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Duration of Medicaid AIDS Hospitalizations—Variation by Season, Stage, and Year

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ABSTRACT

Using New York State Medicaid data from 1984 to 1987, we analyzed hospital length-of-stay patterns for acquired immunodeficiency syndrome (AIDS) patients. We found an overall decline in monthly average length of stay, with seasonal fluctuations producing longer stays in the fall and winter months. These findings suggest that hospital utilization for AIDS patients is changing over time and may vary by season. (*Am J Public Health.* 1992;82:578-580)

Introduction

Over the past decade, hospitals in several regions of the country have been heavily burdened by the dramatic rise in the number of acquired immunodeficiency syndrome (AIDS) patients.[1,2] Inpatient care is one of the most expensive components of the cost of AIDS,[3-5] and hospitals in New York State have one of the longest average lengths of stay for AIDS care in the country.[2,6,7] Information on patterns of AIDS hospitalizations is needed to assist hospital planners in meeting the needs of this special population. In this study, we analyzed length-of-stay patterns for New York State Medicaid AIDS hospitalizations to examine temporal patterns and changes in hospital length of stay.

Methods

We examined hospital claims for New York State Medicaid AIDS cases over 35 months, from October 1984 through August 1987. Using a methodology tested elsewhere,[8] we identified a hospital stay as an AIDS admission if one of the following ICD-9-CM codes was recorded: *Pneumocystis carinii* pneumonia (136.3), selected immunodeficiency codes (279.10 and 279.19), or the AIDS codes (042.xx or 043.xx).

The study population comprised AIDS patients aged 15 to 65 years who were hospitalized for nonobstetric reasons. Two classes of outliers were deleted from the sample: patient admissions with stays of more than 66 days (less than 5% of the patients) and those with more than eight inpatient stays over the 35-month period (1.5% of the patients). The study sample consisted of 11 482 patient admissions; males constituted approximately three fourths of the sample. Eighty-two percent of the sample was 26 to 45 years of age at the time of hospitalization.

To adjust for differences in case mix, we determined the severity of each case, using the Staging Classification for AIDS Hospitalizations.[9,10] This AIDS staging system can be summarized into three integer stages, with stage 3 indicating the most severe cases. Stage 4 is used in some analyses to distinguish patients who died in the hospital.

Length of stay was analyzed as an average per month, calculated as the av-

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erage length of a hospital stay for all patients admitted in the same calendar month. We observed patterns in length of stay by plotting 3-month moving averages, a useful smoothing technique to reduce the short-term fluctuations in time-series data.[11] To compute 3-month moving averages, we determined the average length of stay for all patients admitted from October 1984 through December 1984, then determined the 3-month average for November 1984 through January 1985, and so on. Moving averages were used only in plotting to assist in visual analysis of trends.

To assess the influence of stage, year, and season, we used multiple linear regression to model monthly variation in hospital stays across the total population. The sample size for this analysis equaled 140 "stage-months" of observation (35 months of utilization and discharge data, classified into four stages). For example, the average length of stay for all Stage 1 patients admitted in the first month of the study is one of the 140 observations. Natural logarithms were used to transform average length of stay per month to produce a more normal distribution of the dependent variable.

Results

Figure 1 displays two trends in monthly average length of stay for New York Medicaid AIDS cases: (1) an overall downward trend ($r = -.62$, $P < .001$) and (2) a periodic trend, with longer stays in the fall and winter months. The longest average length of stay was 21.2 days, in October 1984 (month 1 of the study); the shortest was 13.8 days, in August 1987 (month 35). For each of the federal fiscal years (FFYs) of the study, the average length of stay for the month of January was compared with the average length of stay for the month of June; length of stay was longer in January by 2.8 days in FFY 1985, 1.1 days in FFY 1986, and 2.4 days in FFY 1987. The periodic trend in monthly average length of stay remained after patients who died in the hospital were removed from the analysis.

Overall, the average length of stay was 13.0, 19.2, and 20.3 days for patients in stages 1, 2, and 3, respectively. Average length of stay by fiscal year was 17.5 days in FFY 1985, 16.4 days in FFY 1986, and 15.9 days in FFY 1987. The regression analyses shown in Table 1 indicate that stage, year, and season explained 76% of the variance in monthly length-of-stay patterns ($F = 50.5$, $P < .001$). Cases classified in stages 2 and 3 had stays that were 58% longer than the stays of cases in stage 1 ($P < .001$), and hospital stays were on average 7% longer ($P < .05$) in fall and winter months than in summer months. After adjustments were made for stage and fiscal year, hospital stays declined by approximately 6% in FFY 1986 and 11% in FFY 1987 as compared with FFY 1985 ($P < .001$). These numbers represent approximately a 1-day decline in hospital length of stay per year.

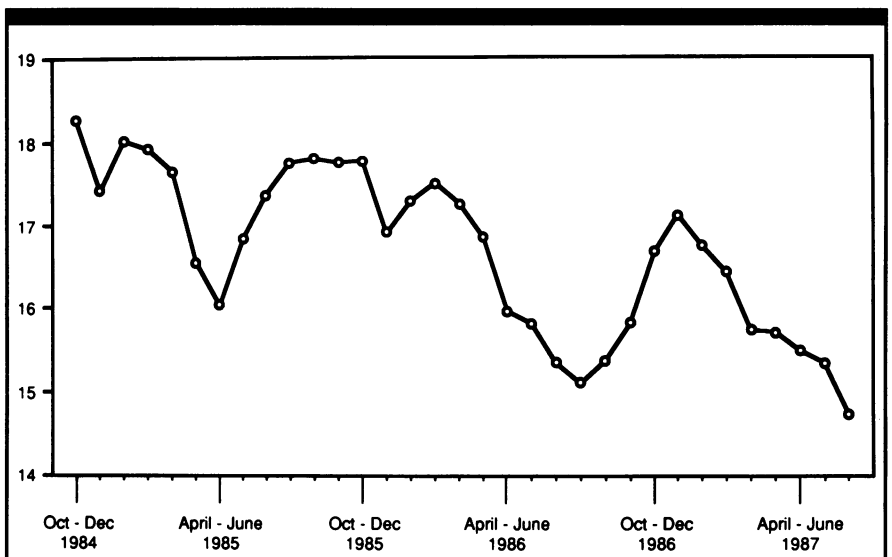

FIGURE 1—Three-month moving average length of stay (days) for New York State AIDS patient admissions from October 1984 through August 1987.

Discussion

Our analyses indicate that length of hospital stay for Medicaid AIDS patients in New York State has declined in recent years, but that average length of stay per month varies depending upon the season of the year and the case mix of the population. Although the effect of season was not large after adjustments were made for severity of illness, seasonal variation in hospital utilization for AIDS patients needs to be explored further. AIDS patients are susceptible to conditions such as respiratory infections, for which prevalence rates and case fatality rates are known to peak in the winter months.[12–14] Other explanations, independent of clinical issues such as availability of nursing home beds, may contribute to seasonal fluctuations in the demand for hospital care. There have been reports on seasonal variations in hospital crowding in New York City in recent times,[15] and the influence of AIDS care in these seasonal hospital occupancy problems should be explored.

This study does not address reasons for the declining length of stay; however, the trend probably reflects improvements in clinical diagnosis and treatments, as well as improved outpatient care. A similar decline in length of hospital stay for a sample of AIDS patients in Massachusetts was recently reported.[16] In addition, data from the National Hospital Discharge Survey for all types of hospitalized patients discharged from short-stay hospitals in the United States indicate an overall decline in recent years in the average length of stay.[17] This national downward trend in length of stay across all diagnosis groups, which is often attributed to prospective payment systems, may also influence the hospital stay patterns for AIDS cases. However, per-case payment for New York Medicaid hospitalizations was not instituted until 1988, after the time of the study.

It should be noted that the observed decline in length-of-stay patterns may not be uniform across all hospitals in New York State. Our analysis focused on monthly variation in length-of-stay patterns and not on length-of-stay patterns within individual hospitals. In addition, our sample was restricted to Medicaid AIDS patients, and it is not clear whether these trends hold for patients not covered by Medicaid. In recent studies of hospital services for AIDS patients, Medicaid was found to be the most frequent payer of AIDS inpatient care.[16,18] Moreover, the number of AIDS patients enrolled in Medicaid is on the rise.[19–21]. As a result, patterns of inpatient care for Medicaid AIDS

TABLE 1—Regression Model of Monthly Log Average Length of Stay (October 1984 through August 1987)

Variable	Coefficient	Standard Error	*P* Value
Stage 2	0.46	.028	<.001
Stage 3	0.46	.028	<.001
Stage 4	0.40	.028	<.001
FFY 1986	−0.07	.024	<.001
FFY 1987	−0.12	.025	<.001
Fall	0.07	.029	.01
Winter	0.07	.028	.02
Spring	0.02	.029	.43
Intercept	2.55	.030	<.001

Note. The sample size for this analysis equaled 140 "stage-months" of observation (35 months of utilization and discharge data, classified into four stages). The reference groups were Stage 1 (the least severe cases), the summer season (June, July, and August), and federal fiscal year (FFY) 1985. $R^2 = .76$; Adj. $R^2 = .74$; $F = 50.5$, $P < .001$.

cases can influence the availability of hospital care for all types of patients. □

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