COUNTY VARIATION IN UTILIZATION AND EXPENDITURES ON INDIGENT PATIENTS IN CALIFORNIA

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# CONTENTS

Acknowledgement ............................................................................................................. iii  
Executive Summary ......................................................................................................... iv  
List of Tables .................................................................................................................... vi  
List of Figures .................................................................................................................. viii  
Introduction ........................................................................................................................1  
  Description and Significance of the Problem .............................................................1  
  Previous Research .......................................................................................................2  
  Outline of this Report .................................................................................................5  
Background ......................................................................................................................7  
  Defining the Indigent Population .............................................................................7  
  Evolution of Indigent Programs in California .......................................................8  
Methods ............................................................................................................................10  
  Indigent Care Samples and Data Sources ..........................................................10  
  Potential Factors Influencing Variation in Indigent Care ..................................14  
  Utilization and Expenditure Measures ...............................................................16  
  Analyses and Measures of Variation .................................................................17  
Empirical Results ............................................................................................................22  
  Profile of Indigent Care Utilization and Expenditures ........................................22  
  Comparisons of Utilization and Expenditure Based on Selected County Characteristics ............................................................34  
  Regression Results .................................................................................................35
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EXECUTIVE SUMMARY

There have been many dramatic changes in how health care services are financed and the way in which these services are provided in the private and public health care delivery systems. Changes in the funding of medical services for individuals without insurance coverage has changed both nationally and at the state level, altering the responsibilities of local health departments for providing medical care to those who do not have insurance and cannot afford to pay themselves. Variation in the amount of indigent care provided by different counties has been alleged and, in some cases, observed. This variation may have adverse implications for the health status of this population if it results from reduced access to needed medical services.

The objectives of this study are to explore different definitions of the indigent population, identify data sources on indigent care, define different measures of indigent care that may be compared across counties, document the amount of indigent care provided by California counties, investigate and explain the degree to which these indigent care measures vary across counties, and provide recommendations for correcting existing data limitations that will improve the ability to address issues related to indigent care in California.

In general, the results of this study suggest the following:

- Indigents appear to use more resources in an outpatient setting compared to non-indigent patients. Outpatient care accounts for approximately 42 percent of total indigent charges or expenditures, compared to only 29 percent for nonindigents.
- Indigent care does not vary consistently across California counties. Some measures display substantial variation, while others exhibit relatively small variation. Thus, it is
not appropriate to speak generically about inter-county variation in indigent care. Instead, the results may depend significantly on the specific indigent care measure that is selected and the data source used.

Available data on selected county characteristics may explain as much as 72 percent of variation in indigent care across California counties.

Future investigations of indigent care would benefit from greater consensus on what constitutes the indigent population, more complete and consistent reporting of data on indigent care by all counties, and greater attention paid to whether differences in indigent care represent valid deficiencies in access to medically appropriate care with measurable adverse effects on health status rather than simply differences in expenditures that may reflect a more costly style of care by some counties.
## List of Tables

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 1</td>
<td>Indigent Utilization and Expenditure Measures</td>
</tr>
<tr>
<td>Table 2</td>
<td>Distribution of Age and Gender of California Counties</td>
</tr>
<tr>
<td>Table 3</td>
<td>Racial Characteristics of California Counties</td>
</tr>
<tr>
<td>Table 4</td>
<td>Economic and Other Characteristics of Counties</td>
</tr>
<tr>
<td>Table 5</td>
<td>Comparisons of Major Diagnostic Categories: MICRS Versus OSHPD Discharge Data</td>
</tr>
<tr>
<td>Table 6</td>
<td>Expenditures or Charges per 1,000 Population: MICRS Versus Quarterly Data</td>
</tr>
<tr>
<td>Table 7</td>
<td>Inpatient and Outpatient Utilization as a Percent of California Total: MICRS Versus Quarterly Data</td>
</tr>
<tr>
<td>Table 8</td>
<td>Indigent Inpatient Utilization and Charges: Quarterly Data</td>
</tr>
<tr>
<td>Table 9</td>
<td>Indigent Inpatient Utilization and Expenditures: MICRS Data</td>
</tr>
<tr>
<td>Table 10</td>
<td>Indigent Outpatient And Total Hospital Utilization And Charges: Quarterly Data</td>
</tr>
<tr>
<td>Table 11</td>
<td>Indigent Outpatient Utilization and Expenditures: MICRS Data</td>
</tr>
<tr>
<td>Table 12</td>
<td>Percent of Total Charges or Expenditures on Outpatient Care: MICRS Versus Quarterly Data</td>
</tr>
<tr>
<td>Table 13</td>
<td>Composition of Total Indigent Expenditures: MICRS Data</td>
</tr>
<tr>
<td>Table 14</td>
<td>Indigent Emergency Room Utilization and Expenditures: MICRS Data</td>
</tr>
<tr>
<td>Table 15</td>
<td>Percent of Admissions and Outpatient Visits by Hospital Ownership: Quarterly Data</td>
</tr>
<tr>
<td>Table 16</td>
<td>Percent of Indigent Discharges by Hospital Type: MICRS Data</td>
</tr>
<tr>
<td>Table 17</td>
<td>Percent of Inpatient Users by Age: MICRS Data</td>
</tr>
<tr>
<td>Table 18</td>
<td>Percent of Outpatient Users by Age: MICRS Data</td>
</tr>
</tbody>
</table>
Table 19  Indigent Utilization and Expenditure Measures Included in County Median Contrasts

Table 20  Differences in Selected Indigent Utilization and Expenditure Measures Across California Counties

Table 21  Regressions on Selected Indigent Utilization and Expenditure Measures: Quarterly Data

Table 22  Percent of Patients Receiving Selected Cardiac Procedures

Table 23  Percent of Patients With Principal Diagnoses Indicating Potential Need for Cardiac Procedures

Table 24  Difference in Selected Indigent Utilization Measures: MICRS Versus Quarterly Data
List of Figures

Figure 1  Total Expenditure per 1,000 Population (MICRS)
Figure 2  Total Hospital Charges per 1,000 Population (Quarterly)
Figure 3  Indigent Users as a Percent of Total Population (MICRS)
Figure 4  Percent of All Inpatient Admissions by Indigents (Quarterly)
Figure 5  Total Expenditure per Indigent User (MICRS)
Figure 6  Outpatient Charges as a Percent of Total Hospital Charges (Quarterly)
INTRODUCTION

Description and Significance of the Problem

The past three decades have witnessed dramatic changes in how health care services are financed and the way in which these services are provided in both the private and public health care delivery systems. Funding of medical services for many individuals without private insurance coverage changed significantly in 1966 with implementation of Medicare and Medicaid. This altered the responsibilities of local health departments, since many of their residents for whom they were providing care were covered by one of these programs and now received their medical services from providers in the private fee-for-service sector. Counties retained responsibility for providing services to those who did not have private insurance coverage, were unable to pay for care themselves, and were not eligible for these or other publicly funded programs.

During the next thirty years, particularly since 1983, there have been many different programs and funding mechanisms related to providing indigent care in California. At the same time, changes in the state’s economy and demographic characteristics have put greater pressure on counties as resources available to provide indigent medical services have grown more slowly than the number of indigents. These factors, coupled with differences in characteristics of local health delivery systems and stringency with which eligibility for public categorical programs is determined and enforced, have contributed to alleged variation across counties in the provision of indigent medical services.

Although modest differences may be expected and would not necessarily be alarming,
substantial variation that cannot be explained by factors related to medical need may suggest adverse implications for access to care, quality of care provided, the health status of this population, programmatic expenditures, and the financial viability of institutions which tend to be the primary source of care for indigents. If reimbursement for indigent care is less generous than other payer sources, providers may face greater financial pressure and have an incentive to restrict access, reduce quality of care, or shift costs to other payers.

This study has four primary objectives:

1. To define what individuals comprise the indigent population, identify sources of data containing information on indigent care in California, and explore alternative ways in which the amount of indigent care provided may be measured and compared across counties.

2. To document the amount of indigent care provided by California counties during the most recent year of data using these different measures, and to investigate the degree to which indigent care varies across counties.

3. To identify empirically factors that may explain why medical services provided to indigents varies across counties.

4. To discuss limitations in available data that prevent a more complete explanation of this variation, and make recommendations that address this limitation.

**Previous Research**

Documenting and explaining geographic variation in the utilization of health services has been growing as a meaningful area of health services research, and promises to provide
important information for health policy discussion and formulation. Many studies of geographic differences in the use of health care services, often referred to as a small area analysis (SAA), have been performed and significant variations have often been observed. These analyses examined variation primarily at the geographic level of states, provinces, or metropolitan statistical areas (MSAs). To account for the variations found, Paul-Shaheen, Clark, and Williams (1987) describe the major contributing elements that have been included in evaluations as community determinants (e.g., unemployment), health services system determinants (e.g., availability of facilities), and individual determinants (e.g., illness severity).

Early SAA studies were designed to investigate variation across geographic areas in the rates of hospital admissions or discharges, with average length of stay examined less frequently and expenditures rarely considered (Paul-Shaheen et al., 1987). Other analyses focused on variation in home health services and the rates of selected surgical procedures, including hysterectomy, tonsillectomy, cholecystectomy, and appendectomy (Paul-Shaheen et al., 1987; Stockwell and Vayda, 1979; Vayda et al., 1984; Stevenson and Olson, 1993; Hammond, 1985).

More recently, SAA has been used to examine the extent to which variations in surgical procedure rates might be explained by inappropriate or unnecessary care (Davidson, 1993; Leape et al., 1990; Chassin et al., 1987). These studies have often failed to explain a large amount of the observed variation in hospital and other medical services, and have provided little evidence that high use rates may be attributed to unnecessary services.

One difficulty in investigating variation in utilization across different areas is determining how much variation is too much. In other words, it is necessary to compare observed variation with the amount that would be considered normal and not alarming.
However, there is generally little theoretical basis for determining how much variation would normally be expected (Diehr, Cain, Connell, and Volinn, 1990). SAA studies have used a number of statistical and other methods to investigate geographic variation in health services. The most popular methods include the extremal quotient (EQ), the chi-square statistic, and the coefficient of variation. Each of these has advantages and disadvantages, as described in Diehr et al. (1990) and discussed below. Unfortunately, results from different SAA studies are often difficult to interpret and compare due to the different methods and data used.

For most studies of small area variation in health care utilization, the unit of analysis has been either the state or the metropolitan statistical area, as mentioned above. While counties may have the advantage of being relatively small and self contained in terms of health providers and medical needs of the population, performing inter-county analysis of variation in utilization of medical care may present several problems. For example, many individuals cross county lines in order to receive medical services. This is especially likely to be true in some states other than California, where there are many counties that are small in size or population. This makes it difficult to draw meaningful conclusions regarding rates. More importantly, data on some factors that may explain variation in utilization tend to be available only at the state or MSA level rather than for counties. This may explain the number of SAA studies that analyze variation across these larger geographic areas. For example, the percent of the population that is uninsured, which is one important potential factor in determining the amount of indigent care provided, is available only at the MSA level from the Current Population Survey.

Little research has been performed to investigate differences in utilization of health
services by uninsured populations, and there appear to be no studies on the subset of insured individuals who qualify for specific state or local indigent health care programs. A report published by the Department of Health Services examined statewide utilization by the indigent, no charge, and self-pay populations using hospital discharge data (Ellis, 1990). This study focused on characteristics and trends in utilization of the entire California population without health insurance, although no analysis was performed at the county level.

While small area analysis can provide valuable information for both researchers and individuals shaping health care policy, there still is no applicable literature that focuses on utilization of medical services by indigent populations and investigates variation in this utilization across different geographic areas. As discussed above, this information may have important implications for access to care by, and the health status of, these individuals. This study attempts to address this paucity of information by documenting different measures of indigent medical care utilization and expenditure, and by attempting to explain variation in these measures across counties in California.

Outline of this Report

The next section of this report explores the different ways in which indigent populations may be defined and provides a brief background on the evolution of public indigent programs in California. The following section presents a detailed explanation of the data sources used in this report as well as factors that might be expected to influence indigent care provided. The different measures of indigent utilization and expenditure that are estimated as well as the
analyses performed to investigate variation in indigent care are also described. Empirical results from the analyses performed on these utilization and expenditure measures are then presented and discussed. The report concludes with a summary of the most important findings and a discussion of data limitations that prevented a more comprehensive investigation of variation in indigent care.
BACKGROUND

Defining the Indigent Population

There are several possible definitions of indigents, each having different implications for data that is required and analyses that may be performed. A broad definition would include all individuals who are unable to pay for their own care and have no private or public insurance (not including public programs designed specifically for indigents). The cost of services provided to this uninsured population would be borne by counties (although defrayed in part by state and possibly federal contributions) and possibly the providers themselves. A narrower definition of the indigent population would include all individuals who are eligible for public categorical programs that are designed specifically to provide medical services to those who are uninsured and are unable to pay their medical bills.

Although the broader definition would be preferred for this report since it provides a more complete and accurate measure of indigent care provided in each county, it requires data on individuals who are not eligible for public indigent programs, have no public or private insurance, and who do not have sufficient income to pay for medical care they receive. Unfortunately, this information is not available at the county level, as discussed below.

Consequently, this report follows the latter, narrower definition, focusing on those individuals who received services that were provided as part of a county- or state-funded program for indigent care. Although this has the benefit of using available data, it probably does not include all medical care provided to those who would reasonably be considered medical indigents in each county.
Evolution of Indigent Programs in California

California currently has a wide array of programs and funding sources that provide for the medical care of the State’s indigent population. During the last two decades these funding sources and programs have provided a safety net for those individuals who have no private health insurance, are not eligible for other public programs (e.g., Medicare and MediCal), and are unable to pay for care (Legislative Analyst’s Office, 1995). Section 17000 of the California Welfare and Institutions Code, which requires counties to provide medical services to indigents, has resulted in a strong history of responsibility at the county level for providing medical care and addressing the health care needs of this population (Duke, 1993).

The first distinct provisions for the medical care of California’s indigents was provided through the State’s MediCal program. The medically indigent adult (MIA) category was added to the MediCal Program in 1971, and included many of the State’s uninsured individuals who did not previously qualify for MediCal coverage based on categorical eligibility criteria. In 1982, budgetary pressures prompted the transfer of responsibility for the MIAs from the State to the counties, with counties receiving approximately 70 percent of expected expenditures for this group from General Fund revenues. As part of this transfer of responsibility for MIAs, smaller counties with populations under 300,000 were allowed to contract back to the State for care provided to their medically indigent residents. This activity became known as the County Medical Services Program (CMSP) through which the State provided indigent care using a program design similar to the mainstream MediCal Program. The remaining counties were allowed to develop their own programs, known as the Medically Indigent Services Program (MISP), and were given full flexibility and responsibility for designing and operationalizing
these programs. Assembly Bill (AB) 8 was used to administer the funds relating to MISP and CMSP programs and provided State General Fund revenues in the form of block grants to counties (County Supervisors Association of California, 1996). AB 8 also required counties to provide matching funds based on previous expenditure levels.

New legislation was passed during the 1992 fiscal year that changed the financing mechanism of the MISP and CMSP programs. Due to the increasing financial pressures felt at the State level in the 1980s, funding of these programs was changed from a previous arrangement of statutory levels of State General Funds based on prior expenditures to a fixed percentage of Vehicle License Fees (VLF) and sales taxes, which were increased to provide a revenue source for this purpose. This transfer, known as ARealignment, shifted financial responsibility for the MISP program and much of the CMSP program back to the counties. Since Realignment was enacted, this new funding mechanism has led to a continued decline in county revenues for indigent programs due to the unexpected reduction in vehicle licensing fees and sales tax revenues (Legislative Analyst’s Office, 1995; County Supervisors Association of California, 1996).

The other main avenue through which counties have provided medical care to indigents since the late 1980s is the California Healthcare for Indigents Program (CHIP) and the Rural Health Services (RHS) program. Assembly Bill 75 (AB 75) established the CHIP and RHS programs in 1989 following passage of the Tobacco and Health Protection Act of 1988 (Proposition 99). Under AB 75, a percentage of tobacco taxes collected under Proposition 99 was designated to county health services, with a portion of this revenue targeted to increasing medical services provided to indigents through the new CHIP and RHS programs. Counties with
RHS programs may also choose to contract back with the State to provide indigent care to their eligible population.

Counties that participate in these programs are required under AB 99 to continue previous levels of funding for indigent care. Thus, AB 99 funds are intended to supplement rather than supplant previous levels of services provided under AB 8. Actual county funding levels under CHIP are based on statutory percentages. RHS counties receive funds based on either uncompensated care percentages reported to the Office of Statewide Health Planning and Development (OSHPD) or population estimates. A key element of AB 75 was funding and requirements to establish a reporting system in CHIP and RHS counties. This resulted in the Medically Indigent Care Reporting System (MICRS), which required that demographic, utilization, and expenditure data on county indigent care programs be reported to the Office of County Health in Sacramento.

The past fifteen years have witnessed a general decentralization in the provision of indigent medical care, with counties now having much greater responsibility and control for services provided to this population. However, counties often vary significantly in terms of how their indigent care programs are organized, the stringency with which eligibility is enforced, and the public and private health care delivery systems. Moreover, the source of funds is now tied to taxes which may vary with changes in the economy.

METHODS

Indigent Care Samples and Data Sources
Several sources of data were used in this study, including three primary data sets on indigent medical services, since no single source contained complete information on indigent medical care. Each of these data sets provides different information about indigent medical services, including what providers are covered and whether charges or actual expenditures are reported. In addition, they are organized at different levels of aggregation (i.e., some data are reported at the patient level, while other sources reported data at the hospital or county level). Hospital-level data was aggregated to the county level for the purpose of performing analyses on variation in indigent care across counties. The differences among these sources of data are discussed in greater detail below and in the final section of this report.

The three data sets on indigent utilization and expenditure are as follows.

1. **Hospital Annual Discharge Data**, Office of Statewide Health Planning and Development (OSHPD). This data contains information on each patient discharged from a California hospital during a given calendar year. Since data on indigent medical care provided by each hospital was more easily obtained from the next source described below, this patient level data was used primarily to investigate whether indigents were as likely as other patients to receive selected high-cost cardiac procedures. Patient data on expected payer source, diagnosis, and procedure(s) were used in this analysis.

2. **Hospital Quarterly Financial and Utilization Data**, Office of Statewide Health Planning and Development (OSHPD). This data contains information on inpatient and outpatient services provided by each hospital in California during a given quarter, and is referred to in this report as **Quarterly** data. Information for each hospital includes the number of inpatient discharges, patient days, outpatient visits, and charges for patients who were
eligible for any county indigent programs.

Medically Indigent Care Reporting System (MICRS), Office of County Health, California Department of Health Services. Passage of AB 75 required that counties participating in the California Healthcare for Indigents Program (CHIP) or the Rural Health Services (RHS) program provide data on all persons served and all services provided through Section 17000. As a result, all counties that receive AB 99 allocations are required to provide demographic, utilization, and expenditure data relating to their indigent health care programs. Selected demographic characteristics as well as utilization and actual expenditure data for inpatient and outpatient services are reported by each participating county to the Medically Indigent Reporting Unit, California Department of Health Services, where a complete California-wide county level data base is created.

Development and implementation of MICRS data began in FY 1991, and became fully operational in FY 1992. Counties that participate in the RHS program, contract back to the State for their noncounty hospital and physician services, and do not operate a county hospital are exempt from reporting MICRS data. As a result, only 28 counties reported MICRS data for the 1994 fiscal year.

Additional data on hospital characteristics as well as demographic and economic characteristics of counties was obtained from the following data sources.

U.S. Census, 1990: per capita income and the distribution of age and gender in each California county.

California Department of Finance, Demographic Research Unit: total population and
distribution of race in each county.

- **California Statistical Abstract, 1994**: unemployment rate for each county.
- **Annual Report of Financial Transactions Concerning Counties of California, Fiscal Year 1993-94**: total county public expenditure and the percent of expenditure devoted to health care.
- **California Hospital Association**: number of county hospitals (this was validated based on hospital ownership and control information in the hospital Quarterly data).

The mean hospital occupancy rate was calculated based on county level aggregation of information on patient days in the hospital Quarterly data.

Although indigent utilization and expenditure data from these different sources were for different reporting periods (i.e., fiscal year vs. quarterly), all analyses in this report were performed on data that correspond to the 1993-94 fiscal year (i.e., July 1993 - June 1994). County demographic and economic characteristics that were used as independent variables or contrasts in the multivariate analysis were for the most recent year available.

Since MICRS data was available only at the county level and consisted of information on indigent care received by all patients in each county, analysis of this data was constrained by those variables that were reported. In contrast, any hospital information in the Quarterly data could be aggregated to the county level. As a result, each data source was used to investigate different questions regarding variation in indigent care services which would otherwise have been unanswered if just one of these data sources were used.

Also, the differences in the data presented some difficulties regarding comparability of results between the two sources. For example, the Quarterly data contained information on gross
hospital charges while MICRS reported actual indigent expenditures. The Quarterly data also included only hospital-based services, while MICRS contained data on all indigent care, including services provided outside the formal hospital setting. In addition, MICRS included data on the number of indigent users in each county, while only the number of indigent services provided was contained on the Quarterly data. Despite these limitations associated with the Quarterly data, this source did contain information on indigent care provided by hospitals in all California counties. In contrast, information on indigent care in the MICRS data set was available only for the 28 counties reporting MICRS data, although these tend to be counties with larger populations. The differences between these two primary sources of indigent care data are discussed in greater detail in the final section of this report.

Some data was missing from these core data sets. Although one advantage of the Quarterly data was that it covers all California counties, no inpatient or outpatient data was available for Alpine or Mono counties on that data set. In addition, no indigent inpatient admissions were reported for Mariposa county, although data on outpatient visits was available. Finally, while Marin, Mariposa, and Sutter counties all report MICRS data, no information on inpatient admissions was available for the 1993-94 fiscal year.

**Potential Factors Influencing Variation in Indigent Care**

One of the primary objectives of this study is to explain why indigent utilization or expenditure vary across counties. There are several factors which may be identified as representing possible factors that influence the volume of indigent care provided by counties. In general, the following are among the most important factors that are likely to affect the
amount of indigent care provided by any county.

- The number of indigents in the county.
- The stringency in determining eligibility for categorical programs.
- Total public expenditure per capita from county funds.
- The percentage of total public expenditure devoted to health care.
- Access to private and public medical services by the indigent population, which depends in part on the availability of public health clinics throughout the county and whether these clinics charge a copayment for services provided or impose a sliding fee schedule.
- Existence of a county hospital.
- The scope and range of services provided to indigent patients.
- The percentage of patients with MediCal or managed care insurance coverage, since these patients may adversely affect the financial viability of private hospitals and other providers due to relatively low reimbursement.
- Per capita funding of indigent care in the previous year.

In addition, as the percentage of total indigent expenditure devoted to outpatient care increases, this may result in more indigent patients receiving services and lower expenditures. This situation may reflect a commitment by the county to continuity of care and a willingness to develop an outpatient network to serve indigents rather than requiring that they be admitted as inpatients or seek care through the ER when they become ill.

Unfortunately, county level data was not available on many of these potential factors. Variables for which data did exist were used as proxies for many of these factors in the descriptive and regression analyses. These are described in more detail below.
Utilization and Expenditure Measures

Table 1 lists the different measures of indigent care that were included in the analyses. The source(s) of data and the table which includes results for each measure are also shown. Separate analyses were performed for inpatient, outpatient, and combined utilization and expenditure measures to allow for the possibility that only one component of indigent care varies significantly across counties.

Different dimensions of these indigent care measures are analyzed, including totals (e.g., aggregate utilization or expenditure in each county), rates (e.g., utilization or expenditure per user or per 1,000 population), unit costs (expenditure or charge per inpatient admission or per outpatient visit), percentages (e.g., indigent admissions as a percent of total inpatient admissions), and distribution of utilization by patient age and hospital type. These dimensions address different aspects of indigent care and may depend on different factors. For example, while aggregate utilization or expenditure would be expected to increase with a county’s indigent population, these same magnitudes per user or per capita may actually be lower in more highly populated counties, reflecting the fact that more indigents are provided medical care but each receives fewer services. These rates may provide more useful information than aggregate amounts for planning or budgeting purposes since they incorporate both indigent utilization or expenditure and the number of actual or potential users. Since information from the Quarterly data was available for number of indigent services instead of the number of individuals receiving those services, analyses of indigent care per user were performed only on indigent utilization and expenditure measures from MICRS data.
Analyses and Measures of Variation

While some variation in indigent care utilization or expenditure would be expected across different counties, it is unclear a priori how much variation should warrant investigation for possible causes and consequences. This study includes several different types of analyses to document variation in indigent care and investigate possible causes. These different analyses and the measures of variation are discussed below.

County Profiles

Values of the indigent utilization and expenditure measures listed in Table 1 are presented for each county for which data exists. In addition to casual observation of the range and different values of each indigent care measure, the tables report the mean and median values for all counties. The Aextremal quotient, defined as the ratio of the maximum value to the minimum value, has been used in some studies to measure the degree to which variation exists. However, this measure may be misleading since it focuses solely on the two counties with extreme values in the distribution and ignores values for all other counties. Two other ways to measure variation that rely on more information about the specific distribution of any underlying indigent care measure are the coefficient of variation and the percentage difference between the median value and the values for counties at small and large percentiles of the distribution. These are described below.

The standard deviation of a distribution, which is one measure of the dispersion of values, is often used to infer the degree to which values vary in a particular sample. Values of
any variable that lie within one and two standard deviations of the mean account for
approximately 68 percent and 95 percent, respectively, of all observations in a sample with a
normal (i.e., bell-shaped) distribution. Consequently, the larger the standard deviation of any
utilization or expenditure measure, the greater would be the variation that is presumed to exist.
However, the value of the standard deviation may be large simply because values of a particular
indigent care measure are large. For example, a variable that has a mean of 25 would generally
be expected to have a larger standard deviation than one with a mean of 5 (although not
necessarily by the same proportion). Thus, the standard deviation alone may provide a
misleading measure of variation unless it takes account of the underlying values of the variable
being measured.

The coefficient of variation (CV) may provide a better measure of variation since it
relates the standard deviation of any distribution to its mean value. Specifically, the CV is
declared as the ratio of the standard deviation and the mean of a distribution. For the same mean
value of any indigent care measure, a larger value of the CV indicates more variation (i.e.,
greater dispersion) in indigent care. A value of 2.0 would then indicate that the standard
deviation of a distribution is twice as large as its mean value, and that there is 33% greater
variation (relative to the mean value) than another indigent care measure with a CV value of 1.5.
Unfortunately, no sampling distribution exists for the coefficient of variation, so we are unable
to make strong statistical statements about whether a particular value of the CV indicates
significant variation in the underlying indigent care measure.

In addition, since outliers may exert a larger influence on the mean value than the
corresponding standard deviation, including counties with outlier values for any indigent care
measure may have a significant impact on the CV value, leading to misleading inferences about variation in that measure of indigent care. For example, Los Angeles County generally reported much larger total values for indigent utilization and expenditure measures than other counties. Including this county often inflated the mean disproportionately compared to the standard deviation, resulting in a much larger coefficient of variation than when Los Angeles was omitted from the analysis. As a result, separate coefficients of variation are reported in the tables of results for distributions with and without Los Angeles County. This was generally not a problem for per capita and percentage measures of indigent care, so only the CV for all California counties is shown for these indigent care measures.

In addition to coefficient of variation, which provides a single measure of variation, the tables profiling county values of indigent care also show the percentage difference between the median value for each indigent care measure and the value for counties at the 10th, 25th, 75th, and 90th percentiles of the distribution based on that same indigent care measure. This provides additional information regarding the magnitude of variation in indigent care and whether this variation is symmetric below and above the median. Relatively small percentage differences both above and below the median would imply modest variation in that indigent care measure. Moreover, if the percentage difference from the median is approximately the same (in absolute value) for counties that are 25 percent above and below the median (i.e., at the 25th and 75th percentiles) and similarly for counties that are 40 percent above and below the median (i.e., at the 10th and 90th percentiles), this implies a symmetric distribution of indigent care. In contrast, a much larger percentage difference above the median than at comparable percentiles below the median would indicate greater variation in a particular indigent care measure above the median.
value. This information may be particularly useful for indigent care measures that are not
distributed normally (as is often the case for total utilization and expenditure) since it does not
involve the standard deviation and it provides summary measures of variation at two different
points above and below the median.

Maps

Several maps are also presented along with the tabular results to investigate whether
there is any systematic geographic pattern to county locations based on low or high values of
selected indigent care measures. These maps were produced using the GeoNetworks module of
GeoAccess, Inc., which is a popular health data mapping software package.

Relationship Between Indigent Care and Selected County and Hospital Characteristics

Two different types of analyses were performed to determine whether any observed
variation in indigent utilization and expenditure across counties in California is significantly
related to selected demographic, economic, or market characteristics. First, counties were
divided into two groups of approximately equal size based on values for each of the following
potential factors: county population, the percent of the population that is white, per capita
income, unemployment rate, mean hospital occupancy rate in the county, the percent of public
county expenditure devoted to health care, and expenditure per indigent user in the previous year.

Counties were also divided into two groups according to whether they had a county hospital.
Most of the indigent utilization and expenditure measures listed in Table 1 were then compared
to determine whether there was a significant difference in the mean value between these two
county samples. Statistically significant differences were determined based on a two-sample t-test.

Since these contrasts consider just two categories for each factor and do not control for other possible confounding factors that may also influence the amount of indigent care provided by counties, multivariate least-squares regressions were estimated for many of the indigent care measures. The independent variables in these regressions included many of those that were used as factors in the two-sample contrasts described above. The regression coefficient and t-statistic for each explanatory variable indicate whether that factor is important in explaining why indigent care utilization and expenditure vary across counties and how much influence it has. The $R^2$ value for each regression indicates the amount of total variation in that particular indigent care measure that can be explained by all factors in that model.

**Percent of Patients Receiving Selected Cardiac Procedures**

Recent studies have suggested that Medicaid beneficiaries and other patients with relatively less generous insurance coverage may be less likely to receive high-cost procedures than those with private insurance due to financial incentives facing providers. No studies have investigated whether this is also true for those who are eligible for other publicly funded indigent care programs. This report includes an analysis of OSHPD patient-level discharge data that investigates whether patients in each of five different payor groups (including Self Pay and Section 17000) are equally likely to receive three selected cardiac procedures: coronary artery bypass grafts (CABG), percutaneous transluminal coronary angioplasty (PTCA), and cardiac
catheterization. Differences in the percent of patients receiving each procedure across these
payer groups are determined based on the value of the chi-square statistic. Only patients with an
appropriate primary diagnosis for each procedure are included.

EMPIRICAL RESULTS

This section presents results from several types of analyses on the different indigent
utilization and expenditure measures shown in Table 1. Although some of these measures, such
as charges or expenditures, apply equally to inpatient care, outpatient care, or total medical care,
many are unique to one type of care (e.g., average length of stay). Results for the two core
county-level data sources, MICRS and OSHPD, are generally reported separately and compared.
Differences in indigent care values between these two data sources are often observed. Possible
explanations for these differences are explored in the final section of this report. Values for
indigent and nonindigent patients from the OSHPD data are also presented and contrasted, when
possible, to investigate any differences that may exist between these two types of patients.

Profile of Indigent Care Utilization and Expenditures

Economic and Demographic Characteristics

Tables 2, 3, and 4 show different demographic and economic characteristics of county
populations. Tables 2 and 3 also provide comparisons of these values between the overall
population and indigent patients in each county for which that data exist. Many of these are
factors that would be expected to affect the need for medical care and access to care by
indigents, as discussed above. Several of these factors are also included as independent variables
in the least squares regressions reported later in this section.
Table 2 reveals that the mean percentage of females among both indigent users (from the MICRS data) and the total population in counties is roughly 50 percent, although there are some differences within specific counties. Moreover, the coefficient of variation equals only 0.04 for the total population but 0.21 for indigent users, suggesting much greater variation in the percentage of females among the indigent population compared to the total population in each county.

The percentage of indigents under age 21 appears to be smaller than the total county population, although this can only be inferred since different age categories exist for these two groups of individuals. However, the indigent population still may be characterized as fairly young. Based on the MICRS data, which was the only source of information on age, more than one-fourth of all indigents who receive medical care are under age 21, and almost 40 percent are under age 25.

Table 3 indicates that a much larger percentage of indigent users tend to be nonwhite compared to the total county population. Blacks comprise 8.3 percent of indigent users but only 3.4 percent of the total county population on average, while almost 40 percent of indigent users are Hispanic compared to less than 18 percent of the total population. Although the average values for these population groups are quite different between the two data sources, variation among counties in racial characteristics (based on the coefficient of variation) is similar for all nonwhite populations.

Table 4 presents information on income, unemployment, public health expenditure, and hospital occupancy for each county in California. There was fairly little variation across counties in per capita income, civilian unemployment rate, and hospital occupancy rate.
Expenditure per indigent user in 1993 averaged $885 among MICRS counties, and ranged from a low of $82 in Nevada County to a high of $2,311 in Monterey County. The coefficient of variation was 0.71, indicating a fair amount of variation in expenditure per user across all counties reporting this information. Although total county public expenditure obviously varied significantly due to the different populations, it is interesting to note that the percent of this expenditure spent on health averaged 12.8 percent and exhibited fairly modest variation overall (the coefficient of variation equals 0.33). Less than 40 percent of all California counties reported having a county hospital.

**Inpatient Diagnoses**

One possible explanation for variation in medical expenditure for any patient group would be differences in medical needs. Table 5 presents information on inpatient diagnoses of indigent and nonindigent patient populations from the MICRS and OSHPD annual hospital discharge data. Indigents appear to have been hospitalized more frequently for diseases related to the nervous system, the digestive system, and the genitourinary system, with these major diagnostic categories (MDCs) accounting for 38.8 percent of all inpatient admissions by indigents compared to only 21.5 percent of inpatient admissions by non-indigents. However, the median charge was very similar for these diagnoses. In contrast, 34 percent of inpatient admissions by non-indigents are related to pregnancy and childbirth while this accounts for less than 6 percent of indigent admissions. Moreover, the median charge for these admissions was almost 40 percent lower for non-indigent patients despite almost identical mean length of stay. Table 5 also reveals very different percentages of total admissions attributed to these different
MDCs for the MICRS indigent and OSHPD indigent populations. These two data sources appear to include different indigent populations, as explained in the final section of this report.

Overall Utilization and Expenditure Measures

Data on total indigent medical charges and expenditures are shown in Table 6 for both the MICRS and OSHPD Quarterly data. In the 1993-94 fiscal year, MICRS data indicate that the average county spent a total of $43.8 million on indigent medical care. The median expenditure was only $11.7 million, reflecting the fact that expenditure in Los Angeles County was roughly nine times greater than the county with the next largest expenditure. Indigent charges from the OSHPD data followed a similar pattern.

Since total expenditure per county clearly reflects the population, it is more meaningful to examine inter-county variation based on measures that take account of the population or number of users. Table 6 includes indigent expenditure per user and per 1000 population in each MICRS county, and total inpatient and outpatient hospital charges per 1000 population for all California counties from the OSHPD data. Average and median expenditure per indigent user based on MICRS data were $1042 and $842, respectively. The coefficient of variation is 0.61. In addition, the values for different percentiles above and below the median suggest modest variation in this value, with greater variation above than below the median.

Figure 1 depicts this variation geographically, with expenditure per indigent user divided into three ranges. Although Los Angeles, Orange, and San Diego Counties tend to have relatively large numbers of indigents (as discussed below), these counties are in the lowest group
based on expenditure per indigent user, as are other counties in Northern California with much smaller populations. Counties with the greatest expenditure per indigent user tend to be located in the southeastern and central portions of Southern California, including San Bernardino, Riverside, Kern, and San Luis Obispo. Counties shown in white did not report MICRS data.

The remainder of Table 6 shows total expenditure and total hospital charges per 1,000 population in each county. MICRS counties reported average and median expenditures per 1000 of $25,972 and $20,408, respectively. There appeared to be slightly greater variation in this value than expenditure per indigent user, as measured by both the coefficient of variation and the values at different percentiles above and below the median. Total hospital charges per 1000 population based on OSHPD data reflected a similar variation.

As with total expenditure per indigent user, Figures 2 and 3 show total expenditure and total hospital charges per 1,000 population and allow exploration of possible geographic patterns in variation of these indigent care values. Figure 3 contains information about all California counties (except Alpine) while Figure 2 once again includes only counties that report MICRS indigent care data. Although indigent expenditure per user may differ from per capita measures due to differences in access to indigent care services across counties, Figures 1 and 2 indicate fairly similar geographic patterns. However, San Diego and Orange Counties increased from the lowest to the middle category based on total expenditure per capita, while Los Angeles increased from the lowest to highest category based on this same measure. While expenditure per user may be fairly low in these counties, a much larger percentage of the population qualifies for indigent care, resulting in higher expenditures per capita. Figure 3 reflects a similar geographic pattern as Figure 2. In general, counties in Western California tend to be in the middle group
based on hospital charges per capita, while counties in the lowest category tend to be located in the northeastern and north central portions of the state.

**Number of Indigent Users**

For a given population, a larger number of indigents in any county will suggest a greater indigent care burden. Table 7 identifies counties which have a relatively high percentage of indigent users based on MICRS data. Almost 60 percent of all indigent users in California reside in Los Angeles County and comprise almost 10 percent of the total population in that county. Alameda, Orange, San Diego, and San Francisco contribute another 22 percent of all indigent users, although the local impact is quite different. For example, indigents in Orange and San Diego account for 3.1 and 4.0 percent, respectively, of the total population in those counties while indigents in San Francisco comprise almost 9 percent of its population. Merced County also bears a fairly large indigent burden, with indigents in that county accounting for only 0.8 percent of all California indigents but 6.2 percent of the county’s population. On average, 2.6 percent of the population in all California counties reporting MICRS data are indigents who receive medical services.

This result is also evident from Figure 4, which shows MICRS counties according to the percentage of the population that is reported to use indigent services. Once again, the Southern coastal counties as well as the cluster of counties bordered by Sacramento and Merced have the most indigents as a percent of their populations. Counties with the fewest percent of indigents are primarily located in central California, are rural or semi-rural, and have relatively small populations.

**Hospital Inpatient Care**
Values for different inpatient indigent care measures are presented for each county and for both data sources in the next few tables. The total number of indigent inpatient admissions for both the MICRS and Quarterly data sets are shown in Table 7. Several observations are particularly noteworthy. First, Los Angeles County once again accounts for the largest percent of indigent inpatient admissions in California, although this is smaller than the percent of all indigents residing in that county who use any medical services (37 percent versus 59 percent, respectively). Second, because the number of inpatient admissions depends largely on the population, there is substantial variation in this value across counties. The coefficient of variation (even without Los Angeles) equals 1.22 for MICRS admissions and 1.74 for admissions from the Quarterly data. Finally, there is substantial disagreement in the number of indigent inpatient admissions between these two sources of data for many counties. This difference is discussed in more detail in the final section of this report.

More detailed information about indigent inpatient care is shown in Table 8. This table is based on Quarterly data, and provides several comparisons between indigents and nonindigents. The average number of indigent inpatient admissions was 1.8 per 1000 population. There was a fair amount of variation in this inpatient measure since the coefficient of variation was 0.62 and half of all counties reported 1.1-2.4 admissions per 1000. There was less variation in the percent of all inpatient admissions and charges attributed to indigents. The coefficient of variation for these indigent care measures was roughly 0.5 in each case, with half of all counties reporting values that were no greater than 50 percent from the median.

Figure 5 depicts graphically this same percentage of all inpatient admissions by indigent patients from the Quarterly data. No consistent geographic pattern is evident, although Los
Angeles and the three most southern counties (Riverside, San Diego, and Imperial) are among those counties with the largest percent of total admissions by indigent patients. Counties with the smallest percent of indigent admissions are in the north and scattered throughout Central California.

Table 8 also provides comparisons between indigent and nonindigent patients for average length of stay and inpatient charge per admission. Although the mean charge per admission and variation in this value across counties was quite similar for indigents and nonindigents, indigent patients reported a much lower median length of stay (4.5 versus 6.4) and substantially less variation (CV = 0.29 versus 1.96) compared to nonindigent patients.

Table 9 displays similar inpatient information for indigents based on MICRS data. As expected, the results are very similar to those in Table 8 based on the Quarterly data. The coefficients of variation suggest similar and relatively modest variation in indigent admissions per capita, average length of stay, and expenditure per admission. Of particular interest is the percent of indigent users with an inpatient admission, which ranges from 2.5 percent in Sonoma to 28.8 percent in Imperial County. The median percent of indigent users with an inpatient admission is 7.2 percent, and the coefficient of variation and percentile differences around the median indicate relatively small variation in this value except for counties in the top 25 percent.

**Outpatient Care**

As with the total number of indigent inpatient admissions, there is considerable variation across counties in the number of outpatient visits made by indigent patients. Table 7 shows the total number of visits and the percent of total indigent outpatient visits in all California counties
for both data sets. Almost two-thirds of all indigent [hospital and nonhospital] outpatient visits reported on the MICRS data occur in Los Angeles County, followed by San Diego County with 7.5 percent of the California total. Even when all counties are included, as with the Quarterly data, Los Angeles County still accounts for almost 40 percent of all indigent [hospital] outpatient visits.

Table 10 shows that all California counties had a median of 37.6 outpatient visits per 1000 population based on the Quarterly data. The coefficient of variation was 0.83 and half of all counties had values within 50 percent of the median. Outpatient charge per visit exhibited even less variation, with a median charge of $318. One half of all counties reported a median outpatient charge per visit that was only 20 percent above or below the median charge. Almost 3 percent of hospital outpatient visits and charges were by indigent patients in all California counties.

Results from the MICRS data are contained in Table 11 and exhibit similar patterns. Of particular interest is the percent of all indigent users who had an outpatient visit. More than 75 percent of all indigents were reported as having an outpatient visit, and there was remarkably little variation in this value across MICRS counties. However, considerably greater variation was observed in the number of outpatient visits per user as well as outpatient expenditure per user, per visit, and per capita. Counties also appeared to differ dramatically in the percent of outpatient visits due to ambulatory surgery.

Overall, indigents appear to use more resources in an outpatient setting compared to nonindigents. Table 12 shows that outpatient care accounted for a median 42 percent of total indigent charges or expenditures, compared to only 29 percent for nonindigent patients. There appears to be relatively little variation across counties in this measure. The coefficient of
variation for all three variables in Table 12 ranged from 0.33 to 0.41, and there was fairly little deviation above and below the median. In fact, 80 percent of all MICRS counties reported a value for this outpatient measure that was just 25-33 percent from the median value.

Figure 6 shows indigent outpatient charges as a percent of total indigent charges based on the Quarterly data. This value indicates the inpatient versus outpatient focus of services provided to indigents. Although there was relatively little variation in this outpatient orientation across counties, as discussed above, Figure 6 reveals an interesting geographic pattern. The majority of counties with relatively heavy emphasis on providing indigent services in outpatient settings are semi-rural counties located in Central or Northern California. All of the more populated counties in Southern California reported much smaller use of outpatient services relative to inpatient care. This almost certainly reflects a greater abundance of inpatient facilities in these counties, and may have important implications for indigent expenditures.

Emergency Room Services

Detailed information about emergency room services provided to indigents is available from the MICRS data. Table 13 compares the percentage of total indigent expenditure attributed to inpatient, outpatient, emergency, and other services. Inpatient and outpatient care each accounted for a median of 41.5 percent of total indigent expenditure. The median percent of total expenditure spent on emergency room services was 10.5 percent. All but one county reported providing some emergency room services to indigents. However, variation in the percent of total indigent services provided through the emergency room was markedly higher than the variation in inpatient and outpatient care based on the coefficient of variation (0.78 for
ER expenditure versus 0.45 and 0.33 for inpatient and outpatient expenditure, respectively).

Table 14 presents additional information about ER visits from the MICRS data. Approximately one of every three indigent users had at least one ER visit in the median county, with a median of 1.5 visits per user. Median expenditure per ER visit was $265. There was substantial variation across counties in these measures reflecting the use of ER services, particularly for expenditure per visit. Unfortunately, no information was available on the types of ER services provided in each county.

**Indigent Services by Hospital Ownership or Operation**

The amount of indigent care provided by different types of hospitals also varies across counties. Table 15 shows the percent of all indigent inpatient admissions and outpatient visits provided by nonprofit, for-profit, and government hospitals in each county. As expected, government hospitals tend to provide the majority of indigent inpatient and outpatient care, even though other hospitals operate in that county. In fact, government hospitals reported providing more than 80 percent of all indigent inpatient admissions in 12 of the 21 counties that had nonprofit or for-profit hospitals. The situation was even more pronounced for hospital outpatient care, where government hospitals reported providing more than 90 percent of all indigent outpatient visits in 15 of the 22 counties where other types of hospitals also operated. This concentration of indigent services in government hospitals is reflected in the relatively small coefficient of variation for these hospitals. In contrast, counties experience much greater variation in the extent to which indigent services are provided by nonprofit, and especially for-profit, hospitals.
In the few counties which had only for-profit and nonprofit hospitals, the latter type of hospital played the dominant role in providing indigent services. The median county in this situation reported providing 58.2 percent of all indigent inpatient care and 83.7 percent of all hospital outpatient visits. For-profit hospitals did play a major role in providing indigent hospital services in several counties, particularly semi-rural counties that did not report any government hospital services (e.g., Humboldt, Placer, and Shasta Counties).

The conclusions drawn above from the Quarterly data also apply to results based on MICRS data. Table 16 indicates once again the dominant role that county hospitals play in providing indigent inpatient care, with all but three counties reporting that county hospitals had at least 70 percent of all indigent hospital admissions. In these three counties, Acontract hospitals (i.e., noncounty facilities that contracted with the county) were the primary providers of indigent inpatient services. Non-contracted university teaching hospitals also provided a large volume of indigent services (between 14 and 72 percent of all indigent admissions) in four counties that did not have a county hospital.

**Age Distribution of Indigents Using Inpatient and Outpatient Services**

The age distribution of indigents receiving inpatient or outpatient care generally displayed relatively little variation across counties. Tables 17 and 18 present age distributions of indigents with an inpatient admission or any outpatient visit reported on the MICRS data. In general, there is fairly small variation in the percent of inpatient users over 21 years of age. However, substantial variation in indigent inpatient care is shown among those under age 21, where the median was only 4.1 percent of all indigent admissions with a coefficient of variation
equaling 1.17. Of the five counties with more than 10 percent of inpatient users under age 21, four are semi-rural and have small populations. The counties with larger populations (e.g., Los Angeles, San Diego, Sacramento, etc.) report 4-7 percent of all indigents with inpatient admissions under age 21. The variation was not as pronounced for outpatient care, with a median 25.5 percent of all outpatient users under age 21. However, the coefficient of variation for outpatient users was still roughly twice as large as for other age groups. Unfortunately, it is not possible to conclude whether this variation reflects differences across counties in access, eligibility, or medical need by this age group.

Comparisons of Utilization and Expenditures Based on Selected County Characteristics

The results presented above indicate substantial variation in some measures of indigent care, while others appear to vary relatively little across California counties. However, no attempt was made in the previous section to explore linkages between this observed variation and possible causal factors. This section provides results from bivariate contrasts of indigent care measures for different groups of counties based on selected economic and demographic characteristics. The most important measures of indigent care that were available on either core data set were selected for the analyses, and are shown in Table 19. Some of these measures were available from just one source of data, while others were contained on both data sets. Although the analyses were performed on each indigent care measure shown in Table 19, results are provided only for those comparisons for which differences were statistically significant based on the selected county characteristic.

The results for the indigent care county contrasts are shown in Table 20. County
population, percent of the population that was white, and whether there was a county hospital were the factors that were causally related to the greatest number of indigent care measures in these bivariate median contrasts. Similarly, inpatient average length of stay, mean inpatient charge per admission, and mean outpatient charge per visit were among the indigent care measures that were found to be significantly related to the most county characteristics. Interestingly, among the indigent care measures based on Quarterly data, mean hospital occupancy rate was significantly related to only average length of stay, while the existence of a county hospital influenced only outpatient care measures.

Counties with larger populations and higher per capita incomes tended to have higher values of almost all indigent care measures, although they appear to rely more heavily on inpatient care compared to less well-populated counties. In contrast, counties with a larger percentage of nonwhites and higher unemployment rates had lower values of all indigent care measures that were statistically significant, including average length of stay and charge per inpatient admission.

Fewer contrasts are statistically significant when using the MICRS data due to the smaller number of counties reporting data. Of special interest are the results for expenditure per indigent in the prior year, which was available only for MICRS counties. The results in Table 20 indicate that prior indigent expenditures are positively related to several indigent care measures in the following year, including inpatient expenditure per admission, outpatient expenditure per visit, and total expenditure per indigent user. The measures of ER services provided to indigents generally were not influenced by any of the county characteristics included in Table 20.
Regression Results

The median contrasts are suggestive of factors that may be related to indigent care utilization or expenditures, but do not themselves establish causation or indicate the degree to which variation in these measures may be explained by easily observed county characteristics. As described above, bivariate comparisons do not control for possible confounding factors that may influence the amount of indigent care provided. Multivariate regressions were performed on several indigent care measures that were found to be related to many of the different factors in Table 20 in an attempt to control for possible confounding influences. The results are shown in Table 21. Only indigent care measures that had at least one statistically significant result are included. No regressions using MICRS data are shown since there were no significant relationships with any independent variables. This is not unexpected due to the few counties that report data to MICRS, and thus the small degrees of freedom in these regressions that contained nine independent variables (including the constant). The natural logarithm of several county characteristics and other independent variables were used instead of their natural units. Given the distribution of many of the indigent care measures, using the logarithmic transformation of these independent variables led to an improved fit of the data and estimation of a more powerful model, resulting in greater explanation of the variation in indigent care.

The $R^2$ value for each regression provides the proportion of total variation in that indigent care measure explained by the independent variables that are included in the regression. Of the eight regressions, four explained at least 50 percent of inter-county variation in indigent care while the remaining four models explained 39-43 percent of total variation. In fact, almost 75 percent of total variation in the percent of total hospital outpatient visits by indigents in each
county was explained by the regression equation shown in Table 21. This suggests that readily available county characteristics may contribute significantly to explaining variation in indigent care across California counties, although much of the variation remains unexplained.

Among the most interesting results, counties that spend a larger percent of total indigent care resources in outpatient settings have smaller average lengths of stay, fewer inpatient admissions per 1000 population, and lower mean charges per admission. In fact, while these counties experience more outpatient visits per capita, as would be expected when more resources are committed to providing this type of care, they also have a lower mean charge per outpatient visit. Even when other factors are controlled, counties with larger populations have significantly higher charges per admission and per outpatient visit, and have more inpatient admissions and outpatient visits per capita, supporting the bivariate result in Table 20. The presence of a county hospital increased the number of outpatient visits per capita but resulted in a lower charge per outpatient visit.

**Selected Cardiac Procedure Rates**

The results in Tables 22 and 23 provide information regarding whether patients with different payor sources are equally likely to receive three popular and costly cardiac procedures. As discussed in the methods section above, this analysis included only patients who received one of these procedures or who had a primary diagnosis that has been used in the literature to identify patients for whom any of these procedures is considered medically appropriate. As a result, unless there is systematic variation in disease across payor groups, we would consider patients from each payor group to suffer from similar medical conditions and thus to be as likely
to receive these procedures. Indigent patients would be included in Section 17000, with perhaps a few in the self-pay category.

Compared to patients with Blue Cross, Blue Shield, Commercial, or HMO/PHP insurance coverage, Section 17000 patients were less likely to receive any of the three procedures. However, Medi-Cal patients were even less likely to receive these procedures, and self-pay patients were less likely to receive CABG or cardiac catheterization. While these analyses are suggestive of differences, they do not allow us to conclude with confidence that indigents are less likely to receive any of these procedures. Further investigation that controls for other factors, including medical need, is required before drawing this conclusion. Although Section 17000 patients were less likely to present with several primary diagnoses that may require these procedures, as shown in Table 23, it is unclear whether the difference in procedure rates may be attributed to this difference instead of possible differences in financial incentives.

**CONCLUSION**

**Summary of Results**

This study has examined the different dimensions of indigent medical care, the ways in which indigent utilization and expenditures may be measured, the degree to which these measures vary across different counties in California, and possible causes of this variation. This task has been complicated by the differences in availability and scope of data on indigent medical care. The most important general results include the following.

Indigents appear to receive inpatient care for different types of diagnoses compared to non-indigent patients. Indigent patients had a much lower median length of stay (4.5
versus 6.4) and experienced substantially less variation in this measure compared to nonindigent patients.

Although total utilization and expenditure measures for indigents vary dramatically, due to different populations in counties, the same measures of indigent care per user, per admission, or per visit may not vary much across counties. When investigating the degree to which indigent care varies across counties, it is important to consider many different measures in addition to those which depend primarily on population.

As expected, Los Angeles County provides a disproportionate amount of indigent care. That county has almost 60 percent of all indigent users (based on one source of data) and accounts for 37-47 percent of all inpatient admissions.

Overall, indigents appear to use more resources in an outpatient setting compared to non-indigent patients. Outpatient care accounts for a median 42 percent of total indigent charges or expenditures, compared to only 29 percent for nonindigents. In addition, most counties with relatively heavy emphasis on providing indigent services in outpatient settings are in semi-rural counties located in Central or Northern California.

Government hospitals tend to provide the majority of indigent inpatient and outpatient care, even though other for-profit and nonprofit hospitals operate in the same county.

Substantial variation exists across counties in the percent of indigent outpatient users, and especially indigent inpatient users, who are under age 21.

Bivariate contrasts indicate that many indigent care measures are related to several county characteristics for which data are widely available. Counties with larger populations and higher per capita incomes tend to have higher values of almost all
indigent care measures. These counties also rely more heavily on inpatient care.

Results from multivariate regressions indicate that these same county characteristics may explain roughly 50 percent of total variation in many indigent care measures.

Despite these and other findings discussed above, there still exists substantial variation across counties in indigent utilization and expenditures that cannot be explained by those factors used in this report based on readily available data.

Based on these results and the data that was available, it is appropriate to make the following observations. First, whether any study finds evidence of significant variation in indigent medical care depends in part on how one defines the indigent population and what data are used in the analysis. Is it appropriate to adopt a fairly narrow view of indigents, such as individuals who qualify for public programs and are reported on the MICRS data? Or should we pursue a more general approach where all individuals without public or private health insurance are considered to be medically indigent?

Second, what measure or measures of indigent care are appropriate in investigating variation? This report has defined and estimated values for many different measures of indigent utilization and expenditures. Although some of these measures exhibited small variation while others were characterized by fairly large differences across counties, each measure may be appropriate to address certain questions or issues related to indigent medical care.

Third, there are several sources of data that may be useful in analyzing variation in indigent medical care. However, each may cover at least slightly different populations, contain different measures of indigent care, and be relatively more useful in addressing certain issues.
Fourth, analysis of indigent care may proceed at many different levels, yielding different conclusions about the extent to which this varies across counties. It is especially important to control for confounding factors when trying to explain variation in indigent utilization or expenditures. While existing data may be adequate to explain a portion of this variation, additional data on indigent patients, particularly clinical data, and better information about insurance status, would be helpful in identifying other factors that may assist in explaining a greater portion of variation.

Finally, even if we are able to explain a large percentage of variation in an indigent care measure, it is unclear whether this may reflect differences in access to care, quality of services provided, medical need, or some other factor. The real test of whether variation in indigent care is of policy importance is whether indigents in counties that have lower utilization and/or expenditure on indigent care experience adverse health outcomes. It is entirely possible, for example, that a county has a relatively low expenditure per indigent user, but has expanded access to quality medical services through greater reliance on an outpatient network which allows indigents to access services in a more timely manner, possibly avoiding the use of costly hospital emergency services. Unfortunately, we need better, more complete, and more consistent data on indigents and indigent services for all counties before this and related issues may be addressed.

Data Limitations

This study examined three public sources of data on indigent utilization and expenditure for medical care: the Medically Indigent Care Reporting System (MICRS), the Hospital
Quarterly Financial and Utilization Data (Quarterly Data), and the Hospital Annual Discharge Data. Although there are some similarities across these three data bases, as described above, each provides unique data on indigent care. Comparisons of results across these three data bases is often problematic and may lead to misleading or incorrect conclusions because each data source provides information at different levels (i.e., patients, hospitals, and counties).

There are several limitations associated with using these data bases to study indigent care, many of which were encountered in this study and constrained the ability to draw strong conclusions about variation in indigent care across counties. The most important data limitations for this study are described below.

1. One of the major problems in analyzing variations in indigent care across counties is that many of the factors that would be expected to influence this care are not available at a geographic level as small as a county. The percent of the county population that is uninsured and characteristics of the county health care delivery system are two examples of factors that would be expected to influence the amount of indigent care provided but for which county level data are generally not available.

2. Values for the same variables differ, often significantly, across the data bases. An example of this variation is shown in Table 24, which provides the number of inpatient admissions, average length of stay, and number of outpatient visits for indigents in the MICRS and Quarterly data bases. In order to compare these values for the same county between these two data bases, values are shown only for counties that report to MICRS. Separate means are shown with and without Los Angeles County since the number of
inpatient admissions and outpatient visits in that county are disproportionately large, resulting in a much higher mean than when these values are excluded. The percent difference between the MICRS and Quarterly values for each indigent care measure is also shown for these counties.

The results in Table 24 indicate substantial variation in values of each of these core indigent care measures between the two primary sources of information, even though these measures purportedly relate to the same patient population (i.e., \( \text{A}_{\text{indigents}} \)). Among all counties that reported information on both data sets, almost two-thirds reported more indigent inpatient admissions on the MICRS data compared to the Quarterly data set, while more than four of every five counties reported a shorter average length of stay on the MICRS data. The median percentage difference in value between these two sources of data was roughly 22 percent for both admissions and average length of stay, while the mean difference was just over 50 percent for both indigent care measures. The difference in value was even more dramatic for the number of indigent hospital outpatient visits. Almost 90 percent of all counties reported more outpatient visits on the Quarterly data than the MICRS data. In fact, the number of outpatient visits on the quarterly data averaged more than twice that on the MICRS data.

These results suggest significant differences in values reported for each of these three indigent care measures ostensibly for the same patient population. One possible explanation rests with the fact that these data are reported at different times. Quarterly data are filed by each hospital roughly 45 days following the end of each quarter. Although this represents more retrospective data reporting than the OSHPD hospital
discharge data, final determination of eligibility for indigent programs may not be accurate. In contrast, MICRS data are reported later and are based on actual expenditures, allowing for a more accurate accounting of eligibility. Thus, based on the results in Table 24, it appears that indigent care reported on the Quarterly hospital data may understate actual indigent inpatient admissions but grossly overstate the number of indigent hospital outpatient visits. Interestingly, we would anticipate the opposite result for outpatient visits, namely a greater number of outpatient visits reported on the MICRS data, since this data set includes both hospital and nonhospital outpatient care while the Quarterly data report only hospital-based outpatient visits. As a result, the Quarterly data do not capture indigent outpatient medical care provided through contracted community clinics and other private providers. These differences in values reported for the same population suggest the importance of exercising caution when comparing results across different sources of data.

3. In addition to presenting significantly different values for the same measure, the MICRS and Quarterly data sets also report different variables:

! The Quarterly data include information on gross patient charges while the MICRS data report actual expenditures relating to indigent medical care. Thus, the Quarterly data will overstate the true resource costs associated with providing indigent care.

! MICRS is the only one of these two data sources that includes information on emergency room services, nonhospital outpatient care (as noted above), and...
utilization and expenditure by patient age. The Quarterly data, however, provide data on identical measures of utilization or charges for both indigents and nonindigents, facilitating comparisons between these two patient groups.

MICRS contains only aggregate data at the county level instead of information for each hospital or patient (as in the Quarterly and Annual Discharge data, respectively). Many data tables include utilization and expenditure measures for specific values or intervals based on patient age, race, and ethnicity. Thus, information to derive county-level estimates of medians or percentiles is not available. In contrast, the Quarterly data includes information on indigent patients in each hospital, which may then be aggregated to the county level. Summary measures of indigent care provided by hospitals within each county may then be calculated.

4. One of the most important shortcomings of the Quarterly data, and strengths of the MICRS data, is that only the latter source contains information on the actual number of indigent users in a county. The Quarterly data includes information only on the number of inpatient and outpatient services used. This prevents analysis of utilization or charges per indigent user. Moreover, neither data source includes information on the total number of county residents who qualify for indigent programs. As a result, this report examined indigent utilization and expenditure per capita. However, comparing these values implicitly assumes comparable medical need and access to care by indigents across counties, which may be an erroneous assumption. Although the ideal measure for budgeting purposes and to evaluate resources committed to the provision of indigent care
would involve utilization or expenditure per potential indigent user, this information was not available.

5. Quarterly data were available for hospitals in all California counties. However, MICRS data were available only for those counties that are required to report under the stipulations of Assembly Bill 99. As a result, only 28 counties were required to report this data to the California Department of Health Services in the 1993-94 fiscal year.

6. Several limitations apply only to the MICRS data.

   Counties are required to report all indigent care utilization and expenditures up to a level that reflects their AB 99 funding. After this level of expenditure is reached, counties are no longer required to report indigent care data to MICRS even though they continue to provide care to this population. Consequently, the MICRS data may not accurately reflect a county’s total indigent care burden.

   Development and implementation of the MICRS reporting system occurred over several years. As county staff acquired a better knowledge and understanding of the MICRS system, and many counties improved their information systems, their ability to collect and report consistent data each year has improved, resulting in more accurate and complete MICRS data.

   Many of the smaller MICRS counties have relatively few staff who are available to ensure complete and accurate reporting of data. This may influence the amount and quality of MICRS data received from these counties.

   MICRS data for the 1991-92 fiscal year includes charges instead of expenditures. These factors suggest problems with the accuracy and completeness of early MICRS
Large variation in MICRS data on emergency room services has been reported by staff at the Office of County Health, California Department of Health Services. These differences are probably attributed to differences in each county’s definition regarding what constitutes AER Services and the accuracy with which hospitals and counties are able to identify correctly indigents who become inpatients following an initial emergency room visit.

Analysis of variation in indigent inpatient care using the OSHPD Annual Discharge data may be problematic due to available data on payer source. For example, each patient who is admitted is assigned an Aexpected source of payment. Unfortunately, final determination of eligibility for Section 17000 may change during an inpatient stay or especially following discharge. As a result, using information on expected payer source to identify indigent patients may provide inaccurate and unreliable information on indigent inpatient utilization. Moreover, uninsured patients may conceivably be assigned to values relating to Aself-pay, Ano charge, or ASection 17000," although only this last category should be treated as identifying indigent patients. Beginning January 1995, the OSHPD annual hospital discharge data will include Acounty indigent program as an expected payer source category. Although these data are not yet available in public use form, they will permit analysis of inpatient care using an indigent payer category that is probably more valid than Section 17000 and also conforms to the way in which indigents are classified on the Quarterly data.
Policy Recommendations

Several recommendations stem from the analysis presented above. Most of these relate to collection of better and more consistent data at the county level. This would unquestionably facilitate analysis with which to address questions about variation in indigent care at the county level.

Information was generally available only for indigents who used inpatient or outpatient medical care. It would be helpful to have survey data on all individuals who qualify for indigent care, independent of whether they accessed medical care during a particular period. Although we recognize the difficulty and cost associated with collecting this information, relying on the available data for users prevents disentangling the issues of access to care by indigents and the volume, type, and cost of care provided.

Additional information should be collected at the county level on factors that are likely to influence indigent care, including the percent of the population that is uninsured and specific characteristics of the local health care delivery system (particularly the public sector) that may affect access to care by, and services provided to, this population. Only then will it be possible to derive better estimates of the factors that influence inter-county variation in indigent care.

It would be very useful to design better incentives and guidelines that could be implemented to allow for more accurate, complete, and consistent data collection and reporting by all counties instead of just a subset of all California counties. More consistent collection of data elements (e.g., expenditures instead of charges) would also
be helpful, particularly with the increased presence of managed care. While practical and political constraints may make this infeasible, more consistent and complete data would greatly improve the chances of understanding indigent care and identifying policies which would improve access to care without unnecessarily increasing cost.

Along the same lines, one of the most vexing problems encountered in this study was how to define the indigent population. It would be helpful if staff from the California Department of Health Services and legislative staff initiated efforts to define this population, then refine existing data collection instruments to acquire accurate information on this population.
BIBLIOGRAPHY


