u>Treatment Setting</u>			
Hospital only	927	99.99	77.63
Demonstration only	253	-366.37	-284.44
<u>Age</u>			
Less than 30	222	-197.83	-135.94
30-39	376	28.15	- 20.36
40-49	278	179.34	174.49
50 and older	304	- 54.36	- 85.47

Grand Mean = \$843.08; N = 1,180

Table B-7

Multiple Classification Analysis of Quarterly Medicaid Costs
by Race, Gender, County of Residence, Treatment Setting,
and Age: 13 Through 15 Months After the Onset of
Alcoholism Treatment (in Dollars)

Demographic Variable	N	Unadjusted Difference From Grand Mean (\$)	Adjusted Difference From Grand Mean (\$)
<u>Race</u>			
White	603	-214.60	-113.77
Nonwhite	577	224.27	118.90
<u>Gender</u>			
Male	577	66.70	16.93
Female	603	- 63.82	- 16.20
<u>County of Residence</u>			
Bay, Genesee, Saginaw	224	-261.11	-169.32
Kent	71	-428.84	-301.94
Wayne	456	370.24	278.62
Other	429	-186.23	-157.77
<u>Treatment Setting</u>			
Hospital only	927	100.69	63.36
Demonstration only	253	-368.93	-232.16
<u>Age</u>			
Less than 30	222	-252.23	-129.83
30-39	376	-120.82	-159.31
40-49	278	390.66	383.71
50 and older	304	- 23.62	- 59.04

Grand Mean = \$878.10; N = 1,180

Table B-8

Multiple Classification Analysis of Quarterly Medicaid Costs
by Race, Gender, County of Residence, Treatment Setting,
and Age: 16 Through 18 Months After the Onset of
Alcoholism Treatment (in Dollars)

Demographic Variable	N	Unadjusted Difference From Grand Mean (\$)	Adjusted Difference From Grand Mean (\$)
<u>Race</u>			
White	603	-111.74	- 12.12
Nonwhite	577	116.77	12.66
<u>Gender</u>			
Male	577	131.26	55.12
Female	603	-125.60	- 52.74
<u>County of Residence</u>			
Bay, Genesee, Saginaw	224	-351.63	-227.06
Kent	71	-102.41	- 67.87
Wayne	456	328.45	293.41
Other	429	-148.57	-182.09
<u>Treatment Setting</u>			
Hospital only	927	80.20	46.64
Demonstration only	253	-293.87	-170.89
<u>Age</u>			
Less than 30	222	-211.05	-100.64
30-39	376	-180.02	-187.32
40-49	278	1.56	- 11.07
50 and older	304	375.35	315.31

Grand Mean = \$937.86; N = 1,180

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