

Longitudinal patterns of California Medicaid recipients with acquired immunodeficiency syndrome

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In this study, the authors examine the longitudinal experience, annual trends, and subpopulation differences in Medicaid use and expenditures for persons with acquired immunodeficiency syndrome (AIDS) in California from 1983 through 1986. About two-thirds of adult males were enrolled in Medicaid within 1 month of their AIDS diagnosis. These recipients averaged

approximately 20-percent higher lifetime expenditures than those enrolled at a later time. Monthly expenditures were higher in the beginning of enrollment and prior to death than in the months in between. From 1983 through 1986, there was a shift of care from inpatient to outpatient settings. In 1986, children and adult females had higher median expenditures than did adult males.

Introduction

Medicaid is a Federal-State program that pays for health care services for eligible low-income individuals and, at the option of each State, for those with high medical bills relative to their ability to pay. Persons with acquired immunodeficiency syndrome (AIDS) often experience a series of debilitating assaults on their health, their ability to work, and their financial ability to meet the high costs of medical treatment. As a result, many persons with AIDS seek assistance from Medicaid to meet the costs of medical care. The Health Care Financing Administration (HCFA) estimates that Medicaid pays about 25 percent of the Nation's health care costs for persons with AIDS and that approximately 40 percent of AIDS patients are on Medicaid at some time during their illness (Roper, 1987). Medicaid was the primary payer for 28 percent of hospital admissions for AIDS in 1986-87 (Ball and Turner, 1991). There is some indication that the percentage of persons with AIDS covered by Medicaid has been increasing over time. For example, a report by the State of California indicates that the percentage of persons with AIDS in the State who are enrolled in Medicaid rose from 29 percent in 1982 to 43 percent in 1987 (Hiehle, Maxfield, and Kizer, 1990).

Despite the importance of Medicaid in financing care for these patients, research on their Medicaid expenditures and service utilization has been limited. In this study, we examine the Medicaid experience of persons with AIDS in California. Although the timeframe of the study is an early period in the AIDS epidemic (1983 through 1986), the study provides important findings from two perspectives. First, it shows the beginnings of the shift in AIDS care from inpatient to outpatient settings and the impact of this shift on California's Medicaid program (Medi-Cal). Second, the study provides background material for States that were affected by the AIDS epidemic later than California (i.e., the so-called "second- or third-wave" States), in

which the current development of services for AIDS may be similar to what it was in California in the mid-1980s.

The purpose of this study was to examine four questions concerning people with AIDS who were enrolled in Medicaid:

- How are lifetime Medicaid expenditures affected by the point in the illness at which a person becomes enrolled in Medicaid?
- What are the patterns of monthly Medicaid expenditures over the time a person has AIDS and Medicaid coverage?
- What are the annual trends in Medicaid enrollment, expenditures, and service utilization for persons with AIDS?
- How do annual Medicaid expenditures and service utilization for children and adult females with AIDS differ from those of adult males with AIDS?

The detailed analyses required to address the first three research questions are limited to adult males because the numbers of women and children were small.

The first two questions involve an examination of Medicaid experience over the course of an individual's illness. Because expenditures are highest for all types of patients in the months immediately prior to death (Lubitz and Prihoda, 1984; McCall, 1984; Long et al., 1984), AIDS patients are also anticipated to have high expenditures in the months immediately preceding death. Some AIDS researchers have described AIDS costs as U-shaped; that is, with high costs both shortly after diagnosis and shortly before death (e.g., Pascal, 1989). However, no research has been completed on monthly costs over a person's lifetime with AIDS. Such data are important in understanding the impact of AIDS on the Medicaid program because people are enrolled in Medicaid at different points in the course of their illness.

The third question, involving an examination of trends in Medicaid service utilization and expenditures, is important because most of the factors affecting cost and service use have been in a state of continual change. The clinical understanding of AIDS has expanded considerably since the early years of the epidemic; new treatments are continually being introduced, some of which have substantially increased survival time after AIDS diagnosis. Alternative treatment settings have been developed to both decrease the high costs associated with

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hospital stays and enhance the quality of life. For example, Seage, Landers, and Lamb (1990) noted that hospital costs per AIDS patient in Massachusetts declined 28 percent from 1984 through 1985 as a result of shorter lengths of stay. The State of California also reports a 16-percent drop in length of hospital stays among the State's Medi-Cal patients from mid-1984 to mid-1988. During the same period, expenditures for inpatient services fell from 90 percent to 73 percent of total expenditures (Hiehle, Maxfield, and Kizer, 1990). Except for tracking trends in overall expenditures and hospital use, little research has been reported on changes over time in the use and cost of other specific health care services for people with AIDS.

The last question, concerning differences in patterns of utilization and expenditures for adult females, children, and men with AIDS who are covered by Medicaid, is examined because most studies have focused solely on adult male populations. Information on the differences among these subpopulations is important because adult females and children manifest AIDS somewhat differently than do homosexual and solidus or bisexual males. Also, it is generally assumed that before contracting the human immunodeficiency virus (HIV), adult females and children with AIDS are more impoverished than homosexual males and would therefore be likely to become dependent on Medicaid at an earlier stage of the illness. Understanding the service utilization and expenditure patterns for adult females and children is also important because their proportion of the AIDS population is increasing.

To address these questions, the study examines data for California, which is second to New York in number of AIDS cases. By the end of 1990, there were more than 30,000 cases in California, which represented 20 percent of reported AIDS cases nationwide. The risk-group distribution in the State varies from the national profile, with far fewer cases among intravenous drug users (IVDUs), adult females, and children. For example, by the end of 1990, homosexual males who were not IVDUs comprised 58 percent of the cumulative cases reported nationwide (Centers for Disease Control, 1991), compared with 79 percent in California (California Department of Health Services, 1991).

There are also differences in AIDS risk-group distribution between persons receiving and those not receiving Medicaid services in California. At the end of 1988, homosexual males who were not IVDUs represented 81 percent of the cumulative number of non-Medicaid AIDS cases in California, compared with 73 percent of the Medicaid AIDS cases in the State. The percentage of AIDS patients covered by Medicaid who were male, homosexual, and IVDU, was 18 percent, compared with 8 percent for the same group who were not covered by Medicaid (Kizer et al., 1988).

Medi-Cal includes a medically needy program and covers more optional eligibility groups than do Medicaid programs in most other States. California also has higher income thresholds for Medicaid eligibility than most States (Health Care Financing Administration, 1987). The State has broad coverage of services. For example, in 1986 it included 29 of the 32 optional services permitted under legislation for the Medicaid program. Of particular relevance to people with AIDS during the period of this

study was the State's coverage of prescription drugs and lack of coverage (outside of special waiver programs) of an optional service provided in the home—private duty nursing—in 1986 (Health Care Financing Administration, 1988).

Methodology

Data sources

The Medicaid data presented in this article were taken from the Medicaid Tape-to-Tape data base, which contains enrollment, claims, and provider data from the Medicaid Management Information System in five States (California, Georgia, Michigan, New York, and Tennessee) participating in this project funded by HCFA. The source files for this study included data from 1982 through 1986. The Tape-to-Tape files include data for Medicaid-covered services only. Data for services covered by Medicare or private insurance for Medicaid enrollees covered by these other payers are not included in the Tape-to-Tape data base. Further, service claims for enrollees who are members of health maintenance organizations (HMOs) are not included because the HMOs do not submit claims to the State Medicaid programs.

Two other sources of data were merged with the California Tape-to-Tape data for this study. The Medi-Cal AIDS Special Research File (1981 through March 1988) was used in the development of an algorithm to identify AIDS cases in the Tape-to-Tape files. The Medi-Cal AIDS Special Research File was created by the State of California by matching Medi-Cal claims and enrollment files to the State's AIDS Reporting System. The Medi-Cal AIDS Special Research File included the date of AIDS diagnosis extracted from the AIDS Reporting System (Kizer et al., 1988). The California Death Certificate File (1982 through 1987) was also merged with the Tape-to-Tape file. Variables extracted from the death certificate file include date of death, cause of death (ICD-9-CM code), and a special indicator for AIDS. (ICD-9-CM is *International Classification of Diseases, 9th Revision, Clinical Modification* [Public Health Service and Health Care Financing Administration, 1980]).

Study population

The AIDS study population was identified through a multistep process. First, a wide screen of ICD-9-CM diagnostic codes indicative of AIDS was used to identify a group of Medicaid recipients potentially having AIDS. All claims containing any diagnostic code in this wide screen were extracted from the Tape-to-Tape California claims files for 1982-86, and corresponding enrollment records were retrieved. The death certificate file and Medi-Cal AIDS Special Research File were then merged with the claims and enrollment records for these recipients.

This large population of suspected AIDS cases was then reduced to include only those cases that were highly likely to have AIDS. Thus, a case was included in the study if it met any of the following criteria: (1) the case was on the Medi-Cal AIDS Special Research File, (2) the case had a special indicator on the death certificate file

identifying the person as having AIDS, or (3) the case met the diagnostic criteria for AIDS that we developed and that were based on diagnostic information on the claims or death certificate.

Development of the diagnostic criteria was necessary because of the potential under-reporting of AIDS cases in the State's AIDS Reporting System (U.S. General Accounting Office, 1989) and because of potential problems in matching the AIDS Reporting System with the Medi-Cal files. The diagnostic criteria were further enhancements of an approach developed for an earlier study of Medicaid recipients with AIDS in California (Keyes, Andrews, and Pine, 1987; Andrews, Keyes, and Pine, 1988). The prior study included only adult males whose Medicaid eligibility group was "SSI (supplemental security income) disabled," but the present study identified AIDS patients of both sexes, all ages, and all Medicaid eligibility groups (e.g., SSI aged, Aid to Families with Dependent Children [AFDC] adults, and AFDC children). To develop the diagnostic criteria, we compared the diagnostic profile of recipients who were verified as having AIDS (based on their presence on the Medi-Cal AIDS Special Research File) with recipients who were not verified as having AIDS. Diagnostic codes and sets of codes that were associated with being a verified AIDS case were included in the criteria, and sets of codes having high false-positive rates were excluded. The development of the diagnostic criteria and the evaluation of their accuracy are described in more detail in Keyes, Andrews, and Mason (1991).

The diagnostic hierarchy used to classify the Medicaid recipients identified through the wide screen is shown in Table 1. Sixteen diagnostic categories, which consisted of individual diagnosis codes or combinations of codes, were used. Recipients were categorized into the highest diagnostic category in the hierarchy for which they qualified. For example, if a person had claims with the diagnosis code of 136.3 (pneumocystis carinii pneumonia, PCP) but had no claims with immune deficiency codes, code 173.x for Kaposi's sarcoma, or other selected diagnoses, that person was classified in category 10, that is, "136.3 only." In another example, if a person had claims containing codes 136.3 and 279.1 (for immune deficiency), that person was classified into category 2, as this is the highest category for which the person qualified. The process of categorizing cases into diagnostic groups used diagnoses from all claims from 1982 through 1986, as well as the diagnosis indicated as the cause of death. The diagnostic criteria were developed separately for six different demographic groups assumed to differ in their clinical manifestations and rates of HIV infection within the Medicaid population (i.e., disabled males 18-50 years of age, other males 18-50 years of age, males over age 50, females 18-50 years of age, females over age 50, and children under age 18). The diagnostic categories used to identify people with AIDS in each of the demographic groups is shown in Table 1.

After recipients with AIDS were identified, we determined a date of entry into the study for each recipient. We assumed that many Medicaid recipients with AIDS became eligible for Medicaid as a result of their disability caused by AIDS. In developing the date of entry, we wanted to include recipients with AIDS for the entire time they were receiving Medicaid benefits but

exclude any pre-AIDS experience for those people who were enrolled in Medicaid prior to their diagnosis of AIDS. Thus, we developed a decision rule based on an analysis of the date of Medicaid enrollment, the date of the first AIDS-related claim, and the date of diagnosis of AIDS as recorded in the AIDS registry (the AIDS Reporting System). In examining the data, we observed that many recipients who became Medicaid recipients at or after their diagnosis of AIDS did not have an AIDS-related claim for several months after their enrollment. To ensure that we captured the full Medicaid experience for these types of recipients, we included recipients in the study from their first month of Medicaid enrollment. If, however, the first month of Medicaid enrollment occurred more than 6 months before the first AIDS-related claim, entry into the study was assigned to the month of the first AIDS-related claim. This "6-month rule" was used to identify people who were enrolled in Medicaid prior to having AIDS and to exclude their pre-AIDS Medicaid experience from the data reported in this study. To determine the date of entry in the study we used Medicaid enrollment information from January 1982 through December 1986.

Table 2 shows the total number of recipients by year, identified by the criteria described earlier in this section. The total number of recipients with AIDS identified in each year rose from 217 in 1983 to 1,744 in 1986. The number of recipients more than doubled each year from 1983 through 1985, while the rate of increase from 1985 through 1986 was slightly lower (i.e., 1.7 times).

As stated previously, two groups of recipients were excluded from the study because the Medicaid files did not contain complete information on their utilization of services: (1) persons enrolled in Medicare and (2) persons enrolled in HMOs or other capitated plans. This latter group included all recipients from Santa Barbara and Monterey counties because these counties were operating capitation demonstration projects during the study period. Recipients whose care was funded entirely by the State (e.g., State general assistance recipients) were also excluded because they did not qualify for Medicaid enrollment. The number of recipients excluded for each of these reasons is shown in Table 2.

The study participants were classified into three groups: children under 18 years of age, adult females, and adult males. There were few children with AIDS covered by Medicaid in California—16 in 1986. The number of adult females (58 in 1986) was also small. The vast majority of recipients with AIDS were adult males. They comprised between 93 and 95 percent of the study population during each of the 4 years. The number of new adult male Medicaid recipients with AIDS each year is also shown in Table 2. New cases comprised 82 percent (134 of the 163 cases) of the adult male cases in 1983. By 1986, new cases comprised only 69 percent of the adult male recipients (i.e., 1,070 out of 1,554).

Results

Lifetime expenditures and utilization

In this section, we examine data on the lifetime Medicaid experiences of adult males with AIDS. Table 3 presents data for a cohort of adult male Medicaid

Table 1

Diagnostic selection criteria hierarchy for Medicaid AIDS study population, by demographic group and diagnosis category: California, 1983-86

Diagnosis category	Demographic groups					
	Disabled males, age 18-50 years	Non-disabled males, age 18-50 years	Males, over 50 years	Females, age 18-50 years	Females, over 50 years	Children under 18 years
1. ID + PCP + KS						
042.x - 044.x	x	x	x	x	—	—
279.1	x	x	x	x	—	—
279.x	x	x	x	x	—	—
2. ID + PCP						
042.x - 044.x	x	x	x	x	—	—
279.1	x	x	x	x	—	x
279.x	x	0	x	0	—	0
3. PCP + KS	x	0	—	—	—	0
4. ID + KS						
042.x - 044.x	x	x	x	x	x	—
279.1	x	x	x	x	x	—
279.x	x	0	0	0	0	0
5. PCP + selected diagnoses	x	0	0	0	—	0
6. KS + selected diagnoses	0	0	0	0	0	0
7. ID + selected diagnoses						
042.x	x	x	x	x	—	x
279.1 inpatient	x	x	x	x	x	0
279.1 outpatient	x	0	x	0	0	0
279.x	0	0	0	0	0	0
8. 043.x + selected diagnoses	0	0	0	0	0	0
9. 044.x + selected diagnoses	0	0	0	0	0	0
10. PCP only	x	0	0	0	0	0
11. KS only	0	0	0	0	0	0
12. 042.x or 279.x only						
042.x	x	x	x	x	x	x
279.1 inpatient	x	x	x	x	x	0
279.1 outpatient	0	0	0	0	0	0
279.x	0	0	0	0	0	0
13. 043.x or 044.x	0	0	0	0	0	0
14. Multiple selected diagnoses	0	0	0	0	0	0
15. Single selected diagnosis	0	0	0	0	0	0
16. One ID outpatient claim	0	0	0	0	0	0

NOTES: AIDS is acquired immunodeficiency syndrome. x = include. 0 = exclude. — = none in population. ID = Immune deficiency (042.x - 044.x or 279.x). KS = Kaposi's sarcoma (173.x). PCP = Pneumocystis carinii pneumonia (136.3). Selected diagnoses include any of the following:

Code	Description
003.1	Salmonella septicemia
007.2	Cryptosporidiosis
010.x - 018.99	Tuberculosis (all sites)
031.x	Diseases due to other mycobacteria
046.3	Progressive multifocal leukoencephalopathy
054.0 - 054.9	Herpes simplex (various sites)
078.5	Cytomegalovirus
112.0 - 112.9	Candidiasis (various sites)
114.x	Coccidiomycosis (various sites)
117.5	Cryptococcosis
127.2	Strongyloidiasis
130.0 - 130.9	Toxoplasmosis
200.00 - 200.08	Selected lymphomas
200.20 - 200.28	Selected lymphomas
421.x	Bacterial endocarditis
484.1	Pneumonia in cytomegalic inclusion disease
516.8	Lymphoid interstitial pneumonia

SOURCE: (Keyes, Andrews, and Mason, 1991).

recipients who entered the study in 1984. Their experiences while covered by Medicaid are examined through December 1986, the end of the study period. The 310 members of this cohort were enrolled for an average of 9.8 months, and 90.3 percent of them died by the end of the study period. Mean total expenditures for members of the cohort were \$22,644, and median expenditures were \$18,195.

Expenditures for hospitalization included \$19,483 for inpatient hospital care and \$791 for inpatient physician services (Table 4). Together, these hospital services accounted for 90 percent of the \$22,644 mean expenditure. A very high percentage of recipients used hospital, physician ambulatory, and outpatient department services: 87, 70, and 76 percent, respectively. More than one-third of the recipients used home health care services.

Table 2

Number of Medicaid recipients with AIDS, by year and type of recipient: California, 1983-86

Type of recipient	1983	1984	1985	1986
Total recipients	217	498	1,040	1,744
Recipients excluded	41	59	87	116
Medicare recipients	32	53	75	90
Recipients in HMOs or in counties with capitated programs	1	2	11	17
State-only program	8	4	1	9
Recipients included	176	439	953	1,628
Children	10	12	15	16
Adult females	3	18	34	58
Adult males	163	409	904	1,554
Adult males, first year covered by Medicaid with AIDS	134	1310	714	1,070

¹This is the group examined in the longitudinal analysis.

NOTES: AIDS is acquired immunodeficiency syndrome. HMO is health maintenance organization.

SOURCES: Health Care Financing Administration, Office of Research and Demonstrations: Data from the Medicaid Tape-to-Tape project; California Department of Health Services: Data from the Medi-Cal AIDS Special Research File (1981-88) and the California Death Certificate File (1982-87).

Table 3

Enrollment characteristics and Medicaid expenditures through December 1986 for adult male Medicaid recipients with AIDS entering study in 1984: California

Characteristic	Statistic	
Number of recipients	310	
Percent of recipients deceased through December 1986	90.3	
Medicaid expenditures		
Mean	\$22,644	
Median	18,195	
Standard deviation	21,672	
Per month enrolled	2,311	
Mean number of months enrolled	9.8	
Length of enrollment in months		
	Percent	Cumulative percent
1-3	24.5	24.5
4-6	20.6	45.1
7-9	17.4	62.5
10-12	11.9	74.4
13-18	10.0	84.4
19-24	6.5	90.9
25-30	5.8	96.7
30-36	3.2	100.0

NOTE: AIDS is acquired immunodeficiency syndrome.

SOURCES: Health Care Financing Administration, Office of Research and Demonstrations: Data from the Medicaid Tape-to-Tape project; California Department of Health Services: Data from the Medi-Cal AIDS Special Research File (1981-88) and the California Death Certificate File (1982-87).

The 1984 cohort had an average of 2.5 hospital admissions and 33 hospital days by the end of 1986 (Table 5). This cohort also had 10 physician visits in an ambulatory setting and 12 outpatient encounters per recipient.

Timing of Medicaid enrollment

People with AIDS enrolled in Medicaid vary by the stage of illness at which they become Medicaid enrollees. There are three key issues concerning the timing of

Table 4

Mean expenditures during study period¹ for adult male Medicaid recipients with AIDS entering study in 1984: California

Type of service	Expenditures per recipient	Percent of recipients using service
Total	\$22,644	100.0
Inpatient or institutional		
Hospital	19,483	87.4
Physician-inpatient ²	791	67.4
Nursing home ³	433	7.0
Ambulatory		
Physician	481	69.7
Outpatient department	778	76.1
Home health care	278	36.4
Prescription drugs	172	50.0
Laboratory	42	31.9
Transportation	36	25.8

¹Through December 1986.

²The physician inpatient services category includes only those services billed separately while the patient was hospitalized. Some patients may have received physician services from hospital staff and not been billed separately by these physicians.

³In 1984 some subacute care hospital days were classified in the Tape-to-Tape data base as nursing home days. In other years, these were classified as inpatient hospital days.

NOTE: AIDS is acquired immunodeficiency syndrome. Columns may not add to totals shown because certain services are not itemized.

SOURCES: Health Care Financing Administration, Office of Research and Demonstrations: Data from the Medicaid Tape-to-Tape project; California Department of Health Services: Data from the Medi-Cal AIDS Special Research File (1981-88) and the California Death Certificate File (1982-87).

Table 5

Utilization per recipient during study period¹ for adult male Medicaid recipients with AIDS entering study in 1984: California

Type of service	Utilization per recipient
Hospital admissions	2.5
Hospital days	33.4
Physician ambulatory visits	10.0
Outpatient department encounters	12.4

¹Through December 1986.

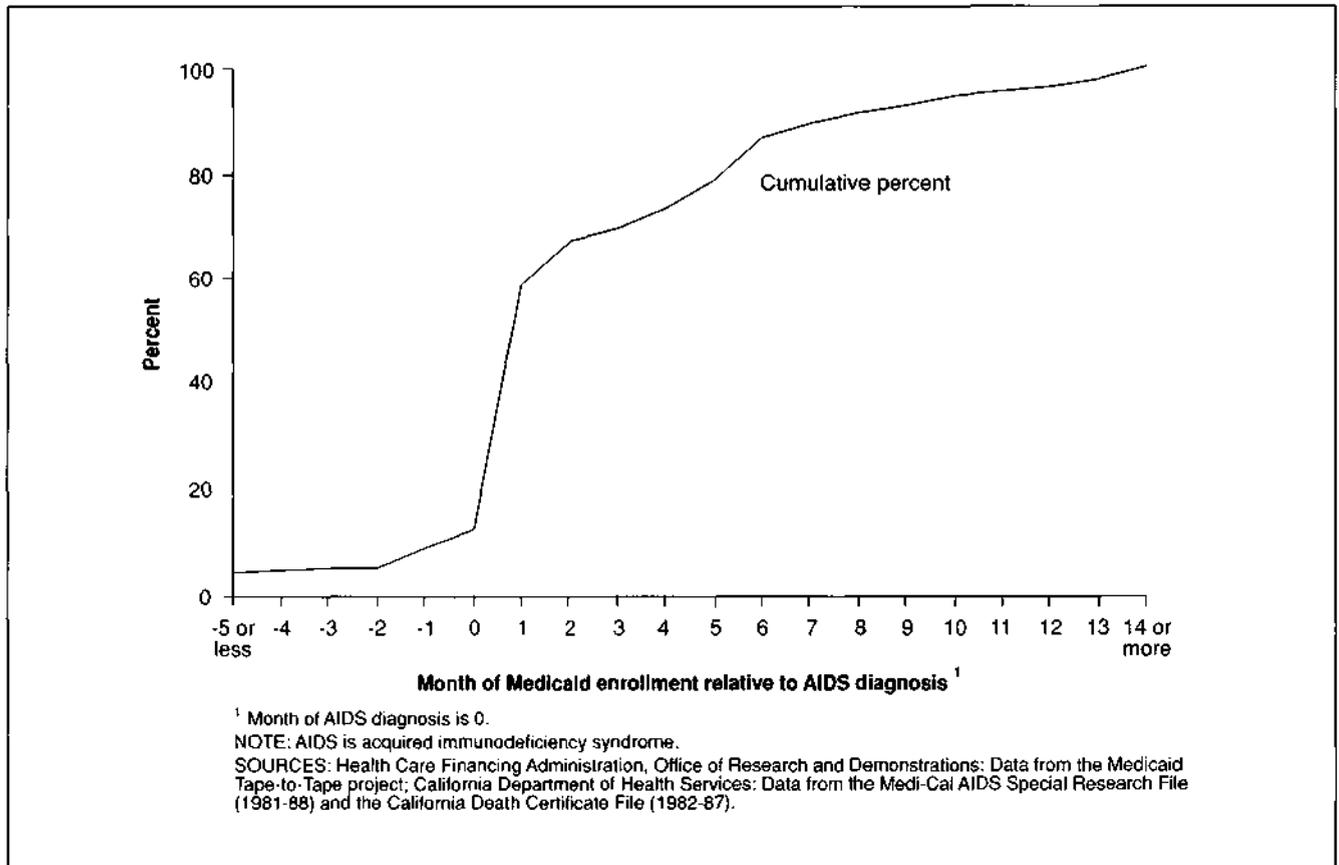
NOTE: AIDS is acquired immunodeficiency syndrome.

SOURCES: Health Care Financing Administration, Office of Research and Demonstrations: Data from the Medicaid Tape-to-Tape project; California Department of Health Services: Data from the Medi-Cal AIDS Special Research File (1981-88) and the California Death Certificate File (1982-87).

Medicaid enrollment that may affect Medicaid expenditures for a person with AIDS: (1) whether the person with AIDS was enrolled in Medicaid close to the time of AIDS diagnosis; (2) whether the person had any interruptions in enrollment; and (3) whether the person was enrolled in Medicaid at the time of death.

Figure 1 shows the month of Medicaid enrollment relative to the month of AIDS diagnosis for adult males entering the study in 1984. Only recipients with date-of-AIDS-diagnosis information available from the AIDS registry (217 of the 310 adult males who entered the study in 1984) are included in the figure. A negative number of months indicates that Medicaid enrollment

Figure 1
Month of Medicaid enrollment with AIDS relative to date of diagnosis for adult males entering study in 1984: California



occurred before AIDS diagnosis, whereas a positive number of months indicates that enrollment occurred after AIDS diagnosis. A zero indicates that the dates of diagnosis and enrollment occurred within the same month.

Based on these data, we found that the majority (59 percent) of Medicaid recipients with AIDS in California were enrolled in Medicaid within 1 month or earlier of their diagnosis date (i.e., they enrolled in the months before, the same month, or within 1 month after their diagnosis date). Although the data are not shown here, this pattern held true for cohorts of adult males enrolling in Medicaid in 1985 and 1986.

The impact of the timing of Medicaid enrollment on Medicaid expenditures is shown in Table 6. This table includes the same set of recipients as in Figure 1, adult males with AIDS entering the study in 1984 whose date of diagnosis was available from the AIDS registry. Data are presented for two groups based on when they were enrolled in Medicaid relative to their date of AIDS diagnosis: those whose Medicaid enrollment was concurrent with the date of their AIDS diagnosis (i.e., they were diagnosed with AIDS and began their enrollment either before or within 1 month of the diagnosis) and those who began their Medicaid enrollment more than 1 month after their date of diagnosis. Both groups were divided into three subpopulations: (1) those who died by the end of December 1986, were covered by Medicaid when they

died, and were continuously enrolled from the beginning of their coverage under Medicaid with AIDS; (2) those who died by the end of December 1986, were enrolled in Medicaid when they died, and had interrupted enrollment since the beginning of their coverage under Medicaid with AIDS; and (3) others who did not die by the end of December 1986 or who were not enrolled in Medicaid when they died.

The percentage of recipients in each of these groups, the mean number of months of survival with AIDS (determined by comparing the month of AIDS diagnosis with the month of death), the mean number of months enrolled in Medicaid with AIDS, and mean Medicaid expenditures through December 1986 are also shown in Table 6. There are three notable findings in the table.

First, recipients in Group 1, that is, those who were covered by Medicaid from diagnosis until death, had a much shorter survival time than all other groups. The shorter survival time suggests that members of this group were diagnosed relatively late, had a more severe form of the illness, or had less access to quality care than did those in the other groups. Second, the timing of Medicaid enrollment did not have a substantial effect on mean total expenditures for those recipients who were covered by Medicaid when they died. Those groups enrolled in Medicaid after their AIDS diagnosis (Groups 4, 5, and 6) had slightly lower average expenditures than did their counterparts who enrolled either before or within 1 month of the date of diagnosis. The mean total expenditures for

Table 6
Statistics for groups of adult male Medicaid recipients with AIDS entering the study in 1984,
by coincidence of Medicaid enrollment and AIDS diagnosis: California

Group	Percent of recipients (N = 217)	Mean survival in months	Mean Medicaid enrollment in months	Mean Medicaid expenditures	Medicaid expenditures per month enrolled
Medicaid enrollment concurrent with AIDS diagnosis¹					
1. Died while covered by Medicaid, had continuous enrollment	40.1	7.8	7.6	\$27,167	\$3,575
2. Died while covered by Medicaid, had interrupted enrollment	11.5	15.6	11.9	28,591	2,403
3. Others ²	6.9	(³)	17.7	15,254	862
Medicaid enrollment after AIDS diagnosis⁴					
4. Died while covered by Medicaid, had continuous enrollment	29.0	14.4	7.5	25,698	3,426
5. Died while covered by Medicaid, had interrupted enrollment	7.4	17.4	9.8	22,415	2,287
6. Others ²	5.1	(³)	11.7	11,369	972

¹AIDS diagnosis occurred 1 month before, the month of, or the month after the date of entry into the study.

²Those who did not die by December 31, 1986, whose date of death was not available, or who were not enrolled in Medicaid when they died.

³Mean survival time for this group was not available because date of death was unavailable for many of the recipients.

⁴AIDS diagnosis occurred more than 1 month before date of entry into the study.

NOTE: AIDS is acquired immunodeficiency syndrome.

SOURCES: Health Care Financing Administration, Office of Research and Demonstrations: Data from the Medicaid Tape-to-Tape project; California Department of Health Services: Data from the Medi-Cal AIDS Special Research File (1981-88) and the California Death Certificate File (1982-87).

the four groups of recipients that died (Group 1, 2, 4, and 5) differed by only 21 percent, comparing the highest group (\$28,591) with the lowest group (\$22,415). Finally, the two groups of people continuously enrolled (Groups 1 and 4) were similar in mean expenditures per month enrolled as were the two groups with interruptions (Groups 2 and 5). However, the continuously enrolled had higher monthly expenditures than did those with interruptions in enrollment.

Monthly trends in expenditures

This analysis focuses on the cohort of adult males with AIDS who died in 1986 and who were continuously enrolled for their entire time under Medicaid. It was necessary to exclude recipients with interruptions in enrollment because the data base did not include any information on their health care expenditures during the interruption. The group of continuously enrolled persons consisted of 573 of 704 adult males (81 percent) in the study who died in 1986. For this analysis, the date of death was identified for each recipient, and 30-day periods were constructed backward from the date of death. Total expenditures for services provided within each of the 30-day periods was computed for each recipient. The very first month of enrollment was not included in the analysis of monthly expenditures because few recipients were enrolled for the entire month; thus, expenditures for the first month did not represent a full 30-day period. Because recipients were enrolled in Medicaid for varying amounts of time, separate groups were defined by 1-month enrollment intervals (e.g., those who were enrolled 1 month, 2 months, 3 months). Recipients enrolled longer than 11 full months were combined into one group because there were too few recipients to place into 1-month interval groups. Data were analyzed separately for these groups. The data for

three of the groups examined—those enrolled for 4, 6, and 8 full months—are shown in Figure 2. These groups were selected for presentation because they typified three general patterns found in the data.

All groups had some period during the middle months of their enrollment during which monthly expenditures were lower than both their first month under Medicaid and the month before death. However, patterns varied somewhat among the groups, depending on the length of enrollment. There were three different patterns based on the relationship of the first month's expenditure to the last month's expenditure. For recipients enrolled for 4 months, mean expenditures in the first full month of enrollment were higher than in the last month of enrollment. The patterns for the groups enrolled less than 6 months (data not shown) were similar to this. For those enrolled for 6 months, mean expenditures in the first full month of enrollment and the last month were approximately the same, and the monthly trends most resembled the U-shape distribution other researchers describe. Those enrolled for 7 months (data not shown) also had this pattern. For those enrolled 8 months, the mean expenditures in the month before death were higher than they were in the first month of enrollment. This also typified the pattern for all groups enrolled for more than 8 months (data not shown).

Cross-sectional annual trends

Average annual Medicaid expenditures for adult males with AIDS declined from 1983 through 1986 (Table 7). Mean expenditures declined by 29 percent, from \$16,759 in 1983 to \$11,972 in 1986. At the same time, the drop in median total expenditures was more modest (11 percent), from \$9,922 in 1983 to \$8,861 in 1986. Expenditures per month enrolled declined at a rate similar to mean expenditures, from \$2,973 in 1983 to \$2,113 in 1986, a 29-percent change.

Figure 2

Mean monthly expenditures prior to death for adult male Medicaid recipients with AIDS who were continuously enrolled for 4, 6, and 8 months and who died in 1986: California

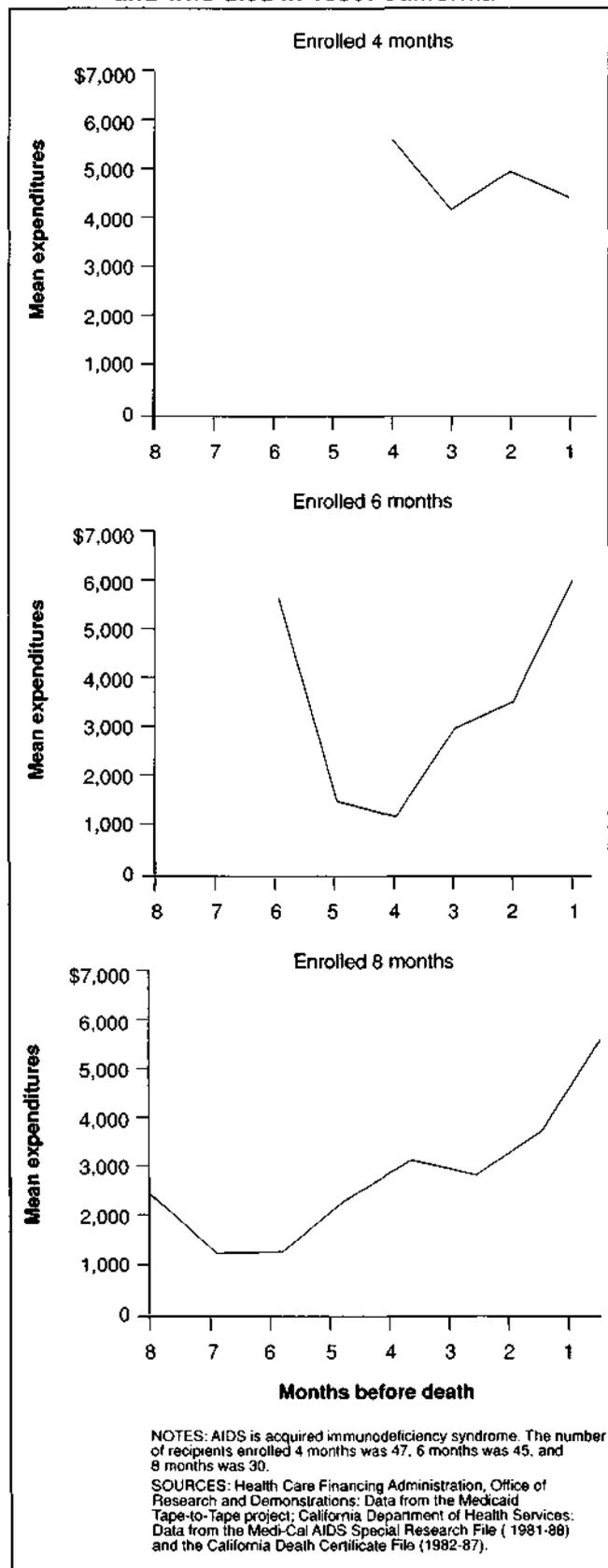


Table 7

Annual Medicaid expenditures for adult males with AIDS: California, 1983-86

Item	1983	1984	1985	1986
Number of recipients	163	409	904	1,554
Mean months enrolled in Medicaid during year	5.6	5.4	5.2	5.7
Percent mortality during year	27.6	41.6	38.7	45.3
Total Medicaid expenditures				
Mean	\$16,759	\$14,185	\$12,298	\$11,972
Median	9,922	8,854	8,561	8,861
Standard deviation	26,288	18,178	15,361	13,353
Per month enrolled	2,973	2,567	2,354	2,113
Mean adjusted to 1986 dollars ¹	20,517	16,015	13,064	11,972

¹The following components of the medical care consumer price index (MC-CPI) were used to inflate expenditures: MC-CPI hospital and related services for inpatient hospital services, MC-CPI physician services for physician services, MC-CPI prescription drugs for prescription drugs, and MC-CPI medical care services for all other services.

NOTE: AIDS is acquired immunodeficiency syndrome.

SOURCES: Health Care Financing Administration, Office of Research and Demonstrations: Data from the Medicaid Tape-to-Tape project; California Department of Health Services: Data from the Medi-Cal AIDS Special Research File (1981-88) and the California Death Certificate File (1982-87); U.S. Bureau of the Census: *Statistical Abstract of the United States, 1988*, 108th ed. Washington, U.S. Government Printing Office, 1988.

The primary reason for the decrease in expenditures was a decline in inpatient hospital expenditures (Table 8). Inpatient hospital expenditures declined by 34 percent during the study period, from \$15,024 in 1983 to \$9,915 in 1986. Inpatient hospital and inpatient physician expenditures, as a percent of total expenditures, dropped from about 93 percent to 86 percent during the study period. In contrast, mean expenditures for the majority (five of six) of ambulatory services shown in Table 8 increased during the study period. Home health care showed the largest percent increase in mean expenditures (more than 700 percent), from \$45 in 1983 to \$322 in 1986.

Annual utilization and expenditure rates for inpatient and ambulatory services are shown in Table 9. The 35-percent decrease in inpatient hospital expenditures from 1983 through 1986 was largely attributable to a decrease in the number of hospital days per recipient (from 23.5 in 1983 to 16.6 in 1986). The substantial drop in the number of hospital days is the result of a decrease in the average length of stay, from 14.0 to 11.4 days, rather than a decrease in number of admissions per recipient. Medicaid expenditures per day also decreased for the study group during this time period, from \$640 to \$599. The substantial decrease in expenditures per day from 1983 through 1984 was probably the result of the implementation of selective contracting in California, which was phased in during 1983 and 1984.

With the exception of physician visits, utilization of ambulatory services increased over time. The average number of outpatient department encounters rose from 5.7 to 7.9 from 1983 through 1986. The percent of recipients using home health care services more than doubled during the 4-year period, from 11.7 percent in 1983 to 28.7 percent by 1986. In contrast to these increases, the number of physician visits decreased from

10.4 in 1983 to 5.8 in 1984 and remained at about the same level through 1986. The decline in physician services and increase of outpatient department services indicates that there was a shift within the ambulatory setting of care from physician offices to care in the outpatient department.

Adult female and children patterns

Statistics for children, adult females, and adult males in the study in 1986 are shown in Table 10. Because the number of children in the study is so small, the data should be interpreted with caution. During 1986, children were enrolled in Medicaid for the longest period—8.8 months—while adult females were enrolled for an average of 6.8 months, and adult males 5.7 months. Approximately 19 percent of the children died during the year, compared with about 45 percent of the adult females and males. Children had by far the highest mean Medicaid expenditures (\$27,210), but their median expenditures were less than one-half as much (\$10,416), suggesting that there were some high outliers. The adult females had the highest median expenditure (\$15,481). For all expenditure rates provided, the adult males had the lowest rates in 1986.

Table 8
Mean annual Medicaid expenditures for adult males with AIDS, by year and type of service: California, 1983-86

Type of service	1983	1984	1985	1986
Total	\$16,759	\$14,185	\$12,298	\$11,972
Inpatient or Institutional				
Inpatient hospital	15,024	12,191	10,603	9,915
Physician-inpatient	546	480	449	439
Nursing home	83	1480	20	33
Ambulatory				
Physician	349	241	276	298
Outpatient department	492	519	458	538
Home health care	45	70	191	322
Prescription drugs	96	85	133	213
Laboratory	38	19	28	44
Transportation	18	28	31	38

¹The data for 1984 are unusually high because that year some subacute care hospital days were classified in the Tape-to-Tape data base as nursing home days. In other years, these were classified as inpatient hospital days.

NOTE: AIDS is acquired immunodeficiency syndrome. Columns may not add to totals shown because certain services are not itemized.

SOURCES: Health Care Financing Administration, Office of Research and Demonstrations: Data from the Medicaid Tape-to-Tape project; California Department of Health Services: Data from the Medi-Cal AIDS Special Research File (1981-88) and the California Death Certificate File (1982-87).

Table 9
Annual Medicaid inpatient and ambulatory utilization and expenditure rates for adult males with AIDS: California, 1983-86

Item	1983	1984	1985	1986
Inpatient or institutional				
Hospital:				
Percent of recipients using service	68.7	70.7	71.9	73.7
Days per recipient	23.5	21.1	18.3	16.6
Admissions per recipient	1.7	1.5	1.4	1.5
Days per stay	14.0	14.3	12.7	11.4
Medicaid payment per day	\$640	\$577	\$581	\$599
Charges per day	961	888	861	992
Nursing home:				
Percent of recipients using service	1.8	17.6	0.7	1.9
Ambulatory				
Physician:				
Percent of recipients using service	75.5	61.4	59.0	58.8
Visits per recipient	10.4	5.8	5.6	5.7
Medicaid payment per visit	\$22	\$24	\$27	\$28
Outpatient department:				
Percent of recipients using service	65.6	68.4	73.4	75.0
Encounters per recipient ²	5.7	6.9	6.8	7.9
Medicaid payment per encounter ²	\$86	\$75	\$67	\$68
Home health care:				
Percent of recipients using service	11.7	16.6	24.9	28.7
Prescription drugs:				
Percent of recipients using service	40.5	39.6	48.3	52.6
Laboratory:				
Percent of recipients using service	23.3	21.8	24.6	25.5
Transportation:				
Percent of recipients using service	9.8	15.4	14.6	18.1

¹The data for 1984 are unusually high because that year some subacute care hospital days were classified in the Tape-to-Tape data base as nursing home days. In other years, these were classified as inpatient hospital days.

²Encounters are any type of service from a provider on the same day.

NOTE: AIDS is acquired immunodeficiency syndrome.

SOURCES: Health Care Financing Administration, Office of Research and Demonstrations: Data from the Medicaid Tape-to-Tape project; California Department of Health Services: Data from the Medi-Cal AIDS Special Research File (1981-88) and the California Death Certificate File (1982-87).

Table 10
Comparison statistics of children, adult females,
and adult males with AIDS enrolled in
Medicaid: California, 1986

Statistic	Children	Adult female	Adult male
Number of recipients	16	58	1,554
Mean months enrolled in Medicaid during year	8.8	6.8	5.7
Percent mortality in 1986	18.8	44.8	45.3
Total Medicaid expenditures			
Mean	\$27,210	\$17,318	\$11,972
Median	10,416	15,481	8,861
Standard deviation	39,399	15,085	13,353
Per month enrolled	3,110	2,530	2,113
Hospital rates			
Percent of total expenditures	82.1	85.7	82.8
Days per recipient	28.8	24.7	16.6
Admissions per recipient	2.4	1.9	1.4
Days per stay	11.8	13.2	11.4

NOTE: AIDS is acquired immunodeficiency syndrome.

SOURCES: Health Care Financing Administration, Office of Research and Demonstrations: Data from the Medicaid Tape-to-Tape project; California Department of Health Services: Data from the Medi-Cal AIDS Special Research File (1981-88) and the California Death Certificate File (1982-87).

Hospital expenditures accounted for a similar proportion of total Medicaid expenditures for all three groups—82-85 percent. Children and adult females had considerably more hospital days per recipient, 28.8 and 24.7, respectively, than the adult males (16.6 days). The difference can largely be attributed to the higher number of admissions per recipient, with children having 2.4 admissions, adult females 1.9 admissions, and adult males 1.4 admissions. Children and adult males had similar lengths of stay, 11.8 and 11.4 days, respectively, while adult females had slightly longer lengths of stay (13.2 days).

Discussion

This study provided longitudinal data on Medicaid use and expenditures for adult males with AIDS in California. An important finding was that the timing of Medicaid enrollment (i.e., whether enrollment was at or after AIDS diagnosis or whether enrollment was interrupted) did not substantially affect total expenditures. Given that a recipient was enrolled in Medicaid when he died, the difference in total expenditures resulting from the timing of Medicaid enrollment was less than 22 percent between the highest cost group (\$28,600) and the lowest (\$22,400). This is probably because, as our findings on monthly trends indicated, the highest expenditures generally occurred in the 1 or 2 months prior to death, during which all four groups were enrolled in Medicaid. Unpublished data from another study of California Medicaid recipients with AIDS indicated that those who had interruptions averaged less than 3 months of interrupted enrollment (Ellwood, 1991). It seems reasonable to assume that these recipients had some short periods when they were without major medical care expenses and that they probably re-enrolled to cover

costly health services (hospitalizations) by "spending down" to Medicaid eligibility levels.

Another notable finding from this study is that nearly two-thirds of the adult male Medicaid recipients with AIDS in California were enrolled within a month of AIDS diagnosis based on the date reported in the registry. This percentage may be higher than expected by some AIDS researchers and policymakers for a State like California, in which the homosexual male risk group predominates the AIDS population. There is a prevalent assumption by AIDS researchers and policymakers that most homosexual males with AIDS have stable work histories and private insurance before developing AIDS and that those who become Medicaid recipients enroll in the program at some point later in their illness, after losing jobs and health insurance and spending down their assets (Pascal, 1987). This is in contrast to IVDUs, adult females and children with AIDS, who are often assumed to be poorer than homosexual males prior to their AIDS diagnosis (Arno and Hughes, 1987; Bartlett, 1990; Health Services and Resources Administration, 1988), therefore immediately meeting the income criteria for Medicaid enrollment. Although the majority of those in the homosexual male risk group may have higher incomes than those in other risk groups, our findings suggest that some of these males were poor and without private insurance at the time of their AIDS diagnosis and immediately became Medicaid enrollees. These recipients made up the majority of the adult males with AIDS covered by Medicaid in California in the 1980s.

Requirements for continuation of health insurance coverage under the Consolidated Omnibus Budget Reconciliation Act of 1985, which became fully implemented after the study period, may affect whether the dates of AIDS diagnosis and Medicaid enrollment continue to frequently coincide. This act provides for additional months (18 months, expanded by the Omnibus Budget Reconciliation Act of 1990 for recipients of Social Security disability to 29 months) of health care insurance coverage for workers (in firms of 20 employees or more) who pay their premiums after they leave their jobs. With this additional period of coverage, people with AIDS may be able to delay entry into Medicaid until sometime after diagnosis more often than was the case during the period of the study.

On the other hand, the short period between date of diagnosis and date of Medicaid enrollment found in this study may be attributable to a data artifact. For example, the reported date of AIDS diagnosis may be later than the actual date of diagnosis, if physicians were reluctant to report AIDS cases out of concern for patients' privacy. It is possible that the process of verifying patients' AIDS diagnoses for the Medicaid program may have also prompted some physicians who avoid reporting AIDS cases because of concerns about privacy to report cases to the AIDS registry, because patient privacy was already compromised through the certification for Medicaid.

It is also possible that the finding represents late diagnosis of AIDS, i.e., the onset of symptoms could have occurred several months before the date of diagnosis. This may be especially true for the group that was continuously enrolled from diagnosis until death, because this group had one-half the survival time of other groups examined in Table 6. Prior to Medicaid

enrollment, this group may have lacked access to the health care required for an earlier diagnosis. The only data reported on late diagnosis are those from the Centers for Disease Control, indicating that 13 percent of reported AIDS cases end in death in the same month as diagnosis (U.S. Government Accounting Office, 1989). Our findings suggest that future research should examine the circumstances surrounding late diagnosis of AIDS and its relationship to access to care and survival time.

Our analysis of annual service use and expenditure rates showed the initial trend in care shifting from inpatient to outpatient services for adult males with AIDS in the mid-1980s. From 1983 through 1986, the number of hospital days declined by 30 percent, primarily because of a decrease in the average length of stay rather than a decrease in admissions. At the same time, hospital outpatient department encounters increased about 20 percent, and the proportion of people receiving home health care services more than doubled. Data from other sources (e.g., New York State Department of Health, 1988) suggest that the decline in hospital use per person with AIDS is not unique to Medicaid patients nor to California and that hospital use will continue to decline beyond the 1986 time period examined here. Use of community-based services will likely increase after the time period of this study as a result of the Medicaid Home and Community-Based Waiver for AIDS that California implemented in January 1989. In addition, community-based models of care for AIDS had not been as thoroughly adopted outside of San Francisco prior to 1986. Los Angeles and other areas within the State have begun to adopt the types of community-based service systems for AIDS developed in San Francisco and have supplemented Medicaid payment for home health care with volunteer labor and Federal, State, and local funding (Andrews, Welch, and Howell, 1989; Keyes, Andrews, and Howell, 1989; Sundwall and Bailey, 1988).

Although our data showed that expenditures for prescription drugs increased over the study period, these expenditures accounted for only about 2 percent of total expenditures. After the study period, there was the introduction and widespread use of azidothymidine (AZT), which has a lifetime estimated cost of \$2,250 (Hellinger, 1990). Consequently, it is likely that Medicaid expenditures for drugs began to rise dramatically after the study period.

Advances in clinical treatment have affected the length of survival with AIDS. Survival has increased for those diagnosed with AIDS after 1985 compared with those diagnosed before 1985, particularly those with pneumocystis carinii pneumonia. This is presumed to be the result of earlier diagnosis and better treatment, such as aerosolized pentamidine and AZT (Harris, 1990; Lemp et al., 1990). The widespread expectation is that survival time will continue to increase with the development and increased availability of drug treatment. Increased survival times of persons with AIDS will undoubtedly impact the Medicaid program in several ways. With increasing longevity, more Medicaid enrollees with AIDS will live to satisfy the 2-year waiting period needed for Medicare eligibility for the disabled. This may shift substantial costs for hospitalization at the end of life from Medicaid to Medicare. Future changes in

the proportion of recipients who are dually enrolled in Medicaid and Medicare will warrant a focused analysis of this subpopulation and its impact on both programs.

In addition, better prognosis could increase overall health care costs because there would be more optimism for entering into aggressive treatment, such as use of intensive care units (Scitovsky, 1989). If this were to happen, the impact on Medicaid would depend on the hospital payment system. In California, with its selective contracting per diem method of payment, increases in the intensity of services would not impact costs to Medicaid, although additional hospital days would. However, increased intensity of services would exacerbate the loss from treating AIDS patients already reported by hospitals (e.g., Andrulis, Weslowski, and Gage, 1989).

It is important to continue monitoring health care costs of people with AIDS and the impact on Medicaid that will stem from the changes occurring in treatment and survival trends. In addition, given that adult females and children are an increasing proportion of the AIDS population and that our findings suggest that their Medicaid use and costs differ from those of adult males, future studies should examine how these subpopulations affect overall Medicaid expenditures and utilization for AIDS.

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