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Lyndon Troy Castro

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THE VARIATIONS IN HEALTH MAINTENANCE ORGANIZATION (HMO) AND MEDICAID MORTALITY AND PREVENTABLE READMISSIONS

A Thesis
Presented to the
Faculty of
California State University,
San Bernardino

In Partial Fulfillment
of the Requirements for the Degree
Master of Science
in
Health Services Administration

by
Lyndon Troy Castro
June 1997
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ABSTRACT

The rising costs of health care and burgeoning government deficits have prompted new ways to control costs, while continuing to provide necessary health care. One method increasingly chosen by states to achieve these objectives is managed health care. There are many forms of managed care organizations today. There are HMOs that provide the financing and delivery systems under the control of a single for-profit or non-profit organization; preferred provider organizations consisting of providers that have a pre-negotiated and usually discounted rate for services; administrative service organizations that provide claims adjudication; and managed indemnity services organizations use case management to control costs, while providing beneficiary freedom of choice. The common element among the varying forms and subsets of managed care organization is cost containment. Each form aspires to control the rate in which health care costs are rising.

The increased enrollment of Medicaid beneficiaries into managed health care plans, specifically HMOs, has raised concerns about the quality of care those beneficiaries may
receive. Another concern is methods for monitoring the quality of care those beneficiaries can expect. There can be a balance between the costs of care and risk of the care with positive benefits realized from the care delivered.

For this study, 169,397 hospital cases from the 1991 California Office of Statewide Health and Planning and Development Discharge Data Set were randomly sampled. This sample represented 50% of all 1991 hospitalization cases from hospitals in the state of California.

The sampled cases were analyzed by payer type to determine whether statistically significant differences in preventable readmissions and deaths were evident. The data were controlled by race, type of diagnosis, number of diagnoses, and gender.

The overall statistical results revealed comparable mortality and preventable readmission rates between the Medi-Cal and HMO payer beneficiaries hospitalized during 1991. Medi-Cal beneficiaries experienced greater preventable readmission rates in the patient age categories of 41 and above. In these age categories, the average preventable readmission rate of Medi-Cal payer beneficiaries was 35%,
while the HMO rate was 23%, representing a difference of 12%. Moreover, the mean age of Medi-Cal readmitted beneficiaries (38) was 20% greater than the overall mean age of all Medi-Cal beneficiaries (32).

In the results depicting all age categories, mortality rates were nearly equal at 1% (370) of all Medi-Cal cases and 1.06% (297) for all HMO cases. In addition, of the Medi-Cal preventable readmission cases (370), 30.8% (114) resulted in death; while of the HMO preventable readmission cases (297), 25.3% (75) resulted in death. The preventable readmission and mortality rates, coupled together with the lower mean age of the Medi-Cal beneficiaries (32) when compared to the HMO beneficiaries (41), would suggest that, for overall ages, statistically insignificant differences between Medi-Cal and HMO beneficiaries occurred.

When these data and analyses are used as measures of the quality of care received during hospitalizations, overall, Medi-Cal and HMO beneficiaries revealed similar quality of care. The HMO cases depicted similar mortality and preventable readmission rates although the mean lengths of stay were 8% lower for the HMO beneficiaries. Also, the
mean number of diagnoses and mean number of procedures were similar.
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OPERATIONAL DEFINITIONS

*Capitation:* A method of paying for medical services on a per-person rather than a per-procedure basis. Under capitation, an HMO pays a participating doctor a fixed amount per month for every HMO member he or she takes care of, regardless of how much or how little care the member receives.

*Copayment:* A fixed payment the patient pays (usually in the $5 to $25 range) each time he or she visits a health plan clinician or receives a covered service.

*Death:* The cessation of the life of a living organism. In this research, death is synonymous with mortality; which, in this research, measures the cessation of life while a patient in a hospital. More specifically, since hospital discharge records are used, death and mortality are recorded in the discharge record as the patient disposition. The patient disposition is place to which the patient was discharged. Therefore, the patients who have died while in custody of the hospital have been discharged as a result of their death.
**Deductible:** More typical in traditional health insurance, a fixed amount the patient must pay each year before the insurer will begin covering the cost of care.

**Fee-for-service:** The traditional method of paying for medical services. A doctor charges a fee for each service provided, and the insurer pays all or part of that fee. Sometimes the patient pays a copayment for each visit to the doctor.

**Health Maintenance Organization (HMO):** An organization that provides health care in return for pre-set monthly payments. Most HMOs provide care through a network of doctors, hospitals and other medical professionals that their members must use to be covered for that care. The term *health maintenance organization* was first coined in the early 1970s during the Nixon administration. There are varying models of HMOs. These models include integrated organizations that provide all types of services, Point of Service (POS) models that allow varying patient cost sharing for more flexibility, and Independent Practice Associations (IPAs) which differ in how the physicians are organized and paid. Ultimately however, the objective is to control costs.
Length of Stay (LOS): The number of days residing in medical institution or hospital.

Managed Care Organization: An umbrella term for HMOs and all health plans that provide health care in return for pre-set monthly payments and coordinate care through a defined network of primary care physicians and hospitals.

Medi-Cal Payer beneficiaries: California Medicaid payer beneficiaries. Medicaid is a state-federal cost-sharing program that pays for certain health services of persons who meet eligibility criteria based on income levels determined by the states. Medicaid is under the auspices of The Department of Health and Human Services (DHHS) and Administered by Health Care Finance Administration, which was created by the Comprehensive Health Planning and Public Health Services Amendments Act of 1966. Medi-Cal is under the auspices of State of California Health and Welfare Agency and administered by the Department of Health Services.

Mortality: Death. In this research, mortality is coded in the hospital discharge record under the field 'disposition'.
**Patient Payer:** The patient payer in this research represents the payer plan in which the beneficiaries have indicated in their hospital records. Although patients can be underwritten by certain insurance companies or the government, the payer plan in this research is the provider plan type, which is responsible for the direction of the patient's health care services.

**Payer source:** Is the entity responsible for paying the health care bills. In this research, the payer sources studied are Medi-Cal (Medicaid), HMO, and all others combined. The Medi-Cal beneficiaries can be enrolled in either managed care plans or fee-for-service plans. The payer sources recorded in the hospital discharge records are used in this study to measure the effects of HMO or Medi-Cal fee-for-service plan types. It is thus the plan type, and the risks associated with the plan's enrollment that is measured in this research.

**Per diem:** The payment of services for a one-day period.

**Point-of-Service (POS) plan:** A type of HMO coverage that allows members to choose to receive services either from participating HMO providers, or from providers outside
the HMO's network. In-network care is more fully covered; for out-of-network care, members pay deductibles and a percentage of the cost of care, much like traditional health insurance coverage.

*Practice guidelines:* Carefully developed information on diagnosing and treating specific medical conditions. Practice guidelines, usually based on clinical literature and expert consensus, are designed to help physicians and patients make decisions, to help a health plan evaluate appropriateness, and medical necessity of care.

*Preferred Provider Organization (PPO):* A network of doctors and hospitals that provides care at a lower cost than through traditional insurance. PPO members get better benefits (more coverage) when they use the PPO's network, and pay higher out-of-pocket costs when they receive care outside the PPO network.

*Preventable readmissions:* Are defined as a rehospitalization within one month of cases with the same diagnosis and within the same hospital. The rehospitalization cases were at the patient level. Preventable readmissions, in this research, are considered
adverse outcomes because, when properly controlled, present proximate measures of outcomes which may indicate underlying deficiencies. Moreover, readmissions may lead to the inefficient use of resources, greater patient suffering, and missed opportunities.

Preventive care: Care designed to prevent disease altogether, to detect and treat it early, or to manage its course most effectively. Examples of preventive care include immunizations and regular screenings as Pap smears or cholesterol checks.

Primary care: Preventive health care and routine medical care that is typically provided by a doctor trained in internal medicine, pediatrics, or family practice, or by a nurse, nurse practitioner or physician's assistant.

Primary care physician (PCP): A physician, usually an internist, pediatrician or family physician, devoted to general medical care of patients. Most HMOs require members to choose a primary care physician, who is then expected to provide or authorize all care for that patient.

Quality of care is defined by the Institute of Medicine’s (IOM) Committee to Design a Strategy for Quality
Review and Assurance in Medicare as: "Quality of care is the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge. How care is provided should reflect appropriate use of the most current knowledge about scientific, clinical, technical, interpersonal, manual, cognitive, and organizational and management elements of health care (Lohr 1990, 4-5). In this research, the quality of care provided to Medi-Cal and HMO payer plans is measured as the differences in the rates of preventable readmissions and deaths.

Referral: A formal process that authorizes an HMO member to get care from a specialist or hospital. To assure coverage, an HMO patient generally must get a referral from his or her primary care doctor before seeing a specialist.

Specialist: A doctor or other health care professional whose training and expertise are in a specific area of medicine, like cardiology or dermatology. Most HMOs require members to get a referral from their primary care physician before seeing a specialist.
CHAPTER ONE -- STATEMENT OF THE PROBLEM

Introduction

The demands of international competition, burgeoning government debts, and the high rates of health care inflation have been deleterious to the number of insured persons and the amount of funds available to those with insurance. The increased international competition forced U.S. companies to be more price-competitive. As companies sought ways to reduce costs, health care, which experienced steep inflation during the past three decades, was an increasingly prominent target for cost controls. As a large and increasing portion of federal and state budgets, health care was also targeted for cost containment. As a result, both the private and public sectors sought ways to reduce the rate of health care inflation without diminishing the quality of care the beneficiaries may receive.

This research reviews the trend to enroll Medicaid beneficiaries--specifically, California Medi-Cal beneficiaries--into Health Maintenance Organizations (HMO) and the potential implications to the quality of care those beneficiaries might receive.
The Medi-Cal populations have experienced gradual introduction into managed care provider plans in the past; however recently, the enrollment has progressed from optional enrollment to mandatory enrollment. Since the amendments to the 1935 Social Security Act that directed the federal government to pay for health services to the over 65 population (Medicare) and the poor or disabled (Medicaid), the programs have experienced tremendous growth in beneficiaries and expenditures. Within two years of these amendments, legislation to rationalize the health services system began to materialize.

The Comprehensive Health Planning and Public Health Service Amendments Act of 1966 (PL 89-749), sought to build on planning processes and techniques required by the Hill Burton Act of 1946. In 1972, Social Security Amendments (PL 92-603) were enacted to monitor the utilization and quality of services provided under Medicare and Medicaid by using professional standards review organizations (PSROs); however, these PSROs were replaced by professional review organizations.
In 1974, the National Health Planning and Resources Development Act created greater control that planning agencies had over health services. As the federal and state governments became concerned about the rate of health care inflation, methods for reducing the rate of inflation were explored. The Tax Equity and Fiscal Act of 1982 and the Social Security Amendments of 1983 established a prospective payment system as a method for containing hospital costs. The rate of Medicare payments would be paid prospectively and based on a mix of hospital services in the form of diagnostic related groups (DRGs) and means tested for weighting payments based on experiences by area. Moreover, states began to control Medicaid expenditures through arbitrary payment limits. It was the intention of both state and federal governments to cause hospitals to become more efficient. The need to control the rise of health care expenditures precipitated the creation of prospective payments, increased competition, and greater risk sharing by health providers. (Rakich 1992)

Historically, Medi-Cal beneficiaries had the freedom of choice to choose their providers.
However, in recent years, greater mandatory enrollment has been explored and realized. This usurpation of what had been perceived as a right by beneficiaries prompted outcries by libertarians and advocacy groups. The grass root's efforts to ensure both governmental entitlement rights and patient rights have galvanized public policy officials, government lawmakers, and health care constituents.

During the 1980s, federal legislation had sought to ease restrictions on the types of plans that could be offered to the Medicare and Medicaid populations. In more recent years, the federal government has adopted more regulations that attempt to safeguard the Medicare and Medicaid beneficiaries from the financial influences attributable to HMOs. A primary concern of government officials is that access, and thus quality of health care, may be adversely effected as the result of greater incentives to ration care based on a fixed budget.

The premises behind these federal actions stem from the belief that Medicare and Medicaid beneficiaries are disadvantaged in some way from the general insured populations and that HMOs may potentially provide care that
is deemed to be of lesser quality than the general insured population. It is the primary tenet of this research to provide results that may lend evidence about the actual differences in mortality and recidivism outcomes experienced by California Medicaid beneficiaries enrolled into HMOs.

The potential risk of enrolling Medicaid/Medi-payer beneficiaries in HMOs is poor quality of health care, as measured by preventable readmission and mortality rates. This research explored the differences among the 1991 California hospitalized HMO and Medi-Cal payer cases.

Purpose of the Study and Implications

The purpose of this study was to determine whether new and current policy changes that propose to enroll greater proportions of Medi-Cal beneficiaries into HMOs, would adversely affect the hospitalization outcome risks of care provided to Medi-Cal beneficiaries.

In this analysis, I used the variations of preventable readmission and death rates between Medi-Cal and HMO payer sources (as indicated in the patient records) as indicators of outcomes and thus the quality of care. To determine whether the risks of mortality and readmission were greater
for HMO payer cases than the Medi-Cal payer cases, the respective odds ratios and relative risks were computed. These statistical measures compute whether excess risks between the HMO and Medi-Cal payer sources existed.

The results of my analyses are synthesized into policy recommendations.

Decade of Change

Health Care Costs

The U.S. health care inflation rate of 8% during the 1980s was significantly greater than the general inflation rate of 4% during the same period. The specific inflation rate of hospital and related services increased from 6.6% in the 1950s and 1960s to over 11.5% in 1989.

In addition, hospitals represented 38% of total health care costs and representing the largest single cost category among all health care cost categories (Levit, Lazenby, Cowan, and Letsch, 1991).

Public health expenditures, as a percentage of total health care spending, have increased from 24.7% of overall spending in 1965 to 42.0% in 1989. Increases in national health expenditures as a percentage of gross national
product grew from 5.9% in 1965 to 11.6% in 1989 (Levit, Lazenby, Cowan, and Letsch, 1991).

Figure 1 Selected Consumer Price Index Trends

The expenditures per capita increased from 1,068 to 3,094 in 1980 and 1992, respectively.

The 1992 amount represented an increase of 290% (U.S. Department of Commerce, 1992).
Figure 2: Health GDP for Selected Years

Figure 3: Health Care Expenditures per Capita for Selected Years
Figure 4 shows the hospital admissions per 1,000 person in the U.S. from 1980 to 1990. The decrease in admissions per 1,000 is clearly evident (U.S. Department of Commerce, 1992).

Figure 4 Hospital Admissions per 1,000 for Selected Years
Figure 6 depicts measures of health status of the U.S. compared with California in 1990.

Although California had the highest enrolled managed care population, these health status data are favorable when compared to the national data (U.S. Department of Commerce, 1992).

**Figure 6 Measure of U.S. and California Health Status**

<table>
<thead>
<tr>
<th></th>
<th>U.S.</th>
<th>California</th>
<th>Difference CA - US</th>
<th>% Diff.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent of Low Birth Rates</td>
<td>7.05</td>
<td>5.85</td>
<td>-1.2</td>
<td>-17.0%</td>
</tr>
<tr>
<td>Infant Deaths per 1,000</td>
<td>8.9</td>
<td>7.5</td>
<td>-1.4</td>
<td>-15.7%</td>
</tr>
</tbody>
</table>

Figure 7 shows the trend of overall and heart disease specific death rates per 100,000 from 1980 through 1991.
During this eleven-year period, overall mortality rates improved from 585.8 to 513.7 deaths per 100,000 (12% improvement).

Heart disease--single most costly disease in the U.S.--deaths per 100,000 improved from 202.0 to 148.2 during the same period (U.S. Department of Commerce, 1992).

Figure 7 U.S. Age Adjusted Death Rates per 100,000

The health care rate of inflation coupled with increases in government programs, greater entitlement participation, and mounting concerns about government budget deficits demanded the development and implementation of serious cost containment measures. However, the demands for access and the best possible quality of health care made the development and implementation of these measures very
difficult. The scarcity of resources motivates us to choose both how much and to whom services should be made.

Managed Care

Since 1973, the federal government has promoted legislation to gain greater acceptance of managed care.

A major financing mechanism that has been evaluated and demonstrated by many states is a capitated risk system. The principles of capitated payments are payment of a fixed amount per member per month to a provider, with the provider assuming or sharing financial risk attributed to the care given to those beneficiaries. In many capitated payment arrangements, the provider is part of an IPA or medical group, and the premium per member per month is divided among physician services, hospital services, and certain carve-out services such as behavioral, pharmaceutical, and vision care. Providers typically strive for payments in excess of costs through controlled utilization and efficient management of the continuum of care.

Managed care is an epiphenomenon of private sector prepaid plans dating back over 60 years. Prominent early prepaid plans included the 1937 Group Health Association in
Washington, DC, the 1942 Kaiser Permanente Medical Care Program, the 1947 Group Health Cooperative of Puget Sound in Seattle, the 1947 Health Insurance Plan of Greater New York, and the 1957 Group Health Plan of Minneapolis.

During the 1950s and 1960s, prototype prepaid variations named IPAs (Independent Practitioner Associations) began to arise. During the early 1970s, Health Maintenance Organizations (HMOs) increasingly became a significant force in the medical industry. In addition to HMOs, Preferred Provider Organizations (PPOs) began evolving and growing. The primary differences between the HMO and PPO organizational forms were the lack of PPO mechanisms for assuring cost and quality controls. Although many of the pre-admission certification and retrospective reviews existed between the two managed care forms, the real difference was in the risk for the patient's health care needs. The HMO was primarily paid per member per month and was responsible for all levels of patient care. The HMO act of 1973 enabled and promoted health maintenance organizations to expand enrollment as a result of grants,
contracts, loans, and overall synergism created by government bureaucracies (Knogsvedt, 1995).

HMOs assumed responsibility for providing a comprehensive range of health services to enrolled populations at a fixed premium. The HMOs were at financial risk because the payments were a fixed amount per member, regardless of the amount of health services used. The HMOs would risk contract with physician groups, usually independent physician associations (IPA) and medical groups to provide the care for a fixed amount per member per month after deducting their administrative and profit margins. The majority of physicians in California today belong to some form of organized group like an IPA. The physicians retain some individual medical practice autonomy while sharing the financial risks and rewards of the overall IPA. In this way, the physicians have financial responsibility for the groups' costs, but can cohesively negotiate for health plan enrollees.

The physicians receive incentives to manage the care provided to beneficiaries by sharing the risk of over-utilization and rewards of under-utilization. This method
contrasts the traditional fee-for-service method of enticing providers to use services.

One consequence of these new incentives was the decrease in hospital inpatient episodes and length of stays, and an increase in the lower cost outpatient episodes. The primary responsibility of patient care continues to reside with the physicians. This responsibility for the types and duration of care the physician's control has made them the focus for managed care. The physician groups in California have been predominantly contracted by HMOs to accept a capitated PMPM for a defined set of both institutional (hospital) and professional (physician) care.

Within most of the HMO and physician contracts reside incentives to ensure both cost effective care and quality care. The physicians typically agree to accept a rate that has been actuarially calculated based on the historical costs associated with both the areas and demographic characteristics that comprise the beneficiary population. The contracts between HMOs and providers however, include provisions for monitoring the quality of care that patients perceive.
The opportunities inherent for both the HMO and the physician group are to manage care below the historical utilization rates and maintain patient satisfaction for continued plan enrollment.

In addition to the physician's responsibility to manage the intensity and frequency of health care provisions, the HMOs endeavor to negotiate better-contracted hospital per diem rates.

The Preferred Provider Organizational (PPO) form of a managed care firm has also affected utilization and costs. The PPO attempts to negotiate the greatest savings from both institutional and professional providers for a defined population, and then shares the cost savings with contracted employer groups. Moreover, PPOs offer a variety of case management and referral policies that manages entry by beneficiaries to the type, frequency, and intensity of services. In some case management agreements, the PPO may also follow the care through all care processes to ensure appropriateness within internal and external medical guidelines.
The PPO in simple form is a contractual relationship between health care providers, institutions, employers, insurance firms, and third party administrators to provide health care services at a discounted rate.

The private sector recognized the cost effectiveness of the new HMO model and enrollment growth during the past ten years has been significant. In 1994, there were 55 million HMO enrollees (Kongsvedt, 1995). In addition, enrollment in PPOs grew from 0 in the 1970s, to 74 million by December 1991. There were many changes in the U.S. that caused the enormous growth in managed health care.

Medical practices transitioned from private to group practices, corporations became more cost conscious, health care providers become more specialized, the prevalence of indemnity insurance enticed over-utilization, and Medicare and Medicaid laws prompted significant increases in teaching and investor owned hospitals (Brown, 1993).

HMO Cost Controls

HMOs have been operating under the simple premise that they can control costs and improve the quality of care.
However, the true dimensions of cost control and quality of care are far from simple. How costs are limited is a key element for the successful outcome of care.

Common methods for controlling utilization in managed care organizations include prospective, concurrent, and retrospective reviews. In prospective reviews, admitting physicians may pre-certify the patient to ensure appropriate care, begin the scheduling tasks, prepare discharge planning systems, and capture financial and operational data. The pre-certification process provides the structure for organizing care efficiently and medically appropriately.

In some cases, utilization management may receive queues about incoming patients so that clinical and administrative protocols can be followed. Also, pre-certification verifies and ensures compliance with insurance and regulatory guidelines.

Concurrent review is the management of utilization during the course of health care. Some of the techniques employed are tracking of length of stay, UM Nurse review, and discharge planning.
The review process may include maximum lengths of stay, level of treatment (inpatient, outpatient, partial, structured), and medical appropriateness.

In addition, concurrent review allows administration to efficiently manage work loads and resource utilization.

Retrospective review occurs after the case is finished and the patient is discharged. Retrospective review includes claims examination and episode evaluation. The claims review process adjudicates mistakes, improprieties, and seeks to optimize billing.

The retrospective process reviews claims to ensure that third party liability payment sources are identified (maximizing collections), optimal billings for procedures are made (maximizing revenues), fraud is minimized, and errors are minimized. The pattern or episode review component examines utilization and compares them with industry, internal, and regional normative data to reengineer existing methods to achieve optimal outcomes. It continuously evaluates industry methods and normative data to internal patterns of care to make internal changes as necessary.
Medicaid and California's Medi-Cal

Medicaid Background

Title XIX of the Social Security Act is a Federal-State matching entitlement program that provides medical assistance for certain individuals and families with low incomes and resources.

This program, known as Medicaid, became law in 1965 as a jointly funded cooperative venture between the federal and state governments to assist States in the provision of more adequate medical care to eligible needy persons.

Medicaid is the largest program providing medical and health related services to America's poorest people. Each state establishes its eligibility standards; determine the type, amount, duration, scope of services, and payment for services; and administer its program (Dallek, 1994).

Subsequent to their enactment, both Medicare and Medicaid had been subject to numerous legislative and administrative changes that continually sought, within financial considerations, to make improvements in the provision of health care services to the elderly and poor.
Since 1965, growth in health care expenditures has consistently outpaced growth in general revenues for all levels of government, and has been the precursor to these changes (Dallek, 1994).

Health and medical care are funded through a variety of private payers and public programs. For each year from 1975 through 1990, private funds paid for 58 to 60 percent of all health care expenditures in the U.S. By 1993, the proportion paid by private funds had dropped to 56.1 percent (Dallek, 1994).

The public share of health care expenditures has steadily increased over the past five years from 40.2 percent in 1988, to 43.9 percent in 1993.

The largest shares of public health expenditures are for the Medicare and Medicaid programs, which in 1993, accounted for 30.8 percent of the total health care spending in the U.S. (By comparison, 17.8 percent of all national health care spending comes from consumers in out-of-pocket expenditures and 33.5 percent is reimbursed by private health insurance. (Dallek, 1994).
Medicare and Medicaid expenditures represented 70.2 percent of all publicly funded health care spending in the U.S. during 1993, with Medicare responsible for 40 percent and Medicaid responsible for 30 percent. The 1994 FY Medicare and Medicaid program expenditures for delivery of services and program administration were reported at $297.5 billion (U.S. Department of Commerce, 1992).

There is a minimum federal set of standards for health care services that must be met. The federal medical assistance percentage (FMAP) is used to determine the share of the federal government's expenditure for each state (Winterbottom, 1995). States determine Medicaid eligibility based on many factors, with the most important criteria being income and financial resources. The minimum eligibility criteria and benefits are developed by each state and vary moderately.

The government pays a percentage of the state's expenditures based on the annual per capita income in the state compared to the national average per capita income. If a state per capita income is below the national per capita income, the range of federal reimbursement is 55 to
83 percent. If the state per capita income is equal to the national per capita income, the federal reimbursement is 55 percent. If the state's per capita income is above the national per capita income, the reimbursement is from 50 to 55 percent. In 1981, the Omnibus Budget Reconciliation Act reduced the payment by 3 percent in 1982, 4 percent in 1983, and 4.5 percent in 1984 (Dallek, 1994).

The states could however reduce the cutbacks if they instituted cost review programs, if unemployment was equal to or greater than 150 percent of the national rate, and if state anti-fraud activities recovered 1 percent or more of the federal payments. The reason for reducing the payments was due to health care inflation rates that were of great concern to the Congress.

The Congress however, did not wish to restrict payments to a level that would deter providers from providing care to Medicaid beneficiaries (Winterbottom, 1995).

The law does not permit the Federal Government to exercise supervision or control over the practice of medicine, the manner in which medical services are provided, and the administration or operation of medical facilities.
Facilities desiring to participate in the Medicare or Medicaid program must meet participation conditions for certification. State agencies certify to the DHHS indicating whether hospitals, SNFs, HHAs, independent laboratories, portable X-ray facilities, and providers furnishing services satisfy, and continue to satisfy, their respective conditions of participation in the Medicare and Medicaid programs.

The Secretary of the DHHS certifies facilities requesting participation in both the Medicare and Medicaid programs. States certify those facilities that request participation in the Medicaid program only.

The state function of making certifications is intended to be a natural adjunct to ongoing state activities (such as the licensing of health care facilities and the setting of standards).

A state coordinates with other state programs that involve payment for health care, quality of care, and distribution of health facilities.

Coordination of these activities is essential in assuring effective and economical use of existing state
facilities and trained personnel and to prevent duplication of effort. Where a state enters into an agreement with the Government to pay the medical insurance premium on behalf of its aged welfare recipients, the agreement may provide for a designated state agency to serve as an intermediary on behalf of its welfare recipients (Kongstvedt, 1995).

Medicaid spending is expected to grow faster than the economy as a whole and faster than State and Federal revenues, just like general health care spending. According to the Congressional Budget Office (CBO), Medicaid is expected to grow between 10 and 11 percent annually during the next six years. This growth rate is more than twice the rate of economic growth and inflation.

In the 1995 fiscal year, the combined Federal and State governments spent $158 billion and are expected to spend $262 billion by fiscal year 2000 (Congressional Budget Office 1995).

Moreover, the age distributions of the Medicaid populations are expected to be concentrated in the elderly categories during the next five to ten years. The care
provided to the elderly has historically been more costly than the younger populations.

As a result of the aging composition of the Medicaid beneficiaries, coupled with the expected increases in enrollment into Medicaid, the costs are expected to rise more sharply than in the past (Congressional Budget Office 1995).

Although in 1993 the Medicaid program represented only 6 percent of Federal spending, it represented the greatest share of the State budgets--12.8 percent. California spending increased by an enormous 23 percent from 1992 to 1993 increased, while the enrollment only increased 7 percent.

The Medicaid program has grown from $250 million in 1965 to over $92 billion by 1992. When the law was implemented, it was estimated that around 2.3 million individuals would be enrolled at any certain time. However, in 1991 over 28 million people were enrolled. These escalating costs and growth rates have prompted lawmakers to formulate new ways to provide quality care while reducing the cost of Medicaid.
Cost sharing, DRGs, reimbursement incentives and disincentives, contracted coverage, and voluntary managed care enrollments have helped reduce the rate of inflation. However, these measures still fail to control growth to an acceptable level (Kongstvedt, 1995).

All of these factors, linked together with Federal spending reduction pressures, suggest that Medicaid funds may diminish even further in California. The concern is that the quality of care—access, satisfaction, outcomes—may be sensitive to these spending reductions (Congressional Budget Office 1995).

The cause of increases in Medicaid spending can be illustrated by three main factors: the utilization of services (types and frequencies); the cost changes of services; and the number and characteristics of the individuals eligible for services (age, gender, location, quantities). In addition, since States receive a portion of Medicaid spending reimbursed from the Federal government, they have recently sought to maximize those reimbursements through disproportionate care hospital (DSH) payments. During 1989 through 1992, Federal DSH payments to States
grew by 2,400 percent. The states had pursued greater DSH payments through strategic spending and taxing and resulted in further exacerbated of the Medicaid inflation rates. The reaction by the Federal government was, however, to mitigate increases by enacting legislation in 1991 and 1993 (Congressional Budget Office 1995).

The Omnibus Budget Reconciliation Act (OBRA) of 1981 mandated some of the most significant changes in the Medicaid program since its beginnings in 1965. The 1981 OBRA had sought to limit the rapid Medicaid cost growth by setting new limits on eligibility for the program, reduced the Federal share of the program costs, and increased the state's ability to manage the program. Prior to the 1981 OBRA, state's paid hospitals on a reasonable cost basis. However, the 1981 OBRA not only forced eligibility cutbacks on the states, but also eliminated the federal requirement for reimbursement of all 'reasonable' hospital costs. This had the effect of encouraging states to adopt prospective payment systems. Moreover, the federal matching was reduced by 3 percent in 1982, 4 percent in 1983, and 4.5 percent in 1984.
To further encourage cost control by the states, reductions were minimized for those states with effective cost controls and higher than national average unemployment rates.

Also arising from the 1981 OBRA was increased flexibility for administering the Medicaid program by eliminating various federal restrictions and allowing waivers. As a result, states began to examine the use of HMOs and other prepayment health care delivery systems.

The economic contractions during the early 1980s, together with federal pressures to reduce the escalating Medicaid expenditures, caused the states to pursue methods for cost reductions or slowed cost growth. The method that has culminated from these efforts to explore new cost containment is the prospective payment system (PPS). Proponents of PPS contend that it contains costs by stimulating efficiency in the delivery system. Also, early studies revealed lower hospital per diem rates for skilled nursing and intermediate care without adverse effects to access and outcomes (Buchanan 1987).
The trend to enroll Medicaid beneficiaries into managed care plans may largely be the reaction to continued increases in Medicaid expenses.

In 1996, over 32 percent of all Medicaid beneficiaries were enrolled in managed care (Health Care Financing Administration, 1996). Between 1990 and 1995, enrollment into managed care plans increased over 400 percent. Also, by 1995, 43 States had some form of Medicaid managed care initiative.

By 1994, forty-three states and the District of Columbia had a Medicaid managed care program either implemented or in the demonstration phase.

The HMOs provide beneficiaries with a specific package of benefits in exchange for a fixed, per capita, prepaid premium. The prepayments to HMOs provide the states with predictable and easier payments. In addition, the state’s receipt of claims for individual services could be eliminated and could thereby reduce administrative costs. The capitated premium per member per month (PMPM) accommodates more predictable budgets because maximum liability is establish in advance.
The HMOs are required to monitor the program and also accept financial risk for the enrollees. As part of the monitoring responsibilities, HMOs must evaluate and ensure the quality of care the enrollees receive. The HMOs are accountable to the states, federal government, and third party monitoring agencies such as the National Committee for Quality Assurance (NCQA).

The NCQA developed a voluntary health plan performance measurement tool called the Health Plan Employer Data and Information Set (HEDIS).

This performance measurement tool provides health plan utilization data for selected procedures, and information on enrollment, access, quality assessment and improvement, and enrollee satisfaction. In addition, other quality assurance and improvement systems for Medicaid managed care were developed under the Quality Assurance Reform Initiative (QARI) during 1991-1993.

In 1989, the Agency for Health Care Policy and Research (AHCPR) was created to enhance the quality, appropriateness, and effectiveness in health care services. AHCPR began developing Patient Outcome Research Teams (PORTS) used to
study diseases and clinical practice guidelines. These guidelines and efforts were intended to be yet another tool for measuring the quality of care.

HCFA had collaborated with states, health plans, and other organizations to develop a system intended to improve oversight of Medicaid managed-care quality. (U.S. Department of Health and Human Services, 1993). The QARI initiative consisted of voluntary guidelines for managed care health plans and states to use when contracting for Medicaid.

Both the QARI and HEDIS tools provide useful information for plan evaluation.

The common goal among these and other evaluation tools is to monitor the quality of care by using valid, efficient, effective, and standard instruments.

Federal laws mandate states to monitor the Medicaid managed care plans to ensure quality care (42 USC 1396a(a)(30)) and to conduct annual audits of contracted plans (42 CFR 434.53). The audits must be conducted by peer review organizations or independent bodies.

The experience of the early prepaid group practices, which served as HMO prototypes, revealed reduced costs
without reducing the quality of care. The organizational
benefits of the prepaid group practice and the financial
incentives to the physicians encouraged the reduction of
medically unnecessary care. The purpose for quality of care
regulations—both self determined and legally mandated—is to
safeguard the beneficiaries from the potentially deleterious
restriction of necessary care.

States determine the amount and duration of services
offered under their Medicaid programs. They may limit the
number of days of hospital care or the number of physician
visits covered. However, states are prohibited from limiting
the duration of coverage for medically necessary inpatient
hospital services provided to Medicaid-eligible children
under age six who are in disproportionate share hospitals or
to infants in all hospitals.

State Medicaid Plans must allow recipients to have
freedom of choice among participating providers of health
care. States may provide and pay for Medicaid services
through various pre-payment arrangements, such as health
maintenance organizations (HMOs).
Payment for Medicaid Services

The Federal government shares in the state's expenditures for administration of the Medicaid program. Most administrative costs are matched at 50 percent. However, depending on the complexities and the need for incentives for a particular service, higher matching rates are paid for certain functions and activities.

Federal Medicaid payments to states have no set limit. The federal government provides the state payments for the mandatory services plus the optional services that the state decides to provide for eligible beneficiaries.

States must also pay additional amounts to qualified hospitals that provide inpatient services to a disproportionate number of Medicaid recipients and to other low-income persons under what is known as the Disproportionate Share Hospital (DSH) program.

The U.S. Congress, the Department of Health and Human Services, and the individual states continually seek to make improvements in the Medicaid programs' quality, effectiveness and extent of health care services. However, the Medicaid programs must function within the various
Federal and state economic, social, and political factors constraints.

The growth in Medicaid beneficiaries clearly depicts the growing needs due to recessions, slowed economic growth, and underlying social problems.

The risk is that financial pressure to reduce Medicaid funding and subsequent lowered reimbursement to providers may create poor quality care. The Medicaid reimbursement rates for risk contracting are far below the private reimbursement rates (Dallek, 1994).

If inflation continues to climb rapidly in the private sector while the public Medicaid funds continue to rise very slowly, insurers and providers could be forced to either subsidize Medicaid beneficiaries or develop a two-tier provider system. A two-tier system could be comprised of lower cost services and procedures for lower paid Medi-Cal beneficiaries; while higher cost services and procedures may be made available for higher paying plans.

The situation in California is particularly troublesome because of the slow economic growth, high influx of immigration, increased budget pressures, and already low per
capita Medicaid expenditures. In 1993, California had the
greatest number of Medicaid enrollees (13.5 million) and the
lowest per capita Medicaid spending ($2,090 per person).

States have options that allow innovative approaches to
financing and delivering Medicaid services. Since 1981,
Federal waivers have been developed to allow states to
enroll Medicaid beneficiaries into HMOs and home and
community systems of care.

Effective utilization management of Medicaid
populations is essential. The Medicaid populations are
generally sicker, while states will, in most cases, contract
with providers at rates less than commercial plans. In
addition, some states mandate more comprehensive educational
and preventative services than commercial plans.
Traditionally, disenrollment rates are very high because of
the nature of Medicaid eligibility. In addition, systems for
monitoring eligibility must be in place to evaluate and
update changing eligibility.

HMO’s may reduce the length of stay, limit high
technology, institute indirect and direct barriers to care,
changes service mixes, shift costs to other insured, reduce
ancillaries, and provide different qualities of care as a way to reduce costs.

If the effects are poor quality of care to the Medi-Cal beneficiaries, in the long term, savings from increased HMO enrollment may not exist. This problem poses questions for policy makers. Will the increased enrollment of Medi-Cal beneficiaries in HMOs yield improvements in care and costs? Moreover, will verification mechanisms be in place to assure quality, efficacious, and cost effective care.

Alternatively, the continued lack of policies, verification mechanisms, and regulation that exist today may yield adverse outcomes for Medi-Cal beneficiaries.

A proposed method for linking the quality of care dimensions with Medi-Cal reimbursement policies has been proposed by The Center for Health Care Rights that would, in their proposal, influence the way in which care is provided to the Medi-Cal populations enrolled in HMOs.

During the early 1980s, sweeping Medicaid reductions took place. Benefits and payments were reduced. However, during the late 1980s, Medicaid expansion took place. Between 1984 and 1990, more than a half million pregnant
women, five million children, and millions of elderly and disabled became eligible for Medicaid.

As a result, the early 1990s saw great concern for the growth of Medicaid expenditures.

The challenges of providing quality care while driving down inflation in the health care system in the country and the state have become more polarized in recent decades. Since the 1981 Omnibus Budget Reconciliation Act (OBRA), Medicaid risk contracting grew from 1 percent to over 4 percent in 1990. By 1995, HCFA reports show 3 million (14%) Medicaid enrollees in managed care plans.

According to research that measures the effects of a prepaid group practice on services and the effectiveness of care, quality of care does not diminish if Medicaid beneficiaries are enrolled in a large HMO containing private beneficiaries. However, smaller HMOs have less ability to spread the costs across a greater population and therefore attempt to compensate for the lower reimbursement rates by reducing medical care services. Data show that the average length of stay for all patients has been reduced over the past 12 years. The concern is that the Medicaid patient
average length of stay has decreased at a greater rate (Rice, 1996).

In California, 1992 and 1993 audits of managed care providers revealed numerous deficiencies.

The audits analyze and present findings about how well managed care plans meet state access and quality standards. Also, the audits measure the degree to which findings improve care.

The audits evaluated the following areas: quality and continuity of care, medical records, plan administration, grievances, pharmacy services, human reproductive sterilization, licensure, facility review, scope of services, and infection control. The audits rated each area from 1, no deficiency, to 5, severe deficiency (Dallek, 1994).

The findings of the managed care plans revealed serious quality of care problems in 14 of 15 medical audits. Moreover, the quality of care findings had no impact on subsequent years. Of the 4 PHP managed care plans audited, all had "significant" or "major deficiency" citations. Two of the four had significant deficiencies in access. Three of
the four had significant deficiencies in continuity of care. Two of the four were cited for significant basic pharmacy. There was one PHP plan that had worsened significantly after the audit instead of improving.

The citations were for significant irregularities and not minor infractions (Dallek, 1994).

In addition to the aforementioned citations, the managed care plans experienced high turnover rates. All plans except Kaiser experienced double-digit disenrollment rates for the years in which they were audited. Two of the plans experienced turnover rates in excess of 100%. Disenrollement may result from one or many reasons.

The first subject of interest is the marketing methods employed by the managed care organizations (Dallek, 1994). California has allowed door-to-door and welfare office solicitations of the managed care plans. Also, commission incentives have been provided for sales agents to enroll as many as possible.

According to a 1993 General Accounting Office (GAO) review, "Marketing can be used to educate beneficiaries
about health plans, but it can also be used to coerce beneficiaries and gain their enrollment."

There have been numerous complaints during the past several years concerning these marketing practices.

In fact, the Medi-Cal beneficiaries may have heightened expectation about the new benefit plan, only to be inflated by the unfamiliarity of managed care (Dallek, 1994).

The DHS maintains records of the reasons given for disenrollment. According to the 1993 data for disenrollment reasons, the top five reasons in order were: general dissatisfaction, preference of FFS, no reason, transportation, and prior care.

The problem in California is the accelerated desire to enroll half of the Medi-Cal beneficiaries in an HMO by the end of 1996. The audits, literature, and evidence suggest that policies, procedures, clear guidelines, and infrastructure do not exist to ensure the level of care that would meet the federal and state statutes. The audits examined many recent years up to 1993 without depicting significant improvements (Dallek, 1994).
In 1992, the federal Health Care Financing Administration (HCFA) reviewed California's administration of its managed care program and concluded:

"The administrative demands of keeping such a large, highly visible program in place while being subjected to unprecedented growth have not unexpectedly eroded the efficacy of day to day contractor oversight, technical assistance, and communication, ultimately impacting the program's Medi-Cal Customers. As a result, it appears that the quality of a contractor's performance depended more on its own internal integrity and competency than on the guidance and supervision of the state. There was also an unevenness in the degree of state supervision and quality of communications with the plans, dependent on the level of experience, expertise, and active involvement of the different state contract managers." (HCFA, 1993)

HCFA further suggests that the state of California limit and prioritize the expansion of managed care. However, the state has ignored the suggestion and has begun massive managed care expansion.

The increased debate about enrolling Medicaid and Medicare beneficiaries into Health Maintenance Organizations has raised concern about methods for monitoring the quality of care those beneficiaries can expect.
The demand for reducing the budget deficits at the federal and state levels has forced policy makers to explore ways to reduce government expenditures.

Since Medicaid and Medicare represent a large portion of government expenditures and have experienced inflation rates greater than the general inflation rate, the governments have targeted them for cost savings.

To ensure that Medicaid and Medicare populations are provided quality care while reducing costs, agencies are evaluating methods for monitoring the outcomes and quality of care. Two measures currently used are preventable readmission and mortality rates. Preventable readmission to a hospital shortly following a previous discharge may be viewed as an adverse outcome of care because of the added direct financial costs to the payer, costs attributable to the patient’s added suffering, and the costs of missed opportunities.

If the quality of the care is insufficient to ensure that the patient has stabilized to a state that would significantly increase the chances of healing, the patient may become more ill or secondary adverse harm could occur as
a result, and thus the patient may require readmission to the hospital. Moreover, the financial pressures to reduce lengths of stay may unwittingly or intentionally cause patients to be discharged more quickly than required for appropriate observations and healing.

The advent of a readmission to hospital care is considered undesirable because it potentially allocates scarce resources that would have otherwise been expended on other care. In other words, it is inefficient and may have resulted in missed opportunities. Also, readmissions may be the outcome of deficient operations and structural segments of a hospital. Prior research has also suggested greater costs in patient suffering and ancillary damage to a patient's health as a result of the linkages to early discharge and the subsequent readmission. As a result, preventable readmissions can be used to monitor the quality of care (Jones 1986).

In addition, mortality rates can serve to measure the performance across different hospitals and payer plans. Death is considered an adverse outcome because it is the result which health care institutions wish to mitigate the
most. Deaths are also most clearly discernible and carry the least interpretive bias. When properly controlled, mortality rates can be proximate outcome measures for identifying and targeting institutions or payer plans that, for some reason, may have underlying deficiencies as their causes.

Table 1 depicts California and national health care utilization data, HMO membership information, and government expenditure data from 1991. The California cost per patient day was 31% greater than the U.S., average. The average hospital cost per stay in California was 12% higher than the national average. The California average length of stay (ALOS) was one day less than the national average (5.6 versus 6.6, respectively).

California expended 10% less per capita for hospital care and 27% more per capita for physician care. This may reflect the lower hospitalization rates and higher outpatient rates.

California also had fewer hospital beds per 1,000 persons (2.5) compared with the national number (3.5). Moreover, California had 8% more physicians per 1,000
persons and 29% fewer admissions per 1,000 in 1991 (U.S. Department of Commerce, 1992).

The HMO data show 107% greater enrollment per 1,000 into California HMOs (317.7) than the national rate (153.7). Also, the 9.8 million enrollees represent 25% of the overall national HMO enrollment, while California represented 12% of the national population in 1991 (Winterbottom, 1995).
Table 1 U.S. and California Utilization Comparisons

<table>
<thead>
<tr>
<th>Description (1991)</th>
<th>U.S.</th>
<th>California</th>
<th>Diff. CA</th>
<th>% Diff. U.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>COSTS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital Cost per Patient Day</td>
<td>$914</td>
<td>$1,199</td>
<td>$285</td>
<td>31.2%</td>
</tr>
<tr>
<td>Hospital Cost per Stay</td>
<td>$5,786</td>
<td>$6,470</td>
<td>$684</td>
<td>11.8%</td>
</tr>
<tr>
<td>Expenditure per Capita for Hospital Care</td>
<td>$1,134</td>
<td>$1,025</td>
<td>-$109</td>
<td>-9.6%</td>
</tr>
<tr>
<td>Expenditure per Capita for Physician Services</td>
<td>$598</td>
<td>$761</td>
<td>$163</td>
<td>27.3%</td>
</tr>
<tr>
<td>Hospital Beds per 1,000 population</td>
<td>3.5</td>
<td>2.5</td>
<td>-1.0</td>
<td>-28.6%</td>
</tr>
<tr>
<td>Expenditure per Capita for Hospital Care</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Admissions per 1,000</td>
<td>125.3</td>
<td>102.5</td>
<td>-22.8</td>
<td>-18.2%</td>
</tr>
<tr>
<td>Inpatient Days per Admission</td>
<td>6.6</td>
<td>5.6</td>
<td>-1.0</td>
<td>-15.2%</td>
</tr>
<tr>
<td>Physicians per 1,000</td>
<td>247.2</td>
<td>267.5</td>
<td>20.3</td>
<td>8.2%</td>
</tr>
<tr>
<td><strong>HMO MEMBERSHIP:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HMOs</td>
<td>556.0</td>
<td>46.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HMO Members &lt;1,000</td>
<td>38,768</td>
<td>9,769</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Members per 1,000</td>
<td>153.7</td>
<td>317.7</td>
<td>164.0</td>
<td>106.7%</td>
</tr>
<tr>
<td><strong>GENERAL REVENUES:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Revenue per Capita</td>
<td>$3,578</td>
<td>$2,966</td>
<td>-$612</td>
<td>-17.1%</td>
</tr>
<tr>
<td><strong>STATE &amp; LOCAL TAX &amp; REVENUE SOURCES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$ per Capita</td>
<td>$2,083</td>
<td>$2,283</td>
<td>$200</td>
<td>9.6%</td>
</tr>
<tr>
<td>% from Individual Income</td>
<td>20.8%</td>
<td>24.3%</td>
<td>3.5%</td>
<td>16.8%</td>
</tr>
<tr>
<td>Taxes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% from Corporate &amp; Other</td>
<td>11.9%</td>
<td>12.9%</td>
<td>1.0%</td>
<td>8.4%</td>
</tr>
<tr>
<td><strong>GENERAL EXPENDITURES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$ per Capita</td>
<td>$3,590</td>
<td>$3,978</td>
<td>$388</td>
<td>10.8%</td>
</tr>
<tr>
<td>Expenditure % Education</td>
<td>34.2%</td>
<td>31.9%</td>
<td>-2.3%</td>
<td>-6.7%</td>
</tr>
<tr>
<td>Expenditure % Welfare</td>
<td>14.0%</td>
<td>14.4%</td>
<td>0.4%</td>
<td>2.9%</td>
</tr>
<tr>
<td>Expenditure % Health/Hospitals</td>
<td>9.0%</td>
<td>9.1%</td>
<td>0.1%</td>
<td>1.1%</td>
</tr>
<tr>
<td>Expenditure % Police/Corrections</td>
<td>8.2%</td>
<td>10.3%</td>
<td>2.1%</td>
<td>25.6%</td>
</tr>
<tr>
<td>Expenditure % Highways</td>
<td>7.2%</td>
<td>4.6%</td>
<td>-2.6%</td>
<td>-36.1%</td>
</tr>
<tr>
<td>Expenditure % Other</td>
<td>27.4%</td>
<td>29.7%</td>
<td>2.3%</td>
<td>8.4%</td>
</tr>
</tbody>
</table>

Table 2 shows selected U.S., and California health care spending and utilization (Winterbottom, 1995).
Table 2 Select U.S. and California Expenditure Data

<table>
<thead>
<tr>
<th>Description</th>
<th>U.S.</th>
<th>California</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEALTH CARE SPENDING IN BILLIONS (1990):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Government</td>
<td>352.9</td>
<td>53.0%</td>
</tr>
<tr>
<td>Public</td>
<td>282.6</td>
<td>42.4%</td>
</tr>
<tr>
<td>Other</td>
<td>30.6</td>
<td>4.5%</td>
</tr>
<tr>
<td>Hospital Care</td>
<td>286.1</td>
<td>38.4%</td>
</tr>
<tr>
<td>Physician Expenditures</td>
<td>150.9</td>
<td>23.1%</td>
</tr>
<tr>
<td>Medicaid Enrollment 1990 &lt;thousands&gt;</td>
<td>25,255</td>
<td>3,624</td>
</tr>
<tr>
<td>Medicaid Payments 1990 &lt;billions&gt;</td>
<td>$66.0</td>
<td>$2.5</td>
</tr>
<tr>
<td>Medicaid 1990 Total Hospital Discharges &lt;1,000&gt;</td>
<td>3,932</td>
<td></td>
</tr>
<tr>
<td>Medicaid 1990 Recipients Discharged &lt;1,000&gt;</td>
<td>2,758</td>
<td></td>
</tr>
<tr>
<td>Total Days of Care</td>
<td>22,059</td>
<td></td>
</tr>
<tr>
<td>Medicaid Admissions per 1,000 covered</td>
<td>155.69</td>
<td></td>
</tr>
<tr>
<td>Average Length of Stay (ALOS)</td>
<td>5.6</td>
<td></td>
</tr>
<tr>
<td>All Hospitals 1990 Admissions per 1,000</td>
<td>131.0</td>
<td></td>
</tr>
<tr>
<td>All Hospitals 1990 Average Length of Stay</td>
<td>7.2</td>
<td></td>
</tr>
<tr>
<td>All Hospitals 1990 Outpatient Visits per 1,000</td>
<td>1,265.0</td>
<td></td>
</tr>
</tbody>
</table>

Table 3 Selected Discharge Data

<table>
<thead>
<tr>
<th>1991</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Discharges per 1,000</td>
</tr>
<tr>
<td>Discharges per 1,000 Males</td>
</tr>
<tr>
<td>Discharges per 1,000 Females</td>
</tr>
<tr>
<td>Discharges per 1,000 under 15 years of age</td>
</tr>
<tr>
<td>Discharges per 1,000 15-44</td>
</tr>
<tr>
<td>Discharges per 1,000 45-64</td>
</tr>
<tr>
<td>Discharges per 1,000 65 &amp; over</td>
</tr>
<tr>
<td>ALOS Total</td>
</tr>
<tr>
<td>ALOS Males</td>
</tr>
<tr>
<td>ALOS Females</td>
</tr>
<tr>
<td>ALOS Under 15 years of age</td>
</tr>
<tr>
<td>ALOS 15-44</td>
</tr>
<tr>
<td>ALOS 45-64</td>
</tr>
<tr>
<td>ALOS 65 &amp; over</td>
</tr>
</tbody>
</table>
Tables 3 and 4 show mortality rates by age categories and gender in 1991 for the U.S. Figures 17 and 18 show California census data by demographic characteristics.

Table 4 Mortality Data

<table>
<thead>
<tr>
<th>Age</th>
<th>Deaths per 100,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 1</td>
<td>916.6</td>
</tr>
<tr>
<td>1-4</td>
<td>47.4</td>
</tr>
<tr>
<td>5-14</td>
<td>23.6</td>
</tr>
<tr>
<td>15-24</td>
<td>100.1</td>
</tr>
<tr>
<td>25-34</td>
<td>139.1</td>
</tr>
<tr>
<td>35-44</td>
<td>224.4</td>
</tr>
<tr>
<td>45-54</td>
<td>468.8</td>
</tr>
<tr>
<td>55-64</td>
<td>1,181.0</td>
</tr>
<tr>
<td>65-74</td>
<td>2,618.5</td>
</tr>
<tr>
<td>75-84</td>
<td>5,890.0</td>
</tr>
<tr>
<td>85 &amp; Ove</td>
<td>15,107.6</td>
</tr>
</tbody>
</table>

Research Approach

In this research, preventable readmissions and deaths were used as indicators for measuring the quality of care. Specifically, the variations in rates between Medi-Cal and HMO cases from the OSHPD California Hospital Discharge Dataset were compared to test the hypothesis that Medi-Cal beneficiaries did not experience higher risks of readmissions and deaths when enrolled in HMOs.

A large data set had been abstracted from the California Office of Statewide Health Planning and
Development Hospital Discharge Data to measure the preventable readmission rates among California hospitalized patients in 1991. Similar to mortality, preventable readmission to a hospital shortly following discharge is a discernible event with a connection to the quality of care. Prospective payment systems, based on diagnosis related groups or risk capitlated payments, theoretically provide incentives for the early discharge of beneficiaries. Early discharges may increase the risk of ensuing preventable readmission if all necessary medical care is not completed appropriately during a patient's first hospital stay.

Although clear linkages between preventable readmissions and poor quality of care during the ensuing hospital stay have been established, continued research to measure preventable readmissions should continue.

Moreover, the current political resolve to achieve Medicaid cost savings from greater HMO enrollment will likely raise the specter and scrutiny of partisan politicians, employers, beneficiaries, and managed care opponents.

This research explores the results of Medi-Cal non-HMO
beneficiaries and HMO beneficiaries. The Medi-Cal beneficiaries enrolled in HMOs may also be included in the HMO; which, is acceptable because the effects of plan selection and respective risks (HMO or Medi-Cal FFS) are the ultimate goals of this research.

Hypothesis

I hypothesize that preventable readmissions and mortality rates of the 1991 hospitalized Medicaid cases were not higher than the Health Maintenance Organizations (HMO) beneficiary cases.

CHAPTER TWO - REVIEW OF THE LITERATURE

Quality of Care

Defining quality of care has become a major concern of employers, consumers, payers, and health care professionals. There are varying degrees of quality, numerous methods to measure quality, and many influences on quality. According to Avedis Donabedian, in simple terms, quality care is the balance between health benefits and harm (Donabedian 1982). Furthermore, Donabedian contends that assessment of quality is a judgment concerning the processes of care, based on the
extent or degree to which the care contributes to valued outcomes. The attributes that comprise quality are not clear. Judgments are often made about the persons providing care and the settings where the care was provided. The management of an episode of care is perhaps the most common and easiest module of care that is studied.

An episode of care identifies many elements that can be used to assess the quality of care (Donabedian, 1982).

A primary tenet of Donabedian's definition was that management of patient care can be divided into two domains: technical and interpersonal. The technical domain is comprised of the science of care methods and technology. The interpersonal domain pertains to the social and psychological interactions between the patient and provider. The two domains are closely related and may influence one another. Amenities such as room comforts, good food, pleasant surroundings, and similar comforts can be considered as part of the interpersonal domain. They are considered to belong in the interpersonal domain because they are perceived to be linked with the provider of care.
The quantity of care must also be considered when making a judgment about quality. If amounts of care are insufficient to realize an intended benefit, then the quality of care is poor. Conversely, excessive unnecessary quantities of care could be considered poor quality as well. If unnecessary care is given, missed opportunities to use resources that could have benefited others in need may occur.

The failure of a system to provide an appropriate quantity of care may suggest inadequacies in the system for providing care, poor judgment, carelessness, or ignorance.

The monetary costs of care also perform an important part in the quality of care. There is a direct relationship between quantity of care and monetary costs. Donabedian contends that care is costlier if excessive or inefficient. The inefficient care may be a result of unbalanced staffing, inappropriate work duties, and unbalanced occupancy rates.

The monetary costs used to determine the quality of care may be used if the costs are added to risk as an unwanted outcome of the care provided.
There are many specific elements in providing the care which influence benefits and risks: patient condition, comorbidities, medical technology, staff competency, contractual restrictions, intensity of workload, and many more. The ultimate goal of providing quality care is to achieve the peak benefits after the deduction of risks and costs.

Also, it is important to mention that providers may vary about their perceived benefits, risks, and costs (Donabedian, 1991).

In the managed care environment of today, costs may be a factor that has become too influential. As revenues decrease, the costs have become a covariant and must also decrease.

The application of judgments and measures of quality must correspond to the purview of the care given and relevancy. Thus, it may be necessary to evaluate the structure, process, and outcome for a defined beneficiary, group, or population.
Assessment Approaches

Donabedian developed an approach for quality assessment and program evaluation with three fundamental relations: structure, process, and outcome.

The structure component is characterized as the provider stability, tools and resources, physical organization and settings, and health insurance. The process element is the set of activities within and between patients and providers.

The outcome's portion of the model is the change in a patient’s health status that is attributed to the health care provided.

The idea of structure includes financial resources, human resources, and physical settings. It includes the quality and quantity of the personnel, equipment available, health care facility geographic distribution and quantities, finance and delivery of service organization, and the presence of health insurance. Structure is related to quality in that it may increase or decrease the probability of good performance. A good structure for care should include a mechanism for monitoring the quality of care.
The process element of the model assesses the relationship between the characteristics of the medical care processes and their consequences to the health and welfare of individuals and society, in congruence with the values of the individual and society.

Also, the technical characteristics of the process of care and the resulting consequences may be revealed by examining congruence with norms of care, appropriateness, and technological advancement.

The process of care is therefore normative behavior. The norms are derived from science, society, and ethics. The assessment of processes of care may be observational or by review of records.

Finally, the outcome component of the model attempts to measure the change in health status as a result of medical care. It includes patient knowledge, attitude, and behaviors. The assertion includes social, psychological, and social function aspects of performance. Also, patient satisfaction is included as a component of outcome. Outcome measurements provide indirect proxies of health objective attainment. Donabedian contends that outcomes are clearly
the best method of evaluating the quality of care provided. To serve as the measure of quality, other causes for changes in health status must be eliminated.

Thus, structure, process, and outcomes are approaches to the acquisition of information about the identification of attributes that define and effect quality care. In this research, I have chosen outcomes as the approach to assessing the quality of care.

The theoretical framework for evaluating quality, outcomes, and monitoring was based on Donabedian’s models. The methods and findings from Donabedian’s research lend a paradigm for evaluating outcomes as a measure of quality health care.

Although little empirical evidence exists to show that the quality of care is significantly diminishing as a result of increased managed care enrollment, it is important that quality must not be weakened or diminished. There are several organizations with indirect authority that are chartered to monitor the quality of care. Two of these organizations are JCAHO and NCQA.
Moreover, states like California which license HMOs conduct random audits to ensure compliance with strict rules and regulations.

At this time, no clear and effective method of measuring the quality of care exists; instead, proxy or quasi methods of evaluating outcomes are used. These measures include patient satisfaction surveys, targeted prevention methods—breast cancer screenings per 1,000, immunization compliance, recidivism, lengths of stay, admits per 1,000, days per 1,000, cost per procedures, employee absenteeism, employee turnover, substance abuse rates, mortality rates, low birth weights, and many more. Moreover, explicit clinical guidelines are under development in the private and government segments that will be used to evaluate modalities, treatment efficacy, and refined care pathways.

The shift from input to outcome's management provides health care professionals, payers, society, employers, and patients with the tools and measures to allocate scarce resources where the greatest benefit will be realized. The
outcome measurements provide patient and system level data that can be measured and applied.

It would be imprudent to attempt structural and process level assessments as the primary objective due to the enormously complex systems that exist.

Preventable Readmission Literature

Discharge Education and Readmissions

The case management process addresses the issues of resource allocation, effectiveness of care, cost containment, and accountability—all important elements in an effective utilization program.

It is important that case management of the patient, including discharge planning and discharge education, begin at admission, to prepare the patient for self-care at home, for every patient in the hospital faces discharge. Recovery from illness may be improved, the transition to home can be eased, utilization of home health care may be decreased, and unplanned preventable readmission may be decreased when the nurse provides supportive-educative guidance and teaches the patient self-care while in the hospital (Harmon, 1993).
Patients who have been instructed prior to discharge in the care that is to be continued at home, including medications to be taken, had fewer preventable readmissions. When the patient receives no education or inadequate education in the hospital, preventable readmission to the hospital may occur, resulting in unnecessary utilization of limited resources (Harmon, 1993).

A descriptive study of preventable readmissions relating to education as a part of the discharge plan was conducted in a large urban acute facility. The medical record was used to answer the question of whether or not a need for discharge education was identified, and if a need was identified, was discharge education provided.

If discharge education was or was not provided, did an unplanned preventable readmission occur for that reason.

The theoretical framework for this study of the relationship between patient discharge education and unplanned hospital preventable readmission was based on Orem’s Self-Care Model. According to this research, appropriate discharge education, which teaches the patient self-reliance and self-management, could decrease health
care costs associated with unplanned preventable readmission.

A person’s knowledge of activities that need to be performed to maintain health and recover from health deviations and the knowledge of the skills needed to perform the actions that knowledge provides are essential to preventing unplanned hospital preventable readmission (Harmon, 1993).

A supportive nursing system provided the framework for goal oriented action to meet universal self-care requisites during discharge planning of ambulatory patients. The care plan progressed from wholly compensatory to educative developmental care directed toward family education. Nurses have professional and legal responsibilities in performing nursing care and preparing the patient for self-care.

Case management and discharge planning are the processes whereby the patient’s needs are identified for care after hospitalization and coordination of needed education.

Discharge planning provides for continuity to the home setting of the care that was provided in the hospital.
(Harmon, 1993). The discharge planning function focuses on the restoration of the patient and must involve the participation of the patient, family, and friends to be successful.

The process incorporates the assessment of the patient's needs, the plan of actions to prepare the patient for discharge, the discharge implementation plan, and the evaluation of the plan outcomes.

The Joint Commission on Accreditation of Health Organizations (JCAHO) Accreditation Manual for Hospitals (1989), which monitors the quality of care provided to patients by hospitals, requires in the Medical Record Services Standard that medical records are documented in an accurate and timely manner, including any specific instructions given to the patient and/or family. The JCAHO Standard also requires that advisement is given relating to physical activity, medication, diet, follow-up care, and that the medical record indicates when preprinted instructions are given to the patient.

The JCAHO Nursing Services Standard requires that patient education and nursing documentation is relative and
concise, and those patients who are discharged from the hospital requiring nursing care also receive instructions and counseling prior to discharge (Harmon, 1993).

Identified Education Need for Self-Care

Education need was defined as any need for discharge education, teaching, or instruction in self-care identified by a professional, the patient, or the researcher.

Twenty-one (95%) of the readmitted group were identified as needing education by the following professionals: nurse, physician, rehabilitation therapist, medical social worker, dietitian, and dentist. Considered were the pharmacist, speech pathologist, and the protocol R.N.; however, these professional did not identify a need for teaching self-care. In addition, the patient identified an education need and the researcher identified discharge education needs for self-care that were not otherwise identified (Harmon, 1993).

For the 21 readmitted subjects, 95% (n=21) had 45 education’s needs identified in nine categories: (1) physical activity; (2) activities of daily living and/or instrumental activities of daily living; (3) diet; (4)
medication; (5) procedures; (6) community resources; (7) emotional support, (8) symptom control; and (9) durable medical equipment and/or oxygen. Thirteen (65%) of the not readmitted group were identified as needing education by the professionals and had 24 identified education needs in seven of the nine categories. No education needs were identified for community resources or emotional support in the non-readmitted group. Four subjects (20%) in the not readmitted group had no identified need for self-care education and 3 (15%) were not applicable (expired).

There was no significant statistical difference between the two groups in the education need identified \( \chi^2=13.9, \text{df}=8, \text{p}=0.08 \). When education need was scored by category for the two groups with each need receiving a score of one, no significant statistical difference was observed \( \chi^2=9.9, \text{df}=6, \text{p}=0.1; t=2.5, \text{df}=40, \text{p}=0.1 \).

An education need was identified by nursing staff in 24.5% of the readmitted group, which included Staff RNs, Staff LVNs, Discharge Planners, and a student nurse.

In the non-readmitted group, education was identified by nursing staff for 35% of the subjects.
Education Provided for Self-Care

Twenty (95.2%) subjects in the readmitted group were identified as the person to be taught, and/or nine (42.9%) significant others. In the not readmitted group, 11 (64.7%) of the patients were to be taught and/or six (35.3%) significant others.

Readiness of the patient to learn was determinable in all cases. Typical descriptors given for readiness to learn were: motivated, willing, understanding, cooperative, or receptive. For not ready to learn, descriptors were anxiety, unwilling, cognition deficit, mentally not ready to accept disease status, and unstable emotional status. Some subjects had more than one descriptor.

Indicators considered but not present were: eager, pain, hesitant, language, depressed, functional disability, and low comprehension (Harmon, 1993).

There were 22 cancer patients readmitted to the hospital in the study. All of the subjects were readmitted to the hospital within 15 days of discharge from an acute care facility.
Ages ranged from 14 to 70 years, with a median age of 57.5 (Mean 53.6, SD 19.05). Of the nine males (41%) and 13 females (59%), 50% (n 11) were single, widowed, or divorced.

English was the language of 82% (n 18). 4% (n 1) spoke Spanish; language was not available for 14%.

The control group consisted of a convenience sample of 20 subjects randomly matched with the readmitted subjects on the date of discharge from the initial admission. The control group was not readmitted within 15 days. Ages ranged 24 to 80 years, with a median age of 53.5.

Seven males (35%) and 13 females (65%) were in the control group, of whom 60% were married, and 40% were single, widowed, or divorced. 90% of the control group were English speaking, 5% were Spanish speaking, and for 5%, language was not available. Educational level was not available for the control group.

There was no significant statistical difference between the readmitted and the not readmitted groups in age, gender, marital status, or language (Harmon, 1993).

Many occupations were represented, ranging from clerk to executive. No analysis of difference in occupations was
performed. Educational level was not easily retrievable, therefore it was not analyzed.

Hospital Preventable Readmission

To determine the relationship of caregiver's knowledge of home care to preventable readmission of high-risk infants and toddlers, Kun and Warburton (1987) conducted telephone interviews 48 hours after discharge from the hospital using questionnaires based on the actual practice of home care nurse specialists who had assisted physicians in establishing guidelines for each specific treatment.

Questions were categorized into three areas: (1) basic knowledge of treatment; (2) knowledge of operation and maintenance of equipment and supplies; and (3) information about vendors.

Sixty high-risk infants and toddlers at Children's Hospital of Los Angeles were discharged with written home-treatment instructions from the intermediate care infant and toddler units between October 1, 1985, and February 28, 1986.

The intermediate care unit had nurse-to-patient ratio of 1:3. Subsequent preventable readmissions were monitored
and studied for six months following the initial discharge. Non-parametric statistics were used to describe telephone assessment of knowledge base and hospital preventable readmission data.

Parents of patients with single treatments scored higher in their knowledge base than parents of patients with multiple home care treatments; caregivers of patients readmitted scored well. This study concludes that none of the preventable readmissions were due to a failure of home care management for patients with single treatments without showing causal link. It does not give the method of measuring preventable readmissions nor does it address the cost of preventable readmission. Missing also is information on patient education during the hospitalization.

Elderly patients who received medication instructions from the nurse as a part of the discharge planning process was less likely to be readmitted to the hospital (Markley and Igou, 1987). This study indicates that the educational process should be an integral and expected part of the patient’s daily activities over the period of hospitalization.
A study of 2,238 medical records randomly selected from 42,880 discharges in six contrasting hospital populations found that 13% of the patients accounted for as much of the hospital charges as the other 87%, and that cancer was included in six of 19 major diagnostic categories representing two-thirds of the most costly 20% of patients (Zook, Savickis, and Moore 1980).

Among these high cost patients were those with repeated hospitalizations within one year for the same disease.

Another study found that repeated hospitalizations for the same disease accounted for 60 percent of all hospitalizations were more expensive than the first hospitalization, with cancer one of the three exceptions with no statistical difference.

Patients with particular illnesses or traits that lead to repeated hospitalization could benefit from vigorous follow-up to increase medical compliance. In addition, health insurance financial incentives should be structured to encouraged preventive programs and low-cost alternatives and to discourage costly hospital preventable readmissions.
Ten variables were identified through regression analysis that were statistically significant predictors of preventable readmissions within 60 days of discharge for the Medicare population (Anderson and Steinberg, 1985). Patient education was not addressed in the 20 variables studied.

Patients with a discharge diagnosis of cancer, as well as those with AIDS and renal disease, were associated with increased risks of emergency preventable readmission within 90 days of discharge (Phillips, Safran, Cleary, and Delbanco, 1987).

Twelve diagnostic categories associated with preventable readmission and suspected laboratory or demographic variables were tested.

Patient education as a variable was not tested. Decision analysis was used as a framework to examine the interrelation of cost and efficacy for interventions designed to reduce emergency preventable readmission to an acute care hospital (Safran and Phillips, 1989). Patient education as a specific cost and benefit were not examined, but rather was included in a list of services that hospitalized patients receive.
Forty medical records were examined using non-disease-specific discharge criteria for adequacy of medical care for patients readmitted within 90 days (Ashton, et al., 1987). A significant degree of predictive validity was found.

The Rand Corporation, however, with the Department of HHS, did compare outcomes of the prepaid care to fee-for-service, including a small Medicaid enrollment, in a 1986 study of participants in the Group Health Cooperative (GHC) of Puget Sound, Seattle. The study concludes that for most people, and particularly for those with high incomes, GHC care saved money and may have been better for health outcomes.

For the limited group of Medicaid enrollees that the study covered, health outcomes appeared poorer than for those in fee-for-service.

GHC officials acknowledged that the system would need modification and supplementation for the poor (Ware, 1987).

The most comprehensive comparative study that considered outcomes for Medicaid/AFDC HMOs has been conducted by the Research Triangle Institute for the Health Care Financing Administration (1988). In this research
project, a quality of care study was completed in 1985 for populations in mandatory Medicaid HMO demonstration projects in Santa Barbara County, CA and Jackson County, MO. These were compared to fee-for-service Medicaid populations in adjacent communities. The project took a random sample of 2,400 women on AFDC between 15 and 45 and their children under 4 years old. Over 2300 births were abstracted from the four projects, as well as other selected information such as maternal health status and outpatient services. Medical records were abstracted for this sample, and questionnaires given to doctors and clients.

The overall conclusion of the study was that the HMO management of care showed no significant effect on self-assessed health status, health habits, or use of preventive services.

In particular, no significant effect was found in mean birth weight or the low birth weight rate, in the C-section rate, or in the complications of delivery.

The study found, however, that care in all the sites was "inadequate" and that these problems were "generic to the population served and to Medicaid programs regardless of
the existence of capitation or case management" (Executive Summary, Research Triangle, p. 3, 1988).

According to a 1991 study at the Harvard School of Public Health, 150,000 persons die each year in hospitals due to negligent care; this figure is six times greater than from street crime. Moreover, a study conducted at Rand by Dr. Robert Brook, concluded that one-third of all hospitalization care is inappropriate. These data clearly depict the costs associated with inappropriate health care.

CHAPTER THREE -- METHODOLOGY

Design and Methods

To determine whether Medi-Cal and HMO readmissions within 30 days of discharge and deaths were potentially preventable, I retrospectively studied hospital readmissions and mortality rates of 50% of all California hospitalizations in 1991 (169,397 cases). The 50% sample of all hospital discharges was coded into three primary payer categories: Medi-Cal, HMO, and others. The payer categories were then compared with one another and the aggregate to determine the odds ratio of their respective rates.
The design method employed was an observational retrospective cohort study. I controlled for confounding by matching payer categories. I abstracted data sets from the California Office of Statewide Health Planning and Development Hospital Discharge Data using random probability sampling for the patient samples. The sample size was 50% of the 1991 hospitalized patients greater than 1 year in age.

The dependent variables in this study were patient preventable readmission (nominal) and mortality (nominal). The independent variable was the patient payer type (nominal). Cases were dichotomized between death and non-death and preventable readmission or non-preventable readmission.

Reliability and Validity

The validity of using outcome measures to assess the quality of health care is quite justifiable. First, outcomes present precise and measurable depictions of the end result of care. Second, the inferences drawn from the data are justifiable. The outcome's data are less receptive to misinterpretation as a result of insufficient data.
Overall, outcomes are inherently valid because they are unquestionable about whether they are favorable or unfavorable. In other words, one would prefer life to death, functional ability to inability, and comfort from pain. The use of processes to assess quality of care requires greater validity because of the enormous variability in appropriateness of methods and technologies.

It is however important to note that not all outcomes are clearly defined as favorable or desired.

An example may be cholesterol levels, blood sugar levels, and other clinical outcome measures that are not absolutely defined. For this reason, the readmission and mortality measures were selected because of their discrete measurement.

More importantly, for the purpose of practical research, it is extremely difficult to account for all of the possible processes that take place during the provision of care. Moreover, the cost of this approach would be prohibitive.

By using outcomes as the tool for measuring the quality of care, scientific methods, technology, and processes of
care can change while the desired outcome measures remain the same.

In other words, if the desired outcome is to reduce episodes of cesarean sections from 6.3 per thousand in 1991, to 4.0 in 1999, the means of achieving the results are not measured. I do not wish to suggest that the means or methods are unimportant.

Most importantly, valid causality is derived neither from process nor outcomes. In this respect, both segments are integrated. When both process and outcomes are used to establish causality, inferences can be made with confidence.

It is more practical and cost effective to measure baseline outcomes with actual outcomes and then pursue an in-depth review of the process antecedents of care. If an outcome measure varies significantly from values that are considered appropriate or normative, then a researcher or organization may evaluate the associated processes in detail.

The use of process evaluation as a quality measurement tool is more rigid, absolute, and costly because of the breadth of required elements that would require measurement.
It is my contention that by developing standards of outcome measures at the highest point achievable, the processes and systems are encouraged and stimulated into pursuing the most efficient and innovative method for achieving the desired end results.

The use of payer source as the independent variable to measure the outcomes of death and readmission was integral to this research.

The sample size of the random sample of cases should allow for valid generalizations about the differences in outcomes between Medi-Cal and HMO payer health plan types. The similarity between the demographic composition, the primary diagnoses, and population size lends confidence in the statistical measures and conclusions from this research. In addition, the duration in years in which California hospitals have been providing these data and the State's rigorousness for verification and validation further lends to the credibility of the sample cases and respective outcomes of this research.

Internal validity was not subject to selection bias, placebo effect, or instrument selection biases associated
with other research methods. The use of an observational retrospective cohort study allows unbiased selection of outcomes.

The selection of the research cases was random, relevant to the study and situation, were validated by a reliable government agency, controlled for confounding, not subject to researcher bias, were not subject to investigator interactions, and were large enough to generalize about the populations.
First Hypothesis

One Dependent Variable
READMISSION
(Nominal)

One Independent Variable
PAYER--HMO & MEDI-CAL
(Nominal)

Null Hypothesis
There is not a Statistically Significant Greater Ratio in Readmissions of Medi-Cal Payer Hospitalizations Than Health Maintenance Organization Payer Hospitalizations

Alternate Hypothesis
There is a Statistically Significant Greater Ratio in Readmissions of Medi-Cal Payer Hospitalizations Than Health Maintenance Organization Payer Hospitalizations

Point Estimate: Means Testing
Readmissions:
Medi-Cal - HMO
Student's t test
Second Hypothesis

One Dependent Variable
MORTALITY
(Nominal)

One Independent Variable
PAYER--HMO & MEDI-CAL
(Nominal)

Null Hypothesis
There is not a Statistically Significant Greater Ratio of Deaths in Medi-Cal Payer Hospitalizations Than in Health Maintenance Organization Payer Hospitalizations

Alternate Hypothesis
There is a Statistically Significant Greater Ratio of Deaths in Medi-Cal Payer Hospitalizations Than in Health Maintenance Organization Payer Hospitalizations

Point Estimate: Means Testing
Deaths:
Medi-Cal - HMO
Odds Ratios

Other variables included were gender (nominal), race (nominal), age category (ordinal), disposition (nominal), DRG (nominal), number of diagnoses (ratio), length of stay (ration), and number of admissions (ratio).
CHAPTER FOUR -- RESULTS

Data Analysis

Data were analyzed using the SPSSS PC statistical software program for statistical analysis. Descriptive statistics were used to compare the two groups of patients: those patients readmitted and those patients not readmitted, and those patients who died and patients who survived. Frequencies, means, and odds ratio analyses were used to describe the data. Odds Ratio analysis was used to compare nominal level data for the two groups.

There were 40 variables and 169,367 cases in the data set analyzed. The age variable contains the patient age in years. The payment source variable contains the expected source of payment at the time of discharge and included the two independent variables of Medi-Cal and HMO. The principal diagnosis variable contained the codes assigned to the case upon discharge. Also included was the second through fourth diagnoses assigned to the case; however, I chose to analyze only the primary diagnosis.
The race variable contained seven data categories and was evaluated for correlation and confounding.

In the Appendix, the data variables are shown with their scales and brief descriptions.

Sex was another variable contained in the data set that was analyzed for its effects on preventable readmission and mortality. The record number was also crucial for this research. It contained the encrypted proxy of the members social security number. This variable allowed measurement of individuals as they were discharged from hospitals throughout California.

The admission source included nine types of patient admission. This variable was analyzed to determine whether relationships existed between payer, preventable readmissions, and mortality. This variable essentially depicts the place (ER, SNF, etc.) from which the patient entered into care. There was also a variable that shows the type or way in which the patient entered care (urgent, scheduled, emergent, etc.); it is the Admission Type variable.
The length of stay (LOS) variable was used throughout the analysis. It contains the number of in-hospital days the patient experienced. The admit date code was important for determining whether a patient had been readmitted (dependent variable).

The disposition variable was important because it contained the mortality dependent variable among other possible discharge categories.

The admission major diagnostic category (MDC), and report source variables were not used in this research. The diagnosis, procedure, and admission variables were analyzed for relationships and severity of illness. The medical/surgical variable represents the service provided to the patient. The medical/surgical variable was compared with the payer types (independent variable) and the preventable readmission and mortality variables (dependents).

The multiple admissions variable is a derived variable from the patient number and admission dates. It is dichotomized to 0 meaning no preventable readmissions, and 1 for preventable readmissions present for this beneficiary.
The admits in month variable is also calculated to depict the number of admissions in the month the patient experienced.

The age category's variable is calculated to classify the beneficiary into a defined age range for more useful analyses. The mortality and payer variables were also dichotomized for the purpose of analyses. The mortality variable had an assigned value of 0 for non-death outcomes and 1 for death.

The payer variable assigned 0 for Medi-Cal and 1 for HMO beneficiary types. The data variable formats and descriptions are detailed in the Appendix.

Descriptive Results

There were 36,964 preventable readmissions (22% of study cases), from 15,736 patients during the study period. Of the 36,964 preventable readmissions, 15,733 (43%) were Male and 21,231 (57%) were Female. These gender percentages were comparable to the non-preventable readmission populations. The age group between 50 and 74 had the greatest number of admissions (40%) and preventable readmissions (40.3%).
Of the 36,964 preventable readmission cases studied, 978 (3%) died. Routine discharges accounted for 26,381 (71%) of the overall discharges.

Of the non-preventable readmission cases, 3.9% (1,635) of the male discharges resulted in death, while 1.7% (1,577) of the female discharges resulted in deaths.

Of the 3,212 non-preventable readmission deaths, 2,391 (74.4%) were white, 352 (11.0%) were black, 299 (9.3%) were Hispanic, and the remaining 170 (5.3%) were other races. Of the 3,212 non-preventable readmission deaths, 2,068 (64.4%) entered care through the emergency room, 776 (24.2%) entered through routine, 177 (5.5%) through skilled nursing, and the remaining cases through other sources. One percent of Routine admission sources resulted in deaths, while 4.4% of the emergent cases resulted in deaths. The preventable readmission cases depicted no statistically significant differences when comparing non-preventable readmissions by race, gender, source of admission, type of admission, DRG, length of stay, and payer type.

Table 9 presents the data abstraction and analysis. In this table, Medi-Cal and HMO sample cases are divided by
total episodes and preventable readmission episodes. Comparisons have been made to show the differences between the Medi-Cal and HMO preventable readmissions cases by demographic characteristic, case modes, disposition, and admission type.

The data show minor differences in the overall percentage of preventable readmissions between Medi-Cal (20% readmitted) and HMO (20% readmitted) cases.

There was a difference between genders; male Medi-Cal payer beneficiaries experienced a 34% preventable readmission rate while HMO payer beneficiaries experienced a 24% preventable readmission rate. The female Medi-Cal payer beneficiaries experienced 15% preventable readmission rate while the HMO payer beneficiaries experience a 14% preventable readmission rate.

The significantly dissimilar age categories were between 41 and 65 years of age. In these age categories, Medi-Cal payer beneficiaries experienced 11-14 percent higher preventable readmission rates than HMO payer beneficiaries did. The other age categories were comparable. The mean overall age of the Medi-Cal payer beneficiaries was
32, while the mean age of the HMO payer beneficiaries was 41. The mean age of the Medi-Cal preventable readmission population was 38, while the mean age of the HMO readmitted population was 47. In both categories, the HMO population was older. Race did not depict any significant differences among overall and readmitted HMO and Medi-Cal populations.

Table 9 also includes the top 5 DRGs from the payer populations, 7 categories of disposition, 5 categories of admission type, and mean utilization figures. The top DRGs show no significant differences among overall, readmitted, HMO, and Medi-Cal cases.

The only two disposition categories with significantly different preventable readmission rates were for Other facility and Structured Nursing Facility (SNF) discharges. The Medi-Cal preventable readmission discharges to Other Facilities were 17.5% greater than the HMO preventable readmission discharges, while the Medi-Cal preventable readmission discharges to SNF were 11.5% greater than the HMO preventable readmission discharges.

The type of admission category having the greatest difference between Medi-Cal and HMO preventable readmissions
was the Elective category. Medi-Cal Elective preventable readmissions were 16% higher than HMO Elective preventable readmissions.

The mean number of diagnoses, mean number of procedures, mean number of admissions, and mean lengths of stays were similar between the overall Medi-Cal and HMO cases. However, the Medi-Cal readmission cases revealed mean number of admits and mean lengths of stay that were greater than the HMO mean data. In addition, the mean number of diagnoses, mean number of admissions, and mean length of stays were significantly higher for the preventable readmission cases of both Medi-Cal and HMO payer beneficiaries compared to the overall cases. (The overall cases are both non-readmitted and readmitted cases.)

Top Five Counties

Table 5 Top 5 Counties by Admissions

<table>
<thead>
<tr>
<th>COUNTY</th>
<th># OF CASES</th>
<th>% OF CASES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alameda</td>
<td>40,513</td>
<td>23.9</td>
</tr>
<tr>
<td>Contra Costa</td>
<td>25,910</td>
<td>15.3</td>
</tr>
<tr>
<td>Los Angeles</td>
<td>23,719</td>
<td>14.0</td>
</tr>
<tr>
<td>Fresno</td>
<td>22,667</td>
<td>13.4</td>
</tr>
<tr>
<td>Kern</td>
<td>18,757</td>
<td>11.1</td>
</tr>
</tbody>
</table>
Table 6 Top 5 Counties by Preventable Readmissions

<table>
<thead>
<tr>
<th>COUNTY</th>
<th># OF CASES</th>
<th>% OF CASES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alameda</td>
<td>10,471</td>
<td>28.3</td>
</tr>
<tr>
<td>Contra Costa</td>
<td>6,381</td>
<td>17.3</td>
</tr>
<tr>
<td>Fresno</td>
<td>4,603</td>
<td>12.5</td>
</tr>
<tr>
<td>Los Angeles</td>
<td>4,294</td>
<td>11.6</td>
</tr>
<tr>
<td>Kern</td>
<td>4,020</td>
<td>10.9</td>
</tr>
</tbody>
</table>

Table 7 Top 5 Counties by HMO Cases

<table>
<thead>
<tr>
<th>COUNTY</th>
<th># OF CASES</th>
<th>% OF CASES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alameda</td>
<td>10,093</td>
<td>35.7</td>
</tr>
<tr>
<td>Contra Costa</td>
<td>7,282</td>
<td>25.7</td>
</tr>
<tr>
<td>Los Angeles</td>
<td>3,625</td>
<td>12.8</td>
</tr>
<tr>
<td>Fresno</td>
<td>2,862</td>
<td>10.1</td>
</tr>
<tr>
<td>Kern</td>
<td>1,312</td>
<td>4.6</td>
</tr>
</tbody>
</table>

Table 8 Top 5 Counties by Medi-Cal Cases

<table>
<thead>
<tr>
<th>COUNTY</th>
<th># OF CASES</th>
<th>% OF CASES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alameda</td>
<td>7,426</td>
<td>19.9</td>
</tr>
<tr>
<td>Fresno</td>
<td>6,979</td>
<td>18.7</td>
</tr>
<tr>
<td>Los Angeles</td>
<td>6,700</td>
<td>17.9</td>
</tr>
<tr>
<td>Kern</td>
<td>4,362</td>
<td>11.7</td>
</tr>
<tr>
<td>Contra Costa</td>
<td>3,303</td>
<td>8.8</td>
</tr>
</tbody>
</table>

Table 9 Top 5 Counties by All Payers

<table>
<thead>
<tr>
<th>COUNTY</th>
<th># OF CASES</th>
<th>% OF CASES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alameda</td>
<td>22,994</td>
<td>22.2</td>
</tr>
<tr>
<td>Contra Costa</td>
<td>15,325</td>
<td>14.8</td>
</tr>
<tr>
<td>Los Angeles</td>
<td>13,394</td>
<td>12.9</td>
</tr>
<tr>
<td>Kern</td>
<td>13,083</td>
<td>12.6</td>
</tr>
<tr>
<td>Fresno</td>
<td>12,826</td>
<td>12.4</td>
</tr>
</tbody>
</table>

Tables 4 through 8 reveal the top readmission and overall cases by payer source and county. These tables
reveal that Alameda County has the highest number of admissions by HMO, Medi-Cal and all-payer sources. In addition, Alameda had the highest readmission rate of 28.3% of all cases; although, Alameda represented only 23.9% of the overall cases. These data show a disproportionate number of readmissions in Alameda County when compared to the other payer source counties.
### Table 10 Medi-Cal and HMO Tabulated Data Results

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th># OF CASES MEDI-CAL</th>
<th># OF CASES HMO</th>
<th>% OF CASES READMITTED MEDI-CAL</th>
<th>% OF CASES READMITTED HMO</th>
<th>% OF CASES DIFFERENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>31,134</td>
<td>20,518</td>
<td>2,777</td>
<td>15.4%</td>
<td>13.9%</td>
</tr>
<tr>
<td>Male</td>
<td>20,294</td>
<td>13,220</td>
<td>2,046</td>
<td>12.6%</td>
<td>12.0%</td>
</tr>
<tr>
<td>Age 1-10</td>
<td>1,077</td>
<td>132</td>
<td>14</td>
<td>26.0%</td>
<td>33.3%</td>
</tr>
<tr>
<td>11-20</td>
<td>7,906</td>
<td>1,436</td>
<td>104</td>
<td>13.2%</td>
<td>14.4%</td>
</tr>
<tr>
<td>21-30</td>
<td>13,088</td>
<td>7,886</td>
<td>794</td>
<td>11.0%</td>
<td>10.2%</td>
</tr>
<tr>
<td>31-40</td>
<td>6,782</td>
<td>7,086</td>
<td>768</td>
<td>10.8%</td>
<td>10.9%</td>
</tr>
<tr>
<td>41-50</td>
<td>2,370</td>
<td>4,038</td>
<td>773</td>
<td>31.3%</td>
<td>18.9%</td>
</tr>
<tr>
<td>51-60</td>
<td>2,448</td>
<td>3,742</td>
<td>904</td>
<td>39.1%</td>
<td>25.4%</td>
</tr>
<tr>
<td>61-65</td>
<td>1,240</td>
<td>1,869</td>
<td>471</td>
<td>39.1%</td>
<td>25.2%</td>
</tr>
<tr>
<td>66-75</td>
<td>787</td>
<td>1,240</td>
<td>327</td>
<td>32.7%</td>
<td>28.0%</td>
</tr>
<tr>
<td>76+</td>
<td>712</td>
<td>934</td>
<td>245</td>
<td>34.8%</td>
<td>20.2%</td>
</tr>
<tr>
<td>Mean Age</td>
<td>32</td>
<td>41</td>
<td>36</td>
<td>120.3%</td>
<td>113.7%</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>13,744</td>
<td>13,574</td>
<td>2,785</td>
<td>20.3%</td>
<td>17.2%</td>
</tr>
<tr>
<td>Black</td>
<td>7,688</td>
<td>7,099</td>
<td>557</td>
<td>21.8%</td>
<td>17.8%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>11,829</td>
<td>11,429</td>
<td>462</td>
<td>38.6%</td>
<td>13.5%</td>
</tr>
<tr>
<td>Native Amer.</td>
<td>221</td>
<td>46</td>
<td>23</td>
<td>10.3%</td>
<td>4.1%</td>
</tr>
<tr>
<td>Asian</td>
<td>3,277</td>
<td>1,843</td>
<td>223</td>
<td>15.2%</td>
<td>12.1%</td>
</tr>
<tr>
<td>Other</td>
<td>545</td>
<td>367</td>
<td>50</td>
<td>18.2%</td>
<td>12.0%</td>
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<tr>
<td>Top 5 DRGs</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#1-Number</td>
<td>373</td>
<td>373</td>
<td>373</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#2-Cases</td>
<td>12,721</td>
<td>6,426</td>
<td>1,846</td>
<td>28.3%</td>
<td>19.4%</td>
</tr>
<tr>
<td>#3-Number</td>
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<td>371</td>
<td>371</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#4-Number</td>
<td>10,000</td>
<td>1,363</td>
<td>95</td>
<td>52.8%</td>
<td>38.8%</td>
</tr>
<tr>
<td>#5-Cases</td>
<td>372</td>
<td>372</td>
<td>372</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#6-Cases</td>
<td>1,068</td>
<td>500</td>
<td>30</td>
<td>7.5%</td>
<td>5.3%</td>
</tr>
<tr>
<td>#7-Number</td>
<td>1,983</td>
<td>138</td>
<td>143</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#8-Number</td>
<td>824</td>
<td>585</td>
<td>285</td>
<td>34.8%</td>
<td>22.9%</td>
</tr>
<tr>
<td>Disposition</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dead</td>
<td>370</td>
<td>287</td>
<td>114</td>
<td>30.8%</td>
<td>25.3%</td>
</tr>
<tr>
<td>Home Health</td>
<td>949</td>
<td>736</td>
<td>305</td>
<td>32.6%</td>
<td>34.8%</td>
</tr>
<tr>
<td>Against Advice</td>
<td>430</td>
<td>168</td>
<td>32</td>
<td>39.1%</td>
<td>33.3%</td>
</tr>
<tr>
<td>Other Facility</td>
<td>224</td>
<td>79</td>
<td>75</td>
<td>32.9%</td>
<td>25.3%</td>
</tr>
<tr>
<td>SNF</td>
<td>199</td>
<td>156</td>
<td>106</td>
<td>51.4%</td>
<td>29.9%</td>
</tr>
<tr>
<td>ST Acute Care Facility</td>
<td>458</td>
<td>617</td>
<td>223</td>
<td>46.2%</td>
<td>36.1%</td>
</tr>
<tr>
<td>Routine</td>
<td>34,390</td>
<td>26,121</td>
<td>5,719</td>
<td>16.7%</td>
<td>15.1%</td>
</tr>
<tr>
<td>Type of Admission</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emergency</td>
<td>4,448</td>
<td>1,596</td>
<td>1,421</td>
<td>31.9%</td>
<td>22.7%</td>
</tr>
<tr>
<td>Urgent</td>
<td>10,466</td>
<td>9,706</td>
<td>2,734</td>
<td>32.4%</td>
<td>26.2%</td>
</tr>
<tr>
<td>Inpatient</td>
<td>3,728</td>
<td>7,090</td>
<td>1,134</td>
<td>33.6%</td>
<td>16.0%</td>
</tr>
<tr>
<td>Discharge</td>
<td>19,722</td>
<td>9,030</td>
<td>384</td>
<td>4.7%</td>
<td>3.9%</td>
</tr>
<tr>
<td>Unknown</td>
<td>17</td>
<td>15</td>
<td>14</td>
<td>33.3%</td>
<td>30.8%</td>
</tr>
<tr>
<td>Mean # of Diagnoses</td>
<td>28</td>
<td>28</td>
<td>34</td>
<td>12.1%</td>
<td>11.5%</td>
</tr>
<tr>
<td>Mean # of Procedures</td>
<td>1.9</td>
<td>1.8</td>
<td>1.7</td>
<td>85.9%</td>
<td>91.8%</td>
</tr>
<tr>
<td>Mean # of Admits</td>
<td>1.0</td>
<td>1.0</td>
<td>3.2</td>
<td>2.5%</td>
<td></td>
</tr>
<tr>
<td>Mean Length of Stay</td>
<td>3.6</td>
<td>3.3</td>
<td>5.4</td>
<td>4.8%</td>
<td></td>
</tr>
</tbody>
</table>
Table 10 reveals preventable readmissions of all payers and payers other than HMO and Medi-Cal. The purpose of these groups was to measure the preventable readmission rates among non-HMO/Medi-Cal payer beneficiaries, all payer beneficiaries, HMO payer beneficiaries, and Medi-Cal payer beneficiaries. There were no significant variations among gender, age, race, dispositions, and type of admission when all payers and non-HMO/Medi-Cal payer beneficiaries were compared. When comparing the four payer groups (HMO, Medi-Cal, All, and All Others), the HMO preventable readmissions rates were lowest in nearly all categories (age, race, gender, top DRGs, disposition, and type of admission). The only negative difference is the 25.3% HMO mortality rate compared to the 22.4% of All Other and the 23.3% rate of All payer preventable readmissions. Although it is impossible to determine the exact severity of illness differences among the payer groups, the top 5 DRGs, which comprise over 80% of the episodes, are the same for all of the payer groups.

The mean ages of the All and All Other payer categories are 47.5 and 56.6 years, respectively. The mean ages of the
All and All Other preventable readmission payer categories are 57.7 and 65.0 years, respectively.

These mean ages are significantly higher than the HMO and Medi-Cal mean ages.

It is expected that the mean ages for the All and All Other payer categories would be higher because of the Medicare payer populations.
## Table 11 Other Payers and All Payers Data Results

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th># OF CASES OTHER Payers</th>
<th># OF CASES ALL Payers</th>
<th># OF CASES OTHERS</th>
<th># OF READMITS ALL</th>
<th>% OF CASES READMITTED OTHERS</th>
<th>% OF CASES READMITTED ALL</th>
<th>% OF CASES READMITTED DIFFERENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td># of Medical Admits</td>
<td>61,697</td>
<td>104,633</td>
<td>17,458</td>
<td>26,046</td>
<td>28.3%</td>
<td>24.8%</td>
<td>3.5</td>
</tr>
<tr>
<td># of Surgical Admits</td>
<td>40,333</td>
<td>92,296</td>
<td>7,946</td>
<td>10,270</td>
<td>17.3%</td>
<td>16.5%</td>
<td>0.8</td>
</tr>
<tr>
<td>TOTAL</td>
<td>102,030</td>
<td>167,061</td>
<td>25,004</td>
<td>36,316</td>
<td>24.5%</td>
<td>21.7%</td>
<td>2.8</td>
</tr>
<tr>
<td>% of All Cases</td>
<td>61%</td>
<td>100%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Sex</td>
<td>Male</td>
<td>43,313</td>
<td>57,331</td>
<td>11,772</td>
<td>15,733</td>
<td>27.2%</td>
<td>27.4%</td>
</tr>
<tr>
<td>Female</td>
<td>60,383</td>
<td>112,035</td>
<td>13,672</td>
<td>21,231</td>
<td>22.6%</td>
<td>19.0%</td>
<td>3.7</td>
</tr>
<tr>
<td>Age</td>
<td>1-10</td>
<td>223</td>
<td>1,452</td>
<td>43</td>
<td>396</td>
<td>19.3%</td>
<td>19.3%</td>
</tr>
<tr>
<td>11-20</td>
<td>2,317</td>
<td>11,716</td>
<td>270</td>
<td>1,532</td>
<td>11.7%</td>
<td>13.1%</td>
<td>-1.4</td>
</tr>
<tr>
<td>21-30</td>
<td>12,576</td>
<td>33,902</td>
<td>1,428</td>
<td>3,717</td>
<td>11.4%</td>
<td>11.0%</td>
<td>-0.4</td>
</tr>
<tr>
<td>31-40</td>
<td>8,068</td>
<td>15,787</td>
<td>1,954</td>
<td>3,451</td>
<td>13.7%</td>
<td>12.9%</td>
<td>-0.8</td>
</tr>
<tr>
<td>41-50</td>
<td>8,886</td>
<td>15,559</td>
<td>1,435</td>
<td>3,329</td>
<td>21.7%</td>
<td>20.7%</td>
<td>-1.0</td>
</tr>
<tr>
<td>51-60</td>
<td>6,894</td>
<td>10,053</td>
<td>1,993</td>
<td>2,968</td>
<td>29.5%</td>
<td>28.7%</td>
<td>-0.8</td>
</tr>
<tr>
<td>66-75</td>
<td>24,273</td>
<td>26,300</td>
<td>7,497</td>
<td>8,101</td>
<td>30.8%</td>
<td>30.4%</td>
<td>0.4</td>
</tr>
<tr>
<td>76+</td>
<td>26,646</td>
<td>28,492</td>
<td>8,179</td>
<td>8,672</td>
<td>30.5%</td>
<td>30.4%</td>
<td>0.1</td>
</tr>
<tr>
<td>Mean Age</td>
<td>56.6</td>
<td>47.5</td>
<td>65.0</td>
<td>57.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race</td>
<td>White</td>
<td>76,764</td>
<td>110,982</td>
<td>18,653</td>
<td>24,907</td>
<td>24.3%</td>
<td>22.5%</td>
</tr>
<tr>
<td>Black</td>
<td>9,869</td>
<td>20,526</td>
<td>3,163</td>
<td>5,545</td>
<td>32.0%</td>
<td>27.0%</td>
<td>5.0</td>
</tr>
<tr>
<td>Hispanic</td>
<td>12,426</td>
<td>27,746</td>
<td>2,869</td>
<td>4,788</td>
<td>21.7%</td>
<td>17.2%</td>
<td>4.5</td>
</tr>
<tr>
<td>Native Amer.</td>
<td>293</td>
<td>566</td>
<td>73</td>
<td>96</td>
<td>24.9%</td>
<td>17.3%</td>
<td>7.6</td>
</tr>
<tr>
<td>Asian</td>
<td>3,351</td>
<td>8,471</td>
<td>656</td>
<td>1,376</td>
<td>19.6%</td>
<td>16.2%</td>
<td>3.3</td>
</tr>
<tr>
<td>Other</td>
<td>993</td>
<td>1,508</td>
<td>200</td>
<td>350</td>
<td>20.1%</td>
<td>18.1%</td>
<td>2.1</td>
</tr>
<tr>
<td>Top 5 DRGs —Ranked by Payer Cases—</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#1-Number</td>
<td>373</td>
<td>373</td>
<td>373</td>
<td>373</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#1-Cases</td>
<td>7,304</td>
<td>373</td>
<td>196</td>
<td>908</td>
<td>27.2%</td>
<td>27.2%</td>
<td>0.0</td>
</tr>
<tr>
<td>#2-Number</td>
<td>127</td>
<td>371</td>
<td>127</td>
<td>371</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#2-Cases</td>
<td>5,390</td>
<td>371</td>
<td>223</td>
<td>371</td>
<td>42.6%</td>
<td>42.6%</td>
<td>0.0</td>
</tr>
<tr>
<td>#3-Number</td>
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<td>371</td>
<td>140</td>
<td>371</td>
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</tr>
<tr>
<td>#3-Cases</td>
<td>2,963</td>
<td>371</td>
<td>1,018</td>
<td>371</td>
<td>34.0%</td>
<td>34.0%</td>
<td>0.0</td>
</tr>
<tr>
<td>#4-Number</td>
<td>299</td>
<td>399</td>
<td>209</td>
<td>399</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#4-Cases</td>
<td>2,554</td>
<td>399</td>
<td>497</td>
<td>399</td>
<td>19.5%</td>
<td>19.5%</td>
<td>0.0</td>
</tr>
<tr>
<td>#5-Number</td>
<td>371</td>
<td>497</td>
<td>371</td>
<td>497</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#5-Cases</td>
<td>2,444</td>
<td>497</td>
<td>1,039</td>
<td>497</td>
<td>4.2%</td>
<td>4.2%</td>
<td>0.0</td>
</tr>
<tr>
<td>Disposition</td>
<td>Left</td>
<td>3,523</td>
<td>4,190</td>
<td>799</td>
<td>978</td>
<td>22.4%</td>
<td>22.4%</td>
</tr>
<tr>
<td>Home Health</td>
<td>8,314</td>
<td>10,599</td>
<td>3,554</td>
<td>3,565</td>
<td>35.8%</td>
<td>35.8%</td>
<td>0.0</td>
</tr>
<tr>
<td>Against Advice</td>
<td>866</td>
<td>1,352</td>
<td>274</td>
<td>474</td>
<td>31.6%</td>
<td>31.6%</td>
<td>0.0</td>
</tr>
<tr>
<td>Other Facility</td>
<td>1,741</td>
<td>2,044</td>
<td>559</td>
<td>675</td>
<td>32.1%</td>
<td>32.1%</td>
<td>0.0</td>
</tr>
<tr>
<td>SNF</td>
<td>8,252</td>
<td>9,206</td>
<td>2,750</td>
<td>3,104</td>
<td>33.3%</td>
<td>33.3%</td>
<td>0.0</td>
</tr>
<tr>
<td>ST Acute Care Facility</td>
<td>2,615</td>
<td>3,890</td>
<td>1,008</td>
<td>1,397</td>
<td>35.8%</td>
<td>35.8%</td>
<td>0.0</td>
</tr>
<tr>
<td>Routine</td>
<td>77,185</td>
<td>137,646</td>
<td>16,730</td>
<td>26,361</td>
<td>21.7%</td>
<td>19.2%</td>
<td>2.5</td>
</tr>
<tr>
<td>Type of Admission</td>
<td>Emergency</td>
<td>16,400</td>
<td>22,444</td>
<td>4,451</td>
<td>6,236</td>
<td>27.1%</td>
<td>27.9%</td>
</tr>
<tr>
<td>Urgent</td>
<td>50,079</td>
<td>70,302</td>
<td>14,824</td>
<td>20,968</td>
<td>29.6%</td>
<td>29.8%</td>
<td>-0.2</td>
</tr>
<tr>
<td>Elective</td>
<td>25,938</td>
<td>36,751</td>
<td>5,756</td>
<td>8,082</td>
<td>22.2%</td>
<td>22.0%</td>
<td>0.2</td>
</tr>
<tr>
<td>Delivery</td>
<td>11,399</td>
<td>16,961</td>
<td>396</td>
<td>1,653</td>
<td>3.5%</td>
<td>4.1%</td>
<td>-0.6</td>
</tr>
<tr>
<td>Unknown</td>
<td>60</td>
<td>98</td>
<td>17</td>
<td>26</td>
<td>28.3%</td>
<td>29.2%</td>
<td>-0.9</td>
</tr>
<tr>
<td>Mean # of Diagnoses</td>
<td>3.3</td>
<td>3.1</td>
<td>4.0</td>
<td>3.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean # of Procedures</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
<td>1.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean # of Admits</td>
<td>5.2</td>
<td>4.5</td>
<td>6.6</td>
<td>6.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean Length of Stay</td>
<td>1.0</td>
<td>1.0</td>
<td>2.6</td>
<td>2.7</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 11 depicts the odds ratio calculations for payer preventable readmissions. In addition, the $r$ squared, odds ratio, and relative risk. The Medi-Cal and All Payer table depicts a weak negative correlation ($r$) of -0.03, a slight negative relative risk of 0.843, and slight negative odds ratio of 0.808.

The HMO and All Payer table depicts a weak negative correlation of -0.054, a moderate negative relative risk of 0.711, and a moderate negative odds ratio of 0.658. The All Others and All Payers table depicts the a weak correlation of 0.031, a weak positive relative risk of 1.12, and a weak positive odds ratio of 1.17. The Medi-Cal and HMO table shows a very weak correlation of 0.026, a weak positive relative risk of 1.12, and a weak positive odds ratio of 1.15. In other words, Medi-Cal cases are 1.12 times more likely than HMO cases to be readmitted.

The Medi-Cal and All Others preventable readmissions table shows a moderate negative correlation of -0.064, a moderate negative relative risk of 0.75, and a moderate odds ratio of 0.69.
The HMO and All Others table show a moderate negative correlation of -0.08, moderate to significant negative relative risk of 0.66, and a moderate to significant negative odds ratio of 0.60.

In other words, All Others cases are 1.40 times more likely to experience preventable readmissions than HMO cases.

The Medical and Surgical Admits table depicts a significant correlation of 0.098, a strong relative risk ratio of 1.51, and a strong odds ratio of 1.67. In other words, Medical admissions are 1.5 times more likely to experience preventable readmissions than surgical admissions. The White and Non-white table statistics are nearly similar. The Male and Female table depicts a significant correlation of 0.097, a strong relative risk of 1.45, and a strong odds ratio of 1.62. In other words, Males are more likely to experience preventable readmissions than Females.

Table 12 depicts the two-by-two tables of various payers, race, gender, and mortality.
The Medi-Cal and All Payer table depicts a weak negative correlation (r) of -0.04, a strong negative relative risk of 0.40, and strong negative odds ratio of 0.39. In words, All Other payer cases are 1.6 times more likely to die than Medi-Cal cases; which, is expected due to the inclusion of the Medicare elderly population in the All Others category.

The HMO and All Payer table depicts a weak negative correlation of -0.033, a strong negative relative risk of 0.424, and a strong negative odds ratio of 0.418.

In other words, HMO payer beneficiaries are 1.6 times less likely to experience death when compared with All Payer beneficiaries.

The Medi-Cal and All Payer mortality table shows a moderate correlation of 0.069, a strong relative risk ratio of 2.123, and a strong odds ratio of 2.186. This table suggests that Medi-Cal patients are 2.12 times more likely to die than the All Payer patients are. The most significant results were revealed in the Medi-Cal and HMO mortality table.
There was a strong correlation of 0.10, a very strong relative risk ratio of 5.01, and a very strong odd ratio of 5.23. This table indicates a chance five-fold of dying if a Medi-Cal beneficiary than a HMO beneficiary.

The Medical and Surgical Admits mortality table depicts a weak correlation of 0.027, a moderate relative risk ratio of 1.45, and a moderate odds ratio of 1.47.

The White and Non-white table shows a weak correlation of 0.028, a moderate to strong relative risk ratio of 1.457, and a moderate to strong odds ratio of 1.507.

The Male and Female table depicts a moderate correlation of 0.056, a strong relative risk of 1.99, and a strong odds ratio of 2.04. In other words, Males are 1.99 times more likely to experience death than Females. Finally, the Readmit and Non-readmit mortality table is similar.
## Table 12 Two by Two Tables of Readmitted Cases

### 2 x 2 Tables

<table>
<thead>
<tr>
<th></th>
<th>Readmitted</th>
<th>Non-Readmitted</th>
<th>r</th>
<th>Rate Ratio</th>
<th>Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Medi-Cal</strong></td>
<td>6,877</td>
<td>30,493</td>
<td>37,370</td>
<td>-0.032</td>
<td>0.843</td>
</tr>
<tr>
<td><strong>All Payers</strong></td>
<td>36,964</td>
<td>132,403</td>
<td>169,367</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>43,841</td>
<td>162,896</td>
<td>206,737</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Readmitted</th>
<th>Non-Readmitted</th>
<th>r</th>
<th>Rate Ratio</th>
<th>Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HMO</strong></td>
<td>4,346</td>
<td>23,658</td>
<td>28,004</td>
<td>-0.054</td>
<td>0.711</td>
</tr>
<tr>
<td><strong>All Payers</strong></td>
<td>36,964</td>
<td>132,403</td>
<td>169,367</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>41,310</td>
<td>156,061</td>
<td>197,371</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Readmitted</th>
<th>Non-Readmitted</th>
<th>r</th>
<th>Rate Ratio</th>
<th>Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All Others</strong></td>
<td>25,444</td>
<td>78,252</td>
<td>103,696</td>
<td>0.031</td>
<td>1.124</td>
</tr>
<tr>
<td><strong>All Payers</strong></td>
<td>36,964</td>
<td>132,403</td>
<td>169,367</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>62,408</td>
<td>210,655</td>
<td>273,063</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Readmitted</th>
<th>Non-Readmitted</th>
<th>r</th>
<th>Rate Ratio</th>
<th>Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Medi-Cal</strong></td>
<td>6,877</td>
<td>30,493</td>
<td>37,370</td>
<td>0.026</td>
<td>1.122</td>
</tr>
<tr>
<td><strong>HMO</strong></td>
<td>4,644</td>
<td>23,658</td>
<td>28,301</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>11,520</td>
<td>54,151</td>
<td>65,671</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Readmitted</th>
<th>Non-Readmitted</th>
<th>r</th>
<th>Rate Ratio</th>
<th>Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Medi-Cal</strong></td>
<td>6,877</td>
<td>30,493</td>
<td>37,370</td>
<td>-0.064</td>
<td>0.750</td>
</tr>
<tr>
<td><strong>All Others</strong></td>
<td>25,444</td>
<td>78,252</td>
<td>103,696</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>32,321</td>
<td>108,745</td>
<td>141,066</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Readmitted</th>
<th>Non-Readmitted</th>
<th>r</th>
<th>Rate Ratio</th>
<th>Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HMO</strong></td>
<td>4,644</td>
<td>23,658</td>
<td>28,301</td>
<td>-0.080</td>
<td>0.669</td>
</tr>
<tr>
<td><strong>All Others</strong></td>
<td>25,444</td>
<td>78,252</td>
<td>103,696</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>30,087</td>
<td>101,910</td>
<td>131,997</td>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Readmitted</th>
<th>Non-Readmitted</th>
<th>r</th>
<th>Rate Ratio</th>
<th>Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Medical Admits</strong></td>
<td>26,046</td>
<td>78,787</td>
<td>104,833</td>
<td>0.098</td>
<td>1.505</td>
</tr>
<tr>
<td><strong>Surgical Admits</strong></td>
<td>10,270</td>
<td>51,958</td>
<td>62,228</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>36,316</td>
<td>130,745</td>
<td>167,061</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Readmitted</th>
<th>Non-Readmitted</th>
<th>r</th>
<th>Rate Ratio</th>
<th>Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>White</strong></td>
<td>24,907</td>
<td>85,275</td>
<td>110,082</td>
<td>0.023</td>
<td>1.099</td>
</tr>
<tr>
<td><strong>Non-White</strong></td>
<td>12,157</td>
<td>47,129</td>
<td>59,285</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>36,964</td>
<td>132,403</td>
<td>169,367</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Readmitted</th>
<th>Non-Readmitted</th>
<th>r</th>
<th>Rate Ratio</th>
<th>Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Male</strong></td>
<td>15,733</td>
<td>41,598</td>
<td>57,331</td>
<td>0.097</td>
<td>1.448</td>
</tr>
<tr>
<td><strong>Female</strong></td>
<td>21,231</td>
<td>90,804</td>
<td>112,035</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>36,964</td>
<td>132,402</td>
<td>169,366</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 13 Two by Two Tables of Mortality Cases

<table>
<thead>
<tr>
<th></th>
<th>Death</th>
<th>Non-Death</th>
<th>( r )</th>
<th>Risk</th>
<th>Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Medi-Cal</strong></td>
<td>370</td>
<td>37,000</td>
<td>37,370</td>
<td>-0.039</td>
<td>0.400 0.394</td>
</tr>
<tr>
<td><strong>All Payers</strong></td>
<td>4,190</td>
<td>165,177</td>
<td>169,367</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4,560</td>
<td>202,177</td>
<td>206,737</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>HMO</strong></td>
<td>297</td>
<td>28,004</td>
<td>28,301</td>
<td>-0.033</td>
<td>0.424 0.418</td>
</tr>
<tr>
<td><strong>All Payers</strong></td>
<td>4,190</td>
<td>165,177</td>
<td>169,367</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4,487</td>
<td>193,181</td>
<td>197,668</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Medi-Cal</strong></td>
<td>3,087</td>
<td>55,678</td>
<td>58,765</td>
<td>0.069</td>
<td>2.123 2.186</td>
</tr>
<tr>
<td><strong>All Payers</strong></td>
<td>4,190</td>
<td>165,177</td>
<td>169,367</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>7,277</td>
<td>220,855</td>
<td>228,132</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>HMO</strong></td>
<td>3,087</td>
<td>55,678</td>
<td>58,765</td>
<td>0.102</td>
<td>5.006 5.228</td>
</tr>
<tr>
<td><strong>All Payers</strong></td>
<td>4,190</td>
<td>165,177</td>
<td>169,367</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>7,277</td>
<td>220,855</td>
<td>228,132</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Medical Admits</strong></td>
<td>2,876</td>
<td>101,957</td>
<td>104,833</td>
<td>0.027</td>
<td>1.457 1.470</td>
</tr>
<tr>
<td><strong>Surgical Admits</strong></td>
<td>1,172</td>
<td>61,056</td>
<td>62,228</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4,048</td>
<td>163,013</td>
<td>167,061</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>White</strong></td>
<td>3,079</td>
<td>107,003</td>
<td>110,082</td>
<td>0.028</td>
<td>1.493 1.507</td>
</tr>
<tr>
<td><strong>Non-White</strong></td>
<td>1,111</td>
<td>58,174</td>
<td>59,285</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4,190</td>
<td>165,177</td>
<td>169,367</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Male</strong></td>
<td>2,119</td>
<td>55,212</td>
<td>57,331</td>
<td>0.056</td>
<td>1.999 2.038</td>
</tr>
<tr>
<td><strong>Female</strong></td>
<td>2,071</td>
<td>109,964</td>
<td>112,035</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4,190</td>
<td>165,176</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Readmit</strong></td>
<td>978</td>
<td>35,986</td>
<td>36,964</td>
<td>0.006</td>
<td>1.091 1.093</td>
</tr>
<tr>
<td><strong>Non-Readmit</strong></td>
<td>3,212</td>
<td>129,191</td>
<td>132,403</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4,190</td>
<td>165,177</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Summary

The data show that HMOs have better mortality and preventable readmission rates than all of the other payer types. The Medi-Cal populations are younger, yet have greater preventable readmission and mortality rates than the HMO populations. The top five diagnoses for Medi-Cal and HMO populations are nearly the same.

Hypothesis Testing

HMO and Medi-Cal Payer beneficiaries

The preventable readmission and mortality variables have been dichotomized to zero and one values to provide percentage results. The zero value represents non-preventable readmission and non-mortality. The value of one represents positive preventable readmission and positive mortality.

Readmissions

The results depicted in table 11 reveal an odds ratio of 1.149 for readmitted Medi-Cal versus HMO readmitted hospital discharge cases. The Medi-Cal readmitted versus All Payers readmissions reveals an odds ratio of 0.808.
Also, the HMO readmitted versus All Payers readmissions reveals an odds ratio of 0.658. These data show that Medi-Cal payer plan readmissions are more likely to occur than HMO payer plan beneficiary readmissions.

The conclusion of these results is therefore to accept the null hypothesis that Medi-Cal payer plan beneficiaries would not experience higher risks of readmissions if enrolled in HMO payer plans.

Mortality
The results depicted in table 12 reveal a strong odds ratio of 5.228 for Medi-Cal deaths versus HMO deaths. The Medi-Cal deaths versus All Payer deaths reveals an odds ratio of 0.394.

Also, the HMO deaths versus All Payer deaths reveals an odds ratio of 0.418. These data show that Medi-Cal payer plan deaths are far more likely to occur than HMO payer plan beneficiary readmissions.

The conclusion of these results is therefore to accept the null hypothesis that Medi-Cal payer plan beneficiaries would not experience higher risks of deaths if enrolled in HMO payer plans.
Summary

The result of the Odds Ratio statistical test is to accept the null hypothesis that no statistical difference exists between Medi-Cal and HMO discharges.
Discussion

In an effort to control health care costs and provide quality health care, many states are enrolling public aid populations in HMOs and other forms of managed care plans. In 1981 there were 280,000 Medicaid payer beneficiaries enrolled in HMOs compared with 2.7 million in 1987. Government agencies expect managed care plans to yield cost savings, or at least slow the rate at which health care costs are increasing, by greater preventive care and controlled utilization.

During the late 1980s, the expanded pursuit of Medicaid managed care contracting has led states to seek federal HCFA waivers from the freedom-of-choice clause.

In some states, enrollment in HMOs or some capitated organizational form is mandatory. However, the health care organizations have not always been eager to provide coverage to the Medicaid population. The frequency of eligibility, high utilization rates, and chronic conditions associated with the Medicaid populations coupled with the reimbursement rates below traditional fee-for-service rates have made the Medicaid population less financially desirable.
Moreover, the managed care organizations have been scrutinized and criticized by health care advocates for discouraging utilization.

The Center for Public Representation of Milwaukee reported many examples of discouraged utilization among mandatory Medicaid HMO plans. The study cites examples of avoidance of specialist referrals and a lack of prenatal and family planning services. The study also depicts a lack of beneficiary knowledge about the system and services available to members and discontinuities in prenatal care.

California has been very successful with managed care. Although there have been limited resources per beneficiary, higher than average unemployment and underemployment, high immigration, lower tax revenues, diminishing federal funds, higher tax burdens, and environmental impairments, the health status indicators and outcomes appear to be favorable when compared with the national data. Overall, the Medi-Cal fee-for-service data show no statistically significant differences when compared with the HMO data. In some cases, the HMOs have more favorable outcomes.
The HMOs in California have been evolving and maturing for decades and have led the nation in refining and exploring more efficient and effective care. Clearly, the outcomes satisfy Donabedian’s definition of quality care, that which does more good than harm, and which is efficient and effective. California HMOs seem to be maximizing the utility of scarce and diminishing resources.

The type of health insurance plan one belongs to will determine the use of health care services according to the Andersen behavioral model. Health plans fit into the enabling segment of the model and their influences span across system differences, financial barriers, access, community resources, and social support. In the Donabedian model, health insurance plans span across structure and process of the three-segment model. Both models lend validity to health care assessment.

The selection of preventable readmissions and mortality as indicators of the quality of care were selected because they are clear events that can be measured, increase the costs to patients or providers, and result in undesirable consequences.
The choice of outcome measures from among the range of possibilities presents a challenge to researchers and health care professionals. It was my choice to select mortality because death is certainly an unwanted, and in most cases costly, outcome. Preventable readmissions are unwanted by the health care professionals, patients, payers, and society because they are costly in real and indirect terms. Although preventable readmission and mortality rates in this research fail to identify the discrete causes of their outcome, they edify changes or differences from some baseline of acceptable limits. If the diagnoses, severity of illness, and demographic characteristics of populations are the same, real difference in the quality of care should not exist.

In terms of policy development, a greater impact assessment must be compiled to determine the baseline of care, the demographic needs of the various communities, and audit guidelines. The increased enrollment of Medi-Cal payer beneficiaries in HMOs will yield improvements in care and costs if outcome measurements and verification audit mechanisms correspond.
Alternatively, the continued lack of policies, verification mechanisms, and regulations may yield adverse outcomes for Medi-Cal payer beneficiaries and more costs to society, health care providers, and payers. Moreover, The DHS should develop Medi-Cal reimbursement policies directly linked to the various dimensions of quality of care.

The enrollment of Medicaid and Medicare payer beneficiaries in HMOs theoretically provides incentives for the early hospital discharge. However, the analysis of the 1991 California data does not support this premise.

Literature related to this subject, in general, suggest that early discharges may increase the risk of subsequent preventable readmission if all necessary medical care is not completed during a patient's first hospital stay. Therefore, further research and close monitoring should continue to create more explicit causal linkages.

The Health Care Financing Administration (1988) requires that preventable readmissions within 31 days of discharge be reviewed by peer review organizations to determine if the preceding discharge was premature or if other quality problems existed and should entice providers...
to maintain quality. However, coding bias may cause some cases to avoid review.

In 1993, the department released a "strategic plan" intended to rapidly move the Medi-Cal Program toward a "managed care" approach for providing services to Medi-Cal payer beneficiaries. In this section, I make several recommendations regarding the department's proposed expansion.

The Legislature and the department have, for several years, attempted to increase the number of Medi-Cal payer beneficiaries enrolled in managed care arrangements. In particular, legislation accompanying the 1992 Budget Act gave the department broad authority to expand managed care in California, with the goals of improving beneficiary access to care and making the Medi-Cal Program more cost-effective.

Approximately 1 million out of 5.5 million Medi-Cal payer beneficiaries were enrolled in a managed care arrangement by the end of 1994-95. The department anticipates this number will increase to a total of 2.5 million by the end of 1995-96.
Under managed care arrangements, the Medi-Cal Program attempts to control costs by generally reimbursing providers on a "capitated," or per-person basis regardless of the number of services any given individual uses. In addition, the use of specialists and high-cost services require a physician referral. This approach contrasts with the fee-for-service system, where Medi-Cal pays providers for each service they provide, and the beneficiary has his or her choice in selecting providers. In fee-for-service, utilization is controlled by requiring prior authorization from the Medi-Cal field offices for the more expensive medical services.

The principal managed care arrangements are:

Medi-Cal contracts with private Prepaid Health Plans (PHPs) to provide care to AFDC-linked payer beneficiaries.

The PHPs are paid a monthly capitation payment, based on an estimate of the costs of serving payer beneficiaries in the fee-for-service system. The department generally has not entered into contracts to enroll SSI/SSP-linked payer beneficiaries in PHPs. Under the approach of County-Organized Health Systems (COHS), the county acts as a
prepaid plan, serving all Medi-Cal payer beneficiaries in the county. The COHS receive a capitated rate for each beneficiary in the county, and assume full financial risk. Currently, Santa Barbara, San Mateo, and Solano Counties have fully implemented this approach, and two additional counties--Orange and Santa Cruz--will begin very soon. Federal law prohibits additional county-organized systems in California beyond these five.

Under the approach of Geographic Managed Care (GMC), the Medi-Cal Program negotiates contracts directly with providers to accept payer beneficiaries within a specified area, paying a monthly rate based on the estimated cost of providing services to similar payer beneficiaries under the fee-for-service system.

The department implemented this approach in Sacramento County April of 1994, and intends to implement a second project in San Diego County.

Primary Care Case Management (PCCM) plans are paid a fixed monthly fee (per capita) to manage the care of the Medi-Cal payer beneficiaries enrolled in the plan. They approve referrals to specialists, non-emergency
hospitalizations, and other high-cost procedures. If the costs of care for enrollees in a PCCM plan are less than the estimated fee-for-service cost would have been for similar payer beneficiaries, the PCCM plan receives a payment equal to half the estimated savings.

The department's strategic plan and the budget propose to enroll nearly half of all beneficiaries (2.5 million out of an estimated 5.5 million) in a managed care arrangement by late 1995-96. The plan proposes to expand the number of beneficiaries served under managed care arrangements primarily by implementing the aforementioned managed care strategies and expanding managed care models to additional counties.

I suggest that the department enact legislation which would require the inclusion of newly enrolled SSI/SSP-linked beneficiaries in the counties targeted for managed care changes to enroll in managed care plans while allowing existing beneficiaries to remain under FFFS arrangements for the next two years. This would allow the current continuum of care to remain stable for providers and beneficiaries for a transitional period of time.
In addition, I recommend greater research, planning, and implementation of clinical guidelines for the top 80% most costly procedures. The literature strongly suggests that significant savings can be realized by minimizing the wide variations of inappropriate care.

Also, the development and fostering of strategic partnerships among the government agencies, pharmaceutical industry, hospitals, practitioners, business, and academic organizations may yield efficient solutions to serious health care issues.

I believe that the Medi-Cal populations will benefit from the HMO continuum of care that is incented to promote better health and which is structurally more consistent than the fragmented fee-for-service structure. The HMO preventable readmission and mortality rates depict better outcomes, include a more mainstream population, and would better control the continuum of care for Medi-Cal payer beneficiaries. In addition, greater regulation of HMOs is becoming more prevalent; which, safeguard the patient’s rights.

Finally, the ultimate problem facing all Americans is
how to allocate scarce resources to all that is fair, efficient, and politically acceptable. The goal of health care leaders is to develop methods which ensure that the decisions are not random. The use of outcomes analysis is a good tool for organizing, delivering, and monitoring efficient and equitable care. The Medicaid population is comprised of a population, which is markedly different from those historically, enrolled in HMOs.

The needs of these low-income women and children, disabled, elderly, and ethnically diverse populations include greater understanding of their specific needs, timely-assessments and response, simplified geographic access, greater education to empower the beneficiary, and greater understanding about the environment within which they live.
### Variable Description

#### AGE

#### PAYMENT SOURCE
- 1=Medicare
- 2=Medi-Cal
- 3=Workers Compensation
- 4=Title V
- 5=Other Government
- 6=Blue Cross/Blue Shield
- 7=Insurance Company
- 8=HMO/PHP
- 9=Self-Pay
- 10=No Charge
- 11=Other Non-Government"
- 12=Medically Indigent (Sec. 1700)

#### PRINCIPAL DIAGNOSIS

#### OTHER DX 1

#### OTHER DX 2

#### OTHER DX 3

#### OTHER DX 4

#### RACE
- 1=White
- 2=Black
- 3=Hispanic
- 4=Native Am./Eskimo
- 5=Asian
- 6=Other
- 7=Unknown

#### SEX
- 1=Male
- 2=Female
- 3=Other
- 4=Unknown

#### ZIP CODE

#### COUNTY OF RESIDENCE
- 1=Alameda
- 2=Alpine
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<td>43</td>
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<td>44</td>
<td>Santa Cruz</td>
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</table>
1=Routine Discharge
2=Short-Term Acute Care Hospital
3=Intermediate Care Facility
4=Skilled Nursing Facility
5=Other Healthcare Facility
6=Against Medical Advice
7=Home Health Service
8=Died

ADMISSION DAY
1=Sunday
2=Monday
3=Tuesday
4=Wednesday
5=Thursday
6=Friday
7=Saturday

ADMISSION MONTH/YEAR

REPORT SOURCE
1=General Acute Care Report
2=Skilled Nursing/Intermediate Care Report
4=Psychiatric Care Report
5=Alcohol/Drug Rehabilitation Report
6=Rehabilitation Report

HOSPITAL COUNTY
1=Alameda
2=Alpine
3=Amador
4=Butte
5=Calaveras
6=Colusa
7=Contra Costa
8=Del Norte
9=El Dorado
10=Fresno
11=Glenn
12=Humboldt
13=Imperial
14=Inyo
15=Kern
16=Kings
17=Lake
18=Lassen
19=Los Angeles
20=Madera
21=Marin
22=Mariposa
23=Mendocino
24=Merced
25=Modoc
26=Mono
27=Monterey
28=Napa
29=Nevada
30=Orange
31=Placer
32=Plumas
33=Riverside
34=Sacramento
35=San Benito
36=San Bernardino
37=San Diego
38=San Francisco
39=San Joaquin
40=San Luis Obispo
41=San Mateo
42=Santa Barbara
43=Santa Clara
44=Santa Cruz
45=Shasta
46=Sierra
47=Siskiyou
48=Solano
49=Sonoma
50=Stanislaus
51=Sutter
52=Tehama
53=Trinity
54=Tulare
55=Tuolumne
56=Ventura
57=Yolo
58=Yuba

# OF DIAGNOSES
# OF PROCEDURES
# ADMISSIONS

MDC–MAJOR DIAGN. CAT.

MEDICAL/SURGICAL
1=Surgical DRG
2=Medical DRG

MULTIPLE ADMISSIONS
0=No
1=Yes

ADMIT DATE

ADMITS IN MONTH

AGE CATEGORIES
0=Outlier
1=1-10
2=11-20
3=21-30
4=31-40
5=41-50
6=51-60
7=61-65
8=66-75
9=76+

OTHERPAY
1.00=ALL OTHERS
2.00=MEDICAL
3.00=HMO

MORTALITY
0=non-death
1=death

PAYER
0=Medi-Cal
1=HMO
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